The Hong Kong Polytechnic University
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Technological Development of Hong Kong Textile and Clothing Industry: A 'Technometric' Approach

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Certificate of Originality

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Ho Kai Chiu

Abstract

Hong Kong textile and clothing industry (HKTCI) has evolved from a low-cost supplier into a world-class textile and fashion centre. In order to facilitate future industrial development and competitiveness of the textile and clothing (TC) manufacturing industry, Hong Kong Special Administrative Region (HKSAR) Government has adopted a policy of industrial support for the industry. The objective of this study is to develop a 'Technometric' model for measuring the technology development of HKTCI using 3 'Technometric' performance attributes, i.e., 'product', 'process' and 'service', and to apply the model to evaluate the technological development of the industry and analyse the relationship between the technological performance levels of the industry and the change of Hong Kong's industrial policy. The objective is achieved through the following steps:

Firstly, a mathematical model of the 'Technometric' model was developed for quantitative description of the technological development in an industry on the basis of the 'Technometric' approach developed for measuring the technology strategy of a firm at the micro-micro level through 'Technometric' feature-by-feature comparison of individual products in a dynamic perspective.

Secondly, the design and development of the theoretical framework – ‘Technometric’ performance attributes were developed for measuring technological change of the TC industry. 5 key indicators, i.e., ‘productivity’, ‘quality’, ‘flexibility’, ‘skill’ and ‘innovation’ as well as their input and output parameters were identified in the 3 ‘Technometric’ performance attributes, i.e., ‘product’, ‘process’ and ‘service’, together with the external factors affecting the technological development of HKTCI through critical analysis of related literatures.

Thirdly, an instrument was developed to measure the technological development of the TC industry and pilot test was conducted to determine the significance and relationship of 5 key indicators and the 3 ‘Technometric’ performance attributes in measuring the technological development of the TC industry. The instrument was validated through the pilot test and reliability test to measure the internal consistency of each ‘Technometric’ performance attributes. The instrument was finalized as an enhanced ‘Technometric’ model for measuring the technological development of the industry.

Fourthly, an enhanced ‘Technometric’ model was applied to evaluate the levels of technological development of HKTCI by analyzing the results of industrial survey using the instrument developed. The evolution and implementation of Hong Kong Government industrial policies were reviewed over the past 30 years for the purpose comparing with the technological developments measured by the enhanced ‘Technometric’ model. It was found that the measured results of the ‘Technometric’ model had matched with the changing pattern of the Government’s policy in the domain field, implying that the ‘Technometric’ model could effectively measure the performance of technological development of HKTCI.

Then, the ‘Technometric’ indices for all the indicators were calculated for each of 30 Hong Kong TC companies, from which the overall ‘Technometric’ indices for the 5 key indicators (i.e., ‘productivity’, ‘quality’, ‘flexibility’, ‘skill’ and ‘innovation’) were defined and computed by aggregating the indices of individual indicators in each category respectively. Statistical analyses were conducted on the 5 overall key indicators indices to study the technological development of HKTCI in the last 3 decades in relation to company background, business profile and relevant Government’s industrial policy. The 5 sets of overall key indicators indices were influenced by time period and company background, i.e., business nature, year of establishment, number of staff and profile. All overall output indices of 5 key indicators, which indicate the technological development levels in the 5 areas, increased steadily in the last 3 decades in the 3 ‘Technometric’ attributes, i.e., ‘product’, ‘process’ and ‘service’. It was also identified that the Government’s industrial policies could have significant influences on the technological developments in all the 5 key areas.

Finally, the development patterns of the overall output indices of the 5 key indicators were analyzed for the 3 ‘Technometric’ performance attributes separately. The Overall Technology Development Index was defined as the indicator to measure the overall technological development of HKTCI. Relationships of this index with company business nature, size and time periods were analyzed in relation to the evolution and implementation of Government’s industrial policies. It was found that Government’s industrial policies played important roles in directing and stimulating the technological developments in HKTCI in the last 3 decades, which contributed significantly to the competitiveness of the industry as shown in the steady increase in total export in the last 3 decades from HKTCI.

Therefore, it was concluded that it is critical for Hong Kong Government to pay special attention to develop and implement more constituents of ‘Technology Policy’ in order to achieve sustainable competitiveness of HKTCI.

Publication

Papers

1. Ho, K.C., Hui, P., Tao, X.M., and Yeung, K.W., (2003), 'Measuring the Technological Development of the Textiles and Clothing Industry in Hong Kong', Int. J. Services Technology and Management, Vol. 4, No.3, pp.255-286.

2. Ho, K.C., Hui, P., Tao, X.M., and Yeung, K.W.., (2004), 'Measuring the Technological Development of the Textiles and Clothing Industry in Hong Kong, Italy and US : Using 'Technometric' Approach', Int. J. Services Technology and Management, Vol. 5, No.1, pp.56-89.

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Chapter 1 Introduction

1.1 Background of the Study

Hong Kong's textile and clothing industry (HKTCI) has undergone great changes since the 1940s. In the last 60 years, Hong Kong evolved from a low-cost textiles and apparel supplier into a world-class textile and fashion centre providing one-stop services ranging from design and manufacturing to marketing and retailing. HKTCI is also a mainstay of Hong Kong's manufacturing sector, being the largest with regard to gross output, employment and domestic exports. With a total of 2,625 manufacturing companies (1,468 textiles manufacturing companies and 1,157 clothing manufacturing companies), it was the largest manufacturing employer in Hong Kong in 2003, hiring 42,803 workers or 25.43% of the total manufacturing workforce. The industry is one of Hong Kong's major export earners, accounting for 57.34% of total domestic exports in 2003 [1].

However, the competitiveness of HKTCI is severely threatened by suppliers in East Europe, Asian countries and Mainland China due to their low manufacturing costs, and plentiful supply of land, labour and raw materials. Most of the Textile and Clothing (TC) manufacturers have already shifted their production bases to countries where the production costs are lower. The difficulties associated with recruiting new operators to maintain the workforce in Hong Kong have affected the continuity of skill and technical know-how from one generation to another. The domestic exports of HKTCI have been declining whereas its re-exports have been booming in this decade. Faced with worldwide competition, removal of quota in 2005, trade globalization and Mainland China's accession to the World Trade Organization (WTO), HKTCI needs to identify a new strategy to develop sustainable competitiveness. Technological development is one of the potential strategies to achieve sustainable competitiveness. Therefore, it was necessary to study the technological development of HKTCI in the last few decades in relation to the change of Hong Kong Government (the Government)'s policy. This, it was considered, would help to find out whether the Government's industrial policy would have significant impact on the technological change of HKTCI and provide measures to improve the technological development of the industry for the sake of maintaining the competitiveness of HKTCI.

1.2 Relationship between technological development of the industry and the Government's policy

Hong Kong is a free market economy. The Government's industrial policy for the TC industry, as well as other industries, is to facilitate, within the framework of a free market, the further development of TC manufacturing and its manufacturing-related industries in Hong Kong [2]. Since 1983, the Government has commissioned techno-economic and market research studies on HKTCI on a regular basis. The purpose of the study is to identity the characteristics and market opportunities of an industry sector, the determinants of and the constraints upon its growth, the adequacy of manpower training, capital infrastructure, industrial support facilities and technical back-up services, and to make recommendations for removing the constraints for the industry's growth and development [3]. Some recommendations from the above-noted studies were accepted by the Government to improve the technological development of HKTCI. For example, Kurt Salmon Associates consultancy, commissioned by the Government for the 1995 Techno-economic and Market Research Study on HKTCI, advised that Centres of Excellence be established in the softgoods industry to enhance Hong Kong's position as a knowledge leader. Furthermore, consultants from the Massachusetts Institute of Technology (MIT), invited by the Government and private sector to study the Hong Kong manufacturing industries, including the TC sector, in 1997, commented that HKTCI should shift towards high value-added manufacturing, upgrade clothing products and manufacturing processes and improve existing technologies by promoting new technology-based enterprises in order to generate new materials, utilize information technology, apply new sample-making technologies and create own brand name products [4]. In response to the recommendations of two external consultants on the technological development of HKTCI, the Chief Executive of the Government, in his first Policy Address on 8 October 1997 emphasized the necessity for HKTCI to move on to high value-added and high technology production, in order to sustain the competitiveness and prosperity of Hong Kong. Having taken into consideration the recommendations of the Chief Executive's Commission on Innovation and Technology, the Chief Executive set forth a vision of making Hong Kong a world-class design and fashion centre [5].

Over the years, Hong Kong has evolved from a low-cost apparel supplier into a world class fashion centre, providing one-stop services ranging from design and manufacturing to marketing and retailing. In terms of total exports, Hong Kong was the world's second largest textile as well as clothing exporter in 1998 [6]. The TC industry has remained globally competitive through the use of capital-intensive and technologically advanced machinery, and computer and information technologies, such as computer-aided design and computer-aided manufacturing. Hong Kong is also the forerunner in applying state-of-art computing technology for 3 dimensional simulation for garment pattern design and fitting [6].

1.2.1 High value-added manufacturing

Zhou [7] pointed out that in view of the lower value-added manufacturing of Hong Kong's clothing industry (US$5.11/sq.m.), as compared with the French counterpart (US$20.42/sq.m.) in 1998, it was apparent that there was much room for HKTCI to improve further on value-added manufacturing in terms of design and manufacturing technology. Media reports suggest that Paris itself has been replaced as the world leading fashion centre by Milan because of the latter's technological know-how and facilities to back up the design operation [8]. It is clear that HKTCI needs to enhance its technology further in order to support the proposed fashion centre and to sustain a leading position in the world.

1.2.2 Technological development of HKTCI

The Government plays a crucial role in leading HKTCI in the 21st century. In his 'Diamond' Model, Porter has suggested that governments must set the appropriate goal for productivity, which underpins economic prosperity [9]. It must strive for determinants, such as incentive, effort, and competition, not the usually counterproductive options such as subsidies, extensive collaboration, and ‘temporary’ protection that are often proposed. A government’s proper role is to push and challenge its industry to advance, not provide ‘help’ so that the industry can avoid it.

The proper role of the government’s policy for a nation’s industry is to stimulate such dynamism and upgrading. The government’s aim should be to create an environment in which firms can upgrade competitive advantages in established industries by introducing more sophisticated technology and methods and penetrating more advanced segments. Government policy should also support the ability of the region’s firms to enter new industries where greater productivity can be achieved than in older, less productive industries and segments.

1.3 Measuring technological development in the industry

While conducting the literature review, many reports of research findings relevant to technological development of the TC industry, including Hong Kong’s counterpart, were found. However, few of them have developed any utilities or models in measuring the technological development of HKTCI in respect to the impact of industrial policy implemented by the government.

1.3.1 Definition of 'Technology'

The definition of technology generally covers the whole spectrum of technological knowledge, although this has never really encompassed the process of technology diffusion or indeed the supply and consumption of technology [10]. Levy [11] defines technology as the assembly of hardware and software means and tools used by human beings to achieve socioeconomic goals. He further defines high technology as referring to a branch of technology based on exploitation of science and applied research for the development of innovative products. Today high technology encompasses a much wider spectrum of industrial and business activities, including biotechnology, aerospace, communication, information technology, software, material technology, and others [11].

Sharif [12] states that technology plays a key part in the sustainable development of an industry. Technology, in various forms, has been, and continues to be, the means for the enhancement of the physical and mental capabilities of human beings, at individual as well as collective levels. All countries, including the least-developed ones, have the potential to benefit from a carefully managed strategy of specialization based on the principle of ‘buy some and make some’ technologies where ‘buy some’ refers to technologies imported from other countries, and ‘make some’ refers to those that are indigenously generated. Sharif [12] further stipulates that vast amounts of natural resources and cheap labour are no longer a prerequisite for an industry to compete in the global business arena. With production factors no longer being immobile, any kind of enterprise activity can now be located anywhere. However, this international economic competition is nowadays fought on the basis of acquired technological competencies, rather than locally available factor cost advantage. Thus, technology has emerged as a key resource of great importance for sustaining corporate profitability and economic growth of a country [13]. In this regard, it was necessary to evaluate the level of technological development of HKTCI and to find out whether it was lagging behind its major competitors.

Porter highlights the importance of technology development to sustain the firm’s competitiveness. The value-chain approach, developed by Porter, identifies the links between activities and the value of them within a firm or an industry - ‘value’ in this case being assessed from the viewpoint of the customer of the organization.

Attention is then focused on the competitive advantage gained from the way firms organize and perform activities. The value chain comprises of primary and support activities. One of the support activities is technology development which provides technical support and services to primary activities, i.e., inbound logistic, operations, outbound logistics, marketing, and sales and service [9].

1.3.2 Related work for measuring the technological development of the TC industry

To evaluate the technological level of the TC industry in Hong Kong compared with other countries such as developing countries and developed countries, Keijiro Ostuka [14] used labour productivity as a measure of the level of technological development. Ostuka's measure was also applied to the clothing industry. Countries for comparison were the USA, Italy, France, the UK, Taiwan, Korea, Thailand, Malaysia and Indonesia. Determining the technological level of Hong Kong's clothing industry compared to these competitors would give an indication of the need for technology development. Following this, there was a need to identify what kinds of technologies would benefit HKTCI in order to sustain its world competitive position [15].

In the literature review, it was found that the Organization for Economic Co-operation and Development (OECD) in 1998 [16] had already identified the key technological indicators for country comparison. They were namely, productivity, quality, flexibility, skill and innovation. Arthur Andersen & Company conducted an international benchmarking survey for Australia's textiles, clothing and footwear industries (TCFI) - the Best Practice 2000 [15]. In this study, over 1,400 companies involved in textiles, clothing and footwear industries in Australia were invited to participate. More than 80 world-leading companies were approached in the USA, Europe and East Asia to act as benchmarking partners. Arthur Andersen & Company produced a list of performance measures in which some successful factors (parameters pertinent to key indicators of technological development of HKTCI) were covered.

The literature cited above demonstrates the key indicators for measuring the technological development of HKTCI. However, the researchers cited have neither built up any models nor tools to measure the technological development of the HKTCI in relation to the change of the Government's industrial policy. Therefore, there was a need to develop a model to reveal the relationship between the technological development of HKTCI and the Government's industrial policy.

1.4 Study objective

The main objective of this study was to identify the relationship between the competitiveness and level of technology development of HKTCI for achieving sustainability. It aimed to develop theoretical understanding of how technological development of the HKTCI influence its competitiveness, and study how the Government's industrial policy influenced the technological development of the TC industry. This would help in deriving guidelines and recommendations of how to develop industrial policy and strategy for achieving sustainable competitiveness of HKTCI. In the study, a 'Technometric' model was developed to measure the technology development in the industry by the 3 'Technometric' performance attributes, i.e., 'product', 'process' and 'service', and the model was evaluated the technological development of HKTCI with the change of the Government's industrial policy in the course of 3 ten-year periods, i.e., from 1974 to 1983, 1984 to 1993 and 1994 to 2003 respectively. The specific objectives of this study included the following:

1. To develop a mathematical model of the ‘Technometric’ model for quantitative description of the technological development in the HKTCI.
2. To identify the ‘Technometric’ performance attributes and key indicators for measuring the technological development of the TC industry as the critical parameters to construct a new ‘Technometric’ model for measuring the technological change of the TC industry.
3. To construct a reliable instrument (i.e. questionnaire) for measuring the technological development of the TC industry.
4. To evaluate the technology development of the HKTCI by applying the new ‘Technometric’ model with comparing with the pattern of change on main constituents of Hong Kong’s industrial policy for the TC industry in the past 3 ten-year periods, i.e., 1974 to 1983, 1984 to 1993 and 1994 to 2003.
5. To develop the overall ‘Technometric’ indices for the 5 key indicators (i.e., ‘productivity’, ‘quality’, ‘flexibility’, ‘skill’ and ‘innovation’) by aggregating the indices of individual indicators in each category respectively, and to analyze the 5 overall key ‘Technometric’ indices for studying the technological development of the HKTCI in the last three decades in relation to company background, business profile and relevant government industrial policy.
6. To analyze the development patterns of the overall output indices of the 5 key

indicators for the 3 ‘Technometric’ performance attributes.

7. To develop an Overall Technology Development Index as an indicator to measure the technological development of HKTCI, also to analyze the relationships of this index with company business nature, size and time periods.
8. To identify the roles of Hong Kong Government’s industrial policies in directing and stimulating the technological developments of HKTCI, and give recommendations to sustain the competitiveness of HKTCI.

1.5 Scope of the study

The data for measuring the technological development in a specific industry using the proposed ‘Technometric’ model came from the feedback of domain experts and selected TC manufacturing companies instead of simply relying upon Hong Kong statistics. This was because they had experienced global (including Hong Kong) TC technological change in the past thirty years in the time period from 1974 to 2003. As they were interested stakeholders in the past TC technological development, they fully understood the crucial factors affecting the technological development of the HKTCI and could provide valuable views and comments on the 3 ‘Technometric’ performance attributes.

The evaluation of the hypotheses for the 3 'Technometric' performance attributes were conducted in 3 cities or countries, i.e., Italy, the USA and Hong Kong Special Administrative Region (HKSAR) of China because:

1. Milan has one of the world fashion centres in Italy which is one of the largest clothing exporters in Europe. World famous Italian fashion houses such as Giorgio Armani, Fendi, Salvatore Ferragamo, Gucci, Max Mara, Prada, etc. design and develop innovative and high value-added products for global marketplaces. It is a world leading fashion design and manufacturing centre, comparable with Paris and London in Europe, garment production for which has been shifted to other European and Asian countries.
2. New York has one of the world fashion centres in the USA and is the world largest clothing importer and distributor. World famous US buyers such as The Gap, Tommy Hilfiger, Liz Claiborne, Brooks Brothers, VF Corporation, Macy's, Sears, etc. design and develop new apparel products for both US and global marketplaces. High innovation and technology have applied to TC material production such as nano-materials and related processing technologies, and smart and intelligent textile materials and garments. High tech products such as

Gore-Tex® breathable fabric, Outlast® thermo-regulated textiles, Nano-Tex® fabrics, etc., lead the world in producing multi-functional and smart TC for high value-added manufacturing.

3. In terms of total exports, Hong Kong was the world's second largest textile as well as clothing exporter in 1998 [6] after the Mainland. Hong Kong has developed its own TC industry since 1940, earlier than the Mainland which adopted its open-door policy for foreign investment from overseas, including Hong Kong in 1979. Hong Kong is a global sourcing hub although most of its TC production has been shifted to the Mainland and other places. It has attracted a number of international trading houses and major retailers to come to Hong Kong due to its proximity to the Mainland and excellent commercial support in financial, legal, banking and transport services [17].

4. Of 5 world fashion centres, Paris, London and Tokyo have already shifted most of their TC production off-shore due to the fact that production costs are high. The technology development of their TC industry has lagged behind Milan and New York. Although New York is facing similar problems to those encountered by Paris, London and Tokyo, its TC industry still sustains product design and development operations so that the development of innovative and technological TC products continues to grow.

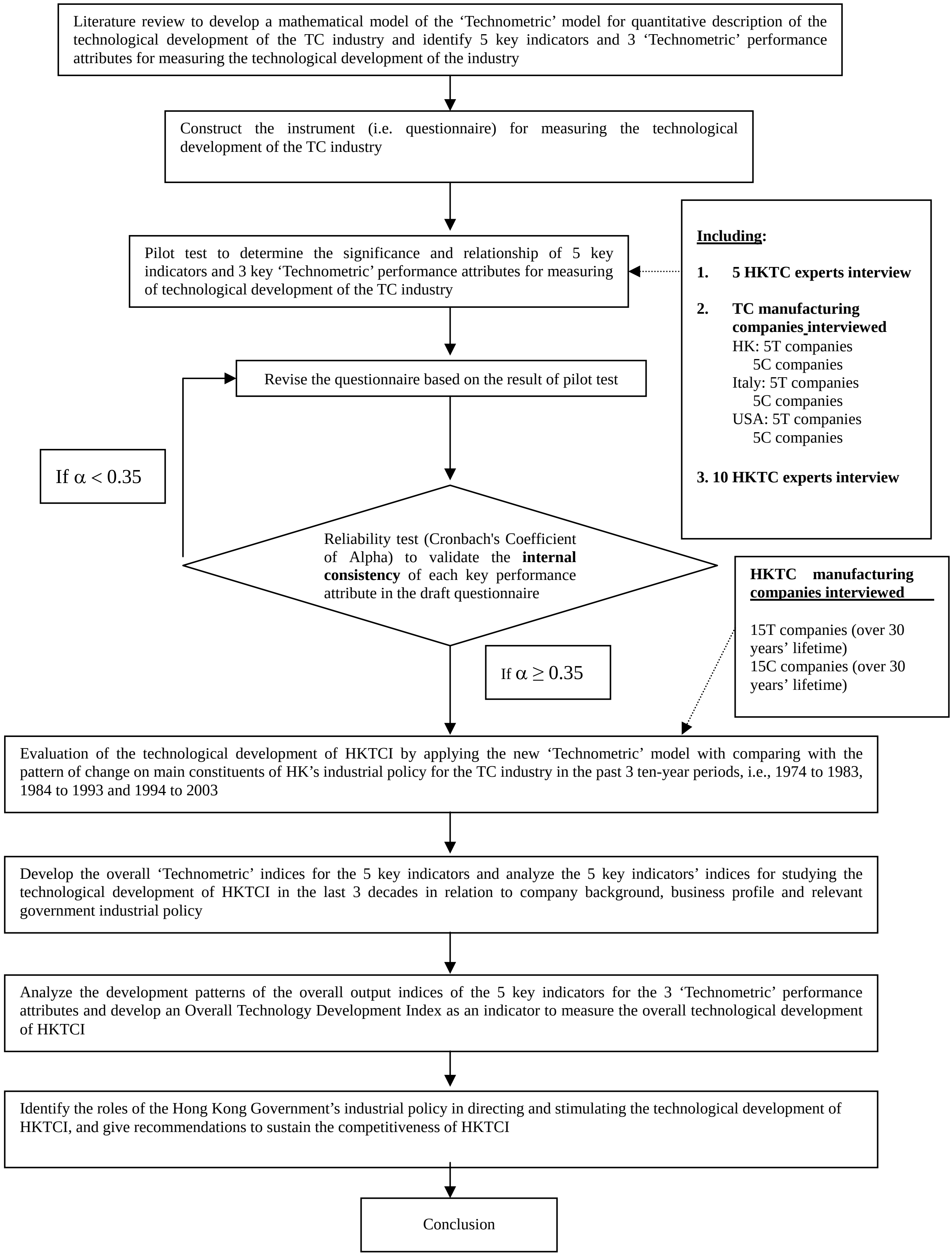
The proposed ‘Technometric’ model was evaluated by comparing the technological performance levels of HKTCI with the change pattern of main constituents of the Government’s industrial policy in the 3 ten-year periods, i.e., from 1974 to 1983, 1984 to 1993 and 1994 to 2003 respectively. The adoption of a ten-year period for evaluating the impacts of industrial policy change on TC industry is quite common in most developed and developing countries. Policy evaluation also distinguishes between short and long-term policy. In general, short-term policy is involved, for macroeconometric models, with stabilization of the economy within a period of one or two years. Long-term policy, by contrast, is concerned with the pattern of growth over longer periods, i.e., 5 to 10 years, or even longer [18].

The ‘Technometric’ model is generally utilized for the microeconomic benchmarking purpose. It offers a novel approach to measuring technical change at the product level, based on intertemporal comparison of product characteristics, using objective performance measures. The ‘Technometric’ approach enables direct measurement of technical features of products for the evaluation of technological innovation changes. The direct measures are of great importance in economic analyses, especially in measuring the quality of products and the quality difference among products in the marketplace [19]. The application of the ‘Technometric’ approach is extended from the measurement of the technological change of a specific product to that of the TC industry. The outcome of the ‘Technometric’ approach therefore provided an objective means of measuring the technological change of HKTCI.

1.6 Methodology used in the study

The methodology of the study is shown in Figure 1-1. The overall procedures were as follows:

Figure 1-1 Methodology utilized in the Study



Footnotes:
HK: HKSAR of China
Textile and Clothing: TC
Hong Kong's Textile and Clothing Industry: HKTCI

1.6.1 Identification of the 'Technometric' performance attributes for measuring the technological development of the TC industry

In the literature research, the key performance attributes were identified such as the proposed 'Technometric' performance attributes, i.e., 'product', 'process' and 'service', and the identified 5 key indicators, i.e., 'productivity', 'quality', 'flexibility', 'skill' and 'innovation' as well as their input and output data. The 'Technometric' performance attributes are the critical parameters to construct a 'Technometric' model for measuring the technological change of the TC industry whereas the 5 key indicators and their input and output data are core constituents of each 'Technometric' performance attribute.

1.6.2 Design of an instrument for measuring the technological development of TC industry

The existing 'Technometric' approach was extended to measuring the technological change of firms by product-by-product comparison (micro-approach), then to measuring the technological change of HKTCI by industry-by-industry comparison (macro-approach). In this context, an instrument (i.e. questionnaire) was designed comprising the identified the 3 ‘Technometric’ performance attributes and 5 key indicators to measure the technological development of the TC industry.

1.6.3 Evaluation of the significance and relationship of 5 key indicators and 3‘Technometric’ performance attributes

Having constructed the instrument (i.e. questionnaire) comprising the identified 3 ‘Technometric’ performance attributes and 5 key indicators for measuring the technological development of the TC industry, a pilot test, including personal interview of 5 local domain experts, 10 selected TC manufacturing companies in 3 countries (HKSAR of China, Italy and the USA) separately, and 10 local domain experts respectively, was then conducted. The aims of the pilot test were:

1. To determine the relationship of the input and output data of the 5 key indicators, namely, ‘productivity’, ‘quality’, ‘flexibility’, ‘skill’ and ‘innovation’ to the 3 ‘Technometric’ performance attributes, i.e., ‘product’, ‘process’ and ‘service’ respectively; and
2. To evaluate the significance of each key performance attributes for measuring the technological change (development) of the TC industry.

After the evaluation, the questionnaire was then revised based on the result of the pilot test.

1.6.4 Reliability test to validate the internal consistency of the questionnaire

Cronbach's Coefficient of Alpha was conducted to test the internal consistency of data attributes by which a group of domain experts responded in the questionnaire. Many research studies conducted in the past set the range of critical value for Cronbach's Coefficient of Alpha between 0.35 and 0.7 [19]. Thus, 0.35 Cronbach's Coefficient of Alpha was selected as the critical value in this study. If the Cronbach's Coefficient of Alpha was less than 0.35 ($\alpha < 0.35$), it was necessary to repeat the former procedural steps, i.e., revise the questionnaire, interview the other group of domain experts, and conduct the reliability test until the internal consistency of each performance attributes in the questionnaire achieved the level $\alpha \geq 0.35$. The measuring instrument (questionnaire) was then finalized for measuring the technological development of the TC industry.

1.6.5 Evaluation of the 'Technometric' model by comparing the technological development of HKTCI with the change of Hong Kong Government's industrial policy in 3 ten-year periods

Having finalized the instrument (questionnaire) and worked out the 'Technometric' model for measuring the technological development of the TC industry, it was necessary to evaluate the 'Technometric' model by means of personal interviews on 15 textile and 15 clothing manufacturing companies established before 1974 in Hong Kong. Based on the viewpoints of the local domain experts, the performance of the technological development of the TC industry over 3 ten-year periods, i.e., 1974 to 1983, 1984 to 1993 and 1994 to 2003 were measured using the validated questionnaire. The results of the survey were used to construct the 'Technometric' index of the TC industry in Hong Kong over these 3 ten-year periods.

The main constituents of industry policy in Hong Kong, i.e., Competition Policy, Trade Policy, Tax Policy and Technology Policy, were determined by means of literature review. The findings were used to understand the changed pattern of the policy towards the TC industry over 3 ten-year periods. Further evaluation of the 'Technometric' model by comparing the technological development of HKTCI with the change of the Government's industrial policy in the past 3 ten-year periods, i.e., 1974 to 1983, 1984 to 1993 and 1994 to 2003, was necessary to determine whether the results of measuring technological development in HKTCI and the changed pattern of the industry policy adopted by Hong Kong Government over the last 3 ten-year periods were correlated. Recommendations on the Government's industrial policy were given to sustain the competitiveness of HKTCI.

1.7 Organization of the thesis

The content of the thesis is organized as follows:

Chapter 1 presents the background of the study, relationship between technological development of the TC industry with the Government's policy, problems associated with measuring technological development in the industry, study objective, methodology of the study, and the organization of the thesis.

Chapter 2 presents a mathematical model of the 'Technometric' model for quantitative description of the technological development of the HKTCI on the basis of the 'Technometric' approach developed for measuring the technology strategy of a firm at the micro level through 'Technometric' feature-by-feature comparison of individual products from a dynamic perspective.

Chapter 3 introduces the design and development of the theoretical framework – the 'Technometric' performance attributes for measuring technological change of the TC industry. It includes the determination of 5 key indicators, i.e., 'productivity', 'quality', 'flexibility', 'skill' and 'innovation' as well as their input and output data, and 3 'Technometric' performance attributes, i.e., 'product', 'process' and 'service', and external factors affecting the technological development of the HKTCI critical analysis of related literature.

Chapter 4 discusses the development of an instrument to measure the technological development of the TC industry and pilot test to determine the significance and relationship of 5 key indicators and 3 key 'Technometric' performance attributes in measuring the technological development of the TC industry. The Chapter also describes the evaluation the findings through a pilot test including an instrument (i.e. questionnaire) design, reliability test to validate the internal consistency of each 'Technometric' performance attribute and the formulation of an enhanced 'Technometric' model for measuring the technological development of the industry.

Chapter 5 highlights the application of the 'Technometric' model to evaluate the levels of technological development of the HKTCI by analyzing the results of industrial survey using the instrument developed in Chapter 4. The evolution and implementation of Hong Kong Government's industrial policies are reviewed over the past 30 years for the purpose comparing with the technological developments measured by the enhanced 'Technometric' model. The measured results of the 'Technometric' model are compared with the changing pattern of the Government policy in the domain field.

Chapter 6 defines and analyses the 'Technometric' indices for all the indicators for each of 30 HKTC companies. The overall 'Technometric' indices for the 5 key indicators (i.e., 'productivity', 'quality', 'flexibility', 'skill' and 'innovation') are defined and computed by aggregating the indices of individual indicators in each category respectively. Statistical analyses were conducted on the 5 overall key 'Technometric' indices to study the technological development of HKTCI in the last 3 decades in relation to company background, business profile and relevant government industrial policy. The 5 sets of overall 'Technometric' indices are influenced by time period and company background, i.e., business nature, year of establishment, number of staff and profile.

Chapter 7 describes the development patterns of the overall output indices of the 5 key indicators and the definition of the Overall Technology Development Index as an indicator to measure the overall technological development of the HKTCI. Relationships of this index with company business nature, size and time periods were analyzed in relation to the evolution and implementation of the Government industrial policies.

Chapter 8 presents a conclusion of the study, limitations and future work.

Chapter 2 Mathematical Description of Industrial Technology Development – A 'Technometric' Model

2.1 'Technometric' indicators

The 'Technometric' indicators permit quantitative comparisons of the quality of products between companies, industries and nations, and have proved helpful in constructing corporate innovation strategy and technology policy [19].

2.1.1 Definition of 'Technometric'

From the micro-economic point of view, direct measurement of technical changes by reference to new product characteristics is a necessity for various economic analyses. Such measurements are required for modern demand theory as well as for the study of product quality and more especially product differentiation. The 'Technometric' indicator belongs to the group of indicators which directly measure the technical specification of changes in innovations. It is regarded as the ideal indicator for progress measurement [19].

‘Technometric’ is defined as a multidimensional index useful for assessing technological performance levels, sophistication and complexity of products, processes and services. The ‘Technometric’ profiles permit quantitative comparisons of the quality of products between companies, industries and nations, and have proved helpful in formulating corporate innovation strategy and technology policy. The ‘Technometric’ assessment of product performance is an useful tool for identifying market niche – customers whose needs are not met by existing products – and hence can help avoid unnecessary, costly rivalry with firms that enjoy superior human and capital resources [20].

2.1.2 Algorithm and application of the ‘Technometric’ approach (micro-approach) to technological change

The ‘Technometric’ approach was first applied to measure the technological change of firms by product-by-product comparison. It is considered to be a micro-approach. The algorithm and application of the ‘Technometric’ approach (micro-approach) is discussed in the paragraphs below.

2.1.2.1 Algorithm of the 'Technometric' approach (micro-approach) to technological change

One of the prime tasks of the 'Technometric' approach is to use fundamental scales to construct direct indicators for establishing product characteristics where these are inter-subjectively verifiable. Also in order to match as closely as possible the classical theories of economics, in the present content only fundamental procedures are involved, that is, the construction of technological distance indices, which meet mathematical standard requirements, that is, which constitute a 'metric'.

According to Grupp [19], a 'metric' space is defined with respect to a given quantity. All distances between elements of the quantity are defined. For the distance function, four salient points must be followed (the distance function can assume all real, positive numbers; its value range is at zero a downwards closed but upwards open interval):

1. The distance between one element and itself must be zero;
2. Each pair of elements from the set, for which the distance is zero, must be identical;

3. The distance of element A to B must be identical to the distance of the element B to A; and
4. If no natural zero point is defined and the scale has an upper limit this case is referred to as an interval scale. It is likewise metric and is therefore acceptable [19].

2.1.2.2 Application of the 'Technometric' approach (micro-approach) to technological change

One of the most complex problems facing managers is how to benchmark their firms' technological capability relative to competitors, in order to identify points of strength and weakness, as part of strategic planning. The following presents an empirical analysis of technical change in industrial sensors (non-textiles products) based on the 'Technometric' approach developed by Grupp [19].

Grupp applied the 'Technometric' approach at the micro-micro level of the firm (individual products) from a dynamic perspective. To measure technical change at the individual products level, a 'Technometric' feature-by-feature comparison was undertaken twice, once in 1991 and again in 1997. By comparing benchmarking scores for each product feature between 1991 and 1998, the quality improvement for each firm's sensors was measured. This enabled the firm to measure in concrete terms the technology strategy chosen by target rivals in seeking to strengthen its sales and market share [21].

2.1.2.3 Methodology for application of the 'Technometric' approach (micro-approach) to technological change

The 'Technometric' approach enables direct measurement of technical features of products for the evaluation of technology innovation changes. The direct measures are of great importance in economic analysis, especially in measuring the quality of products and the quality differences between products in the marketplace. The 'Technometric' model can provide an answer to one of the most important questions that firms face in considering whether or not to produce a new product, or a new version of an existing product. Frenkel, Maital, and Grupp outlined the 'Technometric' approach to technology benchmarking, which was introduced in the 1980s [22] with a revised terminology:

i = product, $i = 1, \ldots, n$

j = feature, $j = 1, \ldots, m$

K = vector of product features

k = firm, 1 = 1, …., r

k' = brand

t = time index, t = t_0, t_1

u = units of measurement for feature 'j'

Let there be product group i and assume that feature j are needed to characterize them. The characteristics j are determined via an economic-technical analysis of the market in which dominant configurations develop, it is therefore finally determined by the collective judgment of technical and economic actors on the consumer product market are 'fine-tuned' by competition. Let the vector for the technical characters be K. Since conditions of heterogeneous competition prevail, products from different companies, or brand k' from the same company are being offered to the market. The technical characteristics can be thus adequately described by vector K(i, j, k', t) at time t. It should be borne in mind that individual technical characteristics are measured in a variety of units of measurement and therefore cannot be offset against one another. Let the 'units' be u (j) [19].

$$\begin{vmatrix} K(i, 1, k', t) \\ K(i, 2, k', t) \\ \ldots\ldots \\ \\ \ldots\ldots \\ K(i, r, k', t) \end{vmatrix} \bullet \begin{vmatrix} u(1) \\ u(2) \\ \ldots \\ \\ \ldots \\ u(r) \end{vmatrix} \Rightarrow \begin{vmatrix} K^{*}(i, 1, k', k, t) \\ K^{*}(i, 2, k', k, t) \\ \ldots\ldots \\ \\ \ldots\ldots \\ K^{*}(i, r, k', k, t) \end{vmatrix} \qquad (2\text{-}1)$$

Equation (2-1) simply uses the u vector to eliminate the units of measurement (e.g., degrees, pounds, inches) in which technical product features or specifications are measured.

The mathematical definition of the ‘Technometric’ index K* is shown in equation (2-2):

$$K^*(i,j,k',k,t) = \frac{[(K(i,j,k',t) - K(i,j,k_{\min},t))]}{[(K(i,j,k_{\max},t) - K(i,j,k_{\min},t))]} \qquad (2\text{-}2)$$

Equation (2-2) converts the K values to [0,1] metrics, by expressing the j^{th} attribute of brand k' in relation to a minimum value, set as zero (the value of the simplest, or least sophisticated, feature available on the market), and a maximum value, set as one (the value of the most sophisticated feature available on the market).

For some features, a higher feature score (e.g. weight) means lower product quality of the industrial sensors. Hence, equation (2-3) is used in such cases, where the need arises to invert feature scores:

$$K^*_{inv}(i,j,k',k,t) = \frac{[(K(i,j,k',t) - K(i,j,k_{\max},t))]}{[(K(i,j,k_{\min},t) - K(i,j,k_{\max},t))]} = 1 - K^*(i,j,k',k,t) \qquad (2\text{-}3)$$

The essence of the 'Technometric' method is the use of the physical units to measure feature sophistication and quality, while the [0,1] metric enables:

1. Aggregate of feature scores, into an overall score for the entire product, or
2. Comparison across features, and across products [21].

2.1.2.4 The dynamic model

Over time there appear technical improvements in the product features in comparison to the capabilities measured in the initial period. Measuring the technological improvement on the time axis is done relative to the metric distance from a given initial distribution at t_0 by extending the time period to t_1. The initial position is frozen and used as a reference point for evaluating the technical improvement between the two periods as presented in the following equation:

$$K^*(i,j,k',k,t_1) = \frac{[(K(i,j,k',t_1) - K(i,j,k_{\min},t_0))]}{[(K(i,j,k_{\max},t_0) - K(i,j,k_{\min},t_0))]} \qquad (2\text{-}4)$$

Equation (2-4) introduces change over time. It measures the jth feature score at time

t_1 in relation to feature scores in period t_0.

2.1.2.5 Reasons to apply the 'Technometric" model developed by Grupp, H. et al

The 'Technometric' model can be utilized to quantitatively product quality between companies, industries and nations, to directly measure the technical specification of changes in innovation, and to assess the technological performance levels of products, processes and services. It could be applied at the micro-level of the firm at individual product comparison from a dynamic perspective and units of measurement of different product features can be converted into a form of [0 – 1] metric whereas the '0' stands for the minimum value as the simplest and least sophisticated product feature and the '1' stands for the maximum value as the most complicated and sophisticated product feature. This micro-approach model is useful for the study since it could be directly converted into a macro-approach at a dynamic perspective to measure the technological development of HKTCI by various kinds of performance parameters and their results could be expressed in simple metric units. There is no other model developed by researcher to achieve this purpose.

2.2 The 'Technometric' approach (macro-approach) to technological change

The 'Technometric' approach was first applied to measure the technological change of firms by industry-by-industry comparison. It is considered to be a macro-approach. Conversion of the 'Technometric' model from the measurement on the technological change of firms by product-by-product comparison (micro-approach) to HKTCI by industry-by-industry comparison (macro-approach) is discussed in the paragraphs below.

2.2.1 Conversion of the Technometric' model from micro-approach to macro-approach

The 'Technometric' model used to measure the technological change of firms by product-by-product comparison, was applied to macro-level in an attempt to establish the relationship between the technological performance levels of HKTCI with the change of industrial policy adopted by the Government in a particular time frame. The modification of the elements of the 'Technometric' model is as follows:

i = industry, i = 1, …, n

j = industry feature, j = 1,….., m

K = vector of industry features

k = firm, 1 = 1, ….,r

k' = ‘Technometric’ performance attributes, i.e., product/process/service of the TC industry

t = time index

u = units of measurement for industry feature ‘j’

Let there be industry i and assume that industry feature j are needed to characterize it. The characteristic j is determined via an economic-technical analysis of the global market in which dominant configurations develop, it is therefore finally determined by the collective judgment of technological and economic actors on the consumer product market are ‘fine-tuned’ by competition. Let the vector for the technical characters be K. Since conditions of heterogeneous competition prevail, products, processes and services from different Hong Kong firm k are being offered to the market. The technological characteristics are thus adequately described by vector K(i, j, k', t) at time t. Individual technological characteristics are measured in a variety of units of measurement and therefore cannot be offset against one another. Let the ‘units’ be u (j).

The equation (2-5) can then be utilized for measuring the technological change of HKTCI by industry-by-industry comparison (macro-approach):

$$\begin{vmatrix} K\ (i, j, k', t) \\ K(i, 2, k', t) \\ \ldots.. \\ \ldots.. \\ K(i, r, k', t) \end{vmatrix} \bullet \begin{vmatrix} u\ (1) \\ u\ (2) \\ \ldots \\ \ldots \\ u\ (r) \end{vmatrix} \Rightarrow \begin{vmatrix} K^*(i, 1, k', k, t) \\ K^*(i, 2, k', k, t) \\ \ldots\ldots \\ \ldots\ldots \\ K^*(i, r, k', k, t) \end{vmatrix} \qquad (2\text{-}5)$$

Equation (2-5) simply uses the u vector to eliminate the units of measurement (rating) in which industry features are measured.

The mathematical definition of the 'Technometric' index K^* is shown in equation (2-6):

$$K^*(i,j,k',k,t) = \frac{[(K(i,j,k',t) - K(i,j,k_{\min},t))]}{[(K(i,j,k_{\max},t) - K(i,j,k_{\min},t))]} \qquad (2\text{-}6)$$

K_{min} : firm producing a simple feature of product/process/service in the industry.
K_{max} : firm producing the most sophisticated feature of product/process/service in the industry.

Equation (2-6) converts the K values to [0,1] metrics, by expressing the j^{th} attribute of product/process/service k' in relation to a minimum value, set as zero (the value of the simplest, or least sophisticated, feature available on the global market), and a maximum value, set as 1 (the value of the most sophisticated feature available on the global market). A higher score in rating of input and output data of the 5 key indicators, including ‘productivity’, ‘quality’, ‘flexibility’, ‘skill’ and ‘innovation’ in the industry survey means higher intention/performance as a result of technological change of HKTCI.

Equation (2-5) and Equation (2-6) were adopted for the study. The ‘Technometric’ performance measured when the main industry survey was conducted in 3 ten-year periods, i.e., 1974 to 1983, 1984 to 1993, and 1994 to 2003. This time dimension shows the dynamics of the ‘Technometric’ model, which can measure the technological improvement on the time axis from a given initial distribution at P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). This dynamic model enables the measurement of the ‘Technometric’ performance of HKTCI in the periods P_0, P_1 and P_2.

2.3 Benefits of utilizing ‘Technometric’ model

‘Technometric’ is the quantitative measurement of the technological quality or sophistication of a product or process, group of products or processes, or an industry. This approach produces a quantitative profile of a product or process, showing graphically its performance characteristics for selected key attributes, in comparison to those of other firms or countries. Such indices can be aggregated across groups of products, to permit comparisons of the comparative technological level of sub-sectors or even entire industries.

Every product or process has a set of key specifications or attributes that define its performance, value or ability to satisfy customer wants. By definition, every specification or attribute can be quantified. Each of these attributes has its own unit of measurement: mm per second, years of lifetime, etc. Problems arise in aggregating attributes to build a single quality index. The ‘Technometric’ indicator surmounts this difficulty by converting each measured attribute into a [0,1] metric, enabling construction of weighted averages, etc., and permitting comparisons across products, firms, industries and countries. The ‘0’ point of metric is set as the technologically-standard attribute, and the ‘1’ point is set as the most technologically-sophisticated attribute in existence [23].

The ‘Technometric’ model can be applied to different kinds of firms, industries and countries for technological performance comparison in specific areas. Furthermore, the model can also be utilized in evaluating the technical improvements of a firm, an industry or a country within a given duration of time. There is no limitation on when the initial and final periods occur.

2.4 Summary

The ‘Technometric’ approach to measuring the technological change of firms by means of product-by-product comparison (micro-approach) was successfully used by Grupp to measure the technological change of firms producing electronic sensors. By adopting the ‘Technometric’ model from the measurement on the technological change of firms by using product-by-product comparison (micro-approach) to HKTCI by industry-by-industry comparison (macro-approach), a new ‘Technometric’ model was developed to measure the ‘Technometric’ performance of HKTCI for a specific time period in a systematic and objective manner.

Chapter 3 ‘Technometric’ Performance Attributes of the TC Industry

3.1 Key attributes and external factors affecting the technological development of the TC industry : review of related literature

In this study, it was necessary to determine key attributes and external factors affecting the technological change of HKTCI and design an instrument to measure the technological development of the TC industry.

3.2 Related work for determining the key indicators of measuring the technological development in the TC industry

In 1998, the OECD [24] identified the key technological indicators for country comparison in the study of ‘The Impact of Technology Change’. Arthur Andersen & Company has also conducted an international benchmarking survey for Australia’s textile, clothing and footwear industries (TCFI) in 2000 [15] and in excess of 1,400 companies involved in textile, clothing and footwear industries participated. In addition, more than 80 world leading companies were approached in the USA, Europe and East Asia to act as benchmarking partners. Arthur Andersen & Company produced a list of performance measures in which some successful factors (parameters pertinent to key indicators on TC technological development) were covered. The literature was used to establish the key indicators for measuring the technological development of HKTCI. Table 3-1 shows a summary of findings from reference books, articles, papers and journals which target the TC industry. From these findings, it may be seen that the 5 key indicators are 'productivity', 'quality', 'flexibility', 'skill' and 'innovation'.

Table 3-1 A summary of the study findings

Author	Relevant Articles (with year)	Nature of the Study	Major Findings	Key Indicators*
Ostuka, K	Ostuka, K. (1988) *Comparative Technology Choice in Development – The Indian and Japanese Cotton Textile Industries*, 1st ed., Macmillan Press.	The study identified cultural and human resource differentials across countries. Ostuka studied textile production, its economic growth and importance to Asian countries' economies.	The major finding of Ostuka's study was to identify 'productivity' as key indicator of the technological development of the textile industry.	**'productivity'**
Organization for Economic Co-operation and Development (OECD)	Organization for Economic Co-operation and Development (1998) *Science, Technology and Industry Outlook*, pp.134	This book covers economic and policy analysis. It includes an overview of the prospects for science, technology and industry in the OECD area and studies the impact of the technological change on manufacturing industries, including TC sector.	The author identified 'productivity' as one of the key indicators of the technological change for the TC industry.	**'productivity'**

Author	Relevant Articles (with year)	Nature of the Study	Major Findings	Key Indicators*
Korres, G.M.	Korres, G.M. (1996) Technical Change and Economic Growth, An Empirical Analysis of the EEC, 1st ed., Ashgate.	The central objective of the study was to reach a better understanding and predict the effects of R & D on economic growth and 'productivity'.	This book defines technological change and its main determinants. It also covers 'growth theories', the relationship between 'productivity'' and 'technological change' and technological gap theories. It also covers the input data (technology, capital, equipment investment, education and training, economies of scale, legal-human environment) and output data ('productivity' growth, technological change and economic growth) of the key indicator 'productivity'.	**'productivity' and its input and output data**
Arthur Andersen	Arthur Andersen (1996) *Best Practice (2000) International Benchmarking Study Starts*, Australasian Textiles & Fashion, July/August, pp.45	Arthur Andersen & Company conducted its international benchmarking survey for Australia's textile, clothing and footwear industries in 1996. The consultant produced a list of performance measures in which some successful factors (data of key indicators of technological development) were covered.	Arthur Andersen identified some input data (labour, capital and raw material) of the key indicator 'productivity'.	**'productivity' and its input data**
Northworthy, J.R. & Jang, S.L.	Norsworthy, J.R. & Jang, S.L. (1992) *Contribution to Economic Analysis*, 1st ed., North-Holland	The authors studied the contributions to economic growth and empirical measurement and analyzed productivity and technological change. They also identified the factors affecting technology and productivity.	This book covers the definition of 'productivity', 'technology' and 'productivity change', 'labour productivity', 'total factor productivity' and their related input data (energy, material, capital and labour) and output data (productivity growth).	**'productivity' and its input and output data**

Author	Relevant Articles (with year)	Nature of the Study	Major Findings	Key Indicators*
Organization for Economic Co-operation and Development (OECD)	Organization for Economic Co-operation and Development (1998) *Science*, *Technology and Industry Outlook*, pp.134	This book covers the economic and policy analysis. It includes an overview of the prospects for science, technology and industry in the OECD area and studies the impacts of the technological change of manufacturing industries, including TC sector.	The author identified product quality as one of the key indicators of the technological change for the TC industry.	**'quality'**
Goetsch, D.L. & Davis, S.	Goetsch, D.L. & Davis, S. (1997) *Introduction to Total Quality*, 2nd ed., Prentice Hall	Increasing global competition has resulted in renewed interest in quality and led many firms to seek guidance in implementing their quality programmes. The paper lists several national and global awards and compares them in terms of their application categories, criteria and nationality.	This paper covers the 'total quality', the relationship between quality and technology and key elements of total quality. It also supplies some input data (capital, technology, skill and knowledge and government support) for the key indicator 'quality'.	**'quality' and its input data**
Arthur Andersen	Arthur Andersen, *Best Practice (2000) International Benchmarking Study Starts, Australasian Textiles & Fashion, July/August*, pp.45	Arthur Andersen conducted its international benchmarking survey for the Australian textile, clothing and footwear industries in 1996. The consultant produced a list of performance measures in which some successful factors (data of key indicators of technological development) were covered.	Arthur Andersen identified some input data (quality management system implementation) and output data (quality accreditation) of the key indicator 'quality'.	**'quality' and its input and output data**

Author	Relevant Articles (with year)	Nature of the Study	Major Findings	Key Indicators*
Nakhal, B. & Neves, J.S.	Nakhal, B. & Neves, J.S.(1994) The Deming, 'Baldrige, and European Quality Award', *Quality Progress*, April, pp.33-37	The authors studied several national global awards and compared them in terms of their application categories, criteria and nationality and compared their advantages and disadvantages.	The paper covers the input data (human resource management, strategic quality planning, customer focus and communication) and output data (quality management improvement, customer satisfaction, people satisfaction, positive impact of society and market share) of the key indicator 'quality'.	**'quality' and its input and output data**
Organization for Economic Co-operation and Development (OECD)	Organization for Economic Co-operation and Development (1998) *Science, Technology and Industry Outlook*, pp.134	This book covers the economic and policy analysis. It includes an overview of the prospects for science, technology and industry in the OECD area and studies the impact of the technological change on manufacturing industries, including the TC sector.	The author identified that the flexibility is one of the key indicators of the technological change and development for the TC industry. Amongst the major findings of the study, OECD also discovered that technology was one of the input data to the key indicator 'flexibility'.	**'flexibility'**
Arthur Andersen	Arthur Andersen, (1996) *Best Practice (2000) International Benchmarking Study Starts*, Australasian Textiles & Fashion, July/August, pp.45	Arthur Andersen conducted its international benchmarking survey for Australia's textile, clothing and footwear industries in 1996. The consultants produced a list of performance measures in which some successful factors (data of key indicators of technological development) were covered.	Arthur Andersen found that improved stock management (with lower buffer stock) would be one of output data of the key indicator 'flexibility'.	**'flexibility' and its input data**

Author	Relevant Articles (with year)	Nature of the Study	Major Findings	Key Indicators*
Dundas, N.H.	Dundas, N.H.(1997) *Corporate Flexibility, A comparative Analysis of Small Firms in Northern Ireland,* 1st ed., Avebury	This book examines the rhetoric which advocates flexibility as the key to economic rejuvenation. Traditional theories of industrial location are increasingly being challenged by non-hierarchical models concerning regional innovation systems. In the new models, the traditional pre-determination of the sector has been ascribed a pivotal role stimulating regional development and facilitating economic rejuvenation.	This book defines 'flexibility' and identifies of its importance to the small and medium-sized enterprises in terms of technological change and development. It also derives the input data (capital, organization change, human resource development, education and training, skill and knowledge, and flexible manufacturing system) and output data (short product life cycle, customized product, shorten lead time, flexible corporation and diversified production) of the key indicator 'flexibility'.	**'flexibility' and its input and output data**
Organization for Economic Co-operation and Development (OECD)	Organization for Economic Co-operation and Development (1998) *Science, Technology and Industry Outlook,* pp.134	This book contains details of economic and policy analysis. It includes an overview of the prospects for science, technology and industry in the OECD area and studies the impact of the technological change of manufacturing industries, including the TC sector.	The author identified that skill was one of the key indicators of technological change and development for the TC industry. Amongst the major findings of the study, OECD also discovered that technology was one of the input data for the key indicator 'skill'.	**'skill'**
Arthur Andersen	Arthur Andersen, (1996) *Best Practice (2000) International Benchmarking Study Starts,* Australasian Textiles & Fashion, July/August, pp.45	Arthur Andersen conducted its international benchmarking survey for Australia's textile, clothing and footwear industries in 1996. The consultants produced a list of performance measures in which some successful factors (data of key indicators of technological development) were covered.	Arthur Andersen identified that the skill acquisition scheme discussed in this reference was one of input data for the key indicator 'skill'.	**'skill' and its input data**

Author	Relevant Articles (with year)	Nature of the Study	Major Findings	Key Indicators*
Proctor, R & Dutta, A.	Proctor, R. & Dutta, A. (1995) *Skill Acquisition and Human Performance*, 1st ed., Saga	The authors bring together research from a variety of relatively distinct research areas to provide a coherent picture of the current understanding of human skill and of the status of skill research.	This book defines 'skill' in terms of human resource management and development.	**'skill'**
James, J & Klan, H.A.	James, J. and Klan, H.A. (1998) *Technological Systems and Development*, 1st, Macmillan Press Ltd. pp.1-2	The authors studied the characteristics of technology which determine resource allocation, productivity, and impact on production and consumption patterns.	This book defines 'skill' in respect of technology development and enhancement. It also identifies the input data (human resource and technology upgrading) of 'skill'.	**'skill' and its input data**
Godfrey, M.	Godfrey, M. (1997), *Skill Development for International Competitiveness*, 1st ed., Edward Elgar	The author considered which skill-development strategies developing countries should adopt to compete successfully in the international markets of the 21 Century. He provided a blend of theory and case studies which shed new light on this important question.	The book identifies the input data (education and training, and skill acquisition scheme) and output data (new skill and knowledge, acceptable performance, human resource improvement, productivity improvement, quality improvement, flexibility improvement and organization improvement) of the key indicator 'skill'.	**'skill' and its input and output data**
Organization for Economic Co-operation and Development (OECD)	Organization for Economic Co-operation and Development (1998) *Science, Technology and Industry Outlook*, pp.134	This book covers economic and policy analysis. It includes an overview of the prospects for science, technology and industry in the OECD area and studies the impact of the technological change on manufacturing industries, including the TC sector.	The author identified that the innovation as one of the key indicators of the technological change and development for the TC industry. Amongst the major findings of the study, OECD also found out that research and development (R & D) was one of the input data of the key indicator 'innovation'.	**'innovation'**

Author	Relevant Articles (with year)	Nature of the Study	Major Findings	Key Indicators*
Sundbo, J.	Sundbo, J. (1998) *The Theory of Innovation (Entrepreneurs, Technology and Strategy)*, 1st ed., Edward Elgar	This book examines the theoretical understanding of the emergence of innovations in society. The study of innovations is a multidisciplinary subject. The book also demonstrates the contribution of innovation to economic growth, social change and actions of organizations.	This book defines 'innovation' and identifies the output data (new product, new product quality, new production method, new market, new material and new organization) of 'innovation'.	**'innovation' and its output data**
Cobbenhagen, J.	Cobbenhagen, J. (2000) *Successful Innovation*, 1st., Edward Elgar	The author studied innovation in relation to technological change and development that give rise to new products or improvement in existing products.	This book covers the definition of 'innovation', input data (technology development) of 'innovation'.	**'innovation' and its input data**
Wang, X.M.	Wang, X.M. (1999) 'A New Strategy of Technology Transfer to China', *International Journal of Operation & Production*, Vol.19, No.5/6	This paper analyses the features of the new environment and discusses the framework of technology transfer based on a review of theory, surveys and studies of Chinese enterprises.	The paper highlights the importance of technology transfer of 'innovation' in the context of a new business environment and moving into a new phase. It also identifies capital investment (including foreign direct investment) as one of the input data of 'innovation'.	**'innovation' and its input data**
Saviotti, P.P. & Nooteboom, B.	Saviotti, P.P. & Nooteboom, B. (2000) *Technology and Knowledge (from the Firm to Innovation Systems)*, European Association for Evolutionary Political Economy, 1st ed., Edward Elgar	In the literature, innovation is seen as the outcome of the interaction between firms: in joint production, exchange or limitation of knowledge. Learning is seen as an interactive phenomenon, and the authors use simulation to analyze how the creation of variety by innovation, and the leveling of variety by diffusion interact to produce system-level effects.	This book elaborates upon the means by which knowledge is acquired, the advantages that 'innovation' can supply to product quality, productivity and business growth, and input data (R & D expenditure, R & D personnel, education and training) and output data as well as (number of patent generated) of 'innovation'.	**'innovation' and its input and output data**

Author	Relevant Articles (with year)	Nature of the Study	Major Findings	Key Indicators*
Porter, M.E.	Porter, M.E. (1998) *The Competitive Advantage of Nations*, 2nd ed., The Macmillan Business.	The author undertook to explain the sources of sustained prosperity in the modern global economy. While the book is set at the level of the nation, the same framework has been readily applied at the regional, state, and city level.	The book addresses the proper role for government, science and technology policy for both industrial and service industries.	**External Factor – Government Policy (including Government Procurement Policy, Science and Technology Policy)**
Teubal, M. et al.	Teubal, M., Foray D., Justman, M. & Zuscovitch, E. (1996) *Technological Infrastructure Policy*, 1st ed., Kluwer Academic.	The book examines the notion of technology infrastructure and the form and function of technological infrastructure policy from a variety of perspectives within the general context of the economics of innovation and technology policy fields.	This book highlights the importance of Technology Infrastructure Policy (TPI) to enhance R & D and high technology industry of a host country. It also gives reference to the form of TPI and its applications.	**External Factor – Government Policy (Technological Infrastructure Policy)**
Sharif, N.	Sharif, N. (1994) 'Integrating Business and Technology Strategies in Developing Countries', *Technology Forecasting and Social Change*, Vol.45, Nos.1, Jan., pp.151-167.	This paper describes a simple framework for integrating business and technology strategies, particularly in the context of developing countries. Possible strategic mixes are identified by considering four commonly practiced business strategies, namely, price, value, niche and image leadership; and four evolving technology strategies, namely: technology leader, follower, exploiter and extender. The author devised a model of techno-business strategies for enhancing company-based technology capability. The paper also covers technology life cycle.	The paper identifies the technology content and climate for an enterprise to manage technological change effectively.	**External Factor – Environment Impact (Technology Content and Climate)**

Author	Relevant Articles (with year)	Nature of the Study	Major Findings	Key Indicators*
Arthur Andersen & Company	Arthur Andersen & Company (2001) *2000 Techno-economic and Market Research Study for Hong Kong's Textiles, Clothing and Footwear Industries, Trade and Industry Department of Hong Kong SAR Government.*	The Arthur Andersen & Company analyzed the strengths, weaknesses, opportunities and threats of Hong Kong's textile, clothing and footwear industries. In order to improve the business environment of the industries as well as to strengthen their competitiveness in the global marketplaces, the consultants then put forward expert views and recommendations to the Hong Kong Special Administrative Region Government, industries, industrial support organizations, etc. for consideration.	The author analyzes the opportunities and threats of the Mainland of China's accession to the WTO enabling the local TC firms to formulate their business plan and strategies for future industrial and technological development.	**External Factor – Environmental Impact (China Accession to the World Trade Organization)**
Arthur Andersen & Company	Arthur Andersen & Company (2001) *2000 Techno-economic and Market Research Study for Hong Kong's Textiles, Clothing and Footwear Industries, Trade and Industry Department of HKSAR Government.*	The Arthur Andersen & Company analyzed the strengths, weaknesses, opportunities and threats of Hong Kong's textile, clothing and footwear industries. In order to improve the business environment of the industries as well as to strengthen their competitiveness in the global marketplaces, the consultant then put forward expert views and recommendations to the Hong Kong Special Administrative Region Government, industries, industrial support organizations, etc. for consideration.	The author identified the opportunities and threats of the quota abolition by 2005 for the HKTC industry and gave some recommendations.	**External Factor – Environmental Impact (Quota Abolition by 2005)**

* : Key indicator of the Technological Development of the TC Industry

3.2.1 The first key indicator is 'productivity'

The OECD [24] showed that the most obvious changes were the quantitative reduction in TC labour force and the dramatic rise in productivity. The productivity gains are a natural outcome of the enormous increase in the speed of the newer generation of TC machinery, such as open-end spinning machinery, shuttleless looms, computer-aided garment design, automated cutting and sewing systems, etc. The automation of associated handling and processing in textile mill production has also contributed to the productivity gains, as have the use of computer-aided design and computer-numerical controlled systems in clothing manufacturing [24].

3.2.1.1 Definition of 'productivity'

Dorf defines 'productivity' as the measure of efficiency of production: the ratio of the output obtained to the inputs utilized for a given process. Alternatively, productivity can also be defined as the efficiency with which resources are used to produce goods (and services) for the market. It is measured by computing the ratio of an index of the output to the index of the input. Labour Productivity, denoting the productive efficiency of labour, is the most important factor in any policy analysis. However, it is increasingly becoming linked with Total Factor Productivity, measuring the efficiency of use of all other factors of production. Productivity has been the most important economic indicator for understanding and predicting economic prosperity [25].

3.2.1.2 Input and output data of 'productivity'

In accordance with the findings of an international benchmarking study conducted by Arthur Andersen [15], the key successful factors of the productivity are:

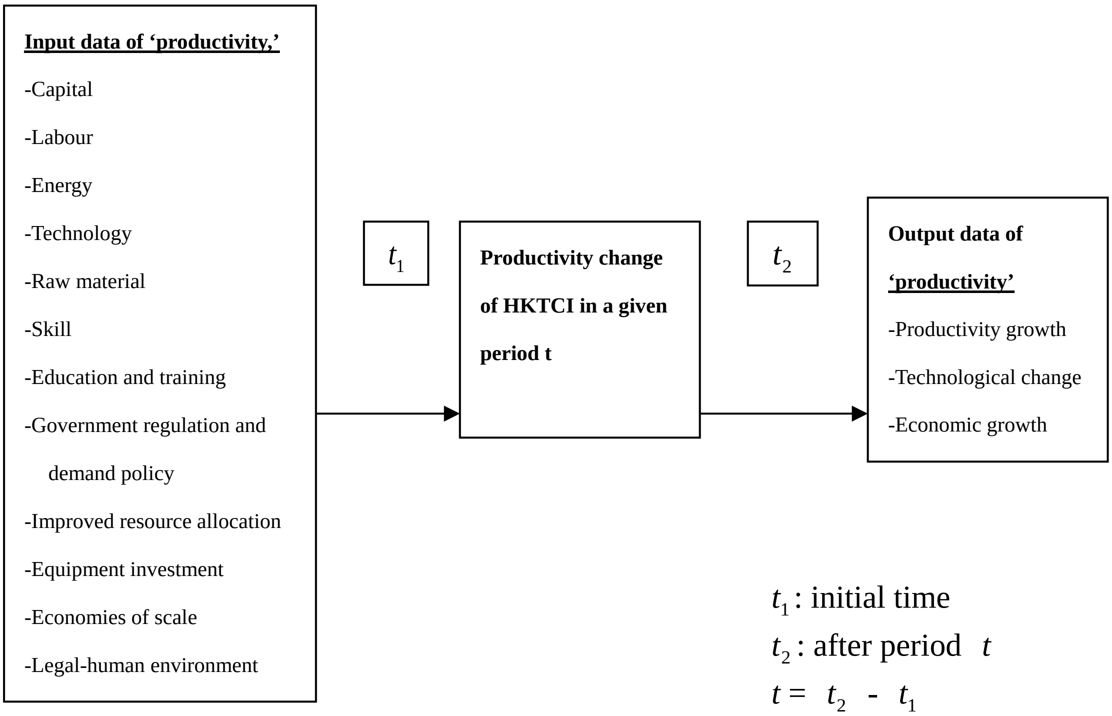
1. Labour productivity
2. Capacity utilization
3. Plant utilization
4. Labour cost per employee
5. Value-added per employee
6. Raw material yield
7. Subcontracting activities [15]

Norworthy and Jang [26] found that in the past, the inputs to production were capital (including equipment investment, labour, energy and materials for manufacturing industries. The problems of the late 1980's and the 1990's, however, were more concerned with technology and competitiveness. Many high technology firms use little energy: rather, analytic emphasis is placed on specific material inputs, capital inputs (computers and flexible manufacturing systems) and labour inputs, particularly non-production workers [26]. Korres [27] observed that some economists had analyzed different possible reasons why productivity growth has declined. The various explanations can be grouped into the following categories:

1. Capital factor, for instance investment may have been inadequate to sustain the level of productivity growth.
2. The technology factor which affects the productivity level, for instance a decline in innovation activities can affect productivity growth.
3. The increased price of raw materials and energy.
4. Government regulations and demand policies that affect the productivity level.
5. Skills and experience of labour force.
6. Products and services produced by the economy have become more diverse.

There are several factors that contribute to changes in productivity: technological progress, quantity of capital, education and training, economies of scale, improved resource allocation and legal-human environment. Baily and Chakrabarti [28] examined the linkage between technological innovation and productivity changes in several industries – chemical, textile, and machine tools – in the USA during the 1970s. Their conclusion was that a slow down in innovation in these industries was linked with a slow down in productivity. It is clear that productivity change is an important aspect of technological change and in turn affects the economic growth of a country [27]. A review of the literature and specifically 'productivity' as a key indicator therefore provided that a model for measuring the technological development in the area of 'productivity' as shown in Figure 3-1.

Figure 3-1 Input and output data of 'productivity'



Korres's study shows that productivity change is an important aspect of technological change and in turn affects the productivity and economic growth of a country [27]. Thus, productivity change, technological change and economic growth are the output data of the key indicator 'productivity' for the technological development of the TC industry.

3.2.2 The second key indicator is 'quality'

The diffusion of newer generation technologies has not only led to quantitative productivity gains but also to improvements in product quality. Defect-free, higher quality products can now be produced more rapidly**.**

3.2.2.1 Definition of 'quality'

Goetech and Davis [29] define 'quality' as a dynamic state associated with products, people, processes, and environment that meets or exceeds expectation. It is about doing things right the first time and about satisfying customers. But quality is also costs, revenues, and profits. Quality plays a key role in keeping costs low, revenue high and profit robust. It is known that winning in the global marketplace has more to do with quality than marketing, and the best way to counter global competition is with quality. The best way to product quality is to continually improve people, processes, and environments using a total quality approach. Total quality is a means of doing business that attempts to maximize the competitiveness of an organization through the continual improvement of the quality of its products, services, people, processes and environments [29].

3.2.2.2 Input and output data of 'quality'

The key elements of total quality are as follows:

1. Customer focus
2. Obsession with quality
3. Scientific approach
4. Teamwork
5. Education and training
6. Freedom through control
7. Unity of purpose

Goetech and Davis [29] informed that the most prestigious award for quality in the USA is the Malcolm Baldrige National Quality Award. Established by the U.S. Congress in 1987, the award is presented to organizations that demonstrate outstanding leadership in the area of quality. Competitors for the award are evaluated according to criteria in seven broad categories as follows:

1. Leadership
2. Information and analysis
3. Strategic quality planning
4. Human resources development and management
5. Management of process quality
6. Quality and operational results
7. Customer focus and satisfaction (ISO 9000, TQM, QC, 5S, Hong Kong Award of Industry) [29]

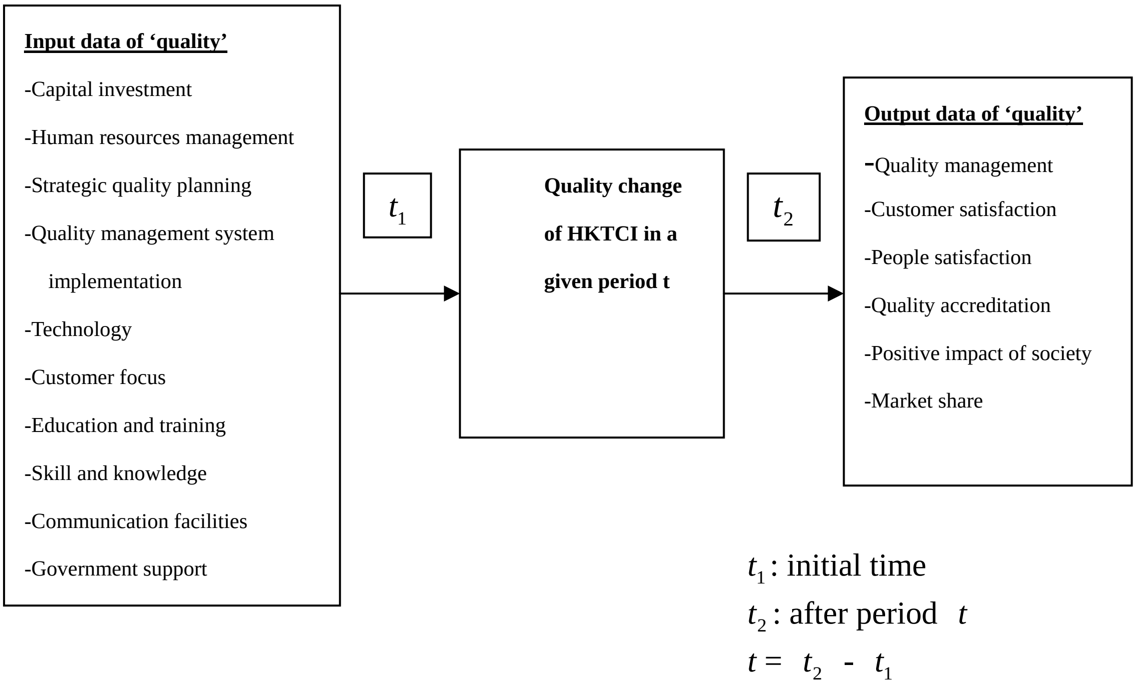
Nakhal and Neves [30] studied the rationale for the above seven criteria from the perspective of senior executive leadership. According to this framework, information and analysis, quality planning, human resource management, and process quality management are contributed to achieve customer satisfaction relative to competitors, customer retention and market share [30].

The key successful factors of product and process quality derived from the international benchmarking study conducted by Arthur Andersen [15] are given as follows:

1. Total Quality Management (TQM) Score
2. Quality accreditation
3. Reject rate
4. Rework rate customer claims – defined as the number of customer claims per sales
5. Sales returns [15]

A review of the literature in the area of 'quality' as a key indicator therefore suggests that a model for measuring the technological development in the area of 'quality' would be as shown in Figure 3-2.

Figure 3-2 Input and output data of 'quality'



Nakhal and Neves [30] found that total quality improvement in terms of manpower, process, product and organization would be achieved through the adaptation of the right quality management system and allocated resources. An effective quality approach will satisfy the needs and expectations of customers and reduce re-work and customer returns. It will also satisfy the needs and expectations of the people within the organization. More companies within a society will achieve more international quality awards and accreditation as a result of improved quality system being adopted. In the long-term, the whole society will be improved in terms of quality of life, the environment and the preservation of global resources. High quality products and competitive price would attract more customers and lead to market domination [30].

3.2.3 The third key indicator is 'flexibility'

The OECD [24] stipulated that because new technologies can respond to the demand for greater flexibility, the OECD-area TC industry can shift from mass production of standardized products to small-lot production of a wider variety of products. Technological change allows the OECD-area TC industry to pursue such a strategy and may have enabled it to survive competition from non-OECD countries which have rapidly become more competitive regarding standardized products due to low labour costs. Despite increased import penetration in the TC sector, most OECD countries have continued to show strong export performance.

3.2.3.1 Definition of 'flexibility'

In addition to efficiency and quality, and facilitated by advances in automation and computer technologies, flexibility and flexible manufacturing emerged as the essential strategic imperative of the 1990s for manufacturers' viability. Dorf [25] defines 'flexibility' as the ability of the manufacturer to fulfil customer's demands in a timely fashion. The deliverables are expected to be customized products that offer high quality at affordable prices. Upton [31] informed that, at the plant level, flexibility was about the ability to adapt or change. It is about increasing range, increasing mobility, or achieving uniform performance across a specified range. Dundas [32] defines functional flexibility as the ability of firms to adjust and deploy the skills of their employees to match the changing tasks required by a changing workload, production methods or technology. While numerical flexibility enables firms to respond to changing market demands, functional flexibility is more closely linked with changes in the operational environment of the firm. Economies of scope, advanced technology and changes in the organization of production interact to necessitate the flexible deployment of skills.

3.2.3.2 Input and output data of 'flexibility'

In their international benchmarking study, Arthur Andersen [15] observed that responsive manufacturing requires great flexibility if the TC industry is to cope with fashion trends and demands from their customers. The key successful factors of 'flexibility' are given as follows:

1. Lead time for design acceptance
2. Lead time for sampling

3. Lead time for manufacturing cycle

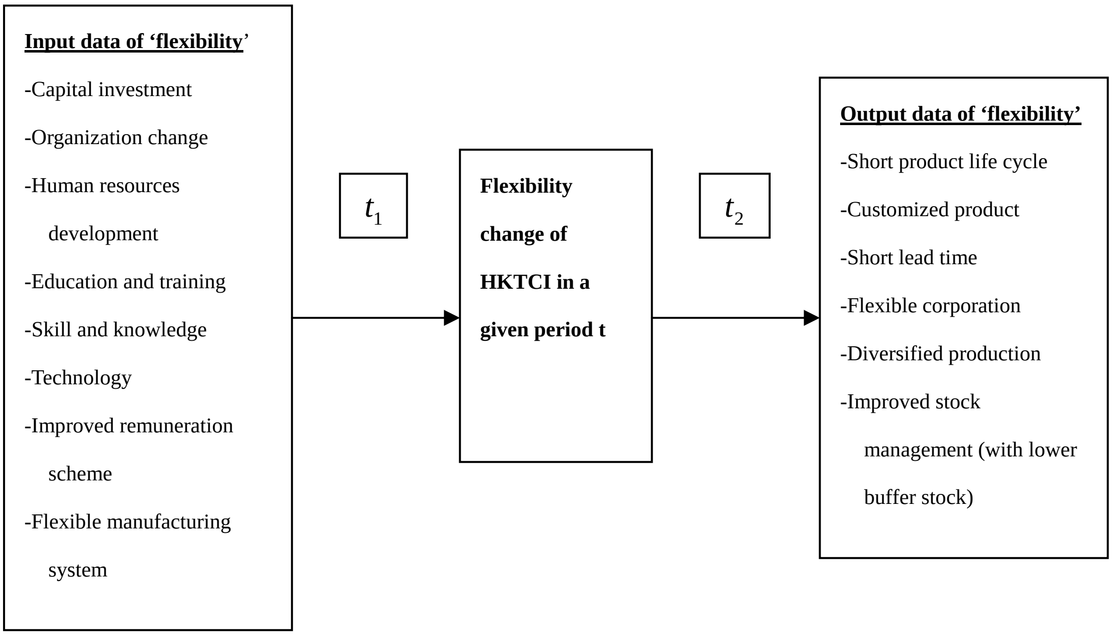
4. Lead time for order to delivery

5. Product order rate

6. Despatch cost

A review of the literature having ‘flexibility’ provided as a key indicator provided the necessary data for the formulation of a model for measuring the technological development in the area of ‘flexibility’ as shown in Figure 3-3.

Figure 3-3 Input and output data of ‘flexibility’



t_1 : initial time
t_2 : after period t
$t = t_2 - t_1$

Dundas’ study [32] shows that with coordination of resources and flexible manufacturing system, enhanced 'flexibility' i.e., shortened lead time, more customized product with a short lifecycle are generated in the sense that the reorganization of the corporation suits customer's demands and expectations. In other words, flexible adaptation will sustain the competitiveness of the TC industry in the global marketplace.

3.2.4 The fourth key indicator is 'skill'

The OECD [24] has identified that there has been deskilling in specific operations, such as cutting in the pre-assembly stage of clothing manufacturing. The general trend has been towards higher skill requirements, however, as workers are now required to operate increasingly sophisticated and versatile machines and equipment, and need to have a broader knowledge and skills base.

James and Klan [33] found that the 'characteristics' of technology should include all the relevant features which determine resource use, productivity and impact on production and consumption patterns. These features include the nature and design of the product, the scale and organizational system for which the technology is designed, its resource use, including capital and labour intensity, material and fuel use, skill requirements, and the infrastructural and complementary inputs it requires.

3.2.4.1 Definition of 'skill'

Proctor and Dutta [34] define skill as all the factors which go to make up a competent, expert, rapid, and accurate performance. Skill in this sense thus attaches, to a greater or lesser extent, to any performance and is not limited to manual operations but covers a wide range of mental activities as well.

Godfrey [35] concurs that skill development and other human resources increasingly are seen as being important in international competitiveness and economic development. This heightened emphasis focuses on the impact of skill enhancement and other human resources on international competitiveness and development. The human resources play a critical role in productivity growth, and, in related interpretations of empirical micro and aggregate associations between indicators of skill development and attainment of various goals including international competitiveness and development.

3.2.4.2 The input and output data of 'skill'

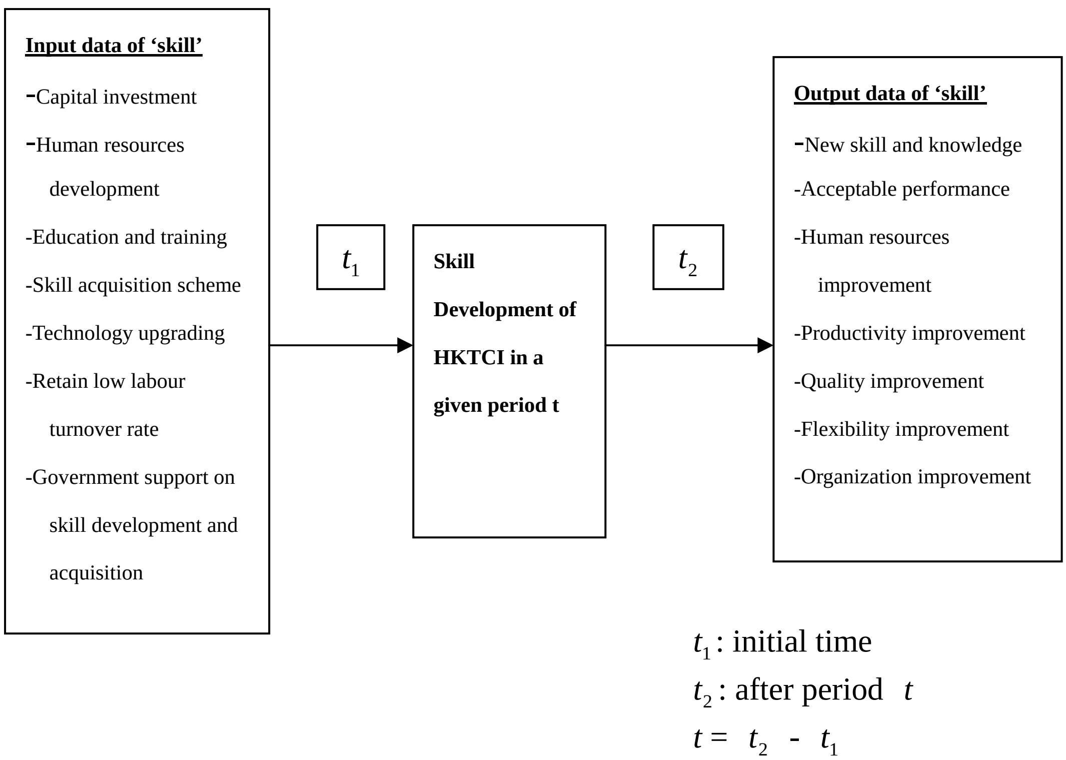
The international benchmarking study conducted by Arthur Andersen [15], identified key indicators for the skill level of the Hong Kong clothing industry as being:

1. Labour turnover
2. Training expenditure
3. Human resource capability
4. Educational level

The Hong Kong Productivity Council was commissioned by the Government to conduct an analysis of the data obtained from the manpower surveys on the TC industries with a view to providing information on the present and future requirements of manpower. The study revealed that in order to improve the skill level of TC workers, the industry should, in collaboration with academic institutions, organize training programmes enabling students and practitioners to acquire more up-to-date technology and information. It is also necessary to upgrade the technology level of local industry in order to match with the accelerating pace of world business. Human resource management and upgrading led by the Government would be a crucial step in sustaining a competitive edge in the world marketplace [36].

A review of the literature having ‘skill’ as a key indicator therefore provided the necessary input for the formulation of a model with which to measure the technological development in the area of ‘skill’ as shown in Figure 3-4:

Figure 3-4 Input and output data of ‘skill’



Godfrey [35] finds that with the valuable input data of the ‘skill’ indicator, the output will be new skill and knowledge, acceptable performance, human capital, higher productivity, quality improvement as well as the organization improvement.

3.2.5 The fifth key indicator is 'innovation'

The OECD [24] identified that increased flexibility also enabled innovation in the organization of production, as firms take advantage of this flexibility to shorten the production cycle and increase responsiveness to market trends, as demonstrated by the ‘Quick Response’ strategy. Organizational innovations such as this have strengthened the competitive base of domestic producers and upstream suppliers such as fibre producers.

3.2.5.1 Definition of ‘innovation’

Sundbo [37] stated that Schumpeter’s definition of ‘innovation’ is the introduction of new elements or a new combination of old elements in industrial organizations. Schumpeter also defined innovation as follows:

1. Introduction of a new product or new product quality.
2. Introduction of a new production process/method - this need not be a new scientific invention but might consist of a new way of treating a product commercially.

3. The opening up of a new market.
4. The opening up of a new source for new materials or semi-manufactured goods regardless of whether the source has existed before.
5. The creation of a new organizational structure in industry, for example by creating a 'breaking down a monopoly' situation.

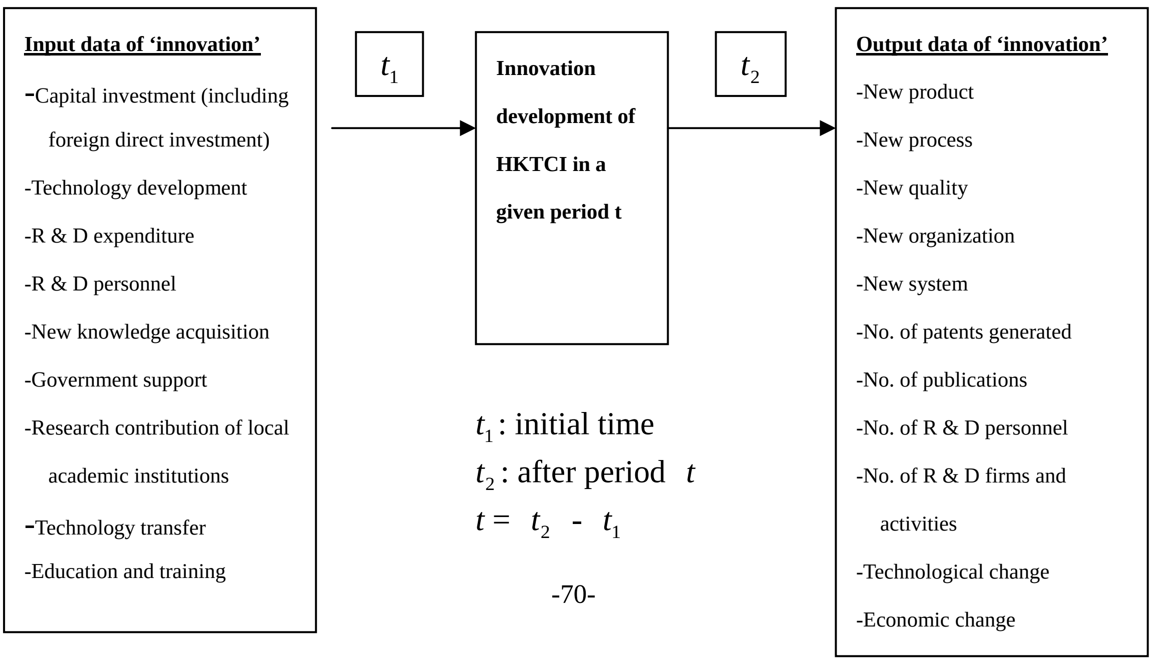
Innovation and technology are powerful drivers of the long-term growth of an economy. They are essential for increasing the added value, productivity and competitiveness of Hong Kong's manufacturing and service industries in the knowledge-based global economy of the 21st century. Innovation encompasses both improved technology and better methods of doing things. It may be manifested in new products or services; improved quality; new methods of production, packaging, marketing or distribution; new markets; new supply sources; new organizations or systems; and other areas. Improved technology is a powerful force for innovation, and is needed not just in the 'high-tech' segments of the economy, but in all economic sectors. Improvements to technology may be applied to all aspects of the value-adding chain, including the way in which a product or service is designed, produced, marketed and delivered. As a result, the outputs of innovation are both technological and economic change [38].

3.2.5.2 Input and output data of ‘innovation’

Saviotti and Nooteboom [39] state that innovation includes government/companies’ expenditures on R & D, product design, trial production, market analysis, purchase of patents and license, number of publications, and training of employees related to innovation projects.

A review of the literature in the area of ‘innovation’ as a key indicator therefore facilitated development of a model for measuring the technological development in the area of ‘innovation’ as shown in Figure 3-5.

Figure 3-5 Input and output data of ‘innovation’



3.3 Research and Development (R & D)

Grupp [19] defined R & D as a systematic, creative work that advances the state of knowledge, whether in conjunction with man, culture or society and used this knowledge to identify new potential applications. The types of R & D are as follows:

1. Pure, basic or fundamental research – initiated 'primarily' with the aim of knowledge gain which would give an advantage, raising expectations of an economic or social increase in prosperity, not necessity even as a long-term prospect, dedicated to solving practical problems.
2. Application-oriented fundamental research – used in situations where basic research targets certain areas of general interest or is focused in their direction.
3. Applied research – original investigations aimed at gaining new knowledge but biased towards specific and practical purposes or objectives.

R & D is a measure of the input effort in relation to knowledge creation (innovation) and patent grants supplying output for the knowledge creation process [40]. Cobbenhagen [41] stipulated that technology management always dealt with make-or-buy decisions regarding technology, and companies with only limited in-house R & D activities might have a very active technology management function. It can distinguish two basic types of innovating companies:

1. Companies which lack internal R & D capacity and have to acquire knowledge outside - they follow external developments and make extensive use of external knowledge.
2. Companies which can develop new products and services themselves.

Companies usually invest in R & D with the aim of developing or maintaining a competitive advantage. Effective R & D aimed at product innovations can, for instance, lead to successful new products, which in turn might lead to an increase in turnover, higher market shares or even increased profit. Nonetheless, the level of R & D expenditures is frequently employed as an indicator of a company's technological activities [41].

Geisler [42] discovered that inputs to the R & D process involve manpower and expenditures. The outputs of R & D involve patents, publications, new products, new ideas and methods, new equipment and systems, etc. The R & D outputs can be classified as follows:

1. Immediate outputs	• Publications in scholarly journals • Technical reports • Patents/patent disclosures • Citations in referred journals • New ideas • Improved understanding of phenomena
2. Intermediate outputs	• Scientific/technical (number of people and firms) Improved performance of products/processes Transformation of marginal specialty into reputable fields • Products/processes used by others Changes in cost of product in manufacturing Increased uniformity of product specifications • Information and its use by others Development of communication networks Improved capability of user to absorb/utilize technical knowledge • Improved performance by other Improved cooperation of users Improved competitiveness of user • Meeting objectives and plans of others Improved cooperation among users and others Improved technology base of users
3. Penultimate outputs	• Level of mortality • Level of morbidity • Improved safety of work environment • Extinction of particular causes of death

	• Improved mobility (transport)
4. Ultimate outputs	• Energy independence • National security • Quality of life • Gross national product [42]

3.3.1 Technology transfer

One of the factors contributing to the creation of innovation is technology transfer. Modes of technology transfer are direct investment in advanced machinery and equipment, foreign direct investment, and technology acquisition through licensing, joint venture or other means.

Dunning [43] points out that the only way in which developing countries can obtain advanced technology is through Foreign Direct Investment (FDI). The following factors for acquiring advanced technologies should be considered:

1. FDI is an important channel for the MNEs to gain access to the Chinese market.
2. The process of technology acquisition by developing countries is one of learning and improving their technological capability. This is a complex, long-term,

process and various levels of technological competence such as the ability to use the technology, adopt it, extend it, and eventually to become more independent by developing, designing and selling it [44].

3. Licensing agreements are not always the best channel for technology transfer. This is especially so in the case where industries that require heavy R & D investment and in developing countries which have limited opportunities to gain access to advanced technology [45].

3.3.1.1 Parameters of technology transfer

Based on the above findings, the key indicators of technology transfer activities are as follows:

1. Advanced machine investment – one of fastest technology transfer policies is to adopt advanced machinery and equipment through direct investment by a company or an industry where is lagging behind other rivals in terms of technology level and know-how.
2. Advanced technology acquisition – an alternative to technology transfer is acquisition of advanced technology through licensing and joint-venture

agreements with overseas manufacturers. The level of technology transfer is based on mutual agreement. For example, licensing arrangements involve an agreement between a firm in one country and a manufacturer in another to use the former's trademarks and expertise to produce and market the product in the foreign manufacturer's country [46].

3. IT investment – The application of information technology (IT) has increased in every sector of the clothing industry from the receipt of the order to goods delivery. It can speed up information acquisition, data transmission, communication and productivity and human efficiency. The level of IT investment implies the level of technology transfer through direct or indirect investment.

3.3.2 External factors affecting the technological development of the TC industry

In addition to indicating the importance of the 5 key indicators discussed, the literature review also revealed that two important factors, these being government policy on innovation and technology, and environmental impact (such as global technology climate, China's accession to WTO, removal of quota in 2005 etc.). These factors will affect the output data of the 5 key indicators after a certain period and should be taken into consideration when the technological development of the TC industry is measured.

3.3.2.1 Government's policy

The best role for government's policy on a nation's industry is to stimulate its dynamism and upgrading. The government's aim should be to create an environment in which firms can improve their competitive advantage in established industries by introducing more sophisticated technology and methods and penetrating more advanced segments. Government policy should also support the ability of the nation's firms to enter new industries where greater productivity can be achieved than in older, less productive industries and segments.

3.3.2.1.1 Science and technology policy

An upgrading economy demands a steadily rising level of technology. Improvements in technology, broadly defined, are integral to improving efficiency, commanding higher prices through better quality, penetrating new segments and markets, and providing the underpinnings of productivity growth. Research and development can not be left solely to firms because the benefits to the national economy spill over from and exceed the benefits to individual firms. Effective science and technology policy should include the following:

1. A match between science and technology policy and the patterns of competitive advantage in the nation's industry.
2. Emphasis on research universities instead of government laboratories.
3. Principal emphasis on commercially relevant technologies.
4. Strong links between research institutions and industry.
5. Research contracts between firms and government research institutions in universities to introduce to some market discipline and facilitate more fluid interchange.
6. Primary emphasis on speeding the rate of innovation rather than diffusion.
7. More cooperative research to bolster the rate of innovation in industry [47].

3.3.2.1.2 Technological infrastructure policy

Teubal et al [48] wrote that Technological Infrastructure Policy (TIP) is increasingly coming to the forefront of policy discussions, both in the specific content of technological policy, and more generally, with regards to growth-promoting policies in advanced and developing economies. They claim that the adoption of TIP is inevitable due to the following:

1. Widespread recognition of the increasing importance of innovation and technological development to national economic performance.
2. The increasing focus of industrial policy in many countries, for example, the European Union, the specific policy roles of generic and pre-competitive research and institutional change.
3. The significant theoretical and empirical contributions made by scholarship in providing our understanding of TIP [47].

Teubal et al [48] have some specific views on the role of technological infrastructure in the following postulates:

1. Technology does not automatically move from the laboratory to the marketplace. It became apparent in the eighties that the role for government was to fund basic science but not technology, and that both the process of innovation and transfer of technology from public laboratories, and the diffusion of new technologies

should be performed by market forces without government support.

2. There is an important role to be played by public institutions, even at the basic research or science stage.
3. Private and public institutions that produce technology must be integrated with business and economic institutions.

The existing forms of technological infrastructure are:

1. Conventional infrastructure (transport, communication, power, etc.)
2. Human capital
3. Institutional infrastructure (e.g. patent system, market for high-risk stocks)
4. Firm-based capabilities in production, investment and innovation
5. The resolution of the implicit interdependences of investment decisions on which structural change depends

To support an effective technological infrastructure, market building should be incorporated. Market building is a dynamic approach to the transfer of technology. It proceeds in stages:

1. The local market for imported technological imports must be developed.
2. A derived market for local linking or intermediation services emerges.
3. These stimulate the creation of a market for local substitutes for foreign technology, so the domestic economy is able to develop a competitive advantage in an increasingly mature foreign technology.

Building the supply of technological infrastructure includes:

1. Learning-by-doing;
2. Training consultants; and
3. Training technical personnel [48].

3.3.2.1.3 Government's procurement policy

Porter [47] suggests that government procurement can be a positive force for upgrading national competitive advantage under the following circumstances:

1. Government procurement should provide early demand for advanced new products and services, pushing its local suppliers into new areas.
2. Government agencies should set stringent product specifications and seek

sophisticated product varieties rather than merely accept domestic suppliers' offers.

3. Government specifications should be set with a view to what will be valued in other advanced nations, rather than reflecting only the nation's idiosyncratic needs.
4. Government procurement should initiate a strong demand of competition if it is to upgrade the local industry.
5. Government procurement that makes innovation easier works to the benefit of a nation's industry.

3.3.2.2 Environmental impacts

The different forms of environmental impacts include global technology climate, China's accession to the WTO, removal of quota in 2005, etc. They would affect the output data of the 5 key indicators after a certain period. Those factors should be taken into consideration for measuring the technological development of the TC industry.

3.3.2.2.1 Technology content and climate

Using Porter's 5 forces model, Sharif [49] constructed a productive enterprise system structure. Technology is a human-made resource comprising various components, which enables an enterprise to perform its productive activities. The key elements that influence the technology content potential of the enterprise are technology components available to the enterprise and technology capabilities possessed by the enterprise. The enhancement of any enterprise's competitive edge in the marketplace can be accomplished by increasing the quantum of the technology content added by the enterprise operations, which in effect is achieved through the enhancement of the degree of sophistication of technology components utilized, and the level of accumulation of technology capability. Technological components as well as technological capability of the firm would enable it to transform limited resources into desired products in a more effective manner. Capability accumulation is a process of institutional learning, which results in both increased productivity and economic efficiency of the enterprise.

Commonly distinguished technology components for conversion of inputs to marketable outputs are: object-embodied physical facilities (such as: tools, devices, equipment, machinery, structures - referred to as technoware), which enhance human physical powers and controls for the transformation operation, person-embodied human abilities (such as: skills, expertise, creativity - referred to as humanware), which contribute to actual utilization of available resources, record-embodied documented facts (such as design parameters, specification, blue-prints, manuals – referred to as inforware), which enable quick learning and result in time and resources savings; and institution-embodied organizational frameworks (such as methods, linkages, practices - referred to as orgaware), which coordinate activities for achieving purposeful results. Generally, the technoware degree of sophistication corresponds to the increasing complexity of the physical transformation operations, the humanware degree of sophistication indicates utility of available facts, and increasing orgaware degree of sophistication results in improved overall performance in the marketplace. Improvement in the degree of sophistication of the four components of technology gradually enhances the technology capability of an enterprise. The enterprise may obtain the above-mentioned components of technology in two ways - either through import or local development [49].

The enterprise also takes into consideration the technology infrastructure and technology climate. The technology climate is, however, dependent on the industry competitive structure and cultural-political aspects. A cascade of various infrastructure and climate factors determines a firm's ability to manage technological change effectively. Industry technology climate can be either a constraint or a catalyst for achieving the full technological potential of an enterprise. Strong competition from rivals and openness of the market generate pressure for continuous technological innovation and development. A competitive industry helps to create related industries in a mutually reinforcing process. This process often breeds new competitive industries. A well developed cluster of related industries helps the pooling of private resources for technology factor creation, human resources development, information services, consultancy services, etc. Clusters provide mobility of skilled manpower, which magnifies and accelerates the process of factor creation. A concentration of rivals, customers and suppliers promote efficiency and business. Geographic concentration of a cluster can also influence the innovation process [49].

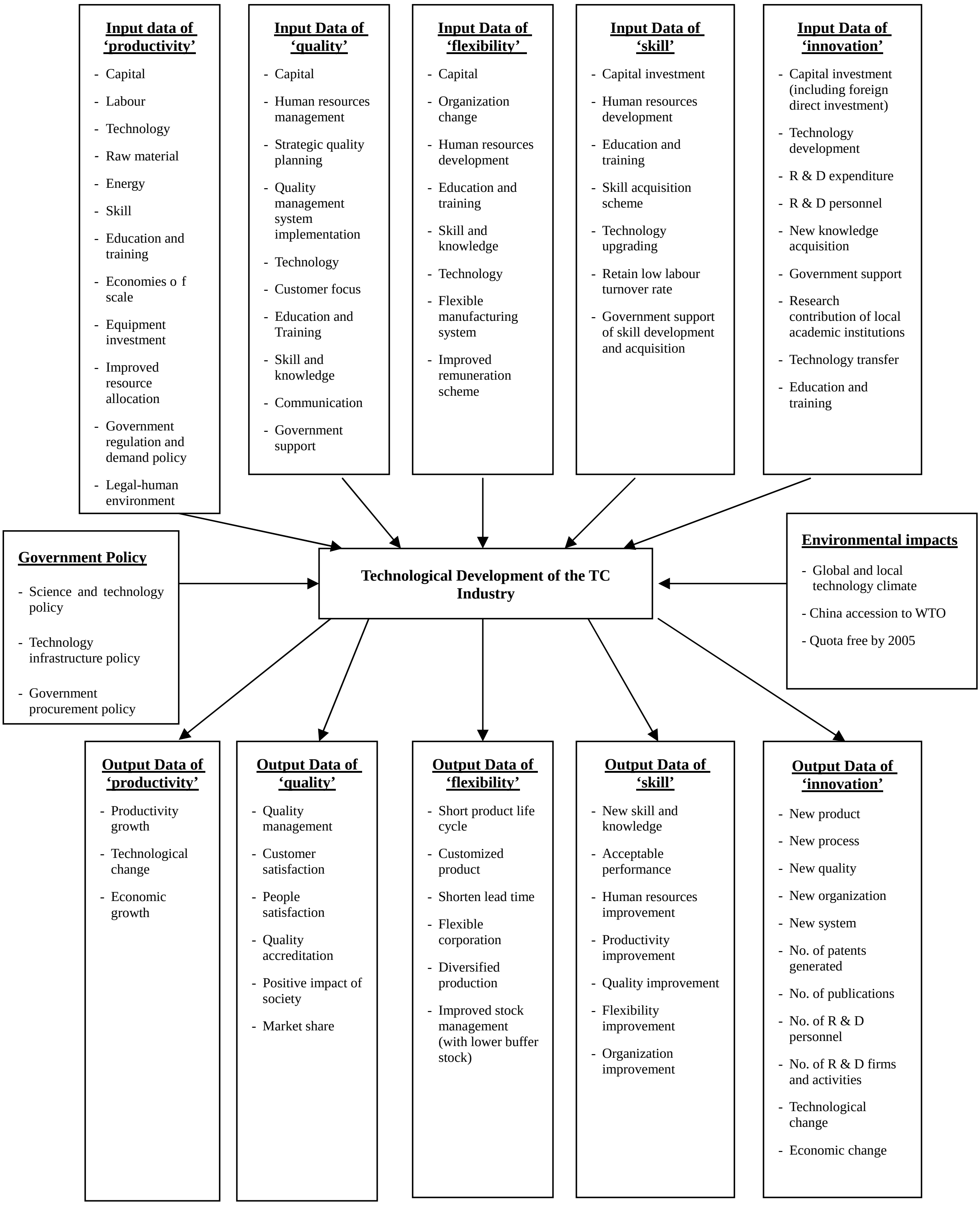
3.3.2..2.2 China's accession to the World Trade Organization (WTO)

China became a member of the WTO in 2001. This created many opportunities or threats to the local TC industry. Many opportunities have been apparent since China's accession to WTO, as China opened its domestic markets to the world, lowered import tariffs and erased trade barriers. De-regulation of the retail and distribution sectors has opened up the market to foreign firms, including local TC firms. Alternatively, disintermediation of Hong Kong due to more direct sourcing from the Mainland China and further reduction in the number of locally based establishments due to rapid relocation to the Mainland has also occurred. In this regard, China accession to WTO is a reason why HKTCI should upgrade its technology in an effort to produce innovative and high value-added products [50].

3.3.2.2.3 Quota free by 2005

The TC quota was removed in 2005. Now, all producers enjoy equal opportunity to compete with each other in the global marketplace. Greater opportunities to export Mainland products to the USA and the EU have arisen. HKTCI is now at a disadvantage when competing with the developing countries to produce low- to medium-cost items. Local firms are therefore expanding their multiple manufacturing locations, creating effective supply chain management. HKTCI should take this chance to further invest in technology change and upgrading in an attempt to re-engineer its organizational structure and roles in order to sustain its competitiveness in the global marketplaces [50].

Figure 3-6 Key Indicators and External Factors Affecting the Technological Development of the TC industry



A review of the literature on the technological development of the TC industry suggests that whilst there are 5 key indicators for the 'Technometric' model for measuring technological development, there are additional factors, namely, Government policy and environmental impact that should be included. Based on the above findings, a model comprising the 5 key indicators and their input and output data influencing the technological development of HKTCI is shown in Figure 3-6. The input and output data of the 5 key indicators described in the review together with the two external factors were subsequently used to prepare a questionnaire for industrial survey and evaluation. The outcome of that study was then to develop the 'Technometric' model in the later in the study.

3.4 Development of 'Technometric' Model for the TC Industry

The next step was to design a 'Technometric' model for measuring the technological development of the TC industry. The measurement could show the technological change of HKTCI and provided a framework to assess the impact of the Government's industrial policy on the technological change of the industry.

3.4.1 The identification of key 'Technometric' performance attributes for measuring the technological development of the TC industry

The literature review revealed that the key 'Technometric' performance attributes included 'product', 'process' and 'service' which in combination are referred to as 'Technometric' profile. These performance attributes were the key attributes used to design a 'Technometric' model for measuring the technological change of the TC industry whereas the 5 key indicators and their input and output data were constituents to each 'Technometric' performance attribute.

3.4.1.1 The definition of 'product'

Product is defined as the result of a process. There are four generic product categories, as follows:

1. Services
2. Software
3. Hardware
4. Processed material

Many products comprise elements belonging to different generic product categories. Whether the product is then called service, software, hardware or processed material depends on the dominant element [51].

3.4.1.2 The definition of 'process'

Process is defined as a set of interrelated or interacting activities which transforms inputs into outputs. Inputs to a process are generally outputs of other processes. Processes in an organization are generally planned and carried out under controlled conditions to add value [52].

The outputs are products, tangible or intangible. The process itself is (or should be) a transformation that adds value. Every process involves people and/or other resources in some way [53].

3.4.1.3 The definition of 'Service'

Service is defined as the result of at least one activity necessarily performed at the interface between the supplier and customer and is generally intangible. Provision of a service can involve, for example, the following:

1. An activity performed on a customer-supplied tangible product.

2. An activity performed on a customer-supplied intangible product.

3. The delivery of an intangible product.

4. The creation of ambience for the customer [53].

The characteristics of a service can differ from those of other products and can include such aspects as personnel, waiting time, delivery time, hygiene, credibility and communication delivered directly to the final customer. Customer assessment, often very subjective, is the ultimate measure of the quality of a service [52].

A service is an activity or series of activities of more or less intangible nature that normally, but not necessarily, take place in interactions between the customer and service employees and/or physical resources or goods and/or systems of the service provider, which are provided as solutions to customer problems [54]. From the economic viewpoint, services are defined as things that do not involve the production of physical things, such as legal and medical services and education [55].

3.4.2 Relationship between the 3 'Technometric' performance attributes and the 5 key indicators

Subsequent to literature review and in-depth analysis, the relationship between the 5 key indicators and the 3 'Technometric' performance attributes was defined and a summary is provided in the forthcoming sections.

3.4.2.1 'Productivity' vs the 3 'Technometric' performance attributes

The following discussion indicates the steps taken to find out the relationship between the first key indicator 'productivity' input and output data with the 3 'Technometric' performance attributes.

3.4.2.1.1 Input data of the first key indicator 'productivity' related to the 3 'Technometric' performance attributes

1. Capital investment for productivity improvement – capital is defined as those goods produced by the economic system that is used as input to produce other goods and services. Machinery and equipment are considered to be a nation's

capital stock for processing resources into other valuable products and services [55].

2. Labour employment for productivity improvement – labour force means the number of people employed in the TC industry [55]. Labuor is one of the prime production inputs to improve productivity of products, processes and services.
3. Energy for productivity improvement – many high technology forms use little energy, rather, analytic emphasis is placed on specific material inputs, capital and labour inputs for production [56].
4. Technology input for productivity improvement - technology involves the use of tools, machines, techniques and sources of power to make work easier and more productive. The work involves the production of goods and services, and performing in the process. As such, technology comprises the vast body of knowledge and devices by which humans have progressively mastered their natural environment over the centuries [57].
5. Material resources for productivity improvement – raw material is one of the prime production inputs to improve productivity of product and process. Effective logistic management on material supply would improve material flow within the process and in turn achieve the output target, i.e., number of products produced per hour.

6. Skill acquisition for productivity improvement - Proctor and Dutta [58] define skill as all factors which go to make up a competent, expert, rapid and accurate performance. Skill in this sense, to a greater or lesser content, applies to any performance and is not limited to manual operations but covers a wide range of mental activities as well. This indicates that the scope of skill covers product, process and service that involve human operation.
7. Education and training programmes for productivity improvement - to improve the skills and technology of the workforce in a country, high quality education and training programmes should be developed in order to upgrade the knowledge and know-how of the labour force. As such, this would improve the quality of product and service, as well as the productivity of processes [55].
8. Government regulation and demand policy for productivity improvement – Korres identified that government regulation and demand policy would affect the productivity level of production [59].
9. Improved resources allocation for productivity improvement - firms in business to make a profit have a good reason to choose the best available technology and improve resources allocation to their production process in order to achieve lower costs and higher profits [59].
10. Economies of scale – it is one of the factors that contribute to change in

productivity of a product and process [59].

11. Legal-human environment – it is one of the factors that contributes to a change in the productivity of a product and process [59].
12. Equipment for productivity improvement – firms in production to make a profit have a good reason to choose the best available equipment and technology for their product and production process in order to achieve lower costs and higher profits [55].

3.4.2.1.2 Output data of the first key indicator 'productivity' related to the 3 'Technometric' performance attributes

1. Productivity growth due to productivity improvement - it is the fundamental way in which economic growth occurs. Productivity growth is considered to be the principal means by which a region or a nation can increase its level of income and the well-being if its population [60]. Productivity growth is the only way for nations to pay for higher wages [61] which in turn increase the production cost of a process.
2. Technological change due to productivity improvement - it is the introduction of new methods of production or new products intended to increase the productivity

of existing inputs or to raise marginal products. Technical change can and does have a powerful influence on factor demands. As new products, services, and processes are born, so are demands for new inputs and new skills [45].

3. Economic growth due to productivity improvement - it is an increase in the total output (products and services) of an economy. It occurs when a society acquires new resources or when it learns to produce more using existing resources, e.g. labour, capital, and machinery and equipment in a process [55].

In conclusion, the relationship of the input and output data of the first key indicator 'productivity' to the 3 'Technometric' performance attributes is summarized in Table 3-2.

Table 3-2 The relationship of the input and output data of the first key indicator 'productivity' to the 3 'Technometric' performance attributes

Key performance attributes to measure the technological development of TC industry				
		3 'Technometric' performance attributes		
		'product'	**'process'**	**'service'**
Item	**Input data of key indicator 'productivity'**			
1.1.1	capital for productivity improvement	✓	✓	✓
1.1.2	labour for productivity improvement	✓	✓	✓
1.1.3	energy for productivity improvement		✓	
1.1.4	technology for productivity improvement	✓	✓	✓
1.1.5	raw material for productivity improvement	✓	✓	
1.1.6	skill for productivity improvement	✓	✓	✓
1.1.7	education and training programmes for productivity improvement	✓	✓	✓
1.1.8	government regulation and demand policy for productivity improvement		✓	
1.1.9	improved resources allocation for productivity improvement		✓	
1.1.10	equipment investment for productivity improvement	✓	✓	
1.1.11	economies of scale for productivity improvement	✓	✓	
1.1.12	legal-human environment	✓	✓	
	Output data of key indicator 'productivity'			

1.2.1	productivity growth due to productivity improvement		✓	
1.2.2	technological change due to productivity improvement	✓	✓	✓
1.2.3	economic growth due to productivity improvement	✓	✓	✓

Footnote
✓ : data related to 'Technometric' performance attributes

3.4.2.2 'Quality' vs the 3 'Technometric' performance attributes

The following paragraphs indicate the process whereby the relationship between the second key indicator 'quality' input and output data with the 3 'Technometric' performance attributes was established.

3.4.2.2.1 Input data of the second key indicator 'quality' related to the 3 'Technometric' performance attributes

1. Capital for quality improvement - investment in machinery and equipment is to improve the output (product and service) quality of a process in order to meet the customer's needs and requirements.
2. Human resources management for quality improvement - is the utilization of individuals to achieve an organization's objectives [62]. The organization's objectives involve the conformity of products, processes and services to customer's requirements.

3. Strategic quality planning - it is the process whereby organizations develop a vision, mission, guiding principles, broad objectives, and specific strategies for achieving the broad objective [63]. Without strategic quality execution, it is hard to convince people the strategic quality planning would improve the outcome quality of the final output (products and services).
4. Quality management system implementation - ISO 9000 registration will give an organization a good start when implementing total quality. ISO 9000 is an international standard for providers of goods and services that sets broad requirements for the assurance of quality and for management's involvement [63].
5. Technology for quality improvement – it is the physical manifestation of knowledge. It extends human capabilities and enhances an organization's competitiveness to sustain high quality performance in products, processes and services [63].
6. Customer focus - in a total-quality setting, the customer is the driver. This applies to both internal and external customers. External customers define the quality of the product and service delivered. Internal customers help define the quality of the people, processes, and environments associated with the products or services [63].
7. Education and training for quality improvement – these are fundamental to total

quality because they represent the best way to improve people on a continual basis [63]. Scholtes [64] pointed out that in a quality organization, everyone is constantly learning. Management encourages employees to constantly elevate their level of technical skill and professional expertise. People gain an ever-greater mastery of their jobs and learn to broaden their capabilities to improve the quality of products, processes and services.

8. Skill and knowledge for quality improvement - Proctor and Dutta [58] define skill as all factors which go to make up a competent, expert, rapid and accurate performance. Skill in this sense, to a greater or lesser extent, refers to any performance and is not limited to manual operations but covers a wide range of mental activities as well. This indicates the scope of skill covers product, process and service that involve human operation.

9. Communication facilities for quality improvement – it is the transfer of a message that is both received and understood. It means the message is received, understood, and being acted on in the desired manner. Communication is the ‘oil’ that keeps the total-quality ‘engine’ running. It plays the role of facilitation in the total-quality setting for products, processes and services [63].

10. Government support for quality improvement – good industrial policy for a country will help eliminate those inhibitors of competitiveness and enhance total

quality management among TC manufacturers via quality improvement programmes, technology transfer, investment in education, and research and development [63]. This assists manufacturers to improve quality of their products, processes and services.

3.4.2.2.2 Output data of the second key indicator 'quality' related to the 3 'Technometric' performance attributes

1. Quality management – Quality management systems can assist organizations in enhancing customer satisfaction. The system approach encourages organizations to analyze customer requirements, define the processes that contribute to the achievement of a product which is acceptable to the customer, and keep these processes under control [52]. The quality management system continuously improves the quality of products, processes and services.
2. Customer satisfaction – in a total-quality setting, customers define quality. Therefore, customer satisfaction must be the highest priority. A total quality approach will satisfy the needs and expectations of customers. Customer satisfaction is achieved by producing high-quality products and services that meet or exceed expectations. It must be renewed with each purchase. The key to

establishing a customer focus is to put employees in touch with customers so that customer needs are known and understood [63].

3. People satisfaction – external suppliers are the people outside the organization who sell the raw material, information, or services to the organization. Inside the company, employees receive work passed on from other people in the organization, the internal suppliers. Each worker, therefore, is a customer of preceding workers; and each has customers, the people to whom the worker passes on his or her work [64]. However, workers and external suppliers are not external customers and they have no direct impact on the quality of the final products and services.

4. Quality accreditation – quality accreditation refers to the kind of accreditation obtained by the company in quality achievement, i.e., ISO 9000 certification, total quality management which improves the quality of the company's products, processes and services.

5. Positive impact of society – the process of incorporating public responsibility and citizenship is not unlike the way in which a company incorporates quality improvements. It begins with an understanding of customer requirements for products and services then translates those requirements into a vision, a mission, and goals for the company. The new management mode takes a more holistic

view of employees' role in their company and community [65].

6. Market share – quality management systems steer the company to meet customer focus and obtain customer satisfaction as a return. Good customer satisfaction and relationship enable make the company to have a greater market share in the target marketplace.

In conclusion, the relationship of the input and output data of the second key indicator 'quality' to the 3 'Technometric' performance attributes is summarized in Table 3-3.

Table 3-3. The relationship of the input and output data of the second key indicator 'quality' to the 3 'Technometric' performance attributes

Key performance attributes to measure the technological development of TC industry				
		3 'Technometric' performance attributes		
Item	**Input data of key indicator 'quality'**	**'product'**	**'process'**	**'service'**
2.1.1	capital for quality improvement			
2.1.2	human resources management for quality improvement	✓	✓	✓
2.1.3	strategic quality planning for quality improvement	✓	✓	✓
2.1.4	quality management system implementation	✓		✓
2.1.5	technology for quality improvement	✓	✓	✓
2.1.6	customer focus for quality improvement	✓	✓	✓
2.1.7	education and training for quality improvement	✓	✓	✓
2.1.8	skill and knowledge for quality improvement	✓	✓	✓
2.1.9	communication facilities for quality improvement	✓	✓	✓
2.1.10	government support for quality improvement	✓	✓	✓
	Output data of key indicator 'quality'			
2.2.1	quality management due to quality improvement	✓	✓	✓
2.2.2	customer satisfaction due to quality improvement	✓		✓

2.2.3	people satisfaction due to quality improvement		✓	
2.2.4	quality accreditation due to quality improvement	✓	✓	✓
2.2.5	positive impact of society due to quality improvement	✓		✓
2.2.6	market share due to quality improvement	✓		✓

Footnote
✓ : data related to 'Technometric' performance attributes

3.4.2.3 'Flexibility' vs the 3 'Technometric' performance attributes

The relationship between the third key indicator 'flexibility' input and output data with the 3 'Technometric' performance attributes is discussed in the following sections.

3.4.2.3.1 Input data of the third key indicator 'flexibility' related to the 3 'Technometric' performance attributes

1. Capital investment for flexibility improvement – production flexibility includes the spectrum of changes which result from automation. Automation based on computers and microelectronics has pushed it beyond the concept of other forms of labour-saving capital investment [61].
2. Organization change for flexibility improvement – Dundas pointed out that

changes in the organization of production interact to necessitate the flexible deployment of skills [66].

3. Human resources development for flexibility improvement – human resources development is required to create a flexible work force. Achieving productivity and efficient in flexible production system may rest largely on flexible labour. The presence of fewer routine tasks and few long production runs from flexible production leads to a demand for a highly 'skilled, flexible, coordinated and committed work force [67].
4. Education and training programmes for flexibility improvement – the technical demand and coordination for flexible production suggests a need for education and training programmes and more cooperative labour relations than was typical under Fordism [68].
5. Skill and knowledge acquisition for flexibility improvement – the presence of fewer routine tasks and few long production runs from flexible production leads to a demand for a highly 'skilled, flexible, coordinated and committed work force [67]. For all employers adopting flexible production, jobs and specific work tasks are more knowledge-based, interdependent and controlled by workers than under traditional Fordist rules [68].
6. Technology input for flexibility improvement – the expense of new technology

might be greater than that of previous generations of machines, but it provides a great deal more flexibility in product variety. This form of flexibility is especially important, because a form with such a capability is able to handle both routine, volume production and more difficult (and profitable) non-standard orders, which allow it to accommodate small-volume new product introduction [61].

7. Improved remuneration scheme for flexibility improvement – an improved remuneration scheme will attract more skilled labour and young people to work in the TC industry. Flexible manufacturing requires high quality, knowledgeable labour to have multi-skilled technique to handle frequently changing production modes and greater variety of goods to be produced. Attractive remuneration and sensitive schemes should be introduced.
8. Flexible manufacturing system for flexibility improvement – Upton [69] also points out that, at the plant and system level, flexibility is about the ability to adapt or change. It is about increasing range, increasing mobility, or achieving uniform performance across a specified range.

3.4.2.3.2 Output data of the third key indicator 'flexibility' related to the 3 'Technometric' performance attributes

1. Short product life cycle – the principal push for flexibility is the speeding up of product life cycle, which means that economies of scale and large production volumes no longer apply, and that much greater attention must be paid to product innovation in order to generate the required succession of new product cycles [61].
2. Customized product – Pine [70] defines mass customization as ‘the mass production of individually customized goods and services’. The prerequisite of implementing mass customization is the application of advanced technology such as a flexible manufacturing system.
3. Short lead time – flexibility shortens required lead time for product manufacture in quick responsive manner. The process must include a flexible manufacturing system in order to produce goods in a shorter time than is normally the case.
4. Flexible corporation – the new segmented markets are held to have demanded ‘flexible forms of organization which permitted rapid shifts in output’ [71]. Firms producing high-quality, low-volume products for niche markets have evolved new organizational form, centred on much smaller specialized production units than their mass production forerunners [55].
5. Diversified production – Dundas’ study shows that coordination of resources and

flexible manufacturing system enhance flexibility and diversify production [66].

6. Improved stock management (with lower buffer stock) – the ladies' fashion market is characterized by volatile product demands, which necessitate shorter production runs and the manufacture of small orders of fast selling items. Flexible manufacturing technology can improve stock management with lower buffer stock [62].

The relationship between the input and output data of the third key indicator 'flexibility' and the 3 'Technometric' performance attributes is shown in Table 3-4.

Table 3-4. The relationship of the input and output data of the third key indicator 'flexibility' to the 3 'Technometric' performance attributes

Key performance attributes to measure the technological development of the TC industry				
		3 'Technometric' performance attributes		
		'product'	**'process'**	**'service'**
Item	**Input data of key indicator 'flexibility'**			
3.1.1	capital for flexibility improvement		✓	
3.1.2	organization change for flexibility improvement		✓	
3.1.3	human resources development for flexibility improvement		✓	
3.1.4	education and training for flexibility improvement		✓	✓
3.1.5	skill and knowledge acquisition for flexibility improvement		✓	✓
3.1.6	technology input for flexibility improvement	✓	✓	✓
3.1.7	improved remuneration scheme for flexibility improvement		✓	✓
3.1.8	flexible manufacturing system for flexibility improvement	✓	✓	
	Output data of key indicator 'flexibility'			
3.2.1	short product life cycle	✓		
3.2.2	customized product	✓	✓	

3.2.3	short lead time	✓	✓	
3.2.4	flexible corporation	✓	✓	✓
3.2.5	diversified production		✓	
3.2.6	improved stock management (with lower buffer stock)		✓	✓

Footnote
✓ : data related to 'Technometric' performance attributes

3.4.2.4 'Skill' vs the 3 'Technometric' performance attributes

The following sections discuss the relationship between the fourth key indicator 'skill' input and output data with the 3 'Technometric' performance attributes.

3.4.2.4.1 Input data of the fourth key indicator 'skill' related to the 3 'Technometric' performance attributes

1. Human resources for skill enhancement – human resources are emphasized as important in international competitiveness and economic development [72]. Stokey [73] states that human resources investment has a positive external effect on the human capital of later cohorts, so average human capital tends to grow over time. Products and services with higher quality having more characteristics would be improved through human resources investment.
2. Education and training programmes for skill enhancement - there is much evidence

of the increase in educational enrolment pari passu with increasing output (products and services) and exports of manufacturers. Considerable survey evidence at the firm level attributes to education and training both the ability to adopt new technology by firms, and the ability to make other productivity advances [72].

3. Skill acquisition scheme – in a world of increasingly sophisticated technologies, it has become more difficult to discern a country's competitive advantage in foreign trade simply on the basis of labour abundance and labour intensity of alternative production activities. The profile of skills embodied in the labour force has assumed an increasing importance in shaping cost competitiveness, and not merely the size of the labour force in relation to other available inputs [72]. Intensive skill acquisition schemes adopted by firms would enhance their productivity in cases where products and services are supplied.
4. Technology upgrading for skill enhancement – technology is not perfectly transferable like a physical product as it has many 'tacit' elements that need the buyer to invest in developing new skills and technical and organizational information [72]. Technology upgrading is required to develop and upgrade useful new technologies to upgrade a firms' skill when producing high quality and value-added products, processes and services.
5. Retain low labour turnover rate – maintaining low turnover rate would assist skill

retention as well as prevent any leakage of privately owned technology and know-how to another competitors [72].

6. Government support for skill development and acquisition – apart from education and training of young people and the existing work force, active support from the government in the areas skill development and acquisition via technology transfer, in addition to research and development should be required to upgrade a firms' skill level when producing high quality and value-added products, processes and services.

3.4.2.4.2 Output data of the fourth key indicator 'skill' related to the 3 'Technometric' performance attributes

1. New skill and knowledge due to skill enhancement – traditional modes of competition based on low costs and prices are being replaced by competition driven by quality, flexibility, design, reliability and networking. This change is not just in markets for advanced manufactured goods but also in standard consumer goods like TC products. Firms acquiring new skill and knowledge are specializing increasingly in different segments of the production chain, outsourcing segments and services to other firms to reap economies of scale and

achieve greater levels of specialization [60].

2. Acceptable performance due to skill enhancement – the processes that go into the development of common, everyday skills also go into the acquisition and performance of more specialized cognitive and motor skills. Skill acquisition proceeds through phases characterized by qualitative differences in performance [58]. In this sense, skills help labor to perform the tasks of producing products and services.
3. Human resources improvement due to skill enhancement – human resources improvement would enhance employees' skill when producing high value-added and quality products and services.
4. Productivity improvement due to skill enhancement – labour productivity is a function of skill in the labour force. This higher labour productivity is assumed to be generated by higher wage rates which may be paid for higher skills: if the higher labour productivity outweighs the higher wage rates which may be paid for higher skills, then there will be a lower labour cost per unit of output and a lower cost of production per unit [72]. Productivity improvement is the only way for the industry to increase the production of products, processes and services.
5. Quality improvement due to skill enhancement – just-in-time and total quality

management required labour involvement and flexibility [73]. More skilled labour will enhance the firm's capability to improve its quality management system to keep the quality of products and services to the customer's requirement.

6. Flexibility improvement due to skill enhancement – Piore and Sabel [74] pointed out that a new production paradigm has emerged. Under appropriate conditions of competition, increased efficiency occurs with flexibility at every level of technological development.

7. Organizational improvement due to skill enhancement – firms increasingly employ high skilled labour and technically qualified personnel who can absorb new technologies and pay adequate attention to certain vital process functions to produce goods and services [72].

The relationship of the input and output data of the third key indicator 'skill' to the 3 'Technometric' performance attributes is shown in Table 3-5. It has been demonstrated that items 4.1.1 capital investment for skill enhancement and 4.1.6 retain low labour turnover rate do not have any relationship to the 3 'Technometric' performance attributes. This finding was further verified by 5 Hong Kong local TC experts in the pilot test.

Table 3-5. The relationship of the input and output data of the fourth key indicator 'skill' to the 3 'Technometric' performance attributes

Key performance attributes to measure the technological development of the TC industry				
		3 'Technometric' performance attributes		
		'product'	**'process'**	**'service'**
Item	**Input data of key indicator 'skill'**			
4.1.1	capital investment for skill enhancement			
4.1.2	human resources for skill enhancement	✓		✓
4.1.3	education and training for skill enhancement	✓		✓
4.1.4	skill acquisition scheme for skill enhancement	✓		✓
4.1.5	technology upgrading for skill enhancement	✓	✓	✓
4.1.6	retain low labour turnover rate			
4.1.7	government support for skill development and acquisition	✓	✓	✓
	Output data of key indicator 'skill'			
4.2.1	new skill and knowledge due to skill enhancement	✓	✓	✓
4.2.2	acceptable performance due to skill enhancement	✓	✓	✓
4.2.3	human resources improvement due to skill enhancement	✓		✓
4.2.4	productivity improvement due to skill enhancement	✓	✓	✓
4.2.5	quality improvement due to skill enhancement	✓		✓
4.2.6	flexibility improvement due to skill enhancement		✓	
4.2.7	organizational improvement due to skill enhancement	✓	✓	✓

Footnote
✓ : data related to 'Technometric' performance attributes

3.4.2.5. 'Innovation' vs the 3 'Technometric' performance attributes

The following sections indicate the relationship between the fifth key indicator 'innovation' input and output data with the 3 'Technometric' performance attributes.

3.4.2.5.1 Input data of the fifth key indicator 'innovation' related to the 3

‘Technometric’ *performance attributes*

1. Capital investment (including foreign direct investment) for innovation upgrading – accumulation of capital and the division of labour increase the technical productivity and capital returns of a firm. Marx emphasized that science was a necessary prerequisite for new machines, production methods or for new technology generally and hence science also boosted economic growth and social wealth [19]. This indicates that capital investment in new technology and production will enhance the firm’s innovation in respect of products, processes and services.
2. Technology development for innovation upgrading – throughout the 1980s, the theoretical school insisted on the development of technology as the central determinant of economic growth and of the company’s development capability. Many services, as we have seen, are not tied to technology, so service innovations cannot be explained in terms of technological development [75].
3. R & D expenditure for innovation upgrading – international commercial success in high-technology products is basically supported by R & D spending as a fraction of GDP. Achieving larger export shares in knowledge-based products requires investment of substantial resources in R & D [74].

4. R & D personnel for innovation upgrading – Geisler [76] discovered that input to the R & D process involved manpower (R & D personnel) and expenditures. The outputs of R & D include patents, publications, new products, new ideas and methods, new equipment and systems, etc.
5. New knowledge expenditure for innovation upgrading – innovation and a technological regime draws upon selected fields of technological and scientific knowledge. The specific combination of these fields defines the knowledge base that underlies a firm's innovation [77]. It is either the process of knowledge accumulation of existing technologies, or the discovery of a new technology (through investment), that precedes and begins the development of improved, or radically new products and processes.
6. Government support for innovation upgrading – in technology development, government intervention differs by national influence domestic technological capabilities. These range from infant industry promotion and the support of large firms to credit subsidization, technology targeting, FDI restrictions, the development of research institutions and extension services, and the financing of links between industry and universities [60]. Government support speeds up the development of innovative products and processes within a nation.
7. Research contribution of local academic institution to innovation upgrading – many

governments of developing countries have research institutions and laboratories, ostensibly to create and disseminate productive technologies to industry [60]. This facilitates firms to develop their innovative products and services.

8. Technology transfer for innovation upgrading – innovation is not an exercise which companies must perform entirely solo. Instead, they depend on their environments for knowledge and ideas. R & D activities, particularly the exploratory aspects, are frequently contracted out. In many sectors, the required disciplines for long-term research are becoming more and more diverse, and it is impossible to have all the necessary knowledge (and equipment) in house. Knowledge transfer between other companies and institutes is therefore becoming increasingly important [78].
9. Education and training programmes for innovation upgrading - to improve the skill and technology of the work force in a country, high quality education and training programmes should be implemented in order to upgrade the knowledge of the labour force. As such, this would improve the quality and innovation of products, processes and services [55].

3.4.2.5.2 Output data of the fifth key indicator 'innovation' related to the 3

'Technometric' performance attributes

1. New product due to innovation upgrading – Sundlo [75] informed that Schumpeter's definition of 'innovation' is the introduction of new elements or a new combination of old elements in industrial organizations. Schumpeter [79] also defined innovation as the introduction of a new product.
2. New process due to innovation upgrading – Schumpeter [79] defined innovation as the introduction of a new production method. This need not be a new scientific invention. It might consist of a new way of treating a product commercially. Sundbo [75] also defined innovation as the introduction of a new process.
3. New quality due to innovation upgrading – Schumpeter [79] defined innovation as the introduction of a new product and service quality.
4. New organization due to innovation upgrading – Schumpeter [79] defined innovation as the introduction of a new organization structure in industry, for example by creating or removing a monopoly situation. The organization may offer products, services and processes for manufacture.
5. New system due to innovation upgrading – Sundbo [75] defined innovation as the introduction of a new system, which may deliver products, processes and services

as a result.

6. Number of patents generated due to innovation upgrading – the methodological tools to be used for innovation benchmarking begin with patent statistics. Patent statistics are also useful to explore the knowledge production that leads to innovation and subsequent growth. A technique known as ‘Technometric’ benchmarking is applied to give quantitative expression to the multidimensional nature of products, processes and services [80].
7. Number of R & D personnel employed due to innovation upgrading – Geisler [76] found that input to the R & D process involved manpower (R & D personnel) and expenditures. The outputs of R & D include patents, publications, new products, new ideas and methods, new equipment and systems, etc.
8. Number of publications arising from innovation upgrading – Geisler [76] stated that one of the outputs of R & D is the publication. Grupp and Maital [80] consider that a publication is one of the scientific outputs of R & D for products, processes and services.
9. Number of R & D firms and activities due to innovation upgrading – companies usually invest in R & D with the aim of developing or managing a competitive advantage. Effective R & D aimed at product innovation can, for instance, lead to successful new products and processes, which in turn might lead to an increase

in turnover, higher market shares or even increased profits [78].

10. Technological change due to innovation upgrading – innovation and technology are powerful drivers of the long-term growth of an economy. The technological change is essential for affecting the added value, productivity and competitiveness of our manufacturing and service sectors [75].
11. Economic change due to innovation upgrading – Schumpeter identified that innovation was the essential function of the entrepreneur and then constructed a theory of economic development in which innovation, credit and profit maximization were the three central elements [81]. Economic change will influence the demand and supply of products and services of the TC industry.

The relationship between the input and output data of the fifth key indicator 'innovation' and the 3 'Technometric' performance attributes is summarized in Table 3-6.

Table 3-6. The relationship of the input and output data of the fifth key indicator 'innovation' to the 3 'Technometric' performance attributes

Key performance attributes to measure the technological development of the TC industry				
		3 'Technometric' performance attributes		
		'product'	**'process'**	**'service'**
Item	**Input data of key indicator 'innovation'**			
5.1.1	capital investment (including foreign direct investment) for innovation upgrading	✓	✓	✓
5.1.2	technology development for innovation upgrading	✓	✓	
5.1.3	R & D expenditure for innovation upgrading	✓	✓	
5.1.4	R & D personnel for innovation upgrading	✓	✓	
5.1.5	new knowledge acquisition for innovation upgrading	✓	✓	
5.1.6	government support for innovation upgrading	✓	✓	✓
5.1.7	research contribution of local academic institution to innovation upgrading	✓	✓	
5.1.8	technology transfer for innovation upgrading	✓	✓	
5.1.9	education and training for innovation upgrading	✓	✓	✓
	Output data of key indicator 'innovation'			
5.2.1	new product due to innovation upgrading	✓		
5.2.2	new process due to innovation upgrading		✓	
5.2.3	new quality due to innovation upgrading	✓		✓
5.2.4	new organization due to innovation upgrading	✓	✓	✓
5.2.5	new system due to innovation upgrading	✓	✓	✓
5.2.6	number of patents generated due to innovation upgrading	✓	✓	✓
5.2.7	number of R & D personnel due to innovation upgrading	✓	✓	
5.2.8	number of publications due to innovation upgrading	✓	✓	✓
5.2.9	number of R & D firms and activities due to innovation upgrading	✓	✓	
5.2.10	technological change due to innovation upgrading	✓	✓	
5.2.11	economic change due to innovation upgrading	✓		✓

Footnote
✓ : data related to 'Technometric' performance attributes

3.5 Reasons to adopt the 5 key indicators and the 3 'Technometric' performance attributes developed through critical analysis from the literature review

Many researchers have developed various kinds of quantitatively approaches to measure the technological development of manufacturing industries, such as 'labour productivity' of Ostuka, K. [14], econometric models of Sharif, N. [12], total factor productivity of Dorf, R.C. [25], etc. They are considered to be single factor measurement lacking more comprehensive approach. Other researchers such as OECD's 5 key indicators, i.e. productivity, quality, flexibility, skill and innovation [16], and Porter's external factors [47] utilized to indicate the technological development of the industry without any quantitative and comprehensive approach. From the literature review, the input and output parameters of key indicators, and 3 key performance attributes, i.e. product, process and service had also been identified. However, they were inconsistent to the study and without any connections to 5 key indicators. Critical analysis of these parameters turn them into more consistent, quantitative and multi-factors approach to measure the technological development of HKTCI: 5 key indicators - productivity, quality, flexibility, skill and innovation as well as their related input and output data under the ambits of 3 key 'Technometric' performance attributes, i.e. product, process and service.

3.6 Summary

Summarizing the input and output data of the 5 key indicators shown in Tables 3-2 to 3-6, the overall relationship of the data to the 3 'Technometric' performance attributes, i.e., 'product', 'process' and 'service' is shown in Table 3-7. The table was utilized to construct the instrument (i.e. questionnaire) to measure the technological development of the TC industry. It was noted that the two items, i.e. '4.1.1 capital investment' and '4.1.6 retain low labour turnover rate' did not have any connection with the 3 'Technometric' performance attributes, i.e., 'product', 'process' and 'service', hence it was necessary to seek advice from 5 local domain experts to determine whether they would be deleted from the measuring instrument (1st draft questionnaire).

Table 3-7 The relationship of the input and output data of the 5 key indicators to the 3 'Technometric' performance attributes

Key performance attribute for measuring the technological development of the TC industry				
		3'Technometric' performance attributes		
		'product'	'process'	'service'
Item	**Key indicator 'productivity' (P)**			
	Input data of key indicator 'productivity'			
1.1.1	capital investment for productivity improvement	✓	✓	✓
1.1.2	labour employment for productivity improvement	✓	✓	✓
1.1.3	energy for productivity improvement		✓	
1.1.4	technology input for productivity improvement	✓	✓	✓
1.1.5	raw material for productivity improvement	✓	✓	
1.1.6	skill for productivity improvement	✓	✓	✓
1.1.7	education and training programmes for productivity improvement	✓	✓	✓
1.1.8	government regulation and demand policy for productivity improvement		✓	
1.1.9	improved resources allocation for productivity improvement		✓	
1.1.10	equipment investment for productivity improvement	✓	✓	
1.1.11	economies of scale for productivity improvement	✓	✓	
1.1.12	legal-human environment	✓	✓	
	Output data of key indicator 'productivity'			
1.2.1	productivity growth due to productivity improvement		✓	
1.2.2	technological change due to productivity improvement	✓	✓	✓
1.2.3	economic growth due to productivity improvement	✓	✓	✓
	Key indicator 'quality' (Q)			
	Input data of key indicator 'quality'			
2.1.1	capital investment for quality improvement	✓	✓	✓
2.1.2	human resources management for quality improvement	✓	✓	✓
2.1.3	strategic quality planning for quality improvement	✓	✓	✓
2.1.4	quality management system implementation for quality improvement	✓		✓
2.1.5	technology input for quality improvement	✓	✓	✓
2.1.6	customer focus for quality improvement	✓	✓	✓
2.1.7	education and training programmes for quality improvement	✓	✓	✓
2.1.8	skill and knowledge acquisition for quality improvement	✓	✓	✓
2.1.9	communication facilities for quality improvement	✓	✓	✓
2.1.10	government support for quality improvement	✓	✓	✓
	Output data of key indicator 'quality'			
2.2.1	effective quality management due to quality improvement	✓	✓	✓
2.2.2	customer satisfaction due to quality improvement	✓		✓
2.2.3	people satisfaction due to quality improvement		✓	
2.2.4	quality accreditation due to quality improvement	✓	✓	✓
2.2.5	positive impact on society due to quality improvement	✓		✓
2.2.6	increasing market share due to quality improvement	✓		✓
	Key indicator 'flexibility' (F)			
	Input data of key indicator 'flexibility'			
3.1.1	capital investment for flexibility improvement		✓	
3.1.2	organization change for flexibility improvement		✓	

Key performance attribute for measuring the technological development of the TC industry				
		3‘Technometric’ performance attributes		
		‘product’	**‘process’**	**‘service’**
3.1.3	human resources development for flexibility improvement		✓	
3.1.4	education and training programmes for flexibility improvement		✓	✓
3.1.5	skill and knowledge acquisition for flexibility improvement		✓	✓
3.1.6	technology input for flexibility improvement	✓	✓	✓
3.1.7	improved remuneration scheme for flexibility improvement		✓	✓
3.1.8	flexible manufacturing system for flexibility improvement	✓	✓	
	Output data of key indicator ‘flexibility’			
3.2.1	short product life cycle	✓		
3.2.2	customized product	✓	✓	
3.2.3	short lead time	✓	✓	
3.2.4	flexible corporation	✓	✓	✓
3.2.5	diversified production		✓	
3.2.6	improved stock management (with lower buffer stock)		✓	✓
	Key indicator ‘skill’ (S)			
	Input data of key indicator ‘skill’			
4.1.1	capital investment for skill enhancement			
4.1.2	human resources for skill enhancement	✓		✓
4.1.3	education and training programmes for skill enhancement	✓		✓
4.1.4	skill acquisition scheme for skill enhancement	✓		✓
4.1.5	technology upgrading for skill enhancement	✓	✓	✓
4.1.6	retain low labour turnover rate			
4.1.7	government support for skill development and acquisition	✓	✓	✓
	Output data of key indicator ‘skill’			
4.2.1	new skill and knowledge due to skill enhancement	✓	✓	✓
4.2.2	acceptable performance due to skill enhancement	✓	✓	✓
4.2.3	human resources improvement due to skill enhancement	✓		✓
4.2.4	productivity improvement due to skill enhancement	✓	✓	✓
4.2.5	quality improvement due to skill enhancement	✓		✓
4.2.6	flexibility improvement due to skill enhancement		✓	
4.2.7	organizational improvement due to skill enhancement	✓	✓	✓
	Key indicator ‘innovation’ (I)			
	Input data of key indicator ‘innovation’			
5.1.1	capital investment (including foreign direct investment for innovation upgrading)	✓	✓	✓
5.1.2	technology development for innovation upgrading	✓	✓	
5.1.3	R & D expenditure for innovation upgrading	✓	✓	
5.1.4	R & D personnel for innovation upgrading	✓	✓	
5.1.5	new knowledge expenditure for innovation upgrading	✓	✓	
5.1.6	government support for innovation upgrading	✓	✓	✓
5.1.7	research contribution of local academic institution for innovation upgrading	✓	✓	
5.1.8	technology transfer for innovation upgrading	✓	✓	
5.1.9	education and training for innovation upgrading	✓	✓	✓
	Output data of key indicator ‘innovation’			
5.2.1	new product development due to innovation upgrading	✓		

Key performance attribute for measuring the technological development of the TC industry				
		3'Technometric' performance attributes		
		'product'	**'process'**	**'service'**
5.2.2	new process development due to innovation upgrading		✓	
5.2.3	new quality development due to innovation upgrading	✓		✓
5.2.4	new organization development due to innovation upgrading	✓	✓	✓
5.2.5	new system development due to innovation upgrading	✓	✓	✓
5.2.6	number of patents generated due to innovation upgrading	✓	✓	✓
5.2.7	number of R & D personnel due to innovation	✓	✓	
5.2.8	number of publications due to innovation upgrading	✓	✓	✓
5.2.9	number of R & D firms and activities due to innovation upgrading	✓	✓	
5.2.10	technological change due to innovation upgrading	✓	✓	
5.2.11	economic change due to innovation upgrading	✓		✓

Chapter 4 Development of an Instrument for Measuring the 'Technometric' Performance Attributes of the TC Industry

4.1 Introduction

In this Chapter, an instrument is developed to measure the technological development of the TC Industry and pilot test to determine the significance and relationship of 5 key indicators and the 3 'Technometric' performance attributes in measuring the technological development of the same. It discusses the validation of the findings through means of a pilot test including a measuring instrument (i.e. questionnaire) and a reliability test to validate the internal consistency of the 'Technometric' performance attributes and to construct an enhanced 'Technometric' model for measuring the technological development of the industry.

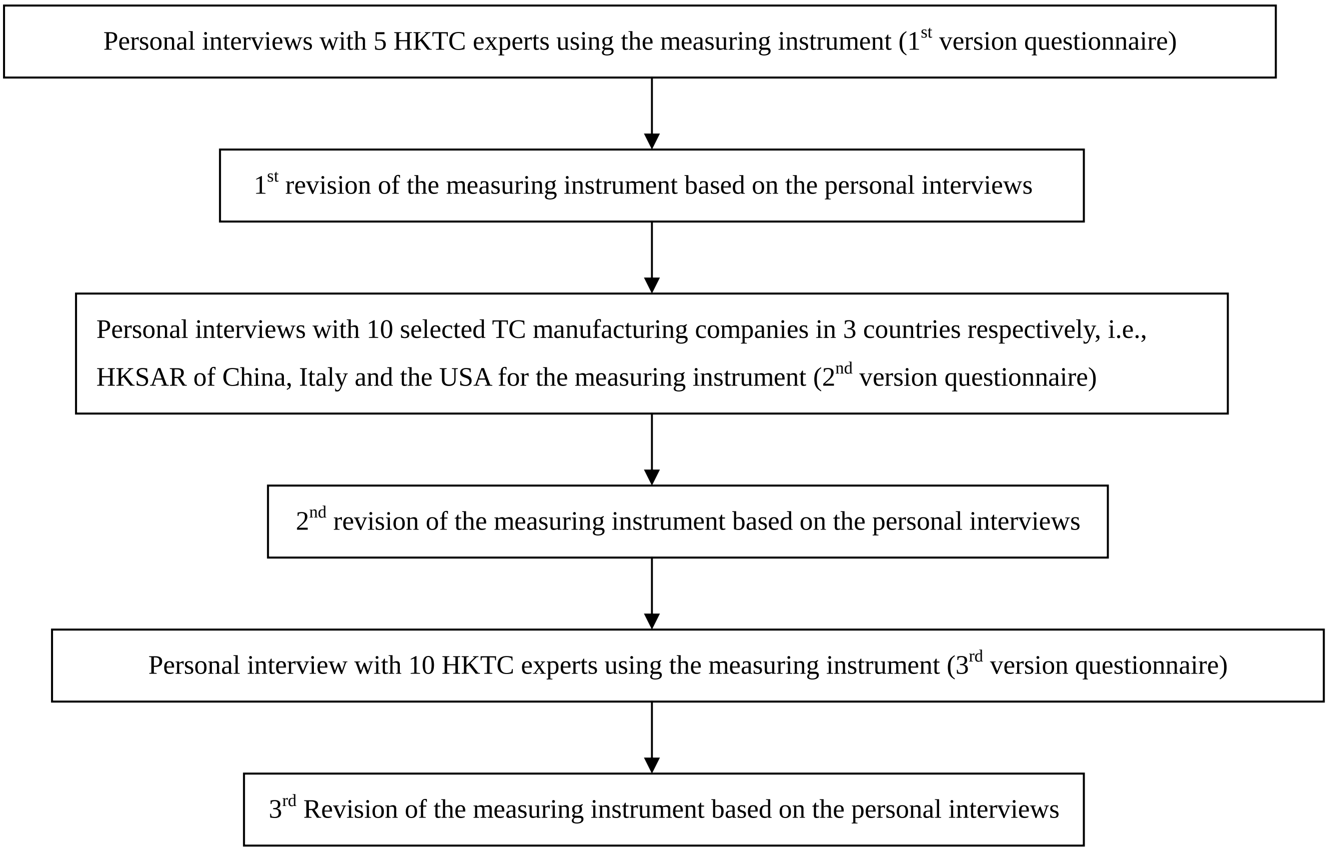
4.2 Development of an instrument to measure the technological development of the TC Industry

With reference to the relationship between the input and output data of 5 key indicators and the 3 'Technometric' performance attributes shown in Table 3-7, a measuring instrument was designed to collect data regarding the 3 'Technometric' performance attributes and their 5 key indicators, i.e., ‘productivity’, ‘quality’, ‘flexibility’, ‘skill’ and ‘innovation’ for each of the performance attributes, from the viewpoints of domain experts. Initially, based on the above-mentioned key indicators for each key performance attribute, the instrument (1^{st} version questionnaire shown in Appendix 1) was designed to measure the technological development of the TC industry.

4.3 Pilot test to determine the significance and relationship of the 5 key indicators and 3 key ‘Technometric’ performance attributes

Having completed the design of the measuring instrument (1^{st} version questionnaire) for the technological development of the TC industry as shown in Appendix 1, an evaluation of the questionnaire was carried out by means of personal interviews with 5 HKTC domain experts, 10 selected TC manufacturing companies in 3 countries respectively, i.e., HKSAR of China, Italy and the USA and 10 HKTC domain experts. Figure 4-1 shows the overall procedures of the pilot test to evaluate the significance and relationship of 3 ‘Technometric’ performance attributes and their 5 key indicators shown in the measuring instrument for the technological development of TC industry as follows:

Figure 4-1 Procedures for evaluating the measuring instrument (i.e., questionnaire) in the pilot test



The aims of the pilot test were as follows:

1. To ascertain the relationship of the input and output data of the 5 key indicators, namely, ‘productivity’, ‘quality’, ‘flexibility’, ‘skill’ and ‘innovation’ to 3 ‘Technometric’ performance attributes, i.e., ‘product’, ‘process’ and ‘service’ respectively, and

2. To evaluate the significance of each key performance attributes for measuring the technological change (development) of the TC industry was evaluated.

4.3.1 Personal interviews to evaluate the measurement instrument (1st version questionnaire shown in Appendix 1)

The brief background information of 5 local field experts is as follows:

Table 4-1. Brief background information about the 5 HKTC experts

Position	Year of service in the TC industry	Work nature	Expertise
Divisional general manager	20	Consultancy in productivity enhancement for Hong Kong's TC industry	Productivity
Principal Lecturer	20	TC total quality management and ISO 9000 implementation	Quality management
Executive Director	30	Clothing flexible manufacturing and industrial training	Flexible manufacturing
Senior training officer	25	TC human resources training and development	Skill development
Government official	2	Administration of Innovation and Technology Fund	Innovation & technology

5 Hong Kong domain experts commented on individual key performance attributes as well as their indicators on the basis of their expertise. The rating means from the responses of the 5 experts were then combined to provide a completed assessment as shown in Table 4-2. They validated the importance level of individual key performance attributes and agreed that the assessed key performance attributes can be

used to measure the technological development of the TC industry. The criterion was set for screening out the neutral or less important performance attributes of the questionnaire. The cut-off point based for the rating mean of each data set was less than 5. The remaining attributes were included in the final revised questionnaire. Attributes with mean rating scores below 5 were:

1. Item 1.1.3 - energy only appeared in the 'Technometric' performance attribute 'process'
2. Item 1.1.8 - government regulation and demand policy only appeared in the 'Technometric' performance attribute 'process'
3. Item 1.1.11 - economies of scale only appeared in the 'Technometric' performance attributes 'product' and 'process'
4. Item 1.1.12 - legal-human environment only appeared in the 'Technometric' performance attributes 'product' and 'process'
5. Item 3.1.2 – organization change only appeared in the 'Technometric' performance attribute 'process'
6. Item 3.2.5 - diversified production only appeared in the 'Technometric' performance attribute 'process'

The attributes listed above were deleted accordingly from the 1st version questionnaire as shown in Appendix 1. Furthermore, two items, i.e. '4.1.1 capital investment' and '4.1.6 retain low labour turnover rate' shown in Table 3-7 did not have any connections with the 3 'Technometric' performance attributes, i.e., product, process and service. Advice was sought from 5 HKTCexperts to delete these attributes from the measuring instrument (1^{st} version questionnaire).

In accordance with the overall procedures of the pilot test shown in Figure 4-1, the 1^{st} version questionnaire was then revised to supply the 2^{nd} version questionnaire shown in Appendix 2.

Table 4-2. Experts' rating for the key performance attributes. The rating means of the data from the 5 domain experts are shown in Appendix 3

Key performance attributes to measure the technological development of the TC industry						
	3 'Technometric' performance attributes					
	Product	**RM**	**Process**	**RM**	**Service**	**RM**
Input data of key indicator 'productivity'						
1.1.1 capital investment	✓	5.0	✓	5.0	✓	5.0
1.1.2 labour employment	✓	5.2	✓	5.8	✓	5.0
1.1.3 energy			✓	**4.0**		
1.1.4 technology input	✓	5.0	✓	5.0	✓	5.8
1.1.5 raw material	✓	5.2	✓	6.0		
1.1.6 skill acquisition	✓	5.8	✓	6.2	✓	5.6
1.1.7 education and training programmes	✓	5.0	✓	5.4	✓	5.4
1.1.8 government regulation and demand policy			✓	**3.8**		
1.1.9 improved resources allocation			✓	5.2		
1.1.10 equipment investment	✓	5.0	✓	6.0		
1.1.11 economies of scale	✓	**4.0**	✓	**3.0**		
1.1.12 legal-human environment	✓	**3.0**	✓	**4.0**		
Output data of key indicator 'productivity'						
1.2.1 productivity growth			✓	5.0		
1.2.2 technological change	✓	6.0	✓	6.0	✓	5.2

1.2.3 economic growth	✓	6.0	✓	5.0	✓	5.2
Input data of key indicator ‘quality’						
2.1.1 capital investment	✓	6.0	✓	5.2	✓	5.0
2.1.2 human resources management	✓	5.2	✓	5.2	✓	5.2
2.1.3 strategic quality planning	✓	6.0	✓	5.0	✓	6.0
2.1.4 quality management system implementation	✓	6.0			✓	6.8
2.1.5 technology input	✓	6.6	✓	5.0	✓	6.6
2.1.6 customer focus	✓	6.4	✓	5.8	✓	6.2
2.1.7 education and training programmes	✓	6.0	✓	6.0	✓	6.6
2.1.8 skill and knowledge acquisition	✓	5.8	✓	5.0	✓	5.0
2.1.9 communication facilities	✓	5.2	✓	5.2	✓	5.0
2.1.10 government support	✓	5.8	✓	6.8	✓	5.8
Output data of key indicator ‘quality’						
2.2.1 quality management	✓	5.8	✓	5.2	✓	5.0
2.2.2 customer satisfaction	✓	6.0			✓	6.0
2.2.3 people satisfaction			✓	6.2		
2.2.4 quality accreditation	✓	6.8	✓	6.2	✓	5.0
2.2.5 positive impact on society	✓	5.8			✓	5.0
2.2.6 market share	✓	6.0			✓	6.0
Input data of key indicator ‘flexibility’						
3.1.1 capital investment			✓	6.0		
3.1.2 organization change			✓	**4.0**		
3.1.3 human resources development			✓	6.0		
3.1.4 education and training programmes			✓	6.2	✓	5.8
3.1.5 skill and knowledge acquisition			✓	6.0	✓	6.0
3.1.6 technology input	✓	5.6	✓	5.8	✓	6.6
3.1.7 improved remuneration scheme			✓	5.2	✓	5.0
3.1.8 flexible manufacturing system	✓	5.8	✓	5.8		
Output data of key indicator ‘flexibility’						
3.2.1 short product life cycle	✓	6.0				
3.2.2 customized product	✓	6.6	✓	6.0		
3.2.3 short lead time	✓	5.8	✓	6.8		
3.2.4 flexible corporation	✓	6.0	✓	6.0	✓	6.2
3.2.5 diversified production			✓	**4.0**		
3.2.6 improved stock management (with lower buffer stock)			✓	5.0	✓	5.4
Input data of key indicator ‘skill’						
4.1.1 capital investment						
4.1.2 human resources	✓	5.0			✓	5.0
4.1.3 education and training programmes	✓	5.2			✓	5.8
4.1.4 skill acquisition scheme	✓	5.6			✓	6.0
4.1.5 technology upgrading	✓	5.8	✓	5.8	✓	5.6
4.1.6 retain low labour turnover rate						
4.1.7 government support	✓	5.2	✓	6.0	✓	5.8
Output data of key indicator ‘skill’						
4.2.1 new skill and knowledge	✓	5.8	✓	5.8	✓	6.0
4.2.2 acceptable performance	✓	5.2	✓	5.2	✓	5.2
4.2.3 human resources improvement	✓	5.8			✓	5.0
4.2.4 productivity improvement	✓	6.6	✓	6.6	✓	6.8

4.2.5 quality improvement	✓	5.6			✓	5.2
4.2.6 flexibility improvement			✓	5.0		
4.2.7 organizational improvement	✓	5.8	✓	5.8	✓	5.8
Input data of key indicator 'innovation'						
5.1.1 capital investment (including foreign direct investment)	✓	5.6	✓	6.6	✓	5.2
5.1.2 technology development	✓	6.6	✓	6.8		
5.1.3 R & D expenditure	✓	5.6	✓	5.6		
5.1.4 R & D personnel	✓	6.2	✓	6.2		
5.1.5 new knowledge expenditure	✓	6.6	✓	6.8		
5.1.6 government support	✓	6.0	✓	6.0	✓	5.0
5.1.7 research contribution of local academic institution	✓	5.8	✓	5.8		
5.1.8 technology transfer	✓	5.8	✓	6.0		
5.1.9 education and training programmes	✓	6.0	✓	6.0	✓	6.0
Output data of key indicator 'innovation'						
5.2.1 new product development	✓	5.8				
5.2.2 new process development			✓	5.8		
5.2.3 new quality development	✓	6.2			✓	6.0
5.2.4 new organization development	✓	6.8	✓	6.0	✓	6.0
5.2.5 new system set up	✓	6.0	✓	6.0	✓	5.8
5.2.6 number of patents generated	✓	6.6	✓	6.8	✓	6.2
5.2.7 number of R & D personnel	✓	6.2	✓	6.2		
5.2.8 number of publications	✓	5.6	✓	6.0	✓	5.2
5.2.9 number of R & D firms and activities	✓	5.8	✓	5.8		
5.2.10 technological change	✓	5.8	✓	6.8		
5.2.11 economic change	✓	6.6			✓	6.0

Footnote

✓ : data related to 'Technometric' performance attributes

RM : rating mean of 5 TC experts

Rating scale

7 : extremely important	4 : neutral	1 : insignificant
6 : most important	3 : less important	
5 : important	2 : least important	

4.3.2 Personal interviews with 10 domain TC experts in 3 selected countries, i.e., HKSAR of China, Italy and the USA to evaluate the instrument (2nd version questionnaire at Appendix 2)

Having completed the personal interviews with the 5 local domain experts, a further

10 interviews were conducted with representatives of selected TC manufacturing companies in 3 countries respectively, i.e., HKSAR of China, Italy and the USA to further evaluate the significance and relationship of 5 key indicators and 3 'Technometric' performance attributes.

4.3.2.1 Sampling method

To ensure the findings were representative and minimize any possible bias, the sample was selected from the databank of the Hong Kong Trade Development Council (HKTDC) for two reasons. Firstly, the sampling method of the HKTDC met the requirement to be unbiased. TC companies were randomly selected by the HKTDC, inclusive of all size groups.

The number of TC companies in Hong Kong in the databank of the HKTDC was around 3000 and they randomly selected 2% (60) of the total. The HKTDC database of TC importers and manufacturers in Italy and the USA contained data about more than 1,000 companies. About 6% (60) of the total number of TC companies in Italy and the USA respectively were randomly selected by HKTDC. The selected companies in each country were contacted for personal interview.

Finally, 10 manufacturing companies in each country agreed to be interviewed.

Table 4-3 Number of companies which agreed to be interviewed for the industrial survey

Countries	No. of manufacturing companies
HKSAR of China	10
Italy	10
The USA	10
Total :	30

The interviewed personnel who answered the questionnaire were influential in formulating industrial policy for the TC industry. Brief information about TC manufacturing company representatives interviewed in Hong Kong, Italy and the USA is shown in Table 4-4:

Table 4-4 Brief background information of TC companies interviewed in HKSAR of China, Italy and the USA

Country/Post of interviewee		Year of service of the interviewee	Employment size of the company	Business nature of the company
No.	**HKSAR of China**			
1	QC Manager	15	700	TM, M, R
2	Executive	20	300	TM, M, R
3	Manager	18	800	TM, M, T, E
4	R & D Manager	15	1000	TM, M, E
5	Executive Director	5	10	TM, E

6	Manager	12	20	CM
7	Chief Executive	14	60	CM, M, E
8	Director	10	550	CM, M, E
9	General Manager	5	1000	CM, M, T, E
10	Factory Manager	12	500	CM, M, E
	Italy			
11	CEO	14	100	TM, M, R, D
12	Manager	12	200	TM, M, R, D
13	Factory Manager	4	500	TM, M, T,
14	CEO	3	200	TM, M, T, E, D
15	Production Manager	16	30	TM, M, E
16	Factory Manager	15	50	CM, M, R, D
17	Manager	3	250	CM, M, E
18	CEO	5	200	CM, M, E
19	Executive Director	15	180	CM, M, T, E, D
20	Director	14	20	CM, M, E, D
	USA			
21	CEO	10	1000	TM, CM, M, R, D
22	Manager	7	250	TM, M, R, D
23	Factory Manager	5	300	TM, M, T, D
24	CEO	13	3000	TM, M, T, R, D
25	Production Manager	16	150	TM, M, R
26	Factory Manager	25	500	CM, M, R
27	Manager	15	1250	CM, M, E, R
28	CEO	10	2200	CM, M, R, D
29	Executive Director	12	100	CM, M, T, D
30	Director	8	400	CM, M, T, D

Note:

PD: product design and development

CM: clothing manufacturing

TM: textile manufacturing

M: merchandising

T: trading

E: exporting

R: retailing

D: distribution

4.3.2.3 Data analysis for the rating scores from the personal interviews

One of most common and useful measures of data collected through an industrial survey is the arithmetic average of a set of data. This measurement is also often referred to as the arithmetic means, or simply the mean, of a set of measurements. Therefore, the arithmetic mean of a set of *n* measurement is equal to the sum of the measurements divided by *n*. [51]

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$$

Where n = number of measurements in the sample. The rating mean (RM) in each country shown in Table 4-5 is the arithmetic mean of the total rating of each performance attribute given by interviewees in that country. Where n = total number of rating given by the interviewed companies in 3 countries, namely, HKSAR of China, Italy and the USA comprised samples of large, medium, small sized enterprises. A data analysis of the rating scores for the importance level of the key performance attributes collected from HKSAR of China, Italy and the USA is summarized in Table 4-5

Table 4-5 Rating scores for the importance level of key performance attributes to measure the technological development of the TC industry in HKSAR of China, Italy and the USA. The rating means of the data from the domain experts in 3 places are shown in Appendix 4

Key performance attributes to measure the technological development of the TC industry						
	3 'Technometric' performance attributes					
	'product'	RM	'process'	RM	'service'	RM
Input data of key indicator 'productivity'						
1.1.1 capital investment	✓	5.633	✓	5.533	✓	5.633
1.1.2 labour employment	✓	5.367	✓	5.400	✓	5.367
1.1.3 technology input	✓	5.733	✓	5.500	✓	5.733
1.1.4 raw material	✓	5.200	✓	5.133		
1.1.5 skill acquisition	✓	5.667	✓	5.567	✓	5.667
1.1.6 education and training programmes	✓	5.333	✓	5.333	✓	5.333
1.1.7 improved resources allocation			✓	5.167		
1.1.8 equipment investment	✓	5.500	✓	5.400		
Output data of key indicator 'productivity'						
1.2.1 productivity growth			✓	5.667		
1.2.2 technological change	✓	5.833	✓	5.600	✓	5.833
1.2.3 economic growth	✓	5.267	✓	5.200	✓	5.267
Input data of key indicator 'quality'						
2.1.1 capital investment	✓	5.200	✓	5.300	✓	5.200
2.1.2 human resources management	✓	5.467	✓	5.433	✓	5.467
2.1.3 strategic quality planning	✓	5.367	✓	5.400	✓	5.367
2.1.4 quality management system implementation	✓	5.600			✓	5.567
2.1.5 technology input	✓	5.400	✓	5.367	✓	5.300
2.1.6 customer focus	✓	5.867	✓	5.767	✓	5.700
2.1.7 education and training programmes	✓	5.400	✓	5.367	✓	5.400
2.1.8 skill and knowledge acquisition	✓	5.600	✓	5.533	✓	5.467
2.1.9 communication facilities	✓	5.400	✓	5.333	✓	5.433
2.1.10 government support	✓	5.067	✓	5.100	✓	5.167
Output data of key indicator 'quality'						
2.2.1 quality management	✓	5.367	✓	5.400	✓	5.367
2.2.2 customer satisfaction	✓	6.033			✓	5.833
2.2.3 people satisfaction			✓	5.300		
2.2.4 quality accreditation	✓	5.267	✓	5.300	✓	5.267
2.2.5 positive impact on society	✓	5.167			✓	5.133
2.2.6 market share	✓	5.633			✓	5.567
Input data of key indicator 'flexibility'						
3.1.1 capital for flexibility improvement			✓	5.367		
3.12 human resources development			✓	5.100		
3.1.3 education and training			✓	5.400	✓	5.467
3.1.4 skill and knowledge acquisition			✓	5.700	✓	5.600

3.1.5 technology input	✓	5.700	✓	5.700	✓	5.633
3.1.6 improved remuneration scheme			✓	5.200	✓	5.067
3.1.7 flexible manufacturing system	✓	5.433	✓	5.467		
Output data of key indicator 'flexibility'						
3.2.1 short product life cycle	✓	5.467				
3.2.2 customized product	✓	5.267	✓	5.267		
3.2.3 short lead time	✓	5.633	✓	5.667		
3.2.4 flexible corporation	✓	5.333	✓	5.333	✓	5.267
3.2.5 improved stock management (with lower buffer stock)			✓	5.267	✓	5.167
Input data of key indicator 'skill'						
4.1.1 human resources for skill enhancement	✓	5.467			✓	5.300
4.1.2 education and training for skill enhancement	✓	5.633			✓	5.567
4.1.3 skill acquisition scheme for skill enhancement	✓	5.300			✓	5.233
4.1.4 technology upgrading for skill enhancement	✓	5.700	✓	5.700	✓	5.533
4.1.5 government support	✓	5.067	✓	5.133	✓	5.167
Output data of key indicator 'skill'						
4.2.1 new skill and knowledge	✓	5.467	✓	5.467	✓	5.567
4.2.2 acceptable performance	✓	5.100	✓	5.100	✓	5.133
4.2.3 human resources improvement	✓	5.100			✓	5.100
4.2.4 productivity improvement	✓	5.467	✓	5.500	✓	5.467
4.2.5 quality improvement	✓	5.600			✓	5.500
4.2.6 flexibility improvement			✓	5.700		
4.2.7 organizational improvement	✓	5.067	✓	5.100	✓	5.000
Input data of key indicator 'innovation'						
5.1.1 capital investment (including foreign direct investment) for innovation upgrading	✓	5.467	✓	5.467	✓	5.467
5.1.2 technology development	✓	5.633	✓	5.667		
5.1.3 R & D expenditure	✓	5.533	✓	5.533		
5.1.4 R & D personnel	✓	5.300	✓	5.300		
5.1.5 new knowledge expenditure	✓	5.567	✓	5.567		
5.1.6 government support	✓	5.067	✓	5.100	✓	5.067
5.1.7 research contribution of local academic institution	✓	5.167	✓	5.200		
5.1.8 technology transfer for innovation upgrading	✓	5.467	✓	5.500		
5.1.9 education and training for innovation upgrading	✓	5.300	✓	5.300	✓	5.300
Output data of key indicator 'innovation'						
5.2.1 new product development	✓	5.767				
5.2.2 new process development			✓	5.567		
5.2.3 new quality development	✓	5..900			✓	5.900
5.2.4 new organization development	✓	5.133	✓	5.167	✓	5.133
5.2.5 new system development	✓	5.067	✓	5.233	✓	5.067
5.2.6 number of patents generated	✓	5.333	✓	5.300	✓	5.333
5.2.7 number of R & D personnel	✓	5.267	✓	5.267		
5.2.8 number of publications	✓	**4.933**	✓	5.133	✓	**4.933**
5.2.9 number of R & D firms and activities	✓	5.067	✓	5.233		
5.2.10 technological change	✓	5.500	✓	5.500		
5.2.11 economic change	✓	5.033			✓	5.033

<u>Footnote</u>

✓ : data related to ‘Technometric’ performance attributes

RM: mean of total rating scores given by 10 TC companies in individual country on each key performance attributes

Rating scale

7 : extremely important	4 : neutral	1 : insignificant important
6 : most important	3 : less important	
5 : important	2 : least important	

Based on the scores collected in the course of analysing data from the interviews, the neutral or less important data for each attribute were screened out of the draft initial questionnaire. The remaining data attributes became the data attributes of the revised measuring instrument (questionnaire). The criteria for screening out the neutral or less important performance attributes from the questionnaire were established. The cut-off point was based on the rating score of each attribute, i.e., less than 5.

Only attribute Item 5.2.8: “number of publications” for product (4.933) and service (4.933) attained scores of less than 5. Due to the closeness to rating score 5 and importance, the attribute was retained for further evaluation in the subsequent pilot test. The 2nd version questionnaire remained unchanged when personal interviews were conducted with 10 Hong Kong domain TC experts.

4.3.3 Personal interviews with 10 Hong Kong domain TC experts to evaluate the instrument (2nd version questionnaire shown in Appendix 2)

The brief background of the10 Hong Kong domain experts is provided in Table 4-6 as follows.

Table 4-6 Brief background information of 10 HKTC experts

Position	Years of service in the TC industry	Work nature	Expertise
Divisional general manager	20	Consultancy in productivity enhancement for HKTC industry	Productivity
Production director	25	TC production planning and control	Productivity
Principal lecturer	20	TC total quality management and ISO 9000 implementation	Quality Management
Quality manager	12	TC total quality management and ISO 9000 implementation	Quality Management
Executive director	30	TC flexible manufacturing and industrial training	Flexible manufacturing
Factory manager	15	Clothing flexible manufacturing	Flexible manufacturing
Senior training officer	25	TC human resources training and development	Skill development
Human resources manager	8	TC human resources training and development	Skill development
Government official	2	Administration of Innovation and Technology Fund	Innovation & technology
Technology Consultant	10	TC technology consultancy	Innovation & technology

Local field experts commented on individual key performance attributes as well as their indicators according to their expertise. The ratings from 10 experts were then compiled to provide a completed assessment, as shown in Table 4-7. The validated the importance level of individual key performance attributes would effectively measure the technological development of the TC industry. The criteria for screening out the neutral or less important performance attributes in the questionnaire were thus established. The cut-off point was the rating score of each data which was less than 5. The remaining data were used to formulate the final questionnaire shown in Figure 4-2.

Table 4-7 Experts' rating of the importance level of the key performance attributes for measuring the technological development of the TC industry. The rating means of the data from the 10 domain experts are shown in Appendix 5

Key performance attributes for measuring the technological development of the TC industry						
	3 'Technometric' performance attributes					
	'product'	**RM**	**'process'**	**RM**	**'service'**	**RM**
Input data of key indicator 'productivity'						
1.1.1 capital investment	✓	5.9	✓	6.2	✓	6.0
1.1.2 labour employment	✓	5.9	✓	6.1	✓	5.9
1.1.3 technology input	✓	6.7	✓	6.7	✓	6.2
1.1.4 raw material	✓	5.3	✓	5.3		
1.1.5 skill acquisition	✓	5.8	✓	6.0	✓	6.1
1.1.6 education and training programmes	✓	5.1	✓	6.3	✓	5.9
1.1.7 improved resources allocation			✓	5.1		
1.1.8 equipment investment	✓	5.9	✓	5.2		
Output data of key indicator 'productivity'						
1.2.1 productivity growth			✓	6.1		
1.2.2 technological change	✓	5.8	✓	6.6	✓	6.6
1.2.3 economic growth	✓	5.9	✓	6.2	✓	6.0
Input data of key indicator 'quality'						
2.1.1 capital investment	✓	5.0	✓	5.3	✓	5.8
2.1.2 human resources management	✓	5.2	✓	5.0	✓	6.3
2.1.3 strategic quality planning	✓	6.1	✓	6.1	✓	6.2
2.1.4 quality management system implementation	✓	6.0			✓	5.6
2.1.5 technology input	✓	5.8	✓	5.9	✓	5.7
2.1.6 customer focus	✓	6.8	✓	6.7	✓	6.6

2.1.7 education and training programmes	✓	5.8	✓	6.8	✓	6.1
2.1.8 skill and knowledge acquisition	✓	5.8	✓	6.2	✓	6.2
2.1.9 communication facilities	✓	5.2	✓	5.0	✓	6.2
2.1.10 government support	✓	5.9	✓	6.7	✓	6.3
Output data of key indicator 'quality'						
2.2.1 effective quality management	✓	6.1	✓	5.6	✓	6.5
2.2.2 customer satisfaction	✓	5.9			✓	6.1
2.2.3 people satisfaction		6.2	✓	6.1		
2.2.4 quality accreditation	✓	6.7	✓	6.3	✓	5.9
2.2.5 positive impact on society	✓	5.1			✓	6.0
2.2.6 increasing market share	✓	5.8			✓	6.2
Input data of key indicator 'flexibility'						
3.1.1 capital investment			✓	6.6		
3.1.2 human resources development			✓	6.2		
3.1.3 education and training programmes			✓	5.9	✓	5.9
3.1.4 skill and knowledge acquisition			✓	6.2	✓	6.4
3.1.5 technology input	✓	6.8	✓	6.7	✓	6.3
3.1.6 improved remuneration scheme			✓	5.9	✓	6.3
3.1.7 flexible manufacturing system	✓	5.9	✓	5.8		
Output data of key indicator 'flexibility'						
3.2.1 short product life cycle	✓	6.0				
3.2.2 customized product	✓	6.7	✓	5.9		
3.2.3 short lead time	✓	6.0	✓	6.7		
3.2.4 flexible corporation	✓	6.1	✓	5.9	✓	5.8
3.2.5 improved stock management (with lower buffer stock)			✓	5.8	✓	6.5
Input data of key indicator 'skill'						
4.1.1 human resources for skill enhancement	✓	5.3			✓	6.4
4.1.2 education and training programmes	✓	5.0			✓	6.1
4.1.3 skill acquisition scheme	✓	5.8			✓	5.8
4.1.4 technology upgrading	✓	6.8	✓	6.8	✓	6.4
4.1.5 government support	✓	6.1	✓	6.2	✓	6.2
Output data of key indicator 'skill'						
4.2.1 new skill and knowledge	✓	5.9	✓	6.1	✓	6.1
4.2.2 acceptable performance	✓	6.1	✓	6.2	✓	5.9
4.2.3 human resources improvement	✓	6.0			✓	6.2
4.2.4 productivity improvement	✓	5.9	✓	6.2	✓	6.4
4.2.5 quality improvement	✓	6.1			✓	6.2
4.2.6 flexibility improvement			✓	5.1		
4.2.7 organizational improvement	✓	6.1	✓	5.8	✓	6.1
Input data of key indicator 'innovation'						
5.1.1 capital investment (including foreign direct investment)	✓	6.1	✓	6.7	✓	6.0
5.1.2 technology development	✓	6.3	✓	6.0		
5.1.3 R & D expenditure	✓	5.9	✓	5.9		
5.1.4 R & D personnel	✓	6.2	✓	6.2		
5.1.5 new knowledge expenditure	✓	6.0	✓	6.6		
5.1.6 government support	✓	6.3	✓	6.4	✓	5.8
5.1.7 research contribution of local academic institution	✓	6.1	✓	6.2		
5.1.8 technology transfer	✓	6.2	✓	6.2		

5.1.9 education and training	✓	6.2	✓	6.2	✓	6.3
Output data of key indicator 'innovation'						
5.2.1 new product development	✓	6.2				
5.2.2 new process development			✓	6.3		
5.2.3 new quality development	✓	6.1			✓	6.1
5.2.4 new organization development	✓	5.9	✓	6.1	✓	5.8
5.2.5 new system development	✓	6.7	✓	5.8	✓	5.7
5.2.6 number of patents generated	✓	6.7	✓	6.6	✓	6.0
5.2.7 number of R & D personnel	✓	6.0	✓	6.2		
5.2.8 number of publications	✓	6.2	✓	6.2	✓	6.3
5.2.9 number of R & D firms and activities	✓	6.1	✓	6.2		
5.2.10 technological change	✓	6.1	✓	6.7		
5.2.11 economic change	✓	6.0			✓	6.4

Footnote

✓ : data related to 'Technometric' performance attributes

RM: rating mean of 10 TC experts

Rating scale

7 : extremely important	4 : neutral	1 : insignificant
6 : most important	3 : less important	
5 : important	2 : least important	

The TC experts considered the relationship of the input and output data of the 5 key indicators, namely, 'productivity', 'quality', 'flexibility', 'skill' and 'innovation'. For the 3 'Technometric' performance attributes, i.e., 'product', 'process' and 'service' respectively, all agreed that the listed key performance attributes could be utilized to measure the performance of the technological change (development) of the TC industry. However, they advised that the presentation of the questionnaire should have the following additions:

1. Footnotes providing the definitions of 5 key indicators, since the input and output data should be incorporated in the questionnaire; and

2. Expanded descriptive wordings for each of the key performance attributes so that each could be distinguished from the others with the same wordings in different key indicator groups. For instance,

   - Item 1.1.1 – ‘capital investment’ should be changed to ‘capital investment for productivity improvement’;
   - Item 1.1.2 – ‘labour employment’ should be ‘labour employment for productivity improvement’; and
   - Item 1.1.3 – ‘technology input’ should be renamed as ‘technology input for productivity improvement’

The revision of the questionnaire permitted greater understanding of the meaning of each of the key performance attributes and hence the right rating score would result in each case. As such, each attribute could more accurately describe the technological development of the TC industry. The 2nd version questionnaire was then revised to supply the final questionnaire once the internal consistency of the 3 ‘Technometric’ performance attributes and their 5 key indicators had been validated by the Reliability Test (Cronbach’s Coefficient of Alpha).

4.3.4 Reliability test to validate the consistency of each of the key 'Technometric' performance attributes in the 2nd version questionnaire

Cronbach's Coefficient of Alpha was used to test the internal consistency of data attributes by which a group of domain experts responded to the questionnaire. If the Cronbach's Coefficient of Alpha was less than 0.35 ($\alpha < 0.35$), the questionnaire was once again revised and an interview conducted with the other group of domain experts of same group. The reliability test was repeated until the internal consistency of each performance attribute in the questionnaire achieved the level $\alpha \geq 0.35$.

Reliability refers to the consistency of the results. Cronbach's Coefficient of Alpha is designed as a measure of internal consistency, that is, do all items within the instrument measure the same thing. Alpha is measured on the same scale as a Pearson r (correlation coefficient) and typically varies between 0 and 1. The closer the alpha is to 1.00, the greater the internal consistency of items in the instrument being assessed. The formula that determines alpha is fairly simple and makes use of the number of items in the scale (k) and the average correlation between pairs of items (r):

$$\alpha = \frac{kr}{1 + (k-1)r} \tag{4-1}$$

Where k is a scale and r is the average correlation between pairs of items.

As the number of items in the scale (k) increases, the value of α becomes greater. Also, if the intercorrelation between items is large, the corresponding α will also be large [82].

Table 4-8 Reliability test (Cronbach's Coefficient of Alpha) to evaluate the internal consistency of the draft questionnaire. The compilation of the α is shown in Appendix 6.

Key performance attributes for measuring the technological development of theTC industry			
	3 'Technometric' performance attributes		
	'product'	**'process'**	**'service'**
Input data of key indicator 'productivity'			
1.1.1 capital for productivity improvement	✓	✓	✓
1.1.2 labour for productivity improvement	✓	✓	✓
1.1.3 technology for productivity improvement	✓	✓	✓
1.1.4 material resources for productivity improvement	✓	✓	
1.1.5 skill acquisition for productivity improvement	✓	✓	✓
1.1.6 education and training programmes for productivity improvement	✓	✓	✓
1.1.7 improved resources allocation for productivity improvement		✓	
1.1.8 equipment investment for productivity improvement	✓	✓	
α	0.7609	0.6845	0.7251
Output data of key indicator 'productivity'			
1.2.1 productivity growth due to productivity improvement		✓	
1.2.2 technological change due to productivity improvement	✓	✓	✓
1.2.3 economic growth due to productivity improvement	✓	✓	✓
α	0.5242	0.5076	0.5242
Input data of key indicator 'quality'			
2.1.1 capital investment for quality improvement	✓	✓	✓
2.1.2 human resources management for quality improvement	✓	✓	✓
2.1.3 strategic quality planning for quality improvement	✓	✓	✓
2.1.4 quality management system implementation for quality improvement	✓		✓
2.1.5 technology input for quality improvement	✓	✓	✓
2.1.6 customer focus for quality improvement	✓	✓	✓
2.1.7 education and training programmes for quality improvement	✓	✓	✓
2.1.8 skill and knowledge acquisition for quality improvement	✓	✓	✓
2.1.9 communication facilities for quality improvement	✓	✓	✓

2.1.10 government support for quality improvement	✓	✓	✓
α	0.8355	0.7232	0.7261
Output data of key indicator ‘quality’			
2.2.1 effective quality management due to quality improvement	✓	✓	✓
2.2.2 customer satisfaction due to quality improvement	✓		✓
2.2.3 people satisfaction due to quality improvement		✓	
2.2.4 quality accreditation due to quality improvement	✓	✓	✓
2.2.5 positive impact on society due to quality improvement	✓		✓
2.2.6 increasing market share due to quality improvement	✓		✓
α	0.6793	0.4550	0.6793
Input data of key indicator ‘flexibility’’			
3.1.1 capital investment for flexibility improvement		✓	
3.1.2 human resources development for flexibility improvement		✓	
3.1.3 education and training for flexibility improvement		✓	✓
3.1.4 skill and knowledge acquisition for flexibility improvement		✓	✓
3.1.5 technology input for flexibility improvement	✓	✓	✓
3.1.6 improved remuneration scheme for flexibility improvement		✓	✓
3.1.7 flexible manufacturing system for flexibility improvement	✓	✓	
α	0.3466	0.7390	0.5650
Output data of key indicator ‘flexibility’’			
3.2.1 short product life cycle	✓		
3.2.2 customized product	✓	✓	
3.2.3 short lead time	✓	✓	
3.2.4 flexible corporation	✓	✓	✓
3.2.5 improved stock management (with lower buffer stock)		✓	✓
α	0.7393	0.6955	0.3898
Input data of key indicator ‘skill’			
4.1.1 human resources for skill enhancement	✓		✓
4.1.2 education and training programmes for skill enhancement	✓		✓
4.1.3 skill acquisition scheme for skill enhancement	✓		✓
4.1.4 technology upgrading for skill enhancement	✓	✓	✓
4.1.5 government support of skill development and acquisition	✓	✓	✓
α	0.7498	0.5615	0.7270
Output data of key indicator ‘skill’			
4.2.1 new skill and knowledge due to skill enhancement	✓	✓	✓
4.2.2 acceptable performance due to skill enhancement	✓	✓	✓
4.2.3 human resources improvement due to skill enhancement	✓		✓
4.2.4 productivity improvement due to skill enhancement	✓	✓	✓
4.2.5 quality improvement due to skill enhancement	✓		✓
4.2.6 flexibility improvement due to skill enhancement		✓	
4.2.7 organizational improvement due to skill enhancement	✓	✓	✓
α	0.8207	0.6993	0.7596
Input data of key indicator ‘innovation’			
5.1.1 capital investment (including foreign direct investment) for innovation upgrading	✓	✓	✓
5.1.2 technology development for innovation upgrading	✓	✓	
5.1.3 R & D expenditure for innovation upgrading	✓	✓	
5.1.4 R & D personnel for innovation upgrading	✓	✓	
5.1.5 new knowledge expenditure for innovation upgrading	✓	✓	
5.1.6 government support for innovation upgrading	✓	✓	✓
5.1.7 research contribution of local academic institution for innovation upgrading	✓	✓	
5.1.8 technology transfer for innovation upgrading	✓	✓	
5.1.9 education and training for innovation upgrading	✓	✓	✓
α	0.8130	0.7940	0.5920
Output data of key indicator ‘innovation’			
5.2.1 new product due to innovation upgrading	✓		

5.2.2 new process due to innovation upgrading		✓	
5.2.3 new quality due to innovation upgrading	✓		✓
5.2.4 new organization due to innovation upgrading	✓	✓	✓
5.2.5 new system due to innovation upgrading	✓	✓	✓
5.2.6 number of patents generated due to innovation upgrading	✓	✓	✓
5.2.7 number of R & D personnel due to innovation upgrading	✓	✓	
5.2.8 number of publications due to innovation upgrading	✓	✓	✓
5.2.9 number of R & D firms and activities due to innovation upgrading	✓	✓	
5.2.10 technological change due to innovation upgrading	✓	✓	
5.2.11 economic change due to innovation upgrading	✓		✓
α	0.7522	0.7499	0.6567

Footnote

✓ : data related to ‘‘Technometric” performance attributes
α = alpha value

After the reliability test (Cronbach’s Coefficient of Alpha test), all of the key performance attributes were found to be greater than and equal to 0.35 ($\alpha \geq 0.35$) having satisfied internal consistency.

When the various tests had been completed, it was concluded that the questionnaire was effective for measuring the technological development of the TC industry.

4.4 A new ‘Technometric’ model for measuring the technological development of the TC industry

Based on the equation provided in Section 2.2.1 and incorporation of the results supplied in previous sections, the definition of the new ‘Technometric’ index K^* for measuring technological development in the TC industry is expressed in equation (2-6):

$$K^*(i, j, k', k, t) = \frac{[(K(i, j, k', t) - K(i, j, k_{\min}, t))]}{[(K(i, j, k_{\max}, t) - K(i, j, k_{\min}, t))]} \qquad (2\text{-}6)$$

whereas:

i = industry, i = 1, …, n

j = industry feature, j = 1,….., m

K = vector of industry features`

k = firm, 1 = 1, ….,r

k' = ‘Technometric’ performance attributes, i.e. product, process, and service of the TC industry

t = time index,

u = units of measurement for industry feature ‘j’

The ‘Technometric’ index *K** measures the technological development of HKTCI by means of computing the metric outcomes of 3 ‘Technometric’ attributes, namely, ‘product’, ‘process’ and ‘service’ in terms of 5 key indicators, i.e., ‘productivity’, ‘quality’, ‘flexibility’, ‘skill’ and ‘innovation’. As referred in Section 2.3, the ‘Technometric’ model can be applied in countries for technological performance evaluation and comparison. Furthermore, the model can also be used to evaluate the technical improvements of a firm, an industry or a country within a given time frame. There is no limitation on the initial and final periods.

4.5 Summary

This Chapter introduced the development of an instrument (questionnaire) for measuring the technological development of the TC industry. The significance and relationship of 3 'Technometric' performance attributes and their related 5 key indicators shown in the questionnaire were evaluated by means of a pilot test including personal interviews with 5 local domain experts, 10 selected TC manufacturing companies in 3 countries, i.e., HKSAR of China, Italy and the USA and 10 local domain experts respectively. To validate the internal consistency of each of the key performance attributes in the draft questionnaire, Cronbach's Coefficient of Alpha test was conducted accordingly. The draft questionnaire was then revised to provide the final questionnaire shown in Figure 4-2 and the 'Technometric' model was formulated to measure the technological development of the TC industry.

Figure 4-2 Final Questionnaire

Company Name ______________________ Date: ______________

Name of Respondent: ______________ Position: ______________ Tel. No: ______________

☐

Part I General Information and Background of the Company

1.1 What are your principal activities?

☐ Yarn manufacturing ☐ Fabric manufacturing

☐ Dyeing, Printing and Finishing

☐ Cut & sewn garment manufacturing ☐ Knitted sweater manufacturing

☐ Others, please specify _____

1.2 Your company has been in operation for _____ year(s).

1.3 Does your company own any production facilities?

☐ Yes ☐ No

1.4 Does your company conduct any manufacturing process off-shore?

☐Yes Which area? _____ ☐ No

1.5 How many staff are employed in your company?

Managers ______________

Technologists ______________

Technicians ______________

Craftsmen ______________

Operators ______________

Clerks ______________

1.6 The major markets are: _____

For First 'Technometric' Performance Attribute 'Product'

Part II Details of Technological Level of the TC Industry (TCI)

For the following key attributes, please state the level of performance for measuring the technological development (change) of your company:

	Key Attributes for Measuring the Technological Development of the TCI		Unit of measurement	P_0	P_1	P_2
1.	**Overall performance of your company for the 'productivity'**					
1.1	*Please state the performance level of your company on the following input factors* for 'productivity' improvement*					
	1.1.1	Capital investment for productivity improvement ($x._{1.1.1}$)	HK$			
	1.1.2	Labour employment for productivity improvement ($x._{1.1.2}$)	No. of staff			
	1.1.3	Technology input for productivity improvement ($x._{1.1.3}$)	HK$			
	1.1.4	Material resources for productivity improvement ($x._{1.1.4}$)	HK$			
	1.1.5	Skill acquisition for productivity improvement ($x._{1.1.5}$)	HK$			
	1.1.6	Education and training programmes for productivity improvement ($x._{1.1.6}$)	No. of programmes			
	1.1.8	Equipment investment for productivity improvement ($x._{1.1.8}$)	HK$			
1.2	*Please state the achievement level of your company for the following output results** due to 'productivity' improvement*					
	1.2.2	Technological change due to productivity improvement ($x._{1.2.2}$)	Change rate (%)			
	1.2.3	Economic growth due to productivity improvement ($x._{1.2.3}$)	Growth rate (%)			
2.	**Overall Performance of your company for the 'quality'**					
2.1	*Please state the performance level of your company for the following input factors* for 'quality' improvement.*					
	2.1.1	Capital investment for quality improvement ($x._{2.1.1}$)	HK$			

		Unit of measurement	P_0	P_1	P_2
2.1.2	Human resources management for quality improvement ($x._{2.1.2}$)	HK$			
2.1.3	Strategic quality planning for quality improvement ($x._{2.1.3}$)	Duration (years)			
2.1.4	Quality management system implementation for quality improvement ($x._{2.1.4}$)	Years of Implementation			
2.1.5	Technology input for quality improvement ($x._{2.1.5}$)	HK$			
2.1.6	Customer focus for quality improvement ($x._{2.1.6}$)	Commitment rate (%)			
2.1.7	Education and training programmes for quality improvement ($x._{2.1.7}$)	No. of programmes			
2.1.8	Skill and knowledge acquisition for quality improvement ($x._{2.1.8}$)	HK$			
2.1.9	Communication facilities for quality improvement ($x._{2.1.9}$)	HK$			
2.1.10	Government support for quality improvement ($x._{2.1.10}$)	HK$			

*2.2 Please state the achievement level of your company for the following output results** due to 'quality' improvement.*

2.2.1	Effective quality management due to quality improvement ($x._{2.2.1}$)	Effectiveness (%)			
2.2.2	Customer satisfaction due to quality improvement ($x._{2.2.2}$)	Satisfaction rate (%)			
2.2.4	Quality accreditation due to quality improvement ($x._{2.2.4}$)	No. of quality accreditation scheme achieved			
2.2.5	Positive impact on society due to quality improvement ($x._{2.2.5}$)	Social satisfaction (%)			
2.2.6	Increasing market share due to quality improvement ($x._{2.2.6}$)	Rate of increase (%)			

3. Overall performance of your company for 'flexibility'

3.1 Please state the performance level of your company for the following input factors for 'flexibility' improvement.*

3.1.5	Technology input for flexibility improvement ($x._{3.1.5}$)	HK$			
3.1.7	Flexible manufacturing system for flexibility improvement ($x._{3.1.7}$)	No. of systems implemented			

		Unit of measurement	P_0	P_1	P_2
3.2	*Please state the achievement level of your company for the following output results** due to' flexibility' improvement.*				
3.2.1	Short production life cycle ($x_{.3.2.1}$)	No. of days			
3.2.2	Customized product ($x_{.3.2.2}$)	Product quantity (pcs)			
3.2.3	Shorten lead time ($x_{.3.2.3}$)	No. of days			
3.2.4	Flexible corporation ($x_{.3.2.4}$)	Level of flexibility			
4.	**Overall Performance of your company for 'skill'**				
4.1	*Please state the performance level of your company on the following input factors* for 'skill' improvement*				
4.1.1	Human resources for skill enhancement ($x_{.4.1.1}$)	HK$			
4.1.2	Education and training programmes for skill enhancement ($x_{.4.1.2}$)	No. of programmes			
4.1.3	Skill acquisition scheme ($x_{.4.1.3}$)	No. of schemes			
4.1.4	Technology upgrading for skill enhancement ($x_{.4.1.4}$)	HK$			
4.1.5	Government support for skill development and acquisition ($x_{.4.1.5}$)	HK$			
4.2	*Please state the achievement level of your company for the following output results** due to 'skill' improvement.*				
4.2.1	New skill and knowledge development due to skill enhancement ($x_{.4.2.1}$)	Development rate (%)			
4.2.2	Acceptable performance due to skill enhancement ($x_{.4.2.2}$)	Performance acceptance rate (%)			
4.2.3	Human resources improvement due to skill enhancement ($x_{.4.2.3}$)	Level of improvement (scale : 1-10)			
4.2.4	Productivity improvement due to skill enhancement ($x_{.4.2.4}$)	Level of improvement (scale : 1-10)			
4.2.5	Quality improvement due to skill enhancement ($x_{.4.2.5}$)	Level of improvement (scale : 1-10)			
4.2.7	Organization improvement due to skill enhancement ($x_{.4.2.7}$)	Level of improvement (scale : 1-10)			
5.	**Overall Performance of Your Company for 'innovation'**				

		Unit of measurement	P_0	P_1	P_2
5.1	*Please state the performance level of your company for the following input factors* for 'innovation' improvement.*				
5.1.1	Capital investment (including foreign direct investment) for innovation upgrading ($x_{5.1.1}$)	HK$			
5.1.2	Technology development for innovation upgrading ($x_{5.1.2}$)	HK$			
5.1.3	R & D expenditure for innovation upgrading ($x_{5.1.3}$)	HK$			
5.1.4	R & D personnel for innovation upgrading ($x_{5.1.4}$)	No. of personnel			
5.1.5	New knowledge expenditure for innovation upgrading ($x_{5.1.5}$)	HK$			
5.1.6	Government support for innovation upgrading ($x_{5.1.6}$)	HK$			
5.1.7	Research contribution of local academic institution for innovation upgrading ($x_{5.1.7}$)	No. of projects			
5.1.8	Technology transfer for innovation upgrading ($x_{5.1.8}$)	HK$			
5.1.9	Education and training program for innovation upgrading ($x_{5.1.9}$)	No. of programmes			
5.2	*Please state the achievement level of your company on the following output results** due to' innovation' upgrading.*				
5.2.1	New product development due to innovation upgrading ($x_{5.2.1}$)	No. of new products			
5.2.3	New quality development due to innovation upgrading ($x_{5.2.3}$)	No. of quality systems			
5.2.4	New organization development due to innovation upgrading ($x_{5.2.4}$)	No. of new organizations			
5.2.5	New system development due to innovation upgrading ($x_{5.2.5}$)	No. of new systems			
5.2.6	No. of patents generated due to innovation upgrading ($x_{5.2.6}$)	No. of patents generated			
5.2.7	No. of R & D personnel employed due to innovation upgrading ($x_{5.2.7}$)	No. of personnel			
5.2.8	No. of publications published due to innovation upgrading ($x_{5.2.8}$)	No. of publications			
5.2.9	No. of R & D firms and activities set up due to innovation upgrading ($x_{5.2.9}$)	No. of firms			
5.2.10	Technological change due to innovation upgrading ($x_{5.2.10}$)	Change rate (%)			
5.2.11	Economic change due to innovation upgrading ($x_{5.2.11}$)	Change rate (%)			

3. Other comments :

- END -

Footnotes

'productivity' is defined as the efficiency with which resources are used to produce goods (and services) for the market. It is measured by computing the ratio of an index of the output to the index of the input.

'quality' is defined as a dynamic state associated with products, people, processes, and environment that meets or exceeds expectations. It is about doing things right the first time and satisfying customers.

'flexibility' is defined as the ability of the manufacturer to fulfill customer's demands in a timely fashion. The deliverables are expected to be customized products that represent high quality at affordable prices.

'skill' is defined as all the factors which go to make up a competent, expert, rapid, and accurate performance.

'innovation' is defined as the introduction of a new product or a new product quality; introduction of a new production method; opening up of a new source for new materials or semi-manufacture goods, and the creation of a new organizational structure in an industry.

* : Input factors of individual key attributes, i.e. productivity, quality, flexibility, skill and innovation, are defined as the factors that contribute to increase/enhance the aforesaid key attributes for the technological development (change) of the TC industry.

** : Output results of individual key attributes, i.e. productivity, quality, flexibility, skill and innovation, are defined as the effects and outcomes derived from the improvement or achievement of the aforesaid key attributes.

P_0 : Industrial survey period from 1974 to 1983
P_1 : Industrial survey period from 1984 to 1993
P_2 : Industrial survey period from 1994 to 2003

$X_{.1.1.1}$: Variable for statistic computation

For Second 'Technometric' Performance Attribute 'Process'

Part II Details of Technological Level of the TC Industry (TCI)

In the following key attributes, please state the level of performance for measuring the technological development (change) of your company:

			Unit of measurement	P_0	P_1	P_2
	Key Attributes for Measuring the Technological Development of the TCI					
1.	**Overall performance of your company for the 'productivity'**					
1.1	*Please state the performance level of your company for the following input factors* for 'productivity' improvement*					
	1.1.1	Capital investment for productivity improvement ($x_{.1.1.1}$)	HK$			
	1.1.2	Labour employment for productivity improvement ($x_{.1.1.2}$)	No. of staff			
	1.1.3	Technology input for productivity improvement ($x_{.1.1.3}$)	HK$			
	1.1.4	Material resources for productivity improvement ($x_{.1.1.4}$)	HK$			
	1.1.5	Skill acquisition for productivity improvement ($x_{.1.1.5}$)	HK$			
	1.1.6	Education and training programmes for productivity improvement ($x_{.1.1.6}$)	No. of programmes			
	1.1.7	Improved resources allocation for productivity improvement ($x_{.1.1.7}$)	HK$			
	1.1.8	Equipment investment for productivity improvement ($x_{.1.1.8}$)	HK$			
1.2	*Please state the achievement level of your company for the following output results** due to 'productivity' improvement*					
	1.2.1	Productivity growth due to productivity improvement ($x_{.1.2.1}$)	Growth rate (%)			
	1.2.2	Technological change due to productivity improvement ($x_{.1.2.2}$)	Change rate (%)			
	1.2.3	Economic growth due to productivity improvement ($x_{.1.2.3}$)	Growth rate (%)			
2.	**Overall performance of your company on the 'quality'**					

		Unit of measurement	P_0	P_1	P_2
2.1	*Please state the performance level of your company for the following input factors* for 'quality' improvement.*				
2.1.1	Capital investment for quality improvement ($x_{.2.1.1}$)	HK$			
2.1.2	Human resources management for quality improvement ($x_{.2.1.2}$)	HK$			
2.1.3	Strategic quality planning for quality improvement ($x_{.2.1.3}$)	Duration (years)			
2.1.5	Technology input for quality improvement ($x_{.2.1.5}$)	HK$			
2.1.6	Customer focus for quality improvement ($x_{.2.1.6}$)	Commitment rate (%)			
2.1.7	Education and training programmes for quality improvement ($x_{.2.1.7}$)	No. of programmes			
2.1.8	Skill and knowledge acquisition for quality improvement ($x_{.2.1.8}$)	HK$			
2.1.9	Communication facilities for quality improvement ($x_{.2.1.9}$)	HK$			
2.1.10	Government support for quality improvement ($x_{.2.1.10}$)	HK$			
2.2	*Please state the achievement level of your company for the following output results** due to' quality' improvement.*				
2.2.1	Effective quality management due to quality improvement ($x_{.2.2.1}$)	Effectiveness (%)			
2.2.3	People satisfaction due to quality improvement ($x_{.2.2.3}$)	Satisfaction rate (%)			
2.2.4	Quality accreditation due to quality improvement ($x_{.2.2.4}$)	No of quality accreditation schemes achieved			
3.	**Overall performance of your company for the 'flexibility"**				
3.1	*Please state the performance level of your company on the following input factors* for 'flexibility' improvement.*				
3.1.1	Capital investment for flexibility improvement ($x_{.3.1.1}$)	HK$			
3.1.2	Human resources development for flexibility improvement ($x_{.3.1.2}$)	HK$			
3.1.3	Education and training programmes for flexibility improvement ($x_{.3.1.3}$)	No. of programmes			

		Unit of measurement	P_0	P_1	P_2
3.1.4	Skill and knowledge acquisition for flexibility improvement ($x_{.3.1.4}$)	HK$			
3.1.5	Technology input for flexibility improvement ($x_{.3.1.5}$)	HK$			
3.1.6	Improved remuneration scheme for flexibility improvement ($x_{.3.1.6}$)	No. of schemes			
3.1.7	Flexible manufacturing system for flexibility improvement ($x_{.3.1.7}$)	No. of system			
3.2	*Please state the achievement level of your company for the following output results** due to' flexibility' improvement.*				
3.2.2	Customized product ($x_{.3.2.2}$)	No. of customized products			
3.2.3	Shorter lead time ($x_{.3.2.3}$)	No. of days			
3.2.4	Flexible corporation ($x_{.3.2.4}$)	Level of flexibility			
3.2.5	Improved stock management (with lower buffer stock) ($x_{.3.2.5}$)	No. of stocks			
4.	**Overall Performance of your company for 'skill'**				
4.1	*Please state the performance level of your company for the following input factors* for 'skill' improvement*				
4.1.4	Technology upgrading for skill enhancement ($x_{.4.1.4}$)	HK$			
4.1.5	Government support on skill development and acquisition ($x_{.4.1.5}$)	HK$			
4.2	*Please state the achievement level of your company for the following output results** due to 'skill' improvement.*				
4.2.1	New skill and knowledge development due to skill enhancement ($x_{.4.2.1}$)	Development rate (%)			
4.2.2	Acceptable performance due to skill enhancement ($x_{.4.2.2}$)	Acceptance rate (%)			
4.2.4	Productivity improvement due to skill enhancement ($x_{.4.2.4}$)	Level of improvement (scale : 1-10)			
4.2.6	Flexibility improvement due to skill enhancement ($x_{.4.2.6}$)	Level of improvement (scale : 1-10)			
4.2.7	Organization improvement due to skill enhancement ($x_{.4.2.7}$)	Level of improvement (scale : 1-10)			
5.	**Overall performance of your company for 'innovation'**				

		Unit of measurement	P_0	P_1	P_2
5.1	*Please state the performance level of your company for the following input factors* for 'innovation' improvement.*				
5.1.1	Capital investment (including foreign direct investment) for innovation upgrading ($x_{5.1.1}$)	HK$			
5.1.2	Technology development for innovation upgrading ($x_{5.1.2}$)	HK$			
5.1.3	R & D expenditure for innovation upgrading ($x_{5.1.3}$)	HK$			
5.1.4	R & D personnel for innovation upgrading ($x_{5.1.4}$)	No. of personnel			
5.1.5	New knowledge expenditure for innovation upgrading ($x_{5.1.5}$)	HK$			
5.1.6	Government support for innovation upgrading ($x_{5.1.6}$)	HK$			
5.1.7	Research contribution of local academic institution for innovation upgrading ($x_{5.1.7}$)	No. of projects			
5.1.8	Technology transfer for innovation upgrading ($x_{5.1.8}$)	HK$			
5.1.9	Education and training programmes for innovation upgrading ($x_{5.1.9}$)	No. of programmes			
5.2	*Please state the achievement level of your company for the following output results** due to' innovation' upgrading.*				
5.2.2	New process development due to innovation upgrading ($x_{5.2.2}$)	No. of new products			
5.2.4	New organization development due to innovation upgrading ($x_{5.2.4}$)	No. of new organizations			
5.2.5	New system development due to innovation upgrading ($x_{5.2.5}$)	No. of new systems			
5.2.6	No. of patents generated due to innovation upgrading ($x_{5.2.6}$)	No. of patents generated			
5.2.7	No. of R & D personnel employed due to innovation upgrading ($x_{5.2.7}$)	No. of personnel			
5.2.8	No. of publications published due to innovation upgrading ($x_{5.2.8}$)	No. of publications			
5.2.9	No. of R & D firms and activities set up due to innovation upgrading ($x_{5.2.9}$)	No. of firms			
5.2.10	Technological change due to innovation upgrading ($x_{5.2.10}$)	Change rate (%)			

3. Other comments :

- END -

Footnotes

‘productivity’ is defined as the efficiency with which resources are used to produce goods (and services) for the market. It is measured by computing the ratio of an index of the output to the index of the input.

‘quality’ is defined as a dynamic state associated with products, people, processes, and environment that meets or exceeds expectations. It is about doing things right the first time and satisfying customers.

‘flexibility’’ is defined as the ability of the manufacturer to fulfill customer’s demands in a timely fashion. The deliverables are expected to be customized products that represent high quality at affordable prices.

‘skill’ is defined as all the factors which go to make up a competent, expert, rapid, and accurate performance.

‘innovation’ is defined as the introduction of a new product or a new product quality; introduction of a new production method; opening up of a new source for new materials or semi-manufacture goods, and the creation of a new organizational structure in an industry.

* : Input factors of individual key attributes, i.e. productivity, quality, flexibility, skill and innovation, are defined as the factors that contribute to increase/enhance the aforesaid key attributes for the technological development (change) of the TC industry.

** : Output results of individual key attributes, i.e. productivity, quality, flexibility, skill and innovation, are defined as the effects and outcomes derived from the improvement or achievement of the aforesaid key attributes.

P_0 : Industrial survey period from 1974 to 1983
P_1 : Industrial survey period from 1984 to 1993
P_2 : Industrial survey period from 1994 to 2003

$X_{.1.1.1}$: Variable for statistic computation

For Third ‘Technometric’ Performance Attribute ‘Service’

Part III Details of Technological Level of the TC Industry (TCI)

For the following key attributes, please state the level of performance for measuring the technological development (change) of your company:

			Unit of measurement	P_0	P_1	P_2
	Key Attributes for Measuring the Technological Development of the TCI					
1.	**Overall performance of your company for ‘productivity’**					
1.1	*Please state the performance level of your company for the following input factors* for ‘productivity’ improvement*					
	1.1.1	Capital investment for productivity improvement ($x._{1.1.1}$)	HK$			
	1.1.2	Labour employment for productivity improvement ($x._{1.1.2}$)	No. of staff			
	1.1.3	Technology input for productivity improvement ($x._{1.1.3}$)	HK$			
	1.1.5	Skill acquisition for productivity improvement ($x._{1.1.5}$)	HK$			
	1.1.6	Education and training programmes for productivity improvement ($x._{1.1.6}$)	No. of programmes			
1.2	*Please state the achievement level of your company for the following output results** due to ‘productivity’ improvement*					
	1.2.2	Technological change due to productivity improvement ($x._{1.2.2}$)	Growth rate (%)			
	1.2.3	Economic growth due to productivity improvement ($x._{1.2.3}$)	Growth rate (%)			
2.	**Overall performance of your company for ‘quality’**					
2.1	*Please state the performance level of your company for the following input factors* for ‘quality’ improvement.*					
	2.1.1	Capital investment for quality improvement ($x._{2.1.1}$)	HK$			
	2.1.2	Human resources management for quality improvement ($x._{2.1.2}$)	HK$			
	2.1.3	Strategic quality planning for quality improvement ($x._{2.1.3}$)	Duration (years)			
	2.1.4	Quality management system implementation for quality improvement ($x._{2.1.4}$)	Years of Implementation			

		Unit of measurement	P_0	P_1	P_2
2.1.5	Technology input for quality improvement ($x_{.2.1.5}$)	HK$			
2.1.6	Customer focus for quality improvement ($x_{.2.1.6}$)	Commitment rate (%)			
2.1.7	Education and training programmes for quality improvement ($x_{.2.1.7}$)	No. of programmes			
2.1.8	Skill and knowledge acquisition for quality improvement ($x_{.2.1.8}$)	HK$			
2.1.9	Communication facilities for quality improvement ($x_{.2.1.9}$)	HK$			
2.1.10	Government support for quality improvement ($x_{.2.1.10}$)	HK$			

2.2 *Please state the achievement level of your company for the following output results** due to 'quality' improvement.*

2.2.1	Effective quality management due to quality improvement ($x_{.2.2.1}$)	Effectiveness (%)			
2.2.2	Customer satisfaction due to quality improvement ($x_{.2.2.2}$)	Satisfaction rate (%)			
2.2.4	Quality accreditation due to quality improvement ($x_{.2.2.4}$)	No. of quality accreditation schemes achieved			
2.2.5	Positive impact of society due to quality improvement ($x_{.2.2.5}$)	Social satisfaction (%)			
2.2.6	Increasing market share due to quality improvement ($x_{.2.2.6}$)	Rate of increase (%)			

3. **Overall performance of your company in 'flexibility"**

3.1 *Please state the performance level of your company for the following input factors* for 'flexibility' improvement.*

3.1.3	Education and training programmes for flexibility improvement ($x_{.3.1.3}$)	No. of programmes			
3.1.4	Skill and knowledge acquisition for flexibility improvement ($x_{.3.1.4}$)	HK$			
3.1.5	Technology input for flexibility improvement ($x_{.3.1.5}$)	HK$			
3.1.6	Improved remuneration scheme for flexibility improvement ($x_{.3.1.6}$)	No. of schemes			

		Unit of measurement	P_0	P_1	P_2
3.2	*Please state the achievement level of your company for the following output results** due to' flexibility' improvement.*				
3.2.4	Flexible corporation ($x._{3.2.4}$)	Level of flexibility			
3.2.5	Improved stock management (with lower buffer stock) ($x._{3.2.5}$)	No. of stock (pcs)			
4.	**Overall performance of your company on 'skill'**				
4.1	*Please state the performance level of your company for the following input factors* for 'skill' improvement*				
4.1.1	Human resources for skill enhancement ($x._{4.1.1}$)	HK$			
4.1.2	Education and training programmes for skill enhancement ($x._{4.1.2}$)	No. of programmes			
4.1.3	Skill acquisition scheme ($x._{4.1.3}$)	No. of schemes			
4.1.4	Technology upgrading for skill enhancement ($x._{4.1.4}$)	HK$			
4.1.5	Government support for skill development and acquisition ($x._{4.1.5}$)	HK$			
4.2	*Please state the achievement level of your company for the following output results** due to 'skill' improvement.*				
4.2.1	New skill and knowledge development due to skill enhancement ($x._{4.2.1}$)	Development rate (%)			
4.2.2	Acceptable performance due to skill enhancement ($x._{4.2.2}$)	Performance acceptance rate (%)			
4.2.3	Human resources improvement due to skill enhancement ($x._{4.2.3}$)	Level of improvement (scale : 1-10)			
4.2.4	Productivity improvement due to skill enhancement ($x._{4.2.4}$)	Level of improvement (scale : 1-10)			
4.2.5	Quality improvement due to skill enhancement ($x._{4.2.5}$)	Level of improvement (scale : 1-10)			
4.2.7	Organization improvement due to skill enhancement ($x._{4.2.7}$)	Level of improvement (scale : 1-10)			
5.	**Overall performance of your company for 'innovation'**				

		Unit of measurement	P_0	P_1	P_2
5.1	*Please state the performance level of your company for the following input factors* for 'innovation' improvement.*				
5.1.1	Capital investment (including foreign direct investment) for innovation upgrading ($x_{.5.1.1}$)	HK$			
5.1.6	Government support for innovation upgrading ($x_{.5.1.6}$)	HK$			
5.1.9	Education and training programmes for innovation upgrading ($x_{.5.1.9}$)	No. of programmes			
5.2	*Please state the achievement level of your company for the following output results** due to 'innovation' upgrading.*				
5.2.3	New quality development due to innovation upgrading ($x_{.5.2.3}$)	No. of quality systems			
5.2.4	New organization development due to innovation upgrading ($x_{.5.2.4}$)	No. of new organizations			
5.2.5	New system development due to innovation upgrading ($x_{.5.2.5}$)	No. of new systems			
5.2.6	No. of patents generated due to innovation upgrading ($x_{.5.2.6}$)	No. of patents generated			
5.2.8	No. of publications published due to innovation upgrading ($x_{.5.2.8}$)	No. of publications			
5.2.11	Economic change due to innovation upgrading ($x_{.5.2.11}$)	Change rate (%)			

3. Other comments :

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- END -

Footnote

'productivity' is defined as the efficiency with which resources are used to produce goods (and services) for the market. It is measured by computing the ratio of an index of the output to the index of the input.

'quality' is defined as a dynamic state associated with products, people, processes, and environment that meets or exceeds expectations. It is about doing things right the first time and satisfying customers.

‘flexibility’’ is defined as the ability of the manufacturer to fulfill customer’s demands in a timely fashion. The deliverables are expected to be customized products that represent high quality at affordable prices.

‘skill’ is defined as all the factors which go to make up a competent, expert, rapid, and accurate performance.

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* : Input factors of individual key attributes, i.e. productivity, quality, flexibility, skill and innovation, are defined as the factors that contribute to increase/enhance the aforesaid key attributes for the technological development (change) of the TC industry.

** : Output results of individual key attributes, i.e. productivity, quality, flexibility, skill and innovation, are defined as the effects and outcomes derived from the improvement or achievement of the aforesaid key attributes.

P_0 : Industrial survey period from 1974 to 1983
P_1 : Industrial survey period from 1984 to 1993
P_2 : Industrial survey period from 1994 to 2003

$X_{.1.1.1}$: Variable for statistic computation

Chapter 5 Evaluation of Technometric Performance in HKTCI in Relation to Government Policies

5.1 Introduction

This Chapter highlights the application of the enhanced ‘Technometric’ model to evaluate the ‘Technometric’ performance of HKTCI. It includes the method of application of an enhanced ‘Technometric’ model, to measure of the technological change in the local industry in the past 30 years, review of the government policy that changed in the past 30 years, and comparison of the results measured by the enhanced ‘Technometric’ model with the changed pattern of the reviewed Government policy.

5.2 Method of application and evaluation of the ‘Technometric’ performance of HKTCI

The evaluation of a new ‘Technometric’ model developed in the last chapter was a 3-fold process. The first process was to measure the performance of the domain field using a new ‘Technometric’ model for the last thirty years. The second process was to identify the Government policies related to the domain field within the same measured period. The last process was to compare the measured results derived from the new ‘Technometric’ model with the changing pattern of the Government policy in the domain field. It was assumed that, if the measured results matched with the changing pattern of the government policy in the domain field, the new ‘Technometric’ model could effectively measure the performance of technological development in the TC industry.

5.2.1 Why the past 30 years was selected as time frame for evaluation?

The TC industry has undergone great changes since theist inception in the 1940’s Over the years, Hong Kong has evolved from a low-cost apparel supplier into a world-class fashion centre, providing one-stop services ranging from design and manufacturing to marketing and retailing. The industry has built up a strong reputation for its reliable quality, quick response and excellent fashion sense. In 1996, Hong Kong was the world’s leading textile exporter and second largest clothing exporter. The TC industry is also a mainstay of Hong Kong’s manufacturing sector, being the largest with regard to gross output, employment and domestic exports. Today, over half of HKTC firms have set up overseas production facilities for carrying out labour-intensive processes. Plants owned and managed by Hong Kong firms spread from the Mainland to various locations across Southeast Asia, Sri Lanka, Pakistan, the Caribbean, Latin America and North America. Hong Kong is functional as a strategic control centre managing this highly successful and geographically dispersed production network [83]. The reasons for selecting the last 30 years (i.e., from 1974 to 2003) as the time frame for this evaluation are as follows:

1. The Multi-fibre Agreement (MFA) was implemented in 1974 and it became the technological development framework for participating countries, including Hong Kong to follow. The period 1974 to 2003 was selected for the purpose of analyzing the change of the technological development of HKTCI in relation to the Government's industrial policies in response to changes in international trade agreements, i.e., MFA, World Trade Organization Agreement on TC, etc.
2. The adoption of a ten-year period for evaluating the impact of industrial policy change on HKTCI is quite commonly used by most of developed and developing countries. Policy evaluation also distinguishes between short and long-term policy. In general, short-term policy is concerned, for macroeconometric models, with the stabilization of the economy within a period of 1 or 2 years. Long-term policy, by way if contrast, is concerned

with the pattern of growth over longer periods, i.e., 5 to 10 years, or even longer. [84]

5.3 Review of Government policy changes during the period 1974 to 2003

The following paragraphs review the Government's industrial policy during the period 1974 to 2003 in order to find out the relationship between policy and the technological change of HKTCI.

5.3.1 Industrial Policy for Technological Development in the TC Industry

Economists often argue that governments should intervene in industry when markets fail to provide an efficient utilization of resources. Unfortunately, discussion of the circumstances in which market failure occurs is often inadequately developed. Furthermore, in practice, governments often intervene for reasons that have (at best) only a hazy connection with market failure.

5.3.1.1 The definition of industrial policy

Industry policy usually relates to those policies whose main direct effect is upon individual firms and industries, or on industry as a whole [85, 86]. Lindbeck defines the term: industry policy as political actions designed to affect either the general mechanisms of production and resource allocation or the actual allocation of resources among sectors of production by means other than general monetary and fiscal policies which are designed to influence various macro-economic aggregate [87]. The European Commission* (EC), subsequently known as European Union (EU) in 1991, including 'Italy', defined industrial policy as the effective and coherent implementation of all those policies which impinge on the structural adjustment of industry with a view to promoting competitiveness [88]. Industrial policy is an elusive concept, which can cover almost everything bearing on industry. Most authors favour a definition based on objectives, for example, Adams and Klein [89] included 'everything which is useful to improve growth and competitive performance. Ha-Joon Chang [90] proposed that an industrial policy is one 'aimed at particular industries (and firms as their components) to achieve the outcomes that are perceived by the state to be efficient for the economy as a whole'.

In summary, industrial policy may be generally defined as 'every form of state intervention that affects industry as a distinct part of the economy'. The 'state' is meant to cover not only central government, local authorities, and the EC but also all independent agencies following government directives primarily with public funds. ‘Industry’ includes manufacturing and also utilities [91]. The definition can be further elaborated upon by distinguishing 3 levels of industrial policy:

1. Creation of a ‘landscape’ – the essential component of a suitable ‘landscape’ is the existence of clearly defined and rigorously enforced property rights. Industrial policy might modify the ecology – foster technical progress by supporting innovation or the diffusion of existing techniques - possibly imported from abroad. To this end, the state can directly undertake R & D (usually for military purposes) and simply subsidize the R & D of firms (often by granting tax reductions). The state can make the available technology known through the specialist press, training projects, and so on.
2. Redistribution of resources among industries and firms are the core of classical industrial policy – with some exceptions (notably the attempts at general planning of the 1950s and 1960s) these policies have targeted single firms of industries according to two different criteria. One is ‘picking winners’ – those industries or businesses that seem to have bright prospects for future development, or that are deemed necessary for whatever reason (including military requirements). Nowadays they are so called hi-tech industries (such as computers, aircraft, and

biotechnology).

3. The other criterion is ‘helping loser’, firms and industries’ which are in trouble. In theory, the government should support them temporarily, either to help them to restructure and survive in the long run or to avoid a too-sudden demise, and to assist an orderly reallocation of the workers to other firms and industries.

* With the Treaty on European Union (TEU), agreed at Maastricht in December 1991, the European Community (EC) member states decided to establish a European Union (EU) founded on the EC and guided by democratic principles: ‘The Union shall respect the national identities of its Member States, whose systems of government are founded on the principles of democracy’. The EU member states are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom. [92]

Industrial policy aims to increase the nation’s productivity and competitiveness and has gone under a variety of names: reindustrialization, revitalization, structural-adjustment policies, bailouts, even supply-side policies. Some economists have taken the position that the best industrial policy is no policy at all, that the unfettered operation of the market will result in optimal resource allocation and the best industrial structure. At the heart of the industrial policy debate is the question of whether policies for growth and competitiveness should target particular industries or whether they can be broadly general without specific industrial focus. In this connection, a terminological distinction is sometimes drawn between ‘micro industrial policies that are industry-specific and ‘macro’ industrial policies, which are not [93].

5.3.1.2 Key constituents of industrial policy

Policies include competition policy intended to affect markets with certain characteristics or firms pursuing certain types of behaviours, regional policy to influence the spatial location of industry, innovation policy to influence the technology used by firms, and trade policy designed to protect specific firms and industries [86] in addition to tax policy and technology policy.

Gual [94] defines ‘industrial policy’ as the set of government interventions that by way of taxes (or subsidies) and regulations on domestic products or factors of production attempt to modify the allocation of domestic resources that results from the free operation of the market. Government policy will play a crucial role in determining whether the future science system will be able to meet the demands of the 21st century. The industrial policy in OECD is for less emphasis on direct support to specific sectors. However, many OECD countries still use such measures to assist the restructuring process in declining industries or to aid specific regions. Instead, policies have shifted towards improving framework conditions for industry, primarily in areas where market failures can be identified, such as investment in infrastructure, skill and R & D [95]. The key constituents of industrial policy from the literature review centred on two world prominent TC producers and leading open marketplaces - the European Union (EU), and the USA – in comparison with HKSAR, were identified.

5.3.1.2.1 Competition policy

Competition policy encompasses measures designed either to promote a more competitive environment or to prevent a reduction in competition. The USA has a long-established and comprehensive competition (antitrust) policy which is enforced by the Federal Trade Commission and the Department of Justice. The main legislation giving substance to this policy is contained in the Sherman Act 1890, the Clayton Act 1914, the Federal Trade Commission Act 1914 and the Robinson-Patman Act 1936 [86]. The EC has jurisdiction to intervene only in matters which affect competition between member states, and has no powers regarding intra-state competition. It considers that a vigorous competition policy is a key element in maintaining both the efficient functioning of markets and competitive pressures. Experience has shown that competition is an effective tool for ensuring that producers remain dynamic, concentrate on innovation, listen to the market, reduce costs and provide high-quality goods and services at the lowest possible prices. Continued enforcement of the competition rule is therefore of paramount importance in bringing out the best in the EU industry [88].

Competition policy is concerned with maintaining competition between firms in all sections of the economy in an attempt to promote the efficient working of the market. Competitive markets are normally viewed as having a number of inherent advantages such as the efficient allocation of resources, the maintenance of consumer choice, the promotion of technological innovation, and the autonomy of industrial enterprises, which it is believed are important for long-run economic progress [96]. Mergers have been brought within the scope of competition policy (for instance, in the UK under the Monopolies and Mergers Act 1965) because they can lead to the development of a monopoly position. Following the 1950 Celler-Kefauver amendment to Section 7 of the Clayton Act 1914, the USA adopted a comprehensive and strict approach to horizontal mergers - all were prohibited unless they were within guidelines set down by the Department of Justice. A significant weakening of competition leading to higher prices and worsening terms of sale is envisaged because the merged firm would have dominance in certain products and in the expanding out-of-town market.

Restrictive practices are agreements between firms that have the effect of reducing competition. Anti-competitive practices are activities undertaken by an individual firm, which restrict, distort or prevent competition, generally through the election of entry barriers. In the USA, a particularly strong line is taken on restrictive and anticompetitive practices. Unlawful practices include price and market sharing agreements between firms and the refusal to supply customers [86]. The EU has wide powers to control policies which adversely affect competition, including (under Article 90) the activities of member governments. For instance, in 1991 the EC agreed that Toyota had been indirectly granted state aid to purchasing government owned land at a price below market value. Exceptions are allowed (for example, regional aid and assistance to the research and development of generic technologies) but these have to be cleared by the Union in advance of their implementation [88]. HKSAR does not yet have a comprehensive competition law. Yet lack of competition and abuse of market power exist in many important sectors, as found by a series of studies issued by the Hong Kong Consumer Council in the 1990’s [97].

Summing up, the competitive policy comprises the following policies which either directly or indirectly influence the technological development in the TC industry:

1. Policy on monopoly (antitrust policy)
2. Policy on mergers
3. Policy on anti-competitive practices.

5.3.1.2.2 Regional policy

The case for policies to direct the spatial location of industry to ameliorate regional problems turns on the failure of the market to achieve adjustments in the economy either quickly or equitably. Firms must adjust to changes in tastes and incomes. Some regions may become prosperous, whilst other face decline. In a region suffering industrial decline, high unemployment is expected to lead to reductions in local wages. This raises the attractiveness of the region to migrant firms. At the same time, relatively higher wages in more successful regions stimulate immigration of the unemployed. The more imperfect the market mechanism, the longer it will take to reduce regional disparities.

It has been argued that the process of readjustment can lead to externalities and that these also provide a case for regional policy. For example, migrants tend to be younger, more educated and more highly skilled than the population left behind. This may worsen the prospects of the remaining unemployed, since firms generally require a mix of skills. The lack of certain types of labour may reduce a firms' willingness to locate in a problem region. Proponents of an active regional policy argue that the best way to improve economic welfare at the national level is by government intervention. To deal with the externality effects of regional disparities, intervention usually involves policies designed to attract firms to problem regions. This may take the form of grants to firms in particular areas, or of a refusal to permit development in more prosperous regions [86].

There is no explicit regional policy in the USA. In the EU, instead of encouraging action in a particular sector - aid to the textile industry or to shipyards in a certain member state – as in the past, the EU wished to tackle all the structural problems facing the less favoured regions and the most deprived citizens. Since investment is the key to development, these regions must be given the best chance of attracting firms by giving them production and economic conditions as close as possible to those in developed regions [88]. There is no regional policy in the HKSAR. Summing up, the regional policy may not directly influence the technological development of the TC industry.

5.3.1.2.3 Trade policy

Protection is frequently used as part of an active on planning approach to industry policy. By restricting foreign competition, it is possible to influence the operation of particular firms and industries, to accelerate the growth of an infant industry, or to decelerate the decline of a mature industry. It may also be used as a 'best-best' measure to try to force other nations to adopt liberal trade policies. In many respects, protection of a declining industry suffers from the same disadvantages as financial support. The respite from foreign competition is rarely used as a 'breathing space' for adjustment, but rather is intended to be seen as an opportunity for inaction. Before the Second World War, trade policy was the principal method of supporting domestic industries, with tariffs and quotas the main instruments. There has been a reduction in the use of these traditional measures, particularly in manufacturing. This is the result of the formation of the General Agreement on Tariffs and Trade (GATT) in 1947 (culminating in tariff cuts in the Kennedy and Tokyo rounds) and the emergence of free trade areas and customs unions (such as the EU). The North American Free Trade Agreement (NAFTA) proposed between Canada, the USA and Mexico is expected eventually to enhance welfare by some $15 billion per year.

Tariffs have been increasingly replaced by non-tariff barriers (such as voluntary export restraints or ‘health’ and ‘safety’ standards to be met by imports) and by the use of selective assistance to industries. Finger [98] argues that the ‘antidumping’ policy can be used as the power of the importing countries to gain an edge over competitors.

The external trade policy of the EU impinges on over one-fifth of world trade. Hence, an understanding of the principles and practice of the EU’s trade policy, the Common Commercial policy (CCP), is of vital importance to any researcher of the global trade environment. The principle of the CCP is put into effect by means of trade policy instruments and trade agreements. This distinguishes it from main policy instruments which the Commission can employ to influence external trade: quota, tariff, voluntary export restraint and anti-dumping measures [99]. The free trade policy means HKSAR maintains no barriers to trade. Thus, the HKSAR does not charge any tariff on imports or exports of goods. Import and export licensing is also kept to a minimum. Licensing is only imposed when there is a genuine need to fulfill obligations undertaken by HKSAR to its trading partners, or to meet public health, safety or internal security needs [100].

Summing up, the trade policy comprises the following policies which indirectly influence the technological development of the TC industry:

1. Tariff policy
2. Quota policy
3. Voluntary export restraints
4. Antidumping policy

5.3.1.2.4 Tax policy

The tax policy process in the US is more centralized than in the country's spending policy process, but these formal and informal procedures remain much more pluralistic than in other countries. Tax instruments are usually divided into two major groups:

1. Direct taxes – are levied as a percentage of income earned by a person or a firm. Personal income tax, corporate income tax, and employee payroll contributions to social security or other government programmes are examples of direct taxes

2. Indirect taxes – are not based on the taxpayer’s income. Employer payroll taxes represent a major form of indirect taxation found in virtually every country around the world. Another common form of indirect tax is the sales tax – a tax charged on the sale of a good or service [101].

Tax policy is a symbol of national sovereignty and part of a country’s overall economic policy, helping to finance public spending and redistribute income. The EU plays only a subsidiary role in determining taxes and social security contributions. The aim is not to standardize the national systems of compulsory taxes and contributions but simply to ensure that they are compatible not only with each other but also with the aims of the tax system established in the EU. The different types of compulsory taxes and contributions are:

1. Direct taxes – they are paid and borne by the taxpayer and include income tax, corporation tax, wealth tax and most local taxes.
2. Indirect taxes – these are based on production and consumption and are not borne by the ‘taxable person’ (traders and industry) who pay them, collecting tax on behalf of the government and passing it on in the price to the final consumer on whom the burden falls (examples include Value Added Tax (VAT) and excise

duties).

3. Social security contributions – these are compulsory charges levied by social security organizations to pay for sickness, disability or unemployment benefits, and to maintain insured persons' income in the event of certain risks [102].

In a world where an increasing number of governments compete hard to attract multinational corporations, fiscal incentives have become a global phenomenon. Poor countries rely on tax holidays and import duty exemptions, while industrialized Western European countries allow investment allowances or accelerated depreciation. The gradual elimination of barriers to capital movements has stimulated governments to compete for Foreign Direct Investment (FDI) in global markets as well as reinforced the role of tax policy in this process. This recent competition trend has to be offset by the increasing pressure that governments face to harmonize their tax policies within regional (or international) agreements. Governments have several tax instruments that they can use to attempt to influence the effective tax rates and the location decision of a multinational corporation. The instruments are linked to the corporate income tax such as tax holidays and tax allowance [103].

With regard to business R & D, rational factors largely determine whether countries prefer tax incentives, subsidies or instruments to increase research investments. Some OECD countries such as France, the United States and the United Kingdom use a combination of subsidies and tax incentives to stimulate private R & D investments [104].

Hong Kong's tax policy system is simple and predictable. It involves corporate tax, personal tax, only income and profits derived directly from Hong Kong and subject to tax, and the Government does not impose tax on capital gains, dividends or interest, generous capital allowance, etc. Hong Kong has no sales tax or value added tax [105].

Summing up, the tax policy comprises the following policies which may either directly influence (DI) or indirectly influence (II) the technological development of the TC industry:

1. Corporate policy (II)
2. Personal tax policy (II)
3. Sales tax policy (II)
4. R & D tax policy (DI)

5.3.1.2.5 Technology policy

Technology involves much more than science and innovation involves much more than technology. That technology policy is important should not be in doubt given the connection between technological advance, wealth creation and the quality of life. Everybody accepts that new technology is central to the innovation process [106]. Technology policy can be defined as policy that is intended to influence the decisions of firms to develop, commercialize or adopt new technologies. Distinction can be made for patent protection of innovations and government policies to stimulate innovations from the supply and demand sides.

Solomon is quoted in EU's Research and Technological Development Policy as having defined science and technology policy as 'the measure taken by government to encourage the development of scientific and technological research and to exploit the results of this research for political objectives' [107]. It should be recognized that policies in relation to science and technology policy are investment policies in the sense of seeking to raise future levels of gross domestic product (GDP) per head and to do so in part by enhancing the international competitive ranking of national industries. The science and technology policy comprises:

1. Science policy – to manage and fund the accumulation of knowledge in relation to natural phenomena by creation and support of appropriate organizations – research laboratories and universities
2. Technology policy – to manage and fund the accumulation and applications of practical knowledge needed for particular productive activities, including transfer of technology from overseas and the conversion of scientific knowledge into wealth creation. Appropriate organizations are research laboratories, universities and firms
3. Innovation policy – to encourage the transfer of science and technology knowledge into application by ensuring that necessary complementary resources (e.g. capital finance) and knowledge are available, by supporting entrepreneurship and by protecting intellectual property [108].

Technology policy is an evolutionary framework aimed at the stimulation of a great variety of innovations, partly via currently-pursued policies and partly via initiatives to diffuse flexibly-targeted technologies: financial subsidies to R & D in the direction of perspective technologies and tax incentives for R & D in the direction of perspective technologies [109]. US technology policy involves efforts to create partnerships between government-funded creators of technology, principally government laboratories and universities, and US industry to speed the development of new technology. In a response to these competitive challenges to the US, particularly in high-technology markets, federal technology policy was established to encourage a fuller and faster exploitation of publicly-supported R & D by American firms [110]. Teubal et al. [111] argue that Technological Infrastructure Policy is increasingly coming to the forefront of policy discussion, both in the specific content of technological policy, and, more generally, with regard to growth-promoting policies in advanced and developing economies. Porter [47] suggested that government procurement could be a positive force for upgrading national competitive advantage which makes innovation easier and works to the benefit of a nation's industry.

The EU highlights the facts that intellectual property rights (IPR: patents, copyright, authors rights, design rights, trade-secrets, trade marks and in general rights that recognize and reward intellectual creation) constitute an important part of the institutional basis of science, technology and innovation. Their function is to provide incentives to actors to invest in technology creation and innovation (by granting to them temporary monopoly rights), while at the same time providing for the communication necessary for social accumulation of knowledge (by forcing disclosure of the knowledge on which the rights are required) [112].

The HKSAR Government actively encourages the industrial sector to harness the forces of innovation and technology for improving productivity and adding value to products, provides world-class support infrastructure for industrial development, and helps address issues of concern to industry. The Innovation and Technology Commission manages on a day-to-day basis the Government's programmes for promoting innovation and technology. The Branch is assisted by the Trade and Industry Department in liaison and networking with industry and providing general support services [113].

Technology policy is an area that has potentially important impacts upon Foreign Direct Investment (FDI) spillover benefits. For example, government policies that encourage the performance of R & D in the host economy should enhance the technical capability of local firms. Other things being equal, this should enhance the capability of host country firms to exploit appropriate foreign technology. Yet even this seemingly obvious conclusion must be hedged. For instance, it can be argued that complementarities between the technical competence of foreign and domestically owned firms strongly condition the magnitude of actual spillover benefits. Hence government policies might increase the technical competence of local firms in meaningful ways, yet still reduce the 'fit' between local technical competencies and those enjoyed by likely foreign investors, thereby actually discouraging net R & D capital accumulation. It would be useful to have more direct evidence that would permit this hypothesis to be evaluated [114].

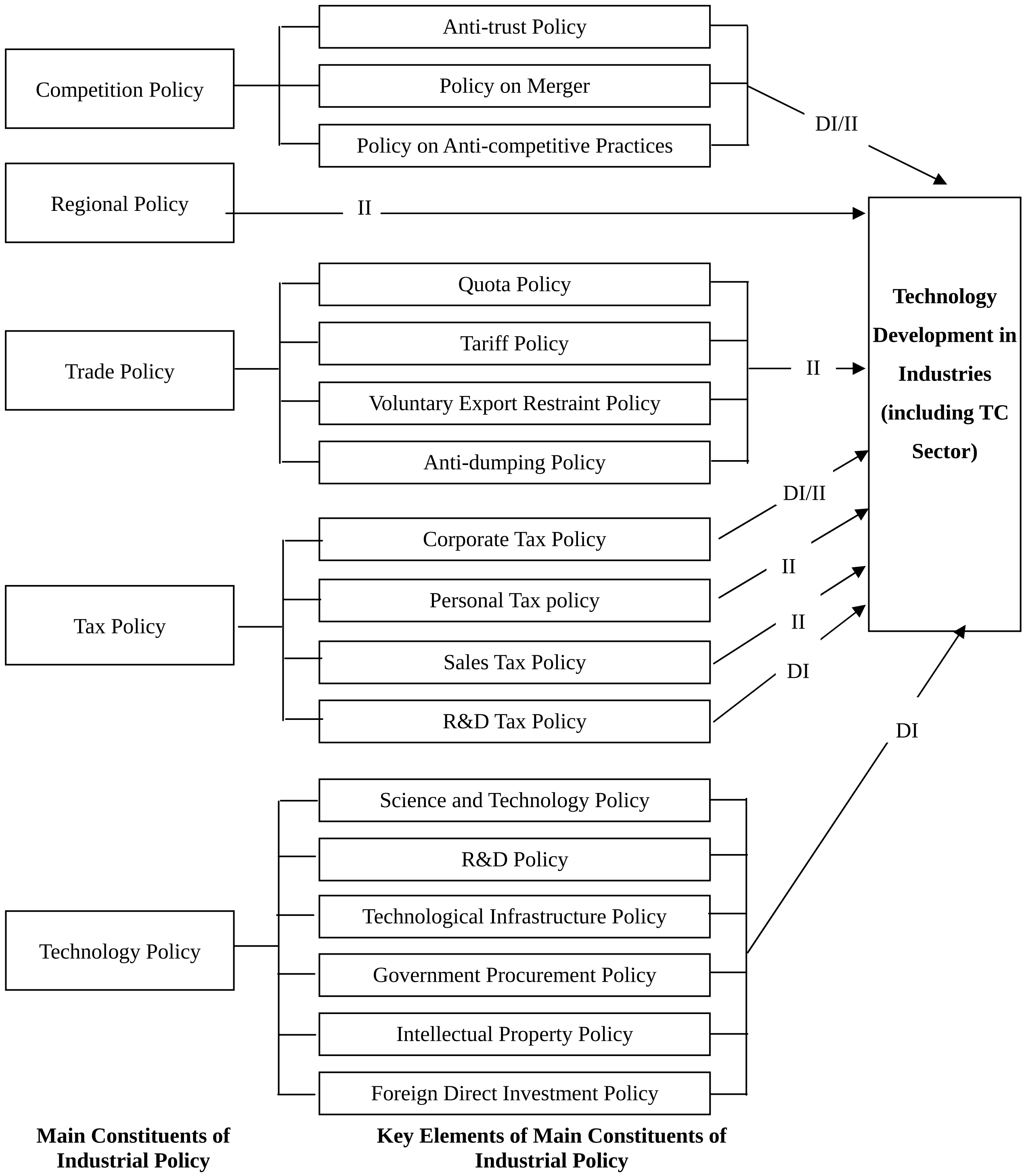
In the context of the increasing multi-nationalization of firms and markets, FDI is considered more and more responsible for welfare in the host country because of advantages related to the introduction of the technologies and innovation, new managerial techniques, skills, capital, new jobs created/safeguarded and the establishment of local industrial sectors in Italy [115]. The US has traditionally welcomed FDI and provides foreign investors fair, equitable and nondiscriminatory treatment with a few exceptions designed to protect national security. The Exon-Florio provision is implemented within the context of this open investment policy. The intent of Exon-Florio is not to discourage FDI generally, but to provide a mechanism to review and, if the President finds necessary, to restrict FDI that threatens the national security [116].

Summing up, the technology policy comprises the following policies which directly influence the technological development in the TC industry:

1. Science and technology policy
2. R & D policy
3. Technological infrastructure policy
4. Government procurement policy
5. Intellectual property policy
6. Foreign direct investment policy

With reference to the above, Figure 5-1 shows the 5 main constituents of 'macro-industrial policy', viz., Competition Policy, Regional Policy, Trade Policy, Tax Policy and Technology Policy. The key elements of each main constituent are also identified by which the technological development in industries, including the TC industry, is either directly (DI) or indirectly influenced (II).

Figure 5-1 Macro Industrial Policy



Footnote
DI : Direct Influence
II : Indirect Influence

5.3.1.3 HKSAR's industrial policy for technological development in the TC industry from 1973 to 2003

The HKSAR does not have a specific industrial policy for the domestic TC industry, but rather it has a 'macro' industrial policy for all industries in Hong Kong. Before the hand over of sovereignty from Britain to China in 1997, the term 'positive, non-interventionist industrial policies' was used and the Government avoided intervening in the marketplace as far as possible. Its support for the manufacturing industries was largely pragmatic, and essentially confined to helping to overcome constraints or obstacles to growth in areas where the Government was the best or only agent for action, or where a clear need for Government support was justified.

The Government's support for industry fell into 2 main categories, i.e., infrastructural support and developmental support, with details as follows:

1. Infrastructural support – provision of industrial land, trained manpower, water, fuels, raw materials, and financial as well as other business services.
2. Developmental support – the stimulation of investment in productivity, quality and innovation, the 3 crucial elements in maintaining manufacturing

competitiveness [117].

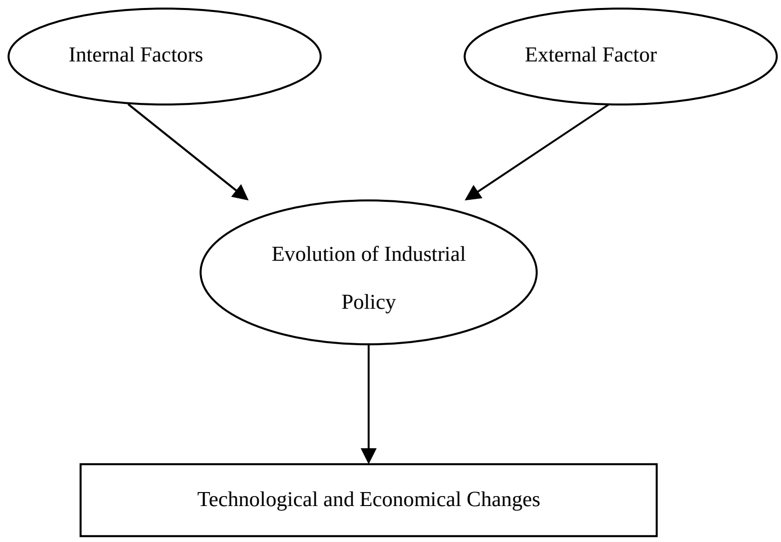
Hong Kong was a free market economy. The Government's policy was to facilitate, within the framework of a free market, the further development of manufacturing and manufacturing-related industries in Hong Kong. The Hong Kong Government neither protected nor subsidized manufacturers. It recognized, however, a responsibility to ensure that the requisite physical, human and technological infrastructure was provided in a timely manner. It helped manufacturing and manufacturing-related industries to become more competitive through improvements in productivity and quality. It supported applied research and development, promoted inward direct investment and encouraged technology transfer. It monitored and informed industries of the world-wide developments that may have impinged upon their competitiveness in the global market [118].

5.3.1.4 Evolution of HKSAR's industrial policy

The approach to industrial development and the range of instruments used evolved over time as a result of changes in development paradigms and in the external environment (as illustrated in Figure 5-2). Industrial policy in East Asia, including

Hong Kong has evolved over the past 3 decades as import substitution gave way to export orientation and, subsequently, to the development of a knowledge-based infrastructure. Shifts in policy approaches and instruments have been influenced by internal factors such as the size of the market, the need to adjust to adverse shocks, the ineffectiveness of import-substitution industrialization strategies, and the need to attract foreign direct investment for technology and to gain market access. Policy has also been influenced by external factors such as increased competition, technological change, pressure from major trading partners to become signatories to GATT codes, multilateral rules negotiated within the auspices of the WTO, and the financial crisis that began in 1997.

Figure 5-2 Evolution of Industrial Policy



The evolution of Hong Kong's industrial policy from the 1950s to the 1990s is as follows:

1. 1950s to 1970s – Export orientation (laissez-faire, education, infrastructure, institutional support)
2. 1980s – improved institutional support for industry
3. 1990s – enhanced support for technology [119]

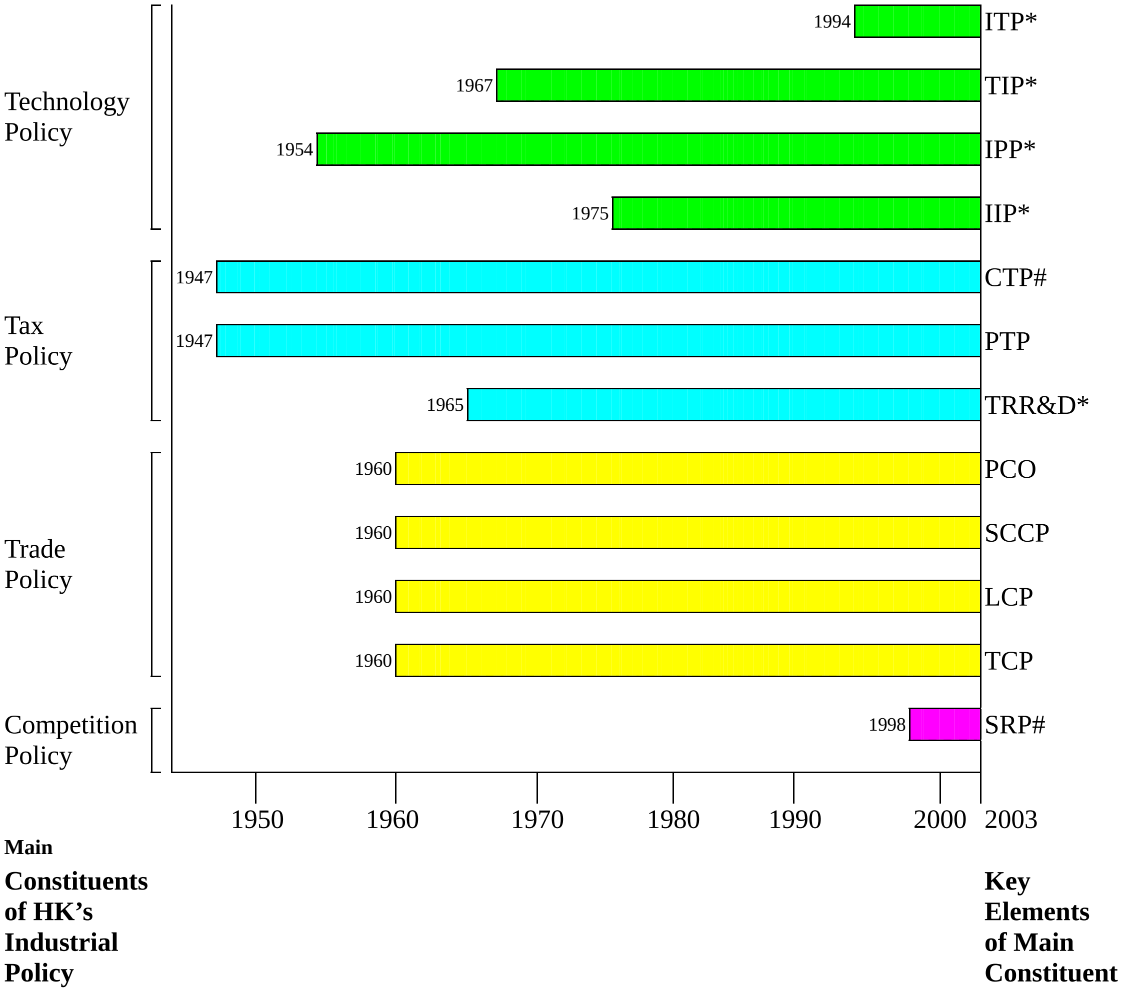
After 1997, Hong Kong became a special administrative region of China. Based on the original Colony's strategy of 'positive non-interventionism', the HKSAR has progressively reformed the policy to take account of global economic and technological change, in particular the emerging knowledge-based economy.

5.3.2 Summary

The main constituents and their key elements of HKSAR's industrial policy implemented, in the period from 1970 to 2003 are shown in Figure 5-3. Appendix 7 (Figures A7-11 and A7-12) shows the proportion of domestic exports and re-exports to the total exports of HKTC products to overseas markets from 1973 to 2003. The figures show that re-exports of TC products have progressively increased more rapidly than domestic exports of the same, in particular, the total exports of textiles products. Figure 5-3 illustrates key elements of 4 main constituents in formulating HKSAR’s industrial policy. Although most of the key elements were implemented from 1970 or even earlier, they primarily facilitated trade and market competition, supported commerce and technological infrastructure, protected intellectual property rights, etc. However, few key elements directly influenced the technological development of Hong Kong’s industrial policy, including the TC sector.

The core element ‘Innovation and Technology Policy’ was implemented by the Government in 1994. The initiative to spur innovation and technology was formulated in July 2000 when the Innovation and Technology Commission of the Government was established to spearhead Hong Kong’s drive to become a world-class, knowledge-based economy through promoting and supporting applied research and development, and technology transfer and application [120].

Figure 5-3 Main Constituents of HKSAR's Industrial Policy Implemented from 1950 to 2003

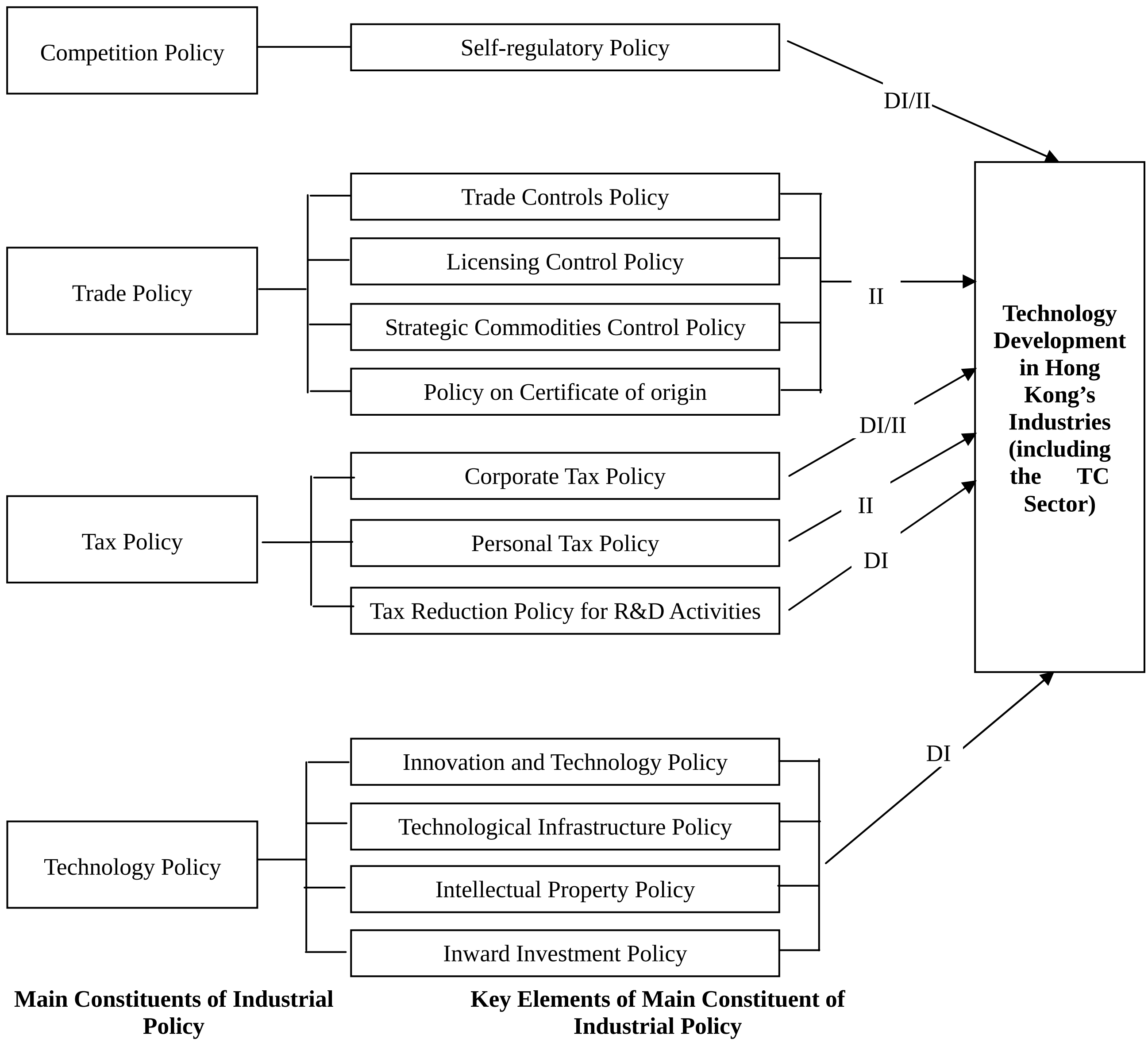


Year of Policy Implementation

Footnote:

SRP	: Self-regulatory Policy
TCP	: Textiles Control Policy
LCP	: Licensing Control Policy
SCCP	: Strategic Commodities Control Policy
PCO	: Policy on Certificate of Origin
TRR&D	: Tax Reduction on R&D Activities
PTP	: Personal Tax Policy
CTP	: Corporate Tax Policy
IIP	: Inward Investment Policy
IPP	: Intellectual Property Policy
TIP	: Technological Infrastructure Policy
ITP	: Innovation and Technology Policy
*	: Direct influence on Technological Development of Hong Kong's Industries (including TC sector)
#	: Direct influence/indirect influence on Technological Development of Hong Kong's Industries (including TC sector)

Figure 5-4 Industrial Policy Affecting the Technological Development of Hong Kong Industries



Footnote

DI : Direct Influence
II : Indirect Influence

5.4 Comparison of the results measured using the new 'Technometric' model and the review of change of the Government's policy discussed in Section 5.2

The main constituents of the industrial policy were found after the review of the Government's policy. The enhanced 'Technometric' model was used to measure the technological development of HKTCI in the period from 1974 to 2003 and compare the results measured using the model and the changed pattern of the reviewed Government's policy.

5.4.1 Computation of the 'Technometric' Index of HKTCI during the period 1973 to 2003

The new 'Technometric' model described in Chapter 2 was used for computation purposes. Since the 'Technometric' performance attributes collected from the main industrial survey were in 3 ten-year periods, i.e., 1974 to 1983, 1984 to 1993, and 1994 to 2003, it was considered a dynamic (time dimension) model of the 'Technometric' approach should be applied, given that measuring the technological development on the time axis should be done relative to the metric distance from a given initial distribution at P_0 (1974 to 1983) by extending the time period to P_1 (1984 to 1993) and P_2 (1994 to 2003).

5.4.2 Data collection

30 manufacturing companies established in 1974 or before in Hong Kong were selected for personal interview. The instrument (final version questionnaire) used to interview the respondents was designed to measure the technological development of HKTCI, as shown in Figure 4-2.

5.4.2.1 Sampling method

To ensure that the findings were accurately represented and minimize any possible bias, the sample was selected from the databank of the Hong Kong Trade Development Council (HKTDC) for on two reasons. Firstly, the HKTDC sampling method was unbiased. TC companies were randomly selected by the HKTDC, and included all size groups, i.e., the sample included small, medium and large enterprises.

The population of TC manufacturing companies established in 1974 or before in Hong Kong was, according to the databank of the HKTDC approximately 100. 15 textile and 15 clothing manufacturing companies established in 1974 or before in

Hong Kong were selected from the population (as shown in Table 5-1). The employment size of the selected TC manufacturing companies only included Hong Kong workers and excluded off-shore counterparts.

Table 5-1 Number of TC companies with specific employment size for interview

	Employment Size	
	1 – 500	>500
No. of textile companies	6	9
No. of clothing companies	8	7

The respondents to the questionnaire were decision-makers of, or had influence on the formulation of industrial policy for the TC industry. The validated instrument (questionnaire) used to interview the respondents was designed to measure the technological development of HKTCI, as shown in Figure 4-2.

5.4.3 Results and Discussion

Data collected from personal interviews with representatives of 30 HKTC manufacturing companies established in 1974 or before with the aid of the enhanced ‘Technometric’ model were utilized to measure the technological change of HKTCI in the period from 1974 to 2003. The results were used to compare with the change pattern of the reviewed Government's industrial policy in the same period.

5.4.3.1 Computing the 'Technometric' index K* and the arithmetic mean of 'Technometric' index $\overline{K}*$ for each* **'Technometric'** *attribute

Reference 40 notes the 3 'Technometric' performance attributes, i.e., 'product', 'process' and 'service' in relation to input and output data of the 5 key indicators. These attributes permit comparisons of 3 periods in Hong Kong's history, and when maximum and minimum values are applied for the entire input and output data of the 5 key indicators, 'Technometric' benchmark scores may be calculated using equations (1) and (2). The data collected in the period P_0 (1974 to 1983) was at 1983 (annual basis), P_1 (1984 to 1993) at 1993 (annual basis) and P_2 (1994 to 2003) at 2003 (annual basis). With the aid of the measuring instrument (questionnaire) shown in Figure 4-2, the maximum and minimum values for each data, inter-time period were recorded. As one of the input data of the key indicator 'productivity' was 'capita investment for productivity improvement (HK$)', the data collected by means of an industrial survey was used.

As may be seen in Table 5-3, code 1.1.1 denotes 'capita investment for productivity improvement (HK$)', it was necessary to have an objective comparing scores in monetary terms within the 3 specified ten-year periods. For computing the maximum and minimum ratings in monetary terms of the period P_1, deflators for the periods 1974 to 1983 (P_0) and 1984 to 1993 (P_1) (2.26 x 1.87 = 4.22 shown in Appendix 8) were utilized to revalue the currency data collected in the period P_1. For example, the maximum rating $1,896,000 shown in the period P_1 was calculated using the data in 1993: $8,001,120/4.22. When the maximum and minimum ratings in monetary terms of the period P_2 were computed, deflators for the period 1974 to 1983 (P_0), 1984 to 1993 (P_1) and 1994 to 2000 (P_2) (2.26 x 1.87 x 1.27 = 5.37 shown in Appendix 8) were utilized to revalue the currency data collected in the period P_2. For example, the maximum rating $3,738,000 shown in the period P_2 was calculated from the data in 2003: $20,073,060/5.37. Inflation rates for 2001, 2002 and 2003 were not recorded. The data for the 'Technometric' performance attributes, i.e., 'product', 'process' and 'service' are shown in Appendices 9a, 9b and 9c respectively.

Table 5-2 Maximum and minimum rating of the input data, 'capita investment for productivity improvement (HK$)' of the key indicator 'productivity' obtained from the 2003 industrial survey conducted in Hong Kong

Industrial Survey Duration	**Maximum Rating (HK$)**	**Minimum Rating (HK$)**
P_o	1,500,000 (in 1983)	100,000 (in 1983)
P_1	1,896,000 (in 1993)	144,000 (in 1993)
P_2	3,738,000 (in 2003)	150,000 (in 2003)

Remarks
P_o = 1974 to 1983
P_1 = 1984 to 1993
P_2 = 1994 to 2003

Applying the equation (2-6), taking in account of ratings collected in 2003 as one group for calculating K^* for the input data 'capita investment for productivity improvement (HK$)' of the key indicator 'productivity' for HKSAR of China can be calculated as follows:

$$K^*(i,j,k',k,t) = \frac{[(K(i,j,k',t) - K(i,j,k_{\min},t))]}{[(K(i,j,k_{\max},t) - K(i,j,k_{\min},t))]} \qquad (2\text{-}6)$$

K(i, j k', t) =HK$1,500,000
K(i, j, $k_{min,}$ t) = HK$ 100,000 *(the minimum rating in the period P_o)*

K(I, j, $k_{max,}$ t) = HK$ 3,738,000 *(the maximum rating in the period P_2 after deflating the currency to the period P_o)*

Then the 'Technometric' index of the 'capital' for HKSAR of China is:

$$K^*(i, j, k', k, t) = \frac{1{,}500{,}000 - 100{,}000}{3{,}738{,}000 - 100{,}000} = 0.385$$

$k^*(P_o) = 0.385$

For some output data of the key indicator 'flexibility', i.e., code 3.2.1 short product life cycle shown in Table 5-3, a higher feature score means lower flexibility of the TC products. Hence, equation (2-3) was used in such cases, when the need arose to invert feature scores:

$$K^*_{inv}(i, j, k', k, t) = \frac{[(K(i, j, k', t) - K(i, j, k_{\max}, t))]}{[(K(i, j, k_{\min}, t) - K(i, j, k_{\max}, t))]} = 1 - K^*(i, j, k', k, t) \qquad (2\text{-}3)$$

The 'Technometric' index of the 'capital' was calculated respectively. Tables 5-3 to 5-5 show the 'Technometric' scores for each of the 3 ten-year periods, and for each 3 'Technometric' attributes in relation to input and output data of the 5 key indicators collected from the main industrial survey which took place in 2003.

One of most common and useful measures of central tendency of the data collected through an industrial survey is the arithmetic average of a set of data. This measurement is also often referred to as the arithmetic means, or simply the mean, of a set of measurements. Therefore, the arithmetic mean ($\bar{x}$) of a set of n measurements is equal to the sum of the measurements divided by n [42].

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$$

Where n = number of measurements in the sample.

For calculating $\bar{K}*$ (the arithmetic mean of $k*$ measurement) for each key indicator in relation to individual 'Technometric' attributes of each country, the above equation is then applied by calculating the arithmetic mean of a set of $k*$ measurements which is equal to the sum of the measurements divided by n.

For example: as shown in Table 5-3, $\bar{K}*$ for the key indicator 'productivity' for Hong Kong can be calculated by the sum of $k*$ measurement of input and output data of the said key indicator for Hong Kong and divided by the total number of data as follows:

$\bar{K}*$ = [*K* (1.1.1 capital investment for productivity improvement) + K* (1.1.2 labour employment for productivity improvement) + K* (1.1.3 technology input for productivity improvement) + K* (1.1.4 material resource for productivity* *improvement) + K* (1.1.5 skill acquisition for productivity improvement) + K* (1.1.6 education and training programmes for productivity improvement) + K* (1.1.8 equipment investment for productivity improvement) + K* (1.2.2 technological change due to productivity improvement) + K* (1.2.3 economic growth due to productivity improvement) / 9*]

The methodology above is likewise used to calculate $\overline{K}*$ values of other key indicators for individual countries

Table 5-3 Compute input and output data of the 5 key indicators in relation to the first 'Technometric' performance attribute '***product'*** for HKSAR of China and the 'Technometric' scores for the 3 periods, i.e., P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). Each data is an average annual data in individual ten-year periods P_0, P_1 and P_2.

	P_0	P_1	P_2	**'Product'**
Key indicator 'productivity' (P)				
Input data of key indicator 'productivity'				K*
1.1.1 capital investment for productivity improvement (HK$)	Max.: 1,500,000 Min.: 100,000 K*: 0.385	Max.: 1,896,000 Min.: 144,000 K* : 0.494	Max.: 3,738,000 Min.: 150,000 K*: 1	Max.: 3,738,000 (P_2) Min.: 100,000 (P_0) K* (P_0) : 0.385 K* (P_1) : 0.494 K* (P_2) : 1
1.1.2 labour employment for productivity improvement (number .of staff)	Max.: 1000 Min.: 100 K* : 0.184	Max.: 3000 Min.: 200 K* : 0.592	Max.: 5000 Min.: 300 K* : 1	Max.: 5000 (P_2) Min.: 100 (P_0) K* (P_0) : 0.184 K* (P_1) : 0.592 K* (P_2) : 1
1.1.3 technology input for productivity improvement (HK$)	Max.: 1,000,000 Min.: 100,000 K* : 0.333	Max.: 1,185,000 Min.: 118,500 K* : 0.401	Max.: 2,804,000 Min.: 150,000 K* : 1	Max.: 2,804,000 (P_2) Min.: 100,000 (P_0)

	P_0	P_1	P_2	'Product'
				K* (P_0) : 0.333 K* (P_1) : 0.401 K* (P_2) : 1
1.1.4 material resources for productivity improvement (HK$)	Max.: 350,000 Min.: 120,000 K* : 0.282	Max.: 355,000 Min.: 142,000 K* : 0.288	Max.: 936,000 Min.: 150,000 K* : 1	Max.: 936,000 (P_2) Min.: 120,000 (P_0) K* (P_0) : 0.282 K* (P_1) : 0.288 K* (P_2) : 1
1.1.5 skill acquisition for productivity improvement (HK$)	Max.: 250,000 Min.: 80,000 K* : 0.354	Max.: 474,000 Min.: 118,500 K* : 0.820	Max.: 560,800 Min.: 112,000 K* : 1	Max.: 560,800 (P_2) Min.: 80,000 (P_0) K* (P_0) : 0.354 K* (P_1) : 0.820 K* (P_2) : 1
1.1.6 education and training programmes for productivity improvement (number of programmes)	Max.: 10 Min.: 5 K* : 0.25	Max.: 16 Min.: 8 K* : 0.55	Max.: 25 Min. : 10 K* : 1	Max.: 25 (P_2) Min.: 5 (P_0) K* (P_0) : 0.25 K* (P_1) : 0.55 K* (P_2) : 1
1.1.8 equipment investment for productivity improvement (HK$)	Max.: 1,000,000 Min.: 100,000 K* : 0.197	Max.: 2,370,000 Min.: 118,483 K* : 0.496	Max.: 4,673,000 Min.: 150,000 K* : 1	Max.: 4,673,000 (P_2) Min.: 100,000 (P_0) K* (P_0) : 0.197 K* (P_1) : 0.496 K* (P_2) : 1
Output data of key indicator 'productivity'				
1.2.2 technological change due to productivity improvement (change rate (%))	Max.: 15 Min.: 5 K* : 0.4	Max.: 20 Min.: 5 K* : 0.6	Max.: 30 Min.: 8 K* : 1	Max.: 30 (P_2) Min.: 5 (P_0) K* (P_0) : 0.4 K* (P_1) : 0.6 K* (P_2) : 1
1.2.3 economic growth due to productivity improvement (growth rate (%))	Max.: 10 Min.: 3 K* : 0.167	Max.: 30 Min.: 10 K* : 0.643	Max. 45 Min. 12 K* : 1	Max.: 45 (P_2) Min.:3 (P_0) K* (P_0) : 0.167 K* (P_1) : 0.643 K* (P_2) : 1
$\bar{K}_1*$ **for the key indicator "Productivity"**				$\bar{K}_{1.1}*$ **(P_0): 0.284** $\bar{K}_{1.1}*$ **(P_1): 0.543**

	P_0	P_1	P_2	**'Product'**
				$\bar{K}_{1.1}$ * (P_2): 1
Key indicator 'quality' (Q)				
Input data of key indicator 'quality'				
2.1.1 capital investment for quality improvement (HK$)	Max.: 300,000 Min.: 50,000 K* : 0.599	Max.: 355,500 Min.: 118,483 K* : 0.732	Max.: 467,290 Min.: 150,094 K* : 1	Max.: 467,290 (P_2) Min.: 50,000 (P_0) K* (P_0) : 0.599 K* (P_1) : 0.732 K* (P_2) : 1
2.1.2 human resource management for quality improvement (HK$)	Max.: 300,000 Min.: 50,000 K* : 0.283	Max.: 473,900 Min.: 118,500 K* : 0.479	Max.: 934,580 Min.: 112,150 K* : 1	Max.: 934,580 (P_2) Min.: 50,000 (P_0) K* (P_0) :0.283 K* (P_1) : 0.479 K* (P_2) : 1
2.1.3 strategic quality planning for quality improvement (number of years)	Max.: 1 Min.: 1 K* : 0	Max.: 2 Min.: 1 K* : 0.5	Max.: 3 Min.: 1 K* : 1	Max.: 3 (P_2) Min.: 1 (P_0) K* (P_0) : 0 K* (P_1) : 0.5 K* (P_2) : 1
2.1.4 quality management system implementation for quality improvement (year of implementation)	Max.: 1 Min.: 1 K* : 0.	Max.: 2 Min.: 1 K* : 0.5	Max. : 3 Min.: 1 K* : 1	Max.: 3 (P_2) Min.: 1 (P_0) K* (P_0) : 0 K* (P_1) : 0.5 K* (P_2) : 1
2.1.5 technology input for quality improvement (HK$)	Max.: 483,340 Min.: 100,000 K* : 0.392	Max.: 700,000 Min.: 71,900 K* : 0.598	Max.: 1,121,500 Min. : 112,150 K* : 1	Max.: 1,121,500 (P_2) Min.: 71,900 (P_1) K* (P_0) : 0.392 K* (P_1) : 0.598 K* (P_2) : 1
2.1.6 customer focus for quality improvement (commitment rate (%))	Max.: 50 Min.: 10 K* : 0.44	Max.: 70 Min.: 40 K* : 0.67	Max.: 100 Min.:80 K* : 1	Max.: 100 (P_2) Min.: 10 (P_0) K* (P_0) : 0.44 K* (P_1) : 0.67 K* (P_2) : 1
2.1.7 education and training programmes for quality improvement (number of programmes)	Max.: 11 Min.: 1 K* : 0.53	Max.: 10 Min.: 3 K* : 0.474	Max.: 20 Min. :4 K* : 1	Max.: 20 (P_2) Min.: 1 (P_0) K* (P_0) : 0.53

	P_0	P_1	P_2	**'Product'**
				K* (P_1) : 0.474 K* (P_2) : 1
2.1.8 skill and knowledge acquisition for quality improvement (HK$)	Max.: 240,000 Min.: 50,000 K* : 0.154	Max.: 473,934 Min.: 71,900 K* : 0.344	Max.: 1,284,000 Min. : 65,420 K* : 1	Max.: 1,284,000 (P_2) Min.: 50,000 (P_0) K* (P_0) : 0.154 K* (P_1) : 0.344 K* (P_2) : 1
2.1.9 communication facilities for quality improvement (HK$)	Max.: 300,000 Min.: 60,000 K* : 0.274	Max.: 473,933 Min.: 94,787 K* : 0.473	Max.: 934,579 Min.: 102,804 K* : 1	Max.: 934,579 (P_2) Min.: 60,000 (P_0) K* (P_0) : 0.274 K* (P_1) : 0.473 K* (P_2) : 1
2.1.10 government support for quality improvement (HK$)	Max.: 0 Min.: 0 K* : 0	Max.: 47,393 Min.: 4,739 K* : 0.845	Max.: 56,074 Min.: 4,860 K* : 1	Max.: 56,074 (P_2) Min.: 0 (P_0) K* (P_0) : 0 K* (P_1) : 0.845 K* (P_2) : 1
Output data of key indicator 'quality'				
2.2.1 effective quality management due to quality improvement (effectiveness (%))	Max.: 30 Min.: 10 K* : 0.24	Max.: 70 Min.: 45 K*: 0.71	Max.: 95 Min.: 70 K*: 1	Max.: 95 (P_2) Min.: 10 (P_0) K* (P_0): 0.24 K* (P_1): 0.71 K* (P_2): 1
2.2.2 customer satisfaction due to quality improvement (satisfaction rate (%))	Max.: 65 Min.: 30 K* : 0.54	Max.: 80 Min.: 50 K*: 0.77	Max.::95 Min. : 65 K*: 1	Max.: 95 (P_2) Min.: 30 (P_0) K* (P_0): 0.54 K* (P_1): 0.77 K* (P_2): 1
2.2.4 quality accreditation due to quality improvement (number of quality accreditations achieved)	Max.: 1 Min.: 0 K* : 0.25	Max.: 2 Min.: 0 K*: 0.5	Max. : :4 Min. : 1 K*: 1	Max.: 4 (P_2) Min.: 0 (P_0) K* (P_0) : 0.25 K* (P_1): 0.5 K* (P_2): 1
2.2.5 positive impact of society due to quality improvement (social satisfaction (%))	Max.: 10 Min.: 0 K* : 0.2	Max.: 30 Min.: 10 K*: 0.6	Max. 50 Min. 10 K*: 1	Max.: 50 (P_2) Min.: 0 (P_0) K* (P_0) : 0.2 K* (P_1): 0.6 K* (P_2): 1

	P_0	P_1	P_2	**'Product'**
2.2.6 market share due to quality improvement (rate of increase (%))	Max.: 10 Min.: 5 K* : 0.11	Max.: 30 Min.: 10 K*: 0.56	Max.: 50 Min. : 15 K*: 1	Max.: 50 (P_2) Min.: 5 (P_0) K* (P_0): 0.11 K* (P_1): 0.56 K* (P_2): 1
$\bar{K}_2*$ **for the key indicator 'quality'**				$\bar{K}_{2.1}*$ **(P_0): *0.268*** $\bar{K}_{2.1}*$ **(P_1): *0.584*** $\bar{K}_{2.1}*$ **(P_2):** 1
Key indicator 'flexibility' (F)				
Input data of key indicator 'flexibility'				
3.1.5 technology input for flexibility improvement (HK$)	Max.:1,000,000 Min.: 100,000 K* : 0.194	Max.:1,184,834 Min.: 189,573 K*: 0.234	Max. : 4,739,330 Min.: 186,920 K*: 1	Max.: 4,739,330 (P_2) Min.: 100,000 (P_0) K* (P_0): 0.194 K* (P_1): 0.234 K* (P_2): 1
3.1.7 flexibility manufacturing system for flexibility improvement (number of systems implemented)	Max.: 2 Min.: 0 K* : 0.25	Max.: 6 Min.: 1 K*: 0.75	Max.: 8 Min. : 1 K*: 1	Max.: 8 (P_2) Min.: 0 (P_0) K* (P_0): 0.25 K* (P_1): 0.75 K* (P_2): 1
Output data of key indicator 'flexibility'				
3.2.1 short product life cycle (number of days)#	Max.: 180 Min.: 90 K*: 1 1 - K* : 0	Max.: 90 Min.: 60 K*: 0.33 1 - K* : 0.67	Max.: 60 Min. : 45 K*: 0.11 1 - K* : 0.89	Max.: 180 (P_0) Min.: 45 (P_2) 1 - K* (P_0): 0 1 - K* (P_1): 0.67 1 - K* (P_2): 0.89
3.2.2 customized product (product quantity (pcs))#	Max.:100,000 Min.: 5,000 K* : 1 1 - K* : 0	Max.: 20,000 Min.: 1000 K*: 0.198 1 - K* : 0.802	Max.: 10,000 Min. : 200 K*: 0.1 1 - K* : 0.9	Max.: 100,000 (P_0) Min.: 200 (P_2) 1 - K* (P_0): 0 1 - K* (P_1): 0.802 1 - K* (P_2): 0.9
3.2.3 short lead time (number of days)#	Max.: 90 Min.: 60 K* : 1 1 - K* : 0	Max.: 60 Min.: 45 K*: 0.6 1 - K* : 0.4	Max.: 30 Min. : 15 K*: 0.2 1 - K* : 0.8	Max.: 90 (P_0) Min.: 15 (P_2) 1 - K* (P_0): 0 1 - K* (P_1): 0.4

	P_0	P_1	P_2	'Product'
				1 - K* (P_2): 0.8
3.2.4 flexible corporation (level of flexibility)	Max.: 30 Min.: 5 K* : 0.294	Max.: 65 Min.: 20 K*: 0.71	Max.: 90 Min. : 50 K*: 1	Max.: 90 (P_2) Min.: 5 (P_0) K* (P_0): 0.294 K* (P_1): 0.71 K* (P_2): 1
$\bar{K}_3*$ **for the key indicator 'flexibility'**				$\bar{K}_{3.1}*$ **(** P_0 **):** 0.123 $\bar{K}_{3.1}*$ **(** P_1 **):** 0.594 $\bar{K}_{3.1}*$ **(** P_2 **):** 0.932
Key indicator 'skill' (S)				
Input data of key indicator 'skill'				
4.1.1 human resources for skill enhancement (HK$)	Max.: 200,000 Min.: 20,000 K* : 0.247	Max.: 473,934 Min.:23,697 K*: 0.624	Max.: 747,664 Min. : 28,037 K*: 1	Max.: 747,664 (P_2) Min.: 20,000 (P_0) K* (P_0): 0.247 K* (P_1): 0.624 K* (P_2): 1
4.1.2 education and training programmes for skill enhancement (number of programmes)	Max.: 5 Min.: 0 K* : 0.417	Max.: 8 Min.: 1 K*: 0.67	Max.: 12 Min. : 1 K*: 1	Max.: 12 (P_2) Min.: 0 (P_0) K* (P_0): 0.417 K* (P_1): 0.67 K* (P_2): 1
4.1.3 skill acquisition scheme (number of schemes)	Max.: 1 Min.: 0 K* : 0.1	Max.: 3 Min.: 1 K*: 0.3	Max.: 10 Min. : 2 K*: 1	Max.: 10 (P_2) Min.: 0 (P_0) K* (P_0): 0.1 K* (P_1): 0.3 K* (P_2): 1
4.1.4 technology upgrading for skill enhancement ((HK$)	Max.: 200,000 Min.: 25,000 K* : 0.328	Max.: 236,967 Min.: 23,696 K*: 0.397	Max.: 560,747 Min. : 37,383 K*: 1	Max.: 560,747 (P_2) Min.: 23,696 (P_1) K* (P_0): 0.328 K* (P_1): 0.397 K* (P_2): 1
4.1.5 government support for skill development and acquisition (HK$)	Max.: 20,000 Min.: 0 K* : 0.71	Max.: 23,697 Min.: 4,739 K*: 0.845	Max.: 28,037 Min. : 5,607 K*: 1	Max.: 28,037 (P_2) Min.: 0 (P_0) K* (P_0): 0.71 K* (P_1): 0.845 K* (P_2): 1

	P_0	P_1	P_2	**'Product'**
Output data of key indicator 'skill'				
4.2.1 new skill and knowledge due to skill enhancement (development rate %)	Max.: 10 Min.: 5 K*: 0.11	Max.: 30 Min.: 10 K*: 0.56	Max.: 50 Min. : 10 K*: 1	Max.: 50 (P_2) Min.: 5 (P_0) K* (P_0): 0.11 K* (P_1): 0.56 K* (P_2): 1
4.2.2 acceptable performance due to skill enhancement (performance acceptance rate %)	Max.: 40 Min.: 10 K* : 0.375	Max.: 70 Min.: 30 K*: 0.75	Max.: 90 Min. : 50 K*: 1	Max.: 90 (P_2) Min.: 10 (P_0) K* (P_0): 0.375 K* (P_1): 0.75 K* (P_2): 1
4.2.3 human resource improvement due to skill enhancement (level of improvement)	Max.: 4 Min.: 1 K* : 0.375	Max.: 6 Min.: 3 K*: 0.625	Max.: 9 Min. : 5 K*: 1	Max.: 9 (P_2) Min.: 1 (P_0) K* (P_0): 0.375 K* (P_1): 0.625 K* (P_2): 1
4.2.4 productivity improvement due to skill enhancement (level of improvement)	Max.: 3 Min.: 1 K* : 0.25	Max.: 6 Min.: 2 K*: 0.625	Max.: 9 Min. : 3 K*: 1	Max.: 9 (P_2) Min.: 1 (P_0) K* (P_0): 0.25 K* (P_1): 0.625 K* (P_2): 1
4.2.5 quality improvement due to skill enhancement (level of improvement)	Max.: 3 Min.: 1 K* : 0.286	Max.: 5 Min.: 1 K*: 0.57	Max.: 8 Min. : 2 K*: 1	Max.: 8 (P_2) Min.: 1 (P_0) K* (P_0): 0.286 K* (P_1): 0.57 K* (P_2): 1
4.2.7 organizational improvement due to skill enhancement (level of improvement)	Max.: 3 Min.: 1 K* : 0.286	Max.: 5 Min.: 1 K*: 0.57	Max.: 8 Min. : 2 K*: 1	Max.: 8 (P_2) Min.: 1 (P_0) K* (P_0): 0.286 K* (P_1): 0.57 K* (P_2): 1
$\bar{K}_4*$ **for the key indicator 'skill'**				$\bar{K}_{4.1}*$ **(** P_0 **):** *0.317* $\bar{K}_{4.1}*$ **(** P_1 **):** *0.594* $\bar{K}_{4.1}*$ **(** P_2 **):** *1*
Key indicator 'innovation' (I)				

	P_0	P_1	P_2	**'Product'**
Input data of key indicator 'innovation'				
5.1.1 capital investment (including foreign direct investment for innovation upgrading (HK$)	Max.: 100,000 Min.: 0 K* : 0..11	Max.: 189,573 Min.: 23,697 K*: 0.203	Max.: 934,579 Min. : 37,383 K*: 1	Max.: 934,579 (P_2) Min.: 0 (P_0) K* (P_0):0.11 K* (P_1): 0.203 K* (P_2): 1
5.1.2 technology development for innovation upgrading (HK$)	Max.: 200,000 Min.: 20,000 K* : 0.510	Max.: 236,967 Min.: 23,697 K*: 0.613	Max.: 373,832 Min. : 28,037 K*: 1	Max.: 373,832 (P_2) Min.: 20,000 (P_0) K* (P_0): 0.510 K* (P_1): 0.613 K* (P_2): 1
5.1.3 R & D expenditure for innovation upgrading (HK$)	Max.: 100,000 Min.: 0 K* : 0.18	Max.: 236,970 Min.: 23,697 K*: 0.423	Max.: 560,748 Min. : 18,691 K*: 1	Max.: 560,748 (P_2) Min.: 0 (P_0) K* (P_0): 0.18 K* (P_1): 0.423 K* (P_2): 1
5.1.4 R & D personnel for innovation upgrading (number of personnel)	Max.: 15 Min.: 0 K* : 0.15	Max.: 50 Min.: 5 K*: 0.5	Max.: 100 Min. : 8 K*: 1	Max.: 100 (P_2) Min.: 0 (P_0) K* (P_0): 0.15 K* (P_1): 0.5 K* (P_2): 1
5.1.5 new knowledge expenditure for innovation upgrading (HK$)	Max.:300,000 Min.: 0 K* : 0.525	Max.: 473,933 Min.: 23,697 K*: 0.829	Max.: 571,429 Min. : 28,037 K*: 1	Max.: 571,429 (P_2) Min.: 0 (P_0) K* (P_0): 0.525 K* (P_1): 0.829 K* (P_2): 1
5.1.6 government support for innovation upgrading (HK$)	Max.: 0 Min.: 0 K* : 0	Max.: 0 Min.: 0 K*: 0	Max.: 500,000 Min. : 0 K*: 1	Max.: 500,000 (P_2) Min.: 0 (P_0 , P_1) K* (P_0): 0 K* (P_1): 0 K* (P_2): 1
5.1.7 research contribution of local academic institution for innovation upgrading (number of projects)	Max.: 1 Min.: 0 K* : 0.25	Max.: 2 Min.: 0 K*: 0.5	Max.: 4 Min. : 0 K*: 1	Max.: 4 (P_2) Min.: 0 (P_0) K* (P_0): 0.25 K* (P_1): 0.5 K* (P_2): 1
5.1.8 technology transfer for innovation upgrading (HK$)	Max.:300,000 Min.: 0	Max.: 473,933 Min.: 23,697	Max.: 571,429 Min. : 28,037	Max.: 571,429 (P_2)

	P_0	P_1	P_2	**'Product'**
	K* : 0.525	K*: 0.829	K*: 1	Min.: 0 (P_0) K* (P_0): 0.525 K* (P_1): 0.829 K* (P_2): 1
5.1.9 education and training programmes for innovation upgrading (number of programmes)	Max.: 5 Min.: 0 K* : 0.5	Max.: 6 Min.: 1 K*: 0.6	Max.: 10 Min. : 1 K*: 1	Max.: 10 (P_2) Min.: 0 (P_0) K* (P_0): 0.5 K* (P_1): 0.6 K* (P_2): 1
Output data of key indicator 'innovation'				
5.2.1 new product due to innovation upgrading (number of new products)	Max.: 500 Min.: 30 K* : 0.484	Max.: 800 Min.: 100 K*: 0.794	Max.: 1000 Min. : 200 K*: 1	Max.: 1000 (P_2) Min.: 30 (P_0) K* (P_0): 0.484 K* (P_1): 0.794 K* (P_2): 1
5.2.3 new quality development due to innovation upgrading (number of quality systems)	Max.: 1 Min.: 0 K* : 0.25	Max.: 2 Min.: 1 K*: 0.5	Max.: 4 Min. : 1 K*: 1	Max.: 4 (P_2) Min.: 0 (P_0) K* (P_0): 0.25 K* (P_1): 0.5 K* (P_2): 1
5.2.4 new organization development due to innovation upgrading (number of new systems)	Max.: 3 Min.: 1 K* : 0.286	Max.: 5 Min.: 1 K*: 0.571	Max.: 8 Min. : 2 K*: 1	Max.: 8 (P_2) Min.: 1 (P_0) K* (P_0): 0.286 K* (P_1): 0.571 K* (P_2): 1
5.2.5 new system development due to innovation upgrading (number of new systems)	Max.: 4 Min.: 1 K* : 0.33	Max.: 8 Min.: 2 K*: 0.78	Max.: 10 Min. : 3 K*: 1	Max.: 10 (P_2) Min.: 1(P_0) K* (P_0): 0.33 K* (P_1): 0.78 K* (P_2): 1
5.2.6 number of patents generated due to innovation upgrading (number of patents generated)	Max.: 0 Min.: 0 K* : 0	Max.: 1 Min.: 0 K*: 0.5	Max.: 2 Min. : 0 K*: 1	Max.: 2 (P_2) Min.: 0 (P_0) K* (P_0): 0 K* (P_1): 0.5 K* (P_2): 1
5.2.7 number of R & D personnel employed due to innovation upgrading (number of personnel)	Max.: 10 Min.: 0 K* : 0.125	Max.: 50 Min.: 3 K*: 0.625	Max.: 80 Min. : 5 K*: 1	Max.: 80 (P_2) Min.: 0 (P_0) K* (P_0): 0.125

	P_0	P_1	P_2	**'Product'**
				K* (P_1): 0.625 K* (P_2): 1
5.2.8 number of publications due to innovation upgrading (number of publications)	Max.: 0 Min.: 0 K* : 0	Max.: 0 Min.: 0 K*: 0	Max.: 1 Min. : 0 K*: 1	Max.: 1 (P_2) Min.: 0 (P_0) K* (P_0):0 K* (P_1): 0 K* (P_2): 1
5.2.9 number of R & D firms and activities due to innovation upgrading (number of firms)	Max.: 0 Min.: 0 K* : 0	Max.: 2 Min.: 0 K*: 0.67	Max.: 3 Min. : 0 K*: 1	Max.: 3 (P_2) Min.: 0 (P_0) K* (P_0): 0 K* (P_1): 0.67 K* (P_2): 1
5.2.10 technological change due to innovation upgrading (change rate (%))	Max.: 10 Min.: 5 K* : 0.111	Max.: 30 Min.: 10 K*: 0.56	Max.: 50 Min. : 15 K*: 1	Max.: 50 (P_2) Min.: 5 (P_0) K* (P_0): 0.111 K* (P_1): 0.56 K* (P_2): 1
5.2.11 economic change due to innovation upgrading (change rate (%))	Max.: 10 Min.: 0 K* : 0.25	Max.: 20 Min.: 5 K*: 0.5	Max.: 40 Min. : 10 K*: 1	Max.: 40 (P_2) Min.: 0(P_0) K* (P_0): 0.25 K* (P_1): 0.5 K* (P_2): 1
$\bar{K}_5 *$ **for the key indicator 'innovation'**				$\bar{K}_{5.1} *$ (P_0): ***0.242*** $\bar{K}_{5.1} *$ (P_1): ***0.526*** $\bar{K}_{5.1} *$ (P_2): *1*

Remarks

: Apply Equation (2-3) for a higher industry feature score that indicates lower influence on technological change

For computing K* (P_1), deflators for the periods 1974 to 1983 (P_0) and 1984 to 1993 (P_1) (2.26 x 1.87 = 4.22) are utilized to revalue the currency data collected in the period (P_1)

For computing K* (P_2), deflators for the period 1974 to 1983 (P_0), 1984 to 1993 (P_1) and 1994 to 2000 (P_2) (2.26 x 1.87 x 1.27 = 5.37) are utilized to revalue the currency data collected in the period (P_2)

Table 5-4. Compute input and output data of the 5 key indicators in relation to the first 'Technometric' performance attribute '***process***' for HKSAR of China and the 'Technometric' scores 3 periods, i.e., P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). Each data is an average annual data in individual ten-year periods P_0, P_1 and P_2.

	P_0	P_1	P_2	**'Process'**
Key indicator 'productivity' (P)				
Input data of key indicator 'productivity'				K*
1.1.1 capital investment for productivity improvement (HK$)	Max.: 1,500,000 Min.: $100,000 K*: 0.427	Max.: 1,896,000 Min.: $118,483 K* : 0.548	Max.: 3,738,000 Min.: $149,533 K*: 1	Max.: 3,738,000 (P_2) Min.: 100,000 (P_0) K* (P_0) : 0.427 K* (P_1) : 0.548 K* (P_2): 1
1.1.2 labour employment for productivity improvement	Max.: 1000 Min.: 100 K* : 0.184	Max.: 3000 Min.: 200 K*: 0.592	Max.: 5000 Min.: 300 K*: 1	Max.: 5000 (P_2) Min.: 100 (P_0) K* (P_0): 0.184 K* (P_1): 0.592 K* (P_2): 1
1.1.3 technology input for productivity improvement (HK$)	Max.: 1,000,000 Min.: 100,000 K* : 0.42	Max.: 948,000 Min.: 118,500 K*: 0.396	Max.: 2,243,000 Min. : 149,530 K*: 1	Max.: 2,243,000 (P_2) Min.: 100,000(P_0) K* (P_0): 0.42 K* (P_1): 0.396 K* (P_2): 1
1.1.4 Material resources for productivity improvement (HK$)	Max.: 350,000 Min.: 120,000 K* : 0.282	Max.: 450,237 Min.: 142,000 K*: 0.405	Max.: 936,000 Min. : 149,535 K*: 1	Max.: 936,000 (P_2) Min.: 120,000(P_0) K* (P_0): 0.282 K* (P_1): 0.405 K* (P_2): 1
1.1.5 skill acquisition for productivity improvement (HK$)	Max.: 250,000 Min.: 80,000 K* : 0.354	Max.: 474,000 Min.: 118,500 K*: 0.819	Max.: 560,800 Min.: 112,000 K*: 1	Max.: 560,800 (P_2) Min.: 80,000 (P_0) K* (P_0): 0.354 K* (P_1): 0.819 K* (P_2): 1

	P_0	P_1	P_2	**'Process'**
1.1.6 education and training programmes for productivity improvement	Max.: 10 Min.: 5 K* : 0.25	Max.: 16 Min.: 8 K*: 0.55	Max.: 25 Min. : 10 K*: 1	Max.: 25 (P_2) Min.: 5 (P_0) K* (P_0): 0.25 K* (P_1): 0.55 K* (P_2): 1
1.1.7 improved resources allocation for productivity enhancement (HK$)	Max.: 1,000,000 Min.: 100,000 K*: 0.197	Max.: 2,370,000 Min.: 115,473 K* : 0.497	Max.: 4,673,000 Min.: 112,150 K*: 1	Max.: 4,673,000 (P_2) Min.: 100,000 (P_0) K* (P_0): 0.197 K* (P_1): 0.497 K* (P_2): 1
1.1.8 equipment investment for productivity improvement (HK$)	Max.: 1,000,000 Min.: 100,000 K* : 0.197	Max.: 2,370,000 Min.: 115,473 K*: 0.497	Max.: 4,673,000 Min. : 112,150 K*: 1	Max.: 4,673,000 (P_2) Min.: 100,000 (P_0) K* (P_0): 0.197 K* (P_1): 0.497 K* (P_2): 1
Output data of key indicator 'productivity'				
1.2.1 productivity growth due to productivity enhancement	Max.: 6 Min.: 2 K* : 0.11	Max.: 30 Min.: 5 K*: 0.74	Max.: 40 Min. : 9 K*: 1	Max.: 40 (P_2) Min.: 2(P_0) K* (P_0): 0.11 K* (P_1): 0.74 K* (P_2): 1
1.2.2 technological change due to productivity improvement	Max.: 10 Min.: 3 K* : 0.167	Max.: 35 Min.: 6 K*: 0.762	Max.: 45 Min. : 9 K*: 1	Max.: 45 (P_2) Min.: 3 (P_0) K* (P_0): 0.167 K* (P_1): 0.762 K* (P_2): 1
1.2.3 economic growth due to productivity improvement	Max.: 10 Min.: 3 K* : 0.167	Max.:30 Min.: 10 K*: 0.643	Max.: 45 Min. : 12 K*: 1	Max.: 45 (P_2) Min.: 3 (P_0) K* (P_0): 0.167 K* (P_1): 0.643 K* (P_2): 1
$\bar{k}*$ **for the key indicator 'productivity'**				$\bar{K}_{1.2}*$ (P_0): ***0.251*** $\bar{K}_{1.2}*$ (P_1): ***0.586*** $\bar{K}_{1.2}*$ (P_2): ***1***
Key indicator 'quality' (Q)				

	P_0	P_1	P_2	**'Process'**
Input data of key indicator 'quality'				
2.1.1 capital investment for quality improvement (HK$)	Max.: 200,000 Min.: 100,000 K* : 0.272	Max.: 237,000 Min.: 118,483 K*: 0.373	Max.: 467,290 Min. : 149,533 K*: 1	Max.: 467,290 (P_2) Min.: 100,000 (P_0) K* (P_0): 0.272 K* (P_1): 0.373 K* (P_2): 1
2.1.2 human resource management for quality improvement (HK$)	Max.: 500,000 Min.: 100,000 K* : 0.701	Max.: 592,417 Min.: 118,483 K*: 0.863	Max.: 670,498 Min. : 112,149 K*: 1	Max.: 670,498 (P_2) Min.: 100,000 (P_0) K* (P_0): 0.701 K* (P_1): 0.863 K* (P_2): 1
2.1.3 strategic quality planning for quality improvement (number of year)	Max.: 0 Min.: 0 K* : 0	Max.: 2 Min.: 1 K*: 0.667	Max.: 3 Min. : 1 K*: 1	Max.: 3 (P_2) Min.: 0 (P_0) K* (P_0): 0 K* (P_1): 0.667 K* (P_2): 1
2.1.5 technology input for quality improvement (HK$)	Max.: 500,000 Min.: 100,000 K* : 0.392	Max.: 710,900 Min.: 118,483 K*: 0.598	Max.: 1,121,500 Min. : 149,533 K*: 1	Max.:1,121,500 (P_2) Min.: 100,000 (P_0) K* (P_0): 0.392 K* (P_1): 0.598 K* (P_2): 1
2.1.6 customer focus for quality improvement (commitment rate)	Max.: 40 Min.: 5 K* : 0.368	Max.: 70 Min.: 40 K*: 0.684	Max.: 100 Min. : 50 K*: 1	Max.: 100 (P_2) Min.: 5 (P_0) K* (P_0): 0.368 K* (P_1): 0.684 K* (P_2): 1
2.1.7 education and training programmes for quality improvement (number of programmes)	Max.: 5 Min.: 1 K* : 0.21	Max.:10 Min.: 3 K*: 0.47	Max.: 20 Min. : 4 K*: 1	Max.: 20 (P_2) Min.: 1 (P_0) K* (P_0): 0.21 K* (P_1): 0.47 K* (P_2): 1
2.1.8 skill and knowledge acquisition for quality improvement (HK$)	Max.: 500,000 Min.: 100,000 K* : 0.392	Max.: 710,900 Min.: 118,483 K*: 0.598	Max.: 1,121,500 Min. : 149,533 K*: 1	Max.:1,121,500 (P_2) Min.: 10 0,000 (P_0) K* (P_0): 0.392 K* (P_1): 0.598 K* (P_2): 1

	P_0	P_1	P_2	**'Process'**
2.1.9 communication facilities for quality improvement (HK$)	Max.: 300,000 Min.: 50,000 K* : 0.203	Max.: 473,933 Min.: 71,900 K*: 0.344	Max.: 1,284,000 Min. : 65,420 K*: 1	Max.: 1,284,000 (P_2) Min.: 50,000 (P_0) K* (P_0): 0.203 K* (P_1): 0.344 K* (P_2): 1
2.1.10 government support for quality improvement (HK$)	Max.: 0 Min.: 0 K* : 0	Max.: 23,697 Min.: 4,739 K*: 0.253	Max.: 93,458 Min. : 10,000 K*: 1	Max.: 93,458 (P_2) Min.: 0(P_0) K* (P_0): 0 K* (P_1): 0.253 K* (P_2): 1
Output data of key indicator 'quality'				
2.2.1 effective quality management due to quality improvement (effectiveness (%))	Max.: 45 Min.: 10 K* : 0.389	Max.: 75 Min.: 50 K*: 0.722	Max.: 100 Min. : 75 K*: 1	Max.: 100 (P_2) Min.: 10 (P_0) K* (P_0): 0.389 K* (P_1): 0.722 K* (P_2): 1
2.2.3 people satisfaction due to quality improvement (satisfaction rate (%))	Max.:40 Min.: 10 K* : 0.333	Max.: 70 Min.: 40 K*: 0.667	Max.: 100 Min. : 50 K*: 1	Max.: 100 (P_2) Min.: 10 (P_0) K* (P_0): 0.333 K* (P_1): 0.667 K* (P_2): 1
2.2.4 quality accreditation due to quality improvement (number of quality accreditations achieved)	Max.: 0 Min.: 0 K* : 0	Max.: 2 Min.: 0 K*: 0.5	Max.: 4 Min. : 1 K*: 1	Max.: 4 (P_2) Min.: 0(P_0) K* (P_0): 0 K* (P_1): 0.5 K* (P_2): 1
$\bar{k}*$ **for the key indicator 'quality'**				$\bar{K}_{2.2}*$ (P_0): ***0.272*** $\bar{K}_{2.2}*$ (P_1): ***0.562*** $\bar{K}_{2.2}*$ (P_2): 1
Key indicator 'flexibility' (F)				
Input data of key indicator 'flexibility'				
3.1.1 capital investment for flexibility improvement (HK$)	Max.:1,000,000 Min.: 100,000 K* : 0.194	Max.:1,184,834 Min.: 189,573 K*: 0.234	Max.: 4,739,330 Min.: 186,920 K*: 1	Max.: 4,739,330 (P_2) Min.: 100,000 (P_0) K* (P_0): *0.194* K* (P_1): *0.234* K* (P_2): *1*

	P_0	P_1	P_2	**'Process'**
3.1.2 human resource development for flexibility improvement (HK$)	Max.:1,000,000 Min.: 100,000 K* : 0.194	Max.:1,184,834 Min.: 189,573 K*: 0.234	Max.: 4,739,330 Min.: 186,920 K*: 1	Max.: 4,739,330 (P_2) Min.: 100,000 (P_0) K* (P_0): *0.194* K* (P_1): *0.234* K* (P_2): *1*
3.1.3 education and training programmes for flexibility improvement (number of programmes)	Max.: 0 Min.: 0 K* : 0	Max.: 8 Min.: 2 K*: 0.67	Max.: 12 Min. : 2 K*: 1	Max.: 12 (P_2) Min.: 0 (P_0) K* (P_0): 0 K* (P_1): 0.67 K* (P_2): 1
3.1.4 skill and knowledge acquisition for flexibility improvement (HK$)	Max.: 240,000 Min.: 50,000 K* : 0.154	Max.: 473,934 Min.: 71,900 K*: 0.344	Max.: 1,284,000 Min. : 112,150 K*: 1	Max.: 1,284,000 (P_2) Min.: 50,000 (P_0) K* (P_0): 0.154 K* (P_1): 0.344 K* (P_2): 1
3.1.5 technology input for flexibility improvement (HK$)	Max.:500,000 Min.: 50,000 K* : 0.365	Max.: 592,417 Min.: 71,900 K*: 0.440	Max.: 1,284,000 Min. : 112,150 K*: 1	Max.: 1,284,000 (P_2) Min.: 50,000 (P_0) 1 - K* (P_0): 0.365 1 - K* (P_1): 0.440 1 - K* (P_2): 1
3.1.6 improved remuneration scheme for flexibility improvement	Max.: 2 Min.: 1 K* : 0.2	Max.: 4 Min.: 1 K*: 0.6	Max.: 6 Min. : 1 K*: 1	Max.: 6 (P_0) Min.: 1 (P_2) K* (P_0): 0.2 K* (P_1): 0.6 K* (P_2):1
3.1.7 Flexible manufacturing system for flexibility improvement	Max.: 2 Min.: 0 K* : 0.2	Max.: 5 Min.: 1 K*: 0.5	Max.: 10 Min. : 1 K*: 1	Max.: 10 (P_0) Min.: 0 (P_2) K* (P_0): 0.2 K* (P_1): 0.5 K* (P_2): 1
Output data of key indicator 'flexibility'				
3.2.2 customized product (product quantity (pcs))#	Max.:100,000 Min.: 5,000 K* : 1 1 - K* : 0	Max.: 20,000 Min.: 1000 K*: 0.198 1 - K* : 0.802	Max.: 10,000 Min. : 200 K*: 0.1 1 - K* : 0.9	Max.: 100,000 (P_0) Min.: 200 (P_2) 1 - K* (P_0): 0 1 - K* (P_1): 0.802 1 - K* (P_2): 0.9

	P_0	P_1	P_2	**'Process'**
3.2.3 short lead time (number of days)#	Max.: 90 Min.: 60 K* : 1 1 - K* : 0	Max.: 60 Min.: 45 K*: 0.6 1 - K* : 0.4	Max.: 30 Min. : 15 K*: 0.2 1 - K* : 0.8	Max.: 90 (P_0) Min.: 15 (P_2) 1 - K* (P_0): 0 1 - K* (P_1): 0.4 1 - K* (P_2): 0.8
3.2.4 flexible corporation (level of flexibility)	Max.: 30 Min.: 5 K* : 0.294	Max.: 65 Min.: 20 K*: 0.706	Max.: 90 Min. : 50 K*: 1	Max.: 90 (P_2) Min.: 5 (P_0) K* (P_0): 0.294 K* (P_1): 0.706 K* (P_2): 1
3.2.5 improved stock management (with lower buffer stock (pcs)) #	Max.: 20,000 Min.:8,000 K* : 1 1 – K*: 0	Max.: 10,000 Min.: 5,000 K*: 0.497 1 – K*: 0.503	Max.: 5,000 Min. : 100 K*: 0.246 1 – K*: 0.754	Max.: 20,000 (P_0) Min.: 100 (P_2) 1 - K* (P_0): 0 1 - K* (P_1): 0.503 1 - K* (P_2): 0.754
$\bar{K}_3*$ **for the key indicator 'flexibility'**				$\bar{K}_{3.2}*$ **(** P_0 **):** 0.146 $\bar{K}_{3.2}*$ **(** P_1 **):** 0.495 $\bar{K}_{3.2}*$ **(** P_2 **):** 0.95
Key indicator 'skill' (S)				
Input data of key indicator 'skill'				
4.1.4 technology upgrading for skill enhancement (HK$)	Max.: 300,000 Min.: 30,000 K* : 0.509	Max.: 355,450 Min.: 35,545 K*: 0.613	Max.: 560,747 Min.: 37,383 K*: 1	Max.: 560,747 (P_2) Min.: 30,000 (P_0) K* (P_0): 0.509 K* (P_1): 0.613 K* (P_2): 1
4.1.5 government support on skill development and acquisition (HK$)	Max.: 20,000 Min.: 0 K* : 0.713	Max.: 23,697 Min.: 4,739 K*: 0.845	Max.: 28,037 Min.: 5,607 K*: 1	Max.: 28,037 (P_2) Min.: 0 (P_0) K* (P_0): 0.713 K* (P_1): 0.845 K* (P_2): 1
Output data of key indicator 'skill'				
4.2.1 new skill and knowledge development due to skill enhancement (development rate %)	Max.: 15 Min.: 5 K* : 0.182	Max.: 40 Min.: 15 K*: 0.636	Max.: 60 Min.: 20 K*: 1	Max.: 60 (P_2) Min.: 5 (P_0) K* (P_0): 0.182 K* (P_1): 0.636 K* (P_2): 1

	P_0	P_1	P_2	**'Process'**
4.2.2 acceptable performance due to skill enhancement (performance acceptance rate %)	Max.: 40 Min.: 10 K* : 0.333	Max.: 80 Min.: 40 K*: 0.778	Max.: 100 Min.: 55 K*: 1	Max.: 100 (P_0) Min.: 10 (P_2) K* (P_0): 0.333 K* (P_1): 0.778 K* (P_2): 1
4.2.4 productivity improvement due to skill enhancement (level of improvement)	Max.: 3 Min.: 1 K* : 0.222	Max.: 5 Min.: 2 K*: 0.444	Max.: 10 Min.: 3 K*: 1	Max.: 10 (P_2) Min.: 1 (P_0) K* (P_0): 0.222 K* (P_1): 0.444 K* (P_2): 1
4.2.6 flexibility improvement due to skill enhancement (level of improvement)	Max.: 3 Min.: 1 K* : 0.286	Max.: 5 Min.: 1 K*: 0.571	Max.:8 Min. : 2 K*: 1	Max.: 8 (P_2) Min.: 1 (P_0) K* (P_0): 0.286 K* (P_1): 0.571 K* (P_2): 1
4.2.7 organizational improvement due to skill enhancement (level of improvement)	Max.: 3 Min.: 1 K* : 0.286	Max.: 5 Min.: 1 K*: 0.571	Max.:8 Min. : 2 K*: 1	Max.: 8 (P_2) Min.: 1 (P_0) K* (P_0): 0.286 K* (P_1): 0.571 K* (P_2): 1
$\bar{k}^*$ **for the key indicator 'skill'**				$\bar{K}_{4.2}^*$ **(** P_0 **):** *0.362* $\bar{K}_{4.2}^*$ **(** P_1 **):** *0.637* $\bar{K}_{4.2}^*$ **(** P_2 **):** *1*
Key indicator 'innovation' (I)				
Input data of key indicator 'innovation'				
5.1.1 capital investment (including foreign direct investment) for innovation upgrading (HK$)	Max.: 100,000 Min.: 0 K* : 0.107	Max.: 189,573 Min.: 23,697 K*: 0.203	Max. 934,579 Min. 37,383 K*: 1	Max.: 934,579 (P_2) Min.: 0 (P_0) K* (P_0): 0.107 K* (P_1): 0.203 K* (P_2): 1
5.1.2 technology development for innovation upgrading (HK$)	Max.: 300,000 Min.: 50,000 K* : 0.358	Max.: 473,934 Min.: 118,483 K*: 0.608	Max.: 747,664 Min.: 112,149 K*: 1	Max.: 747,664 (P_2) Min.: 50,000 (P_0) K* (P_0): 0.358 K* (P_1): 0.608 K* (P_2): 1

	P_0	P_1	P_2	**'Process'**
5.1.3 R & D expenditure for innovation upgrading	Max.: 500,000 Min.: 0 K* : 0.535	Max.: 592,417 Min.: 23,697 K*: 0.634	Max. : 934,579 Min. : 37,383 K*: 1	Max.: 934,579 (P_2) Min.: 0(P_0) K* (P_0): 0.535 K* (P_1): 0.634 K* (P_2): 1
5.1.4 R & D personnel for innovation upgrading (number of personnel)	Max.: 20 Min.: 0 K* : 0.20	Max.: 50 Min.: 5 K*: 0.50	Max. : 100 Min. : 10 K*: 1	Max.: 100 (P_2) Min.: 0 (P_0) K* (P_0): 0.20 K* (P_1): 0.50 K* (P_2): 1
5.1.5 new knowledge expenditure for innovation upgrading (HK$)	Max.: 300,000 Min.: 0 K* : 0.459	Max.: 473,933 Min.: 23,697 K*: 0.724	Max.: 654,206 Min.: 37,383 K*: 1	Max.: 654,206 (P_2) Min.: 0 (P_0) K* (P_0): 0.459 K* (P_1): 0.724 K* (P_2): 1
5.1.6 government support for innovation upgrading (HK$)	Max.: 0 Min.: 0 K* : 0	Max.: 0 Min.: 0 K*: 0	Max.: 500,000 Min. : 0 K*: 1	Max.: 500,000 (P_2) Min.: 0 (P_0) K* (P_0): 0 K* (P_1): 0 K* (P_2): 1
5.1.7 research contribution of local academic institution for innovation upgrading (number of projects)	Max.: 1 Min.: 0 K* : 0.25	Max.: 2 Min.: 0 K*: 0.5	Max.: 4 Min. : 0 K*: 1	Max.: 4 (P_2) Min.: 0 (P_0) K* (P_0): 0.25 K* (P_1): 0.5 K* (P_2): 1
5.1.8 technology transfer for innovation upgrading (HK$)	Max.: 200,000 Min.: 0 K* : 0.535	Max.: 236,967 Min.: 23,697 K*: 0.634	Max. : 373,830 Min. : 28,037 K*: 1	Max.: 373,830 (P_2) Min.: 0 (P_0) K* (P_0): 0.535 K* (P_1): 0.634 K* (P_2): 1
5.1.9 education and training programmes for innovation upgrading	Max.: 5 Min.: 0 K* : 0.5	Max.: 8 Min.: 1 K*: 0.8	Max.: 10 Min. : 1 K*: 1	Max.: 10 (P_2) Min.: 0 (P_0) K* (P_0): 0.5 K* (P_1): 0.8 K* (P_2): 1
Output data of key indicator 'innovation'				

	P_0	P_1	P_2	**'Process'**
5.2.2 new process due to innovation upgrading (number of processes)	Max.: 5 Min.: 1 K* : 0.286	Max.: 12 Min.: 1 K*: 0.786	Max. : 15 Min. : 1 K*: 1	Max.: 15 (P_2) Min.: 1 (P_0) K* (P_0): 0.286 K* (P_1): 0.786 K* (P_2): 1
5.2.4 new organization development due to innovation upgrading (number of new organizations)	Max.: 3 Min.: 1 K* : 0.286	Max.: 5 Min.: 1 K*: 0.571	Max. : 8 Min. : 2 K*: 1	Max.: 8 (P_2) Min.: 1 (P_0) K* (P_0): 0.286 K* (P_1): 0.571 K* (P_2): 1
5.2.5 new system development due to innovation upgrading (number of new systems)	Max.: 4 Min.: 1 K* : 0.33	Max.: 8 Min.: 2 K*: 0.78	Max.: 10 Min. : 3 K*: 1	Max.: 10 (P_2) Min.: 1 (P_0) K* (P_0): 0.33 K* (P_1): 0.78 K* (P_2): 1
5.2.6 number of patents generated due to innovation upgrading (number of patents)	Max.: 0 Min.: 0 K* : 0	Max.: 0 Min.: 0 K*: 0	Max.: 2 Min. : 0 K*: 1	Max.: 2(P_2) Min.: 0 (P_0) & 0 (P_1) K* (P_0): 0 K* (P_1): 0 K* (P_2): 1
5.2.7 number of R & D personnel employed due to innovation upgrading (number of personnel)	Max.: 12 Min.: 0 K* : 0.24	Max.: 20 Min.: 0 K*: 0.4	Max. : 50 Min. : 1 K*: 1	Max.: 50 (P_2) Min.: 0 (P_0) K* (P_0): 0.24 K* (P_1): 0.4 K* (P_2): 1
5.2.8 number of publications due to innovation upgrading (number of publications)	Max.: 0 Min.: 0 K* : 0	Max.: 0 Min.: 0 K*: 0	Max. : 1 Min. : 0 K*: 1	Max.: 1 (P_2) Min.: 0 (P_0) & 0 (P_1) K* (P_0): 0 K* (P_1): 0 K* (P_2): 1
5.2.9 number of R & D firms and activities set up due to innovation upgrading (number of firms)	Max.: 0 Min.: 0 K* : 0	Max.: 2 Min.: 0 K*: 0.67	Max.: 3 Min. : 0 K*: 1	Max.: 3 (P_2) Min.: 0 (P_0) K* (P_0): 0 K* (P_1): 0.67 K* (P_2): 1

	P_0	P_1	P_2	**'Process'**
5.2.10 technological change due to innovation upgrading (change rate %)	Max.: 10 Min.: 5 K* : 0.111	Max.: 30 Min.: 10 K*: 0.56	Max. : 50 Min. : 15 K*: 1	Max.: 50 (P_2) Min.: 5 (P_0) K* (P_0): 0.111 K* (P_1): 0.56 K* (P_2): 1
$\bar{k}*$ **for the key indicator 'innovation'**				$\bar{K}_{5.2}*$ (P_0): ***0.247*** $\bar{K}_{5.2}*$ (P_1): ***0.492*** $\bar{K}_{5.2}*$ (P_2): ***1***

<u>Remarks</u>
: Apply Equation (2-3) for a higher industry feature score that indicates lower influence to technological change

For computing K* (P_1), deflators for the periods 1974 to 1983 (P_0) and 1984 to 1993 (P_1) (2.26 x 1.87 = 4.22) are utilized to revalue the currency data collected in the period (P_1)

For computing K* (P_2), deflators for the period 1974 to 1983 (P_0), 1984 to 1993 (P_1) and 1994 to 2000 (P_2) (2.26 x 1.87 x 1.27 = 5.37) are utilized to revalue the currency data collected in the period (P_2)

Table 5-5. Compute input and output data of the 5 key indicators in relation to the first 'Technometric' performance attribute '***service***' for HKSAR of China and the 'Technometric' scores 3 periods, i.e., P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). Each data is an average annual data in individual ten-year periods P_0, P_1 and P_2.

	P_0	P_1	P_2	**'Service'**
Key indicator 'productivity' (P)				
Input data of key indicator 'productivity'				
1.1.1 capital investment for productivity improvement (HK$)	Max.: 300,000 Min.: 40,000 K*: 0.291	Max.: 473,933 Min.: 59,242 K* : 0.485	Max.: 934,579 Min.: 46,729 K*: 1	Max.: 934,579 (P_2) Min.: 40,000 (P_0) K* (P_0) : 0.291 K* (P_1) : 0.485 K* (P_2): 1
1.1.2 labour employment for productivity improvement (number of staff)	Max.: 100 Min.: 5 K* : 0.192	Max.: 200 Min.: 10 K*: 0.394	Max.: 500 Min.: 12 K*: 1	Max.: 500 (P_2) Min.: 5 (P_0) K* (P_0): 0.192 K* (P_1): 0.394 K* (P_2): 1
1.1.3 technology input for productivity improvement (HK$)	Max.: 500,000 Min.: 100,000 K* : 0.235	Max.: 592,417 Min.: 118,500 K*: 0.289	Max.: 1,804,000 Min.: 150,000 K*: 1	Max.:1,804,000 (P_2) Min.: 100,000 (P_0) K* (P_0): 0.235 K* (P_1): 0.289 K* (P_2): 1
1.1.5 skill acquisition for productivity improvement (HK$)	Max.: 500,000 Min.: 100,000 K* : 0.235	Max.: 592,417 Min.: 118,500 K*: 0.289	Max.: 1,804,000 Min.: 150,000 K*: 1	Max.:1,804,000 (P_2) Min.: 100,000 (P_0) K* (P_0): 0.235 K* (P_1): 0.289 K* (P_2): 1
1.1.6 education and training programmes for productivity improvement (number of programmes)	Max.:5 Min.: 0 K* : 0.357	Max.: 10 Min.: 1 K*: 0.714	Max.: 14 Min.: 1 K*: 1	Max.: 14 (P_2) Min.: 0 (P_0) K* (P_0): 0.357 K* (P_1): 0.714 K* (P_2): 1
Output data of key indicator 'productivity'				

	P_0	P_1	P_2	**'Service'**
1.2.2 technological change due to productivity improvement (change rate %))	Max.: 4 Min.: 1 K* : 0.158	Max.: 10 Min.: 2 K*: 0.474	Max.: 20 Min.: 2 K*: 1	Max.: 20 (P_2) Min.: 1 (P_0) K* (P_0): 0.158 K* (P_1): 0.474 K* (P_2): 1
1.2.3 economic growth due to productivity improvement (growth rate (%))	Max.: 10 Min.: 5 K* : 0.111	Max.: 20 Min.: 10 K*: 0.333	Max.: 50 Min.: 15 K*: 1	Max.: 50 (P_2) Min.: 5 (P_0) K* (P_0): 0.111 K* (P_1): 0.333 K* (P_2): 1
$\bar{k}*$ **for the key indicator 'productivity'**				$\bar{K}_{1.3}*$ **(P_0): 0.226** $\bar{K}_{1.3}*$ **(P_1): 0.425** $\bar{K}_{1.3}*$ **(P_2): 1**
Key indicator 'quality' (Q)				
Input data of key indicator 'quality'				
2.1.1 capital investment for quality improvement (HK$)	Max.: 300,000 Min.: 50,000 K* : 0.599	Max.: 355,500 Min.: 210,000 K*: 0.732	Max.: 467,290 Min.: 186,915 K*: 1	Max.: 467,290 (P_2) Min.: 50,000 (P_0) K* (P_0): 0.599 K* (P_1): 0.732 K* (P_2): 1
2.1.2 human resource management for quality improvement (HK$)	Max.: 500,000 Min.: 50,000 K* : 0.645	Max.: 592,417 Min.: 59,242 K*: 0.778	Max.: 747,664 Min.: 56,074 K*: 1	Max.: 747,664 (P_2) Min.: 50,000 (P_0) K* (P_0): 0.645 K* (P_1): 0.778 K* (P_2): 1
2.1.3 strategic quality planning for quality improvement (number of year)	Max.: 1 Min.: 1 K* : 0	Max.: 2 Min.: 1 K*: 0.5	Max.: 3 Min.: 1 K*: 1	Max.: 3 (P_2) Min.: 1 (P_0) K* (P_0): 0 K* (P_1): 0.5 K* (P_2): 1
2.1.4 quality management system implementation for quality improvement (year of implementation)	Max.: 1 Min.: 1 K* : 0	Max.: 2 Min.: 1 K*: 0.5	Max.: 3 Min.: 1 K*: 1	Max.: 3 (P_2) Min.: 1 (P_0) K* (P_0): 0 K* (P_1): 0.5 K* (P_2): 1

	P_0	P_1	P_2	**'Service'**
2.1.5 technology input for quality improvement (HK$)	Max.: 300,000 Min.: 50,000 K* : 0.490	Max.: 473,933 Min.: 59,242 K*: 0.830	Max.: 560,747 Min.: 56,075 K*: 1	Max.: 560,747 (P_2) Min.: 50,000 (P_0) K* (P_0): 0.490 K* (P_1): 0.830 K* (P_2): 1
2.1.6 customer focus for quality improvement (commitment rate (%))	Max.: 40 Min.: 10 K* : 0.333	Max.: 60 Min.: 30 K*: 0.555	Max.: 100 Min.: 45 K*: 1	Max.: 100 (P_2) Min.: 10 (P_0) K* (P_0): 0.333 K* (P_1): 0.555 K* (P_2): 1
2.1.7 education and training programmes for quality improvement (number of programmes)	Max.: 4 Min.: 1 K* : 0.333	Max.: 8 Min.: 1 K*: 0.777	Max.: 10 Min.: 1 K*: 1	Max.: 10 (P_2) Min.: 1 (P_0) K* (P_0): 0.333 K* (P_1): 0.777 K* (P_2): 1
2.1.8 skill and knowledge acquisition for quality improvement (HK$)	Max.: 300,000 Min.: 50,000 K* : 0.358	Max.: 473,933 Min.: 59,242 K*: 0.608	Max.: 747,664. Min.: 56,074 K*: 1	Max.: 747,664 (P_2) Min.: 50,000 (P_0) K* (P_0): 0.358 K* (P_1): 0.608 K* (P_2): 1
2.1.9 communication facilities for quality improvement (HK$)	Max.: 300,000 Min.: 60,000 K* : 0.274	Max.: 473,933 Min.: 94,787 K*: 0.473	Max.: 934,579 Min.: 100,000 K*: 1	Max.: 934,579 (P_2) Min.: 60,000 (P_0) K* (P_0): 0.274 K* (P_1): 0.473 K* (P_2): 1
2.1.10 government support for quality improvement (HK$)	Max.: 0 Min.: 0 K* : 0	Max.: 47,393 Min.: 4,739 K*: 0.845	Max.: 56,074 Min.: 4,860 K*: 1	Max.: 56,074 (P_2) Min.: 0 (P_0) K* (P_0): 0 K* (P_1): 0.845 K* (P_2): 1
Output data of key indicator 'quality'				
2.2.1 effective quality management due to quality improvement (effectiveness %)	Max.: 30 Min.: 10 K* : 0.286	Max.: 60 Min.: 40 K*: 0.714	Max.: 80 Min.: 50 K*: 1	Max.: 80 (P_2) Min.: 10 (P_0) K* (P_0): 0.286 K* (P_1): 0.714 K* (P_2): 1

	P_0	P_1	P_2	'Service'
2.2.2 customer satisfaction due to quality improvement (satisfaction rate %)	Max.: 10 Min.: 5 K* : 0.111	Max.: 20 Min.: 10 K*: 0.333	Max.: 50 Min.: 15 K*: 1	Max.: 4 (P_2) Min.: 0 (P_0) K* (P_0): 0.111 K* (P_1): 0.333 K* (P_2): 1
2.2.4 quality accreditation due to quality improvement (number of quality accreditations achieved)	Max.: 1 Min.: 0 K* : 0.25	Max.: 2 Min.: 0 K*: 0.5	Max.: 4 Min.: 1 K*: 1	Max.: 4 (P_2) Min.: 0 (P_0) K* (P_0): 0.25 K* (P_1): 0.5 K* (P_2): 1
2.2.5 positive impact on society due to quality improvement (social satisfaction %)	Max.: 15 Min.: 0 K* : 0.3	Max.:30 Min.: 10 K*: 0.6	Max.: 50 Min.: 10 K*: 1	Max.: 50 (P_2) Min.: 0 (P_0) K* (P_0): 0.3 K* (P_1): 0.6 K* (P_2): 1
2.2.6 increasing market share due to quality improvement (rate of increase (%))	Max.: 10 Min.: 5 K* : 0.111	Max.: 30 Min.: 10 K*: 0.56	Max.: 50 Min.: 15 K*: 1	Max.: 50 (P_2) Min.: 5 (P_0) K* (P_0): 0.111 K* (P_1): 0.56 K* (P_2): 1
$\bar{k}*$ **for the key indicator 'quality'**				$\bar{K}_{2.3}*$ **(P_0): *0.274*** $\bar{K}_{2.3}*$ **(P_1): *0.629*** $\bar{K}_{2.3}*$ **(P_2): *1***
Key indicator 'flexibility' (F)				
Input data of key indicator 'flexibility'				
3.1.3 education and training programmes for flexibility improvement (number of programmes)	Max.:2 Min.: 1 K* : 0.167	Max.: 5 Min.: 1 K*: 0.667	Max.: 7 Min.: 1 K*: 1	Max.: 7 (P_2) Min.: 1 (P_0) K* (P_0): 0.167 K* (P_1): 0.667 K* (P_2): 1
3.1.4 skill and knowledge acquisition for flexibility improvement (HK$)	Max.: 240,000 Min.: 50,000 K* : 0.154	Max.: 473,934 Min.: 71,900 K*: 0.344	Max.: 1,284,000 Min. : 112,150 K*: 1	Max.: 1,284,000 (P_2) Min.: 50,000 (P_0) K* (P_0): 0.154 K* (P_1): 0.344 K* (P_2): 1

	P_0	P_1	P_2	'Service'
3.1.5 technology input for flexibility improvement (HK$)	Max.: 200,000 Min.: 50,000 K* : 0.17	Max.: 473,933 Min.: 59,241 K*: 0.479	Max.: 934,579 Min.: 56,074 K*: 1	Max.: 934,579 (P_2) Min.: 50,000 (P_0) K* (P_0): 0.170 K* (P_1): 0.479 K* (P_2): 1
3.1.6 improved remuneration scheme for flexibility improvement (number of schemes)	Max.: 5 Min.: 1 K* : 0.444	Max.: 8 Min.: 1 K*: 0.778	Max.: 10 Min.: 2 K*: 1	Max.: 10 (P_2) Min.: 1 (P_0) K* (P_0): 0.444 K* (P_1): 0.778 K* (P_2): 1
Output data of key indicator 'flexibility'				
3.2.4 flexible corporation (level of flexibility)	Max.: 30 Min.: 5 K* : 0.294	Max.: 65 Min.: 20 K*: 0.706	Max.: 90 Min. : 50 K*: 1	Max.: 90 (P_2) Min.: 5 (P_0) K* (P_0): 0.294 K* (P_1): 0.706 K* (P_2): 1
3.2.5 improved stock management (with lower buffer stock (pcs)) #	Max.: 20,000 Min.:8,000 K* : 1 1 – K*: 0	Max.: 10,000 Min.: 5,000 K*: 0.497 1 – K*: 0.503	Max.: 5,000 Min. : 100 K*: 0.246 1 – K*: 0.754	Max.: 20,000 (P_0) Min.: 100 (P_2) 1 - K* (P_0): 0 1 - K* (P_1): 0.503 1 - K* (P_2): 0.754
$\bar{k}*$ **for the key indicator 'flexibility'**				$\bar{K}_{3.3}*$ (P_0): *0.205* $\bar{K}_{3.3}*$ (P_1): *0.580* $\bar{K}_{3.3}*$ (P_2): *0.959*
Key indicator 'skill' (S)				
Input data of key indicator 'skill'				
4.1.1 human resources for skill enhancement (HK$)	Max.: 200,000 Min.: 20,000 K* : 0.247	Max.: 473,934 Min.: 23,697 K*: 0.624	Max.: 747,664 Min. : 28,037 K*: 1	Max.: 747,664 (P_2) Min.: 20,000 (P_0) K* (P_0): 0.247 K* (P_1): 0.624 K* (P_2): 1
4.1.2 education and training programmes for skill enhancement (number of programmes)	Max.: 4 Min.: 0 K* : 0.4	Max.: 7 Min.: 1 K*: 0.7	Max.: 10 Min. : 1 K*: 1	Max.: 10 (P_2) Min.: 0 (P_0) K* (P_0): 0.4 K* (P_1): 0.7 K* (P_2): 1

	P_0	P_1	P_2	**'Service'**
4.1.3 skill acquisition scheme (number of schemes)	Max.: 1 Min.: 0 K* : 0.08	Max.: 3 Min.: 1 K*: 0.25	Max.: 12 Min. : 1 K*: 1	Max.: 12 (P_2) Min.: 0 (P_0) K* (P_0): 0.08 K* (P_1): 0.25 K* (P_2): 1
4.1.4 technology upgrading for skill enhancement (HK$)	Max.: 200,000 Min.: 20,000 K* : 0.333	Max.: 355,450 Min.: 23,697 K*: 0.620	Max.: 560,748 Min. : 37,383 K*: 1	Max.: 560,748 (P_2) Min.: 20,000 (P_0) K* (P_0): 0.333 K* (P_1): 0.620 K* (P_2): 1
4.1.5 government support on skill development and acquisition (HK$)	Max.: 20,000 Min.: 0 K* : 0.71	Max.: 23,697 Min.: 4,739 K*: 0.845	Max.: 28,037 Min. : 5,607 K*: 1	Max.: 28,037 (P_2) Min.: 0 (P_0) K* (P_0): 0.71 K* (P_1): 0.845 K* (P_2): 1
Output data of key indicator 'skill'				
4.2.1 new skill and knowledge development due to skill enhancement (development rate %)	Max.: 5 Min.: 0 K* : 0.5	Max.: 7 Min.: 1 K*: 0..7	Max.: 10 Min. : 1 K*: 1	Max.: 10 (P_2) Min.: 0 (P_0) K* (P_0): 0.5 K* (P_1): 0.7 K* (P_2): 1
4.2.2 acceptable performance due to skill enhancement (performance acceptance %)	Max.: 30 Min.: 5 K* : 0. 294	Max.: 60 Min.: 30 K*: 0.647	Max.: 90 Min. : 50 K*: 1	Max.: 90 (P_2) Min.: 5 (P_0) K* (P_0): 0.294 K* (P_1): 0.647 K* (P_2): 1
4.2.3 human resource improvement due to skill enhancement (level of improvement)	Max.: 3 Min.: 1 K* : 0.25	Max.: 6 Min.: 2 K*: 0.625	Max.: 9 Min. : 5 K*: 1	Max.: 9 (P_2) Min.: 1 (P_0) K* (P_0): 0.25 K* (P_1): 0.625 K* (P_2): 1
4.2.4 productivity improvement due to skill enhancement (level of improvement)	Max.: 3 Min.: 1 K* : 0.25	Max.: 6 Min.: 2 K*: 0.625	Max.: 9 Min. : 3 K*: 1	Max.: 9 (P_2) Min.: 1 (P_0) K* (P_0): 0.25 K* (P_1): 0.625 K* (P_2): 1

	P_0	P_1	P_2	**'Service'**
4.2.5 quality improvement due to skill enhancement (level of improvement)	Max.: 2 Min.: 1 K* : 0.167	Max.: 4 Min.: 1 K*: 0.5	Max.: 7 Min. : 1 K*: 1	Max.: 7 (P_2) Min.: 1 (P_0) K* (P_0): 0.167 K* (P_1): 0.5 K* (P_2): 1
4.2.7 organizational improvement due to skill enhancement	Max.: 3 Min.: 1 K* : 0.286	Max.: 5 Min.: 1 K*: 0.57	Max.: 8 Min. : 1 K*: 1	Max.: 8 (P_2) Min.: 1 (P_0) K* (P_0): 0.286 K* (P_1): 0.57 K* (P_2): 1
$\bar{k}*$ **for the key indicator 'skill'**				$\bar{K}_{4.3}*$ (P_0): *0.320* $\bar{K}_{4.3}*$ (P_1): *0.610* $\bar{K}_{4.3}*$ (P_2): *1*
Key indicator 'innovation' (I)				
Input data of key indicator 'innovation'				
5.1.1 capital investment (including foreign direct investment) for innovation upgrading (HK$)	Max.: 100,000 Min.: 0 K* : 0.178	Max.:189,573 Min.: 23,697 K*: 0.338	Max.: 560,748 Min. : 37,383 K*: 1	Max.: 560,748 (P_2) Min.: 0 (P_0) K* (P_0): 0.178 K* (P_1): 0.338 K* (P_2): 1
5.1.6 government support for innovation upgrading (HK$)	Max.: 0 Min.: 0 K* : 0	Max.: 0 Min.: 0 K*: 0	Max.: 500,000 Min. : 0 K*: 1	Max.: 500,000 (P_2) Min.: 0 (P_0) K* (P_0): 0 K* (P_1): 0 K* (P_2): 1
5.1.9 education and training programmes for innovation upgrading (number of programmes)	Max.: 2 Min.: 0 K* : 0.2	Max.: 4 Min.: 1 K*: 0.4	Max.: 10 Min. : 1 K*: 1	Max.:10 (P_2) Min.: 0 (P_0) K* (P_0): 0.2 K* (P_1): 0.4 K* (P_2): 1
Output data of key indicator 'innovation'				

	P_0	P_1	P_2	**'Service'**
5.2.3 new quality due to innovation upgrading (number of quality systems)	Max.: 1 Min.: 0 K* : 0.25	Max.: 2 Min.: 1 K*: 0.5	Max.: 4 Min. : 1 K*: 1	Max.: 4 (P_2) Min.: 0 (P_0) K* (P_0): 0.25 K* (P_1): 0.5 K* (P_2): 1
5.2.4 new organization development due to innovation upgrading (number of new organizations)	Max.: 3 Min.: 1 K* : 0.286	Max.: 5 Min.: 1 K*: 0.571	Max.: 8 Min. : 2 K*: 1	Max.: 8 (P_2) Min.: 1 (P_0) K* (P_0): 0.286 K* (P_1): 0.571 K* (P_2): 1
5.2.5 new system development due to innovation upgrading (number of new systems)	Max.: 3 Min.: 1 K* : 0.286	Max.: 5 Min.: 1 K*: 0.571	Max.: 8 Min. : 2 K*: 1	Max.: 8 (P_2) Min.: 1 (P_0) K* (P_0): 0.286 K* (P_1): 0.571 K* (P_2): 1
5.2.6 number of patents generated due to innovation upgrading (number of patents generated)	Max.: 0 Min.: 0 K* : 0	Max.: 0 Min.: 0 K*: 0	Max.: 1 Min. : 0 K*: 1	Max.: 1 (P_2) Min.: 0 (P_0) K* (P_0): 0 K* (P_1): 0 K* (P_2): 1
5.2.8 number of publications due to innovation upgrading (number of publications)	Max.: 0 Min.: 0 K* : 0	Max.: 0 Min.: 0 K*: 0	Max.: 1 Min. : 0 K*: 1	Max.:1 (P_2) Min.: 0 (P_0) K* (P_0): 0 K* (P_1): 0 K* (P_2): 1
5.2.11 economic change due to innovation upgrading	Max.: 10 Min.: 0 K* : 0.25	Max.: 20 Min.: 5 K*: 0.5	Max.: 40 Min. : 10 K*: 1	Max.: 40 (P_2) Min.: 0 (P_0) K* (P_0): 0.25 K* (P_1): 0.5 K* (P_2): 1
$\bar{k}*$ **for the key indicator 'innovation'**				$\bar{K}_{5.3}*$ (P_0): ***0.161*** $\bar{K}_{5.3}*$ (P_1): ***0.32*** $\bar{K}_{5.3}*$ (P_2): *1*

<u>Remarks</u>
: Apply Equation (2-3) for a higher industry feature score that indicates lower influence to technological change

For computing K* (P_1), deflators for the periods 1974 to 1983 (P_0) and 1984 to 1993 (P_1) (2.26 x 1.87 = 4.22) are utilized to revalue the currency data collected in the period (P_1)

For computing K* (P_2), deflators for the period 1974 to 1983 (P_0), 1984 to 1993 (P_1) and 1994 to 2000 (P_2) (2.26 x 1.87 x 1.27 = 5.37) are utilized to revalue the currency data collected in the period (P_2)

The $\bar{K}*$ of 5 key indicators for technological development of the TC industry with respect to 3 'Technometric' performance attributes were computed for the time periods: P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). Details of the computations are provided as follows:

$$\begin{array}{c} \\ P \\ Q \\ F \\ S \\ I \end{array} \begin{array}{c} \begin{array}{ccc} \text{Pd} & \text{Pr} & \text{Sr} \end{array} \\ \left| \begin{array}{ccc} 0.284 & 0.251 & 0.226 \\ 0.268 & 0.272 & 0.274 \\ 0.123 & 0.146 & 0.205 \\ 0.317 & 0.362 & 0.320 \\ 0.242 & 0.247 & 0.161 \end{array} \right| \end{array}_{P_0} \qquad (5\text{-}1)$$

Pd : product
Pr : process
Sr : service
P: Productivity
Q: Quality
F: Flexibility
S: Skill
I: Innovation
P_0 : 1974 to 1983

	Pd	Pr	Sr
P	0.543	0.586	0.425
Q	0.584	0.562	0.629
F	0.594	0.495	0.580
S	0.594	0.637	0.610
I	0.526	0.492	0.32

P_1 (5-2)

Pd : product
Pr : process
Sr : service
P: Productivity
Q: Quality
F: Flexibility
S: Skill
I: Innovation
Same point as above – standardize.
P_1 : 1984 to 1993

	Pd	Pr	Sr
P	1	1	1
Q	1	1	1
F	0.932	0.95	0.959
S	1	1	1
I	1	1	1

P_2 (5-3)

Pd : product
Pr : process
Sr : service
P: Productivity
Q: Quality
F: Flexibility
S: Skill
I: Innovation
P_2 :1994 to 2003

With reference to the above findings, the change of the first ‘Technometric’ performance attribute - product in the time periods: P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003) was rewritten and is shown in Figure 5-5 as follows:

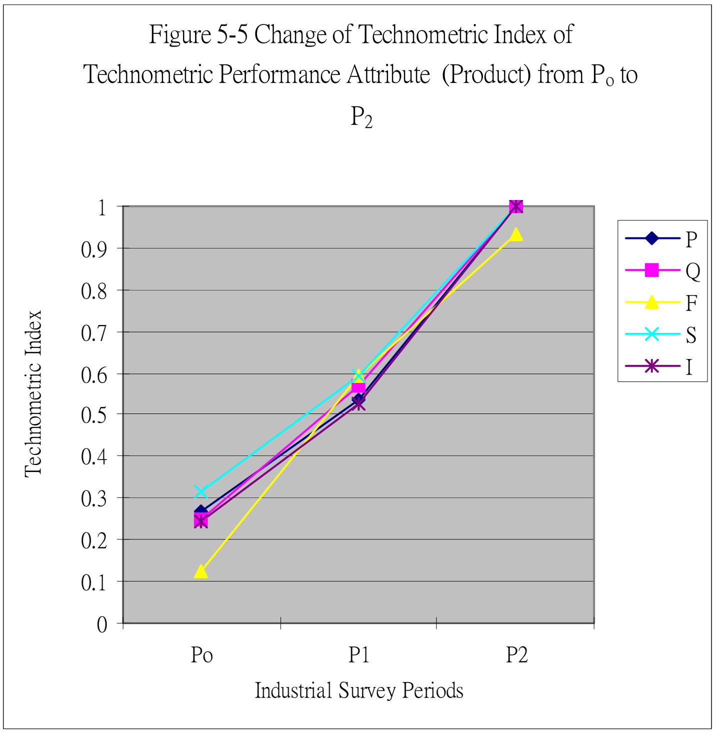
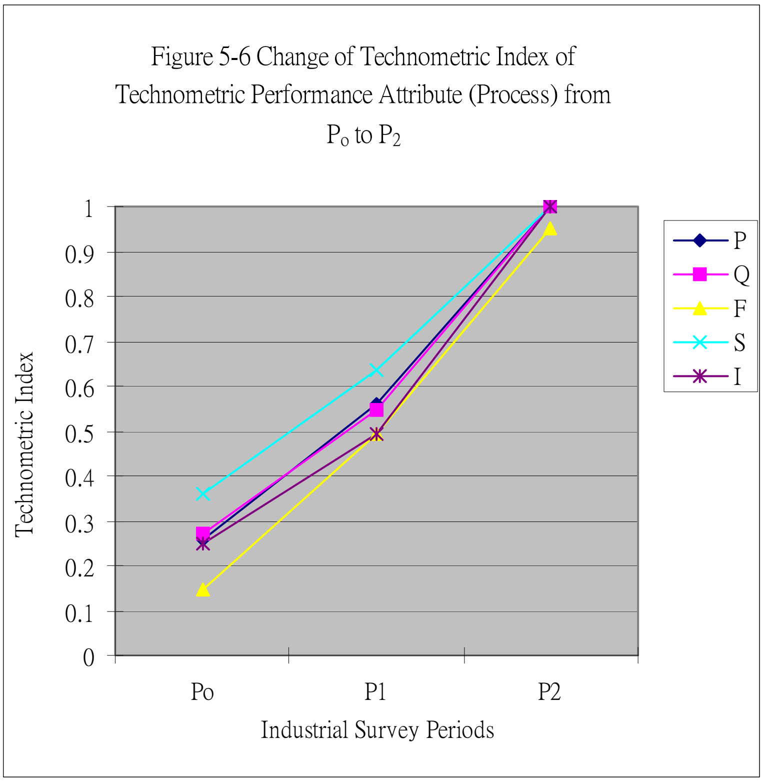


Figure 5-5 Change of Technometric Index of Technometric Performance Attribute (Product) from P_o to P_2

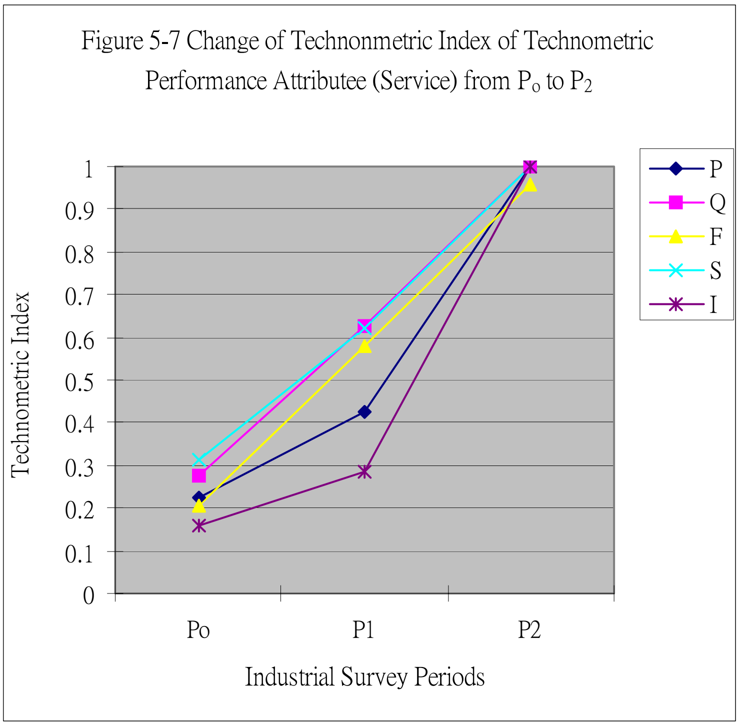
Pd : product
Pr : process
Sr : service
P: Productivity
Q: Quality
F: Flexibility
S: Skill
I: Innovation
P_0 : 1974 to 1983
P_1 (1984 to 1993)
P_2 (1994 to 2003)

The second 'Technometric' performance attribute - process in the time periods: P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003) was also rewritten and is shown in Figure 5-6 as follows:



Pd : product
Pr : process
Sr : service
P: Productivity
Q: Quality
F: Flexibility
S: Skill
I: Innovation
P_0 : 1974 to 1983
P_1 (1984 to 1993)
P_2 (1994 to 2003)

The third 'Technometric' performance attribute - service in the time periods: P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003) was also rewritten and is shown in Figure 5-7 as follows:



Pd : product

Pr : process

Sr : service

P: Productivity

Q: Quality

F: Flexibility

S: Skill

I: Innovation

P_0 : 1974 to 1983

P_1 (1984 to 1993)

P_2 (1994 to 2003)

Summing up the averages of the 5 key indicators of the 'Technometric' performance attributes, i.e. product (Pd), process (Pr) and service (Sr), the results are as follows:

	P_o	P_1	P_2
Pd	0..2468	0.5682	0.9864
Pr	0.2556	0.5544	0.99
Sr	0.2372	0.5128	0.9918
Average	0.2465	0.5451	0.9894

(5-4)

5.4.3.2 The change of 3 'Technometric' performance attributes in the period P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003) in relation to the change of HKSAR's industrial policy

Figures 5-5 to 5-7 show the change of the 3 'Technometric' performance attributes, i.e. product, process and service as well as their 5 key indicators in relation to the change of the Government's industrial policy in the period P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). The change of the 3 'Technometric' performance attributes truly reflects the technological development of HKTCI. From Figures 5-5 to 5-7, it may be seen that the 3 'Technometric' performance attributes as well as their 5 key indicators increased substantially from the period P_0 to P_2 as the index in P_0 is not zero. A full explanation is given in the following paragraphs.

5.4.3.2.1 The change of 3 'Technometric' performance attributes before the period P_0 (1974 to 1983) in relation to the change of HKSAR's industrial policy

Before the period P_0, there were already some main constituents of industrial policy implemented by the Government to enhance the technological development of the whole manufacturing industry, including the TC sector.

1. A 'Trade Policy' was implemented in 1960 although it did not directly influence the technological development of HKTCI. The participation of the developed countries in GATT and textile quota allocation in the 1960's stimulated the technological growth of HKTCI, prompting improvements in productivity, quality, flexibility, skill and innovation.
2. Key constituents of the 'Tax Policy', i.e., 'Corporate Tax Policy' (direct/indirect influence) and 'Tax Reduction on R & D activities' (direct influence) implemented in 1947 and 1965 respectively encouraged more local manufacturing companies to emphasize product R & D.
3. Key constituents of the 'Technology Policy' i.e., 'Intellectual Property Policy', and 'Technological Infrastructure Policy' (direct influence) implemented in 1954 and 1967 had a positive impact on the growth of 'Technometric' index of 3 'Technometric' performance attributes in the period P_0.

The implementation of the aforesaid constituents of industrial policy before the period P_0 had a positive impact on the technological development of HKTCI. The 'Technometric' index of the 3 'Technometric' performance attributes increased by the factor of 0.2465 (average values shown at equation (5-4)) in the period P_0.

5.4.3.2.2 The change of 3 'Technometric' performance attributes the period P_0 **(1974 to 1983)** *in relation to the change of HKSAR's industrial policy*

1. Although there was no change in HKSAR's industrial policy in the period P_1, the policy implemented before the period P_1 was both short-and long-term policy. In general, short-term policy is concerned, for macroeconometric models, with stabilization of the economy within a period of one or two years. Long-term policy, by way of contrast, is concerned with the pattern of growth over longer periods, i.e., 5 to 6 years, or even longer [84]. The impact of the policy implemented in the period P_0 affected the growth of 'Technometric' index in the period P_1.
2. Together with the influence from constituents of industry policy referred in paragraphs 5.3.3.2.1 and 5.3.3.2.2 above, the 'Technometric' index of the 3 'Technometric' performance attributes increased by a factor of 0.545 (average values shown in equation (5-4)) in the periods P_0 to P_1.

5.4.3.2.3 The change of 3 'Technometric' performance attributes in the period P_1

(1984 to 1993) ***in relation to the change of HKSAR's industrial policy***

1. Although there was no change in HKSAR's industrial policy in the period P_1, the policy implemented before the period P_1 was both short-and long-term policy. In general, short-term policy is concerned, for macroeconometric models, with stabilization of the economy within a period of one or two years. Long-term policy, by contrast, is concerned with the pattern of growth over longer periods, i.e., 5 to 6 years, or even longer [84]. The impact of the policy implemented in the period P_0 would affect the growth of 'Technometric' index in the period P_1.
2. Together with the influence from constituents of industry policy mentioned in paragraphs 5.3.3.2.1 and 5.3.3.2.2 above, the 'Technometric' index of 3 'Technometric' performance attributes increased at 0.545 (average values shown in equation (5-4)) in the periods P_0 to P_1.

5.4.3.2.4 The change of 3 'Technometric' performance attributes the period P_2* (1994 to 2003) *in relation to the change of HKSAR's industrial policy

1. The 'Innovation and Technology Policy' (one of the key constituents of the

‘Technology Policy’ and the ‘Competition Policy’ was implemented in 1994 and 1998 respectively. The former policy (direct influence) was to promote and support applied research and development, and technology transfer and application whereas the latter (direct/indirect influence) was to ensure a free and fair competitive environment for Hong Kong’s industry.

2. For the period P_2, the ‘Technometric’ indexes of 3 ‘Technometric’ performance attributes rose substantially to nearly 1, as shown in Figure 5-7 (1 is the maximum index of ‘Technometric’ unit). This indicates that the positive impact of all constituents of HKSAR’s industrial policy resulted in the technological growth of HKTCI, in parallel to the open policy of China and the improvement of the world economy before 1997.

Table 5-6 Policy change of HKSAR's Industrial Policy in 3 periods, i.e., P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003)

Periods	**Change of HKSAR's Industrial Policy**
Before P_0 (1974 to 1983)	<u>Trade Policy</u> Hong Kong Trade Policy, comprised of the following key elements after 1960: Policy on Certificate of Origin, Strategic Commodities Control Policy, Licensing Controls Policy and Textiles Controls Policy. Most of the main policy constituents were as a result of the signed agreements on the Short-term Arrangement (from 1960 to 1961), Long-term Agreement (1962 to 1973), the Multifibre Arrangement (1974 to 1994) and the TC Agreement of the World Trade Organization (1995 to 2004). The Trade Policy may be considered to have indirectly influenced the technological development (TD) of HKTCI. <u>Tax Policy</u> Two key elements, i.e., Corporate Tax Policy and Personal Tax Policy of Tax Policy have been evident since 1947. The former directly/indirectly influenced the TD of HKTCI. The latter only indirectly influenced the TD of HKTCI. The remaining key element, the Tax Reduction on R & D Activities was introduced in 1965. It directly influenced the TD of HKTCI. <u>Technology Policy</u> The Intellectual Property Policy was introduced in 1954, was and may be considered one of the direct influences on the TD of HKTCI. One of the key constituents, Technological Infrastructure Policy, has been implemented since 1967 and has directly influenced the TD of HKTCI since that time. A number of statutory non-government bodies have since been set up for delivery of technical services for the local industries, including TC industry.
P_0 (1974 to 1983)	<u>Technology Policy</u> One of the key constituents, Inward Investment Policy, had been implemented since 1975, and it is directly influencing the TD of HKTCI. The HKSAR government actively attracts external direct investment, brings in new technology and management culture, creates employment, and enriches Hong Kong as a cosmopolitan city.

P_1 (1984 to 1993)	There was no change in any of the main constituents of HKSAR's industrial policy.
P_2 (1994 to 2003)	Competition Policy In May 1998, HKSAR introduced a competition policy to set up a sector-specific (telecommunication industry) competition policy framework. The policy both directly and indirectly influenced the TD of HKTCI. Technology Policy One of the key constituents, Innovation and Technology Policy, was introduced in 1994. It directly influenced the TD of HKTCI. The aim of the policy was to enhance the competitiveness of the local manufacturing industry through the provision of government funding assistance for technology and innovation improvements.

5.5 Summary

As referred in Figures 5-5 to 5-7, the 'Technometric' indexes of the 3 'Technometric' performance attributes, i.e., 'product', 'process' and 'service' started to grow in the period P_0 since the Government implemented a series of key constituents of industrial policy before the period P_0, as shown in Table 5-2. Furthermore, in the period P_0, the change of industrial policy in one of the key constituents 'Technology Policy', in addition to 'Inward Investment Policy' implemented in 1975 gave rise the growth of the 'Technometric' indexes. Although there was no change in any main constituents of Hong Kong's industrial policy in the period P_1, the positive impact of industrial policy stimulated the continued growth of the 'Technometric' indexes in that period. In the period P_2, the great change in the industrial policy on 'Competition Policy' and 'Technology Policy' resulted in substantial growth of the 'Technometric' indexes of the 3 'Technometric' performance attributes near to 1. This proves that the measured results of the 'Technometric' model matched with the changing pattern of the government policy in the domain field, indicating also that a new 'Technometric' model could effectively measure the performance of technological development of HKTCI.

The Hong Kong Government should consider the current 'Technology Policy' and take into consideration the recommendations shown in paragraph 5.4 above in order to achieve the sustainability of local TC industry.

Chapter 6 The Development of 5 Key 'Technometric' Indicators in the Last 3 Decades

6.1 Introduction

In Chapter 5, the derivation of the 'Technometric' index K^* and the arithmetic mean of the 'Technometric'' index $\bar{K}^*$ for each 'Technometric' performance attribute are discussed, in which cross-time period comparisons are made for 3 time periods using the maximum and minimum values for the entire input and output data of the 5 key indicators of the 3 'Technometric' performance attributes. However, the individual input and output data of 30 HKTC companies were not used for the computation due to the large of volume of data, with the result that thorough statistical analyses were not conducted.

In this Chapter, the method whereby the 'Technometric' indices for all the indicators were calculated for each of 30 HKTC companies is provided according to equations (2-6) and (2-3), from which the overall 'Technometric' indices for the 5 key indicators (i.e., 'productivity', 'quality', 'flexibility', 'skill' and 'innovation') were defined and computed by aggregating the indices of individual indicators in each category respectively. A thorough statistical analysis was conducted for the 5 overall key indicators indices to study the technological development of HKTCI in the last 3 decades in relation to company background, business profile and relevant government industrial policy. Linear regression was used to find the relationships between each pair of the overall input and output indices of the 5 key indicators. Error bar charts were used, together with one way and multivariate analysis of variances, to illustrate the changes in the 5 key indicators over time periods in relation to relevant government policies. The statistical significance were calculated in terms of sample size.

6.2 'Productivity'

As defined in Chapter 4, 'productivity' was the first of the 5 key indicators for measuring the technological development of the TC industry, which included 7 input indices and 2 output indices for the 'Technometric' performance attribute 'product', 8 input indices and 3 output indices for the attribute 'process', and 5 input indices and 2 output indices for the attribute 'service'. These indices provided the necessary information to indicate the level of productivity in HKTCI from various perspectives. To obtain a clear picture of the trend of development for productivity, it was necessary to aggregate all the individual scores of the indices into an overall score for the entire spectrum of ‘productivity’ indices, so that comparison and analysis could be made across performance attributes, time periods and across companies.

6.2.1 Overall ‘productivity’ input and output indices

To calculate the overall ‘productivity’ indices, the individual ‘Technometric’ index *k** was calculated for the 30 local TC companies using the 3 performance attributes according to Equations (2-6) and (2-3) as shown in Appendices 10a to 10c. Then, the overall ‘productivity’ input and output indices were defined as follows:

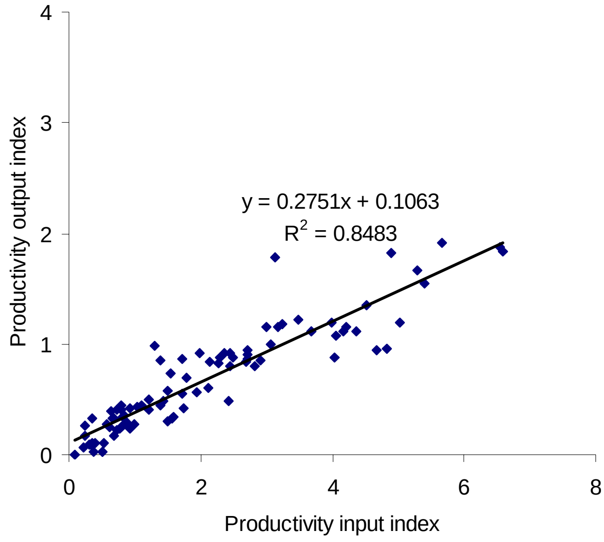
$$P_{input} = \sum_{ijk} a_{ijk} x_{ijk} \qquad (6\text{-}1)$$

$$P_{output} = \sum_{ijk} b_{ijk} x_{ijk} \qquad (6\text{-}2)$$

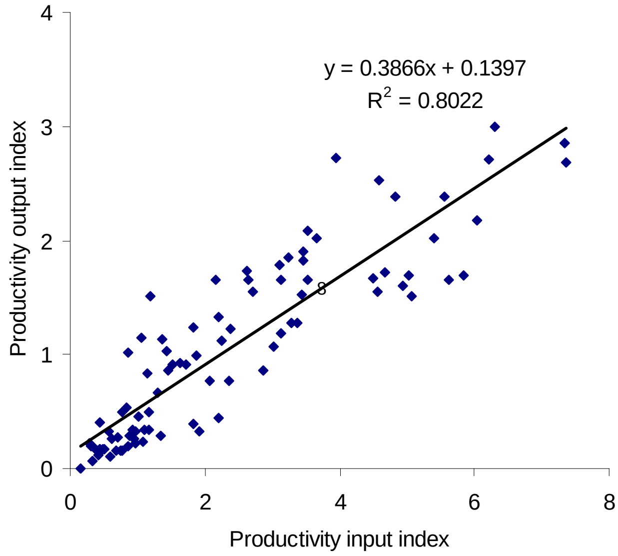
In Figure 4-4, which shows the final version of the questionnaire, x_{ijk} represents, for instance, the input indices of the ‘productivity’, i.e., $x._{1.1.1}$, $x._{1.1.2}$, $x._{1.1.3}$, $x._{1.1.4}$, $x._{1.1.5}$, $x._{1.1.6}$ and $x._{1.1.8}$, and output indices of the ‘productivity’, i.e., $x._{1.2.2}$ and $x._{1.2.3}$ for the performance attribute – ‘product’. P_{input} and P_{output} are the overall ‘productivity’ input and output indices respectively. The weights, which indicate the importance, of the individual elements x_{ijk}s are described by a_{ijk} and b_{ijk} for input and output elements. As the individual elements are assumed to be of similar importance, the value of a_{ijk} and b_{ijk} are set as 1. The overall 'productivity' input and output indices are calculated according to equations (6-1) and (6-2) for the individual companies in each performance attribute and time period with 90 observations in total.

6.2.2 Relationship between the overall 'productivity' input and output indices

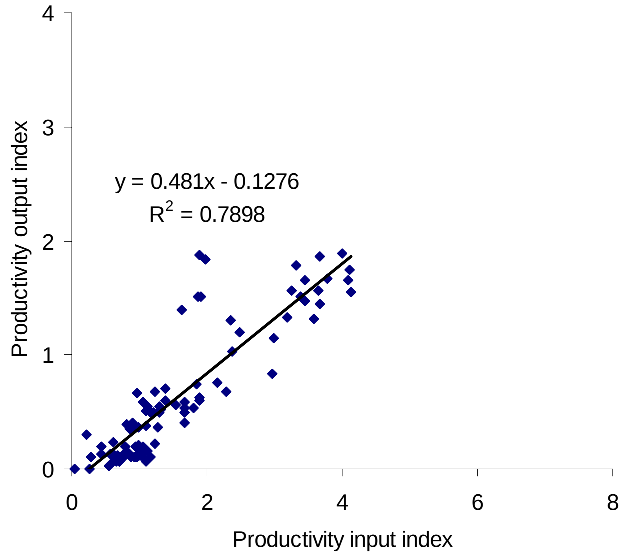
Figure 6-1 illustrates that there are linear relationships between the 'productivity' input and output indices. The correlation coefficients of the indices in the 3 'Technometric' performance attributes, i.e., 'product', 'process' and 'service' are 0.848, 0.8022 and 0.7898 respectively, significant at p-value < 0.001. The output 'productivity' index is largely determined by the overall input 'productivity' index, which includes a number of data such as capital investment, labour employment, technology input, material resource, skill acquisition, education and training and equipment investment. This suggests that the overall 'productivity' output index can be used as an indicator for 'productivity'.



(a) The ‘Technometric’ performance attribute ‘product’



(b) The ‘Technometric’ performance attribute ‘process’



(c) The ‘Technometric’ performance attribute ‘service’

Figure 6-1 Relationship between the overall ‘productivity’ input and output indices for the 3 ‘Technometric’ performance attributes, i.e., ‘product’, ‘process’ and ‘service’ respectively

6.2.3 Overall trend

There was a significant increase in the overall ‘productivity’ output index across the 3 ‘Technometric’ performance attributes over the time period: P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003), as shown in Figure 6-2. The significance of their differences is at the level of p-value < 0.001.

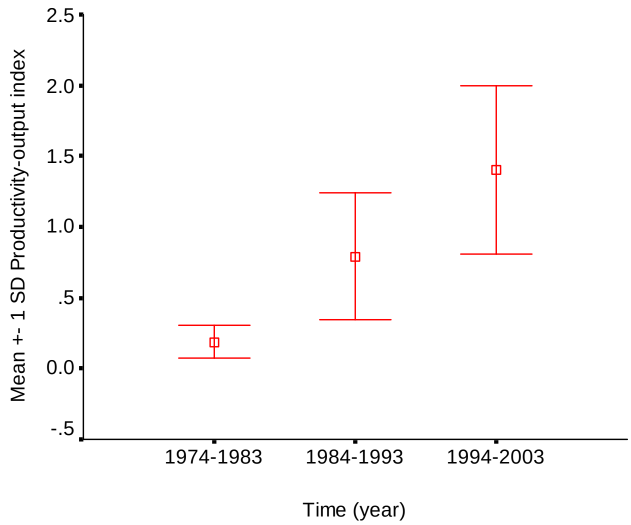


Figure 6-2 The overall 'productivity' output index for the 3 'Technometric' performance attributes at different time periods

6.2.4 Influence of time period and company background

One way analysis of variance was applied to the overall output 'productivity' index, as shown in Table 6-1a. The overall 'productivity' output index was significantly for the different time periods at p-value < 0.001. Similarly, multivariate analysis of variance was applied to study the influence of time, company background and their interactions on the overall 'productivity' output index. The results are summarized in Table 6-1b in terms of p-values. In terms of individual factors, 'number of staff', 'profile' and 'time period' were found to have significant influence on the overall 'productivity' output index. In terms of interactions, 'number of staff' with 'time period' and 'profile' with 'time period' also had significant influence on the ‘productivity’ output index, showing that the overall ‘productivity’ output index for individual companies was influenced by the number of staff and the profile (in product, process and/or services) in the specified time periods.

Table 6-1a Analysis of variances of overall ‘productivity’ output index against time periods

Productivity-output index

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	66.694	2	33.347	176.667	.000
Within Groups	50.397	267	.189		
Total	117.091	269			

Table 6-1b Summary of multivariate analysis of variances of overall ‘productivity’ output index against time period, company background, profile and their interactions

Factor	Significance (p-value)
Individual	
Business nature (BN)	------
Year of establishment (YE)	------
Number of staff (NS)	0.000
Profile (PR)	0.000
Time period (P)	0.000
Interaction	
NS*P	0.000
PR*P	0.000

p-value > 0.05 is considered as not significant and marked as ‘------‘.

Only the significant interactions are listed in the above table.

P: the time period, P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003)

6.2.5 Influence of profile

In terms of the ‘Technometric’ profile, it was found to have significant influence on the overall ‘productivity’ output index. The influence is shown as follows:

6.2.5.1 The first ‘Technometric’ performance attribute – ‘product’

Figure 6-3a shows that there is a positive relationship between the mean ‘productivity’ output index and company staff size, which indicates in general, more staff in a company would increase the ‘productivity’ output index value. The more staff that the company has, the higher the productivity in terms of product output which can be achieved. Figure 6-3b shows that the mean overall ‘productivity’ output index increased significantly during the time period P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003), indicating that the impact of the Government industrial policy may have significant effect on overall productivity.

The above explanation is only applicable to Hong Kong and the Mainland only since higher number of staff can facilitate effective division of labour and gain higher productivity in return. In particular, the TC industries in both Hong Kong and the Mainland are quite labour-intensive as increase of number of staff in a company would increase the ‘productivity’ output index value. The results would be reversed in Italy and USA as mass production by labour-intensive operation has no longer existed and their sustainable competitiveness relies upon quick response manner in small unit production without limited number of staff.

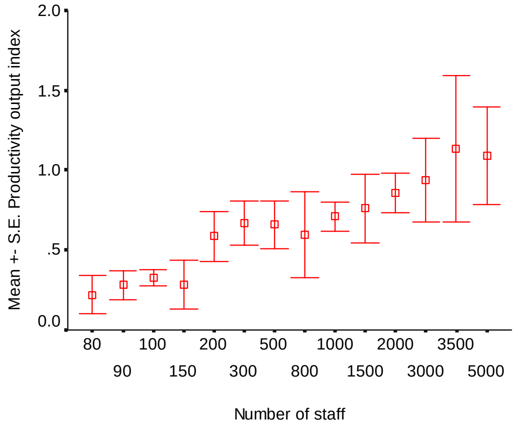


Figure 6-3a The overall 'productivity' output index against number of staff for the 'Technometric' performance attribute – 'product'

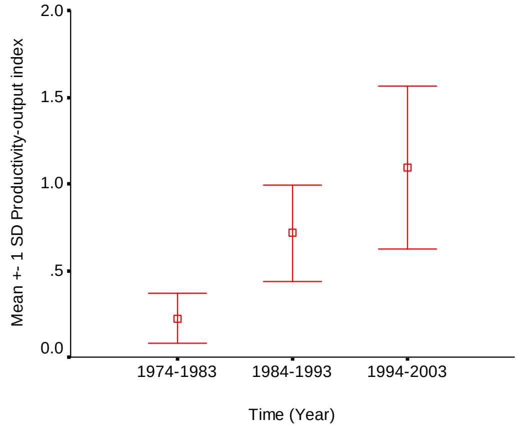


Figure 6-3b The overall 'productivity' output index against different period of time for the 'Technometric' performance attribute – 'product'

6.2.5.2. The second 'Technometric' performance attribute – 'process'

Figure 6-4a shows that the mean overall 'productivity' output index increases with company staff size, indicating that more staff in a company would increase the 'productivity'. The more staff that the company has, the higher productivity in process which can be achieved due to intensive human resource input. Figure 6-4b shows that the overall 'productivity' output index increased steadily in the 3 time periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003).

The above explanation is only applicable to Hong Kong and the Mainland only since higher number of staff can facilitate effective division of labour and gain higher productivity in return. In particular, the TC industries in both Hong Kong and the Mainland are quite labour-intensive as increase of number of staff in a company would increase the 'productivity' output index value. The results would be reversed in Italy and USA as mass production by labour-intensive operation has no longer existed and their sustainable competitiveness relies upon quick response manner in small unit production without limited number of staff.

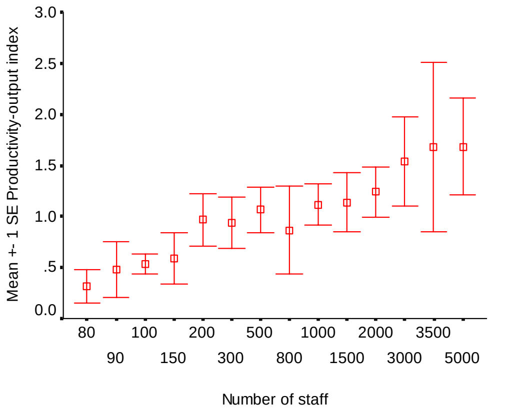


Figure 6-4a Overall 'productivity' output index against number of staff for the 'Technometric' performance attribute –'process'

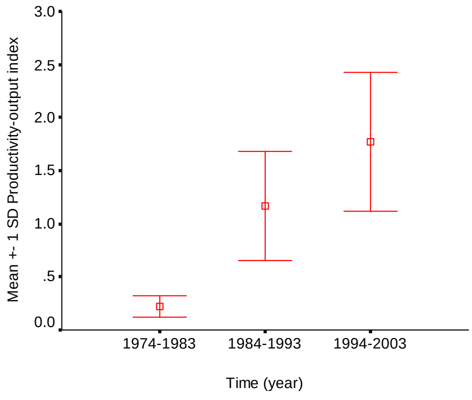


Figure 6-4b Overall 'productivity' output index against different period of time for the 'Technometric' performance attribute – 'process'

6.2.5.3 *The third 'Technometric' performance attribute – 'service'*

Similarly, Figure 6-5a shows that there is a positive relationship between mean overall 'productivity' output index and company staff size for companies in service, but the level of increase is smaller than those in product and process. The more staff the company has, the higher the productivity in service, i.e., more sales output, customer satisfaction and achievement, which can be achieved. Figure 6-5b shows that the overall 'productivity' output index increased steadily from the time period P_0 (1974 to 1983), P_1 (1984 to 1993) to P_2 (1994 to 2003), particularly from period P_1 to period P_2, showing that the change in the Government industrial policy may have had a positive impact on productivity growth of companies in service.

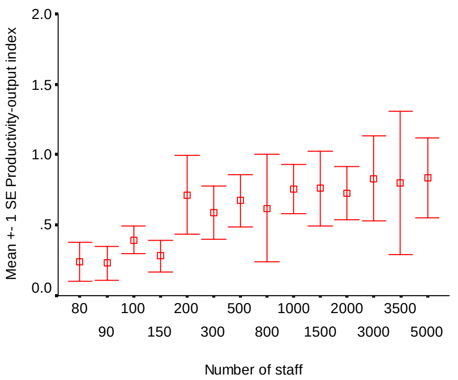


Figure 6-5a Overall 'productivity' output index against number of staff for the 'Technometric' performance attribute – 'service'

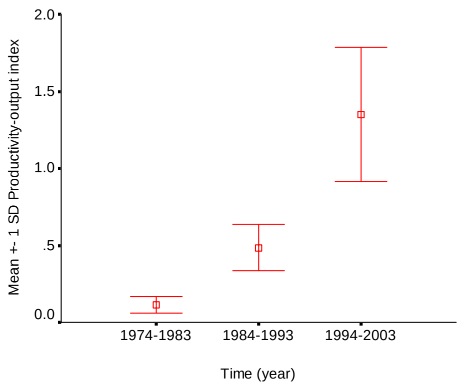


Figure 6-5b Overall 'productivity' output index against different periods of time for the 'Technometric' performance attribute – 'service'

6.2.6 *Relationship between the ‘productivity’ index and relevant government policy*

In the above paragraphs, it was demonstrated that the overall ‘productivity’ output index increased steadily in the time periods P_0 (1974 to 1983), P_1 (1984 to 1993) to P_2 (1994 to 2003), indicating that relevant government industrial policy may have made an impact on the growth of productivity. As referred to in paragraph 5.3.3.2, the initiatives of the key constituents ‘Technology Policy’ such as ‘Trade Policy’, ‘Intellectual Property Policy’, ‘Technological Infrastructural Policy’ and ‘Inward Investment Policy’, which were implemented in 1960, 1954, 1967 and 1975 respectively, stimulated a large volume of production of TC products in Hong Kong for exports and established a fundamental framework for the technological development of HKTCI. To meet the target production volume with the limited supply of labour, Hong Kong manufacturers emphasized both capital investment and production management in order to achieve higher productivity. In addition, the foreign direct investment stimulated by the ‘Inward Investment Policy’ improved the inflow of scientific management, automatic and computerized manufacturing systems and skilled personnel from overseas to Hong Kong. These government policies played an important role in the growth of ‘productivity’ in the 3 periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003), as shown in Figures 6.3b, 6-4b and 6-5b for the 3 different performance attributes. The overall ‘productivity’ output index steadily increased in the 3 time periods, and the overall ‘productivity’ input index also increased as companies had confidence to invest in the TC industry in the era of global economical growth and prospering world TC business.

6.3 ‘ Quality’

As defined in Chapter 4, ‘quality’ was the second of the 5 key indicators for measuring the technological development of the TC industry, which included 10 input indices and 5 output indices for the ‘Technometric’ performance attribute ‘product’, 9 input indices and 3 output indices for the attribute ‘process’, and 10 input indices and 5 output indices for the attribute ‘service’. These indices provided the necessary information to indicate the level of quality in HKTCI from various perspectives. To obtain a clear picture of the trend of development for quality, it was necessary to aggregate all the individual scores of the indices into an overall score for the entire spectrum of ‘quality’ indices, so that comparison and analysis could be made across performance attributes, time periods and across companies.

6.3.1 Overall 'quality' input and output indices

To find the overall 'quality' indices, the individual 'Technometric' index k^* was calculated for the 30 local TC companies using the 3 performance attributes according to Equations (2-6) and (2-3) as shown in Appendices 10a to 10c. Then, the overall 'quality' input and output indices were defined as follows:

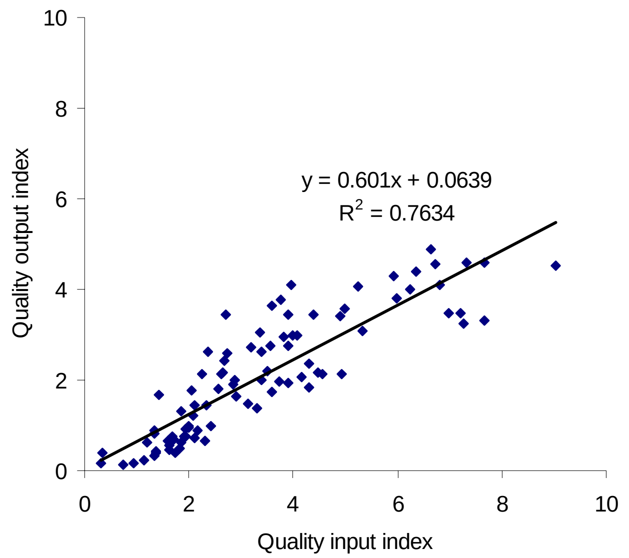
$$Q_{input} = \sum_{ijk} a_{ijk} x_{ijk} \qquad (6\text{-}3)$$

$$Q_{output} = \sum_{ijk} b_{ijk} x_{ijk} \qquad (6\text{-}4)$$

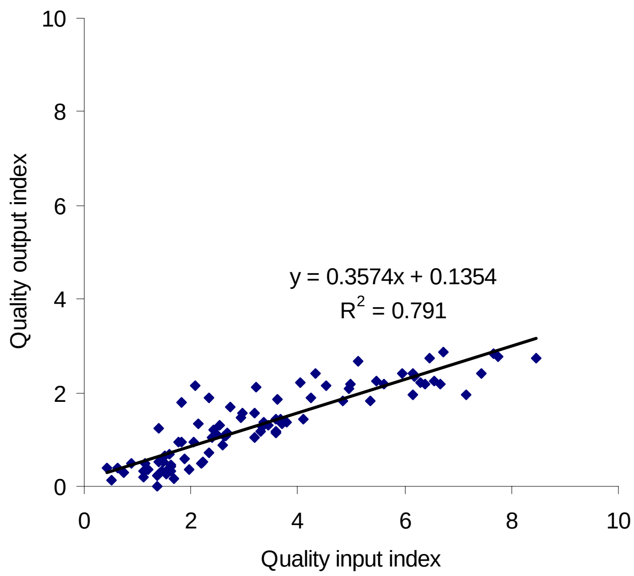
As referred to in Figure 4-4, which shows the final version of the questionnaire, x_{ijk} represents, for instance, the input indices of the 'quality', i.e., $x_{2.1.1}$, $x_{2.1.2}$, $x_{2.1.3}$, $x_{2.1.4}$, $x_{2.1.5}$, $x_{2.1.6}$, $x_{2.1.7}$, $x_{2.1.8}$, $x_{2.1.9}$ and $x_{2.1.10}$ and output indices of the 'quality', i.e., $x_{2.2..1}$, $x_{2.2.2}$, $x_{2.2.4}$, $x_{2.2.5}$ and $x_{2.2.6}$ for the performance attribute – 'product'. Q_{input} and Q_{output} are the overall 'quality' input and output indices respectively. The weights, which indicate the importance of the individual elements x_{ijk}s are described by a_{ijk} and b_{ijk} for input and output elements. As the individual elements are assumed to be of similar importance, the value of a_{ijk} and b_{ijk} are set as 1. The overall 'quality' input and output indices are calculated according to equations (6-3) and (6-4) for the individual companies in each performance attribute and time period with 90 observations in total.

6.3.2 Relationship between the overall ‘quality’ input and output indices

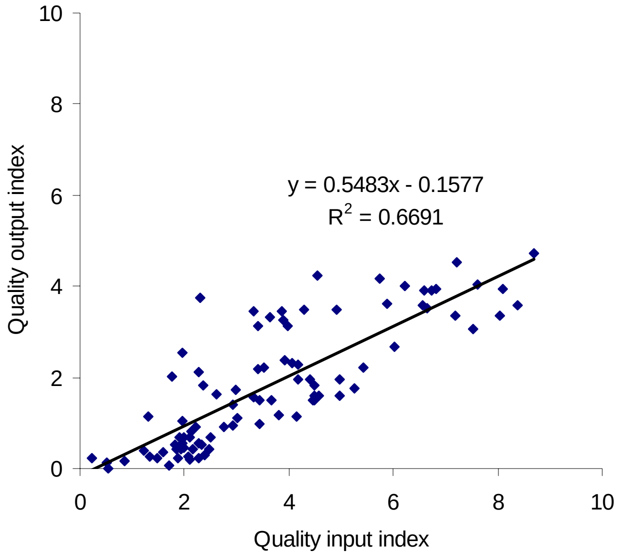
Figure 6-6 illustrates that there are linear relationships between the ‘quality’ input and output indices. The correlation coefficients of the indices in the 3 ‘Technometric’ performance attributes, i.e., ‘product’, ‘process’ and ‘service’ are 0.7634, 0.791 and 0.6691 respectively, significant at p-value < 0.001. The output ‘quality’ index is largely determined by the overall input ‘quality’ index, which includes a number of data such as capital investment, human resources management, strategic quality planning, quality management system, technology input, customer focus, education and training programmes, skill and knowledge, communication facilities, government support. This suggests that the overall ‘quality’ output index can be used as an indicator for ‘quality’.



(a) The ‘Technometric’ performance attribute ‘product’



(b) The ‘Technometric’ performance attribute ‘process’



(c) The ‘Technometric’ performance attribute ‘service’

Figure 6-6 Relationship between the overall ‘quality’ input and output indices for the 3 ‘Technometric’ performance attributes, i.e., ‘product’, ‘process’ and ‘service’ respectively

6.3.3 Overall trend

There was a significant increase in the overall ‘quality’ output index across the 3 ‘Technometric’ performance attributes over the time period: P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003), as shown in Figure 6.7. The significance of their differences is at the level of p-value < 0.001.

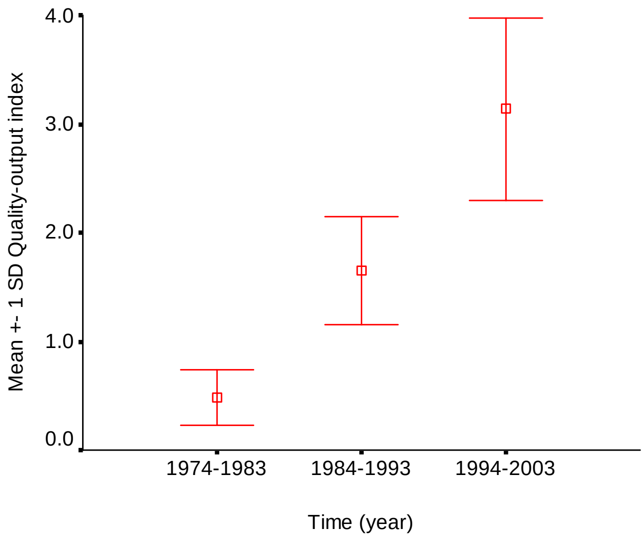


Figure 6-7 Comparison of the 'quality' output indices for the 3 'Technometric' performance attributes at different time periods

6.3.4 Influence of time period and company background

One way analysis of variance was applied to the overall output 'quality' index. The overall 'quality' output index was significantly different for the different time periods at p-value < 0.001. Similarly, multivariate analysis of variance was applied to study the influence of time, company background and their interactions on the overall 'quality' output index. The results are summarized in Table 6-2 in terms of p-values. In terms of individual factors, 'number of staff', 'profile' and 'time period' were found to have significant influence on the overall 'quality' output index. In terms of interactions, only 'profile' with 'time period' had significant influence on the 'quality' output index, showing that the overall 'quality' output index for individual companies was influenced by the 'profile' (in product, process and/or service) in the specified time periods.

Table 6-2 Summary of multivariate analysis of variances of overall ‘quality’ output index against time period, company background, profile and their interactions

Factor	Significance (p-value)
Individual	
Business nature (BN)	------
Year of establishment (YE)	------
Number of staff (NS)	0.001
Profile (PR)	0.000
Time period (P)	0.000
Interaction	
PR*P	0.000

$p > 0.05$ is considered as not significant and marked as ‘------‘.

Only the significant interactions are listed in the above table.

P: the time period, P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003)

6.3.5 Influence of profile

In terms of the ‘Technometric’ profile, it was found to have significant influence on the overall ‘quality’ output index. The influence is shown as follows:

6.3.5.1 The first ‘Technometric’ performance attribute – ‘product’

Table 6-2 shows that there is a positive relationship between the ‘quality’ output index and company staff size. More staff in a company would increase the output index of the ‘quality’. The more staff the company has, the higher the customer satisfaction in product quality which can be achieved due to intensive quality management and evaluation conducted by company staff. Figures 6.8a shows the mean ‘quality’ output index of the ‘Technometric’ performance attribute - ‘product’ increased significantly during the time periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). Comparing Figure 6-8a with Figures 6-8b and 6-8c, the growth rate of the mean ‘quality’ output index in the attribute ‘product’ was much higher than other attributes for the time periods from P_0 (1974 to 1983), P_1 (1984 to 1993) to P_2 (1994 to 2003) whereas the attribute ‘process’ was the lowest. In general, product quality was in the position of first priority among process and service quality as HKTC manufacturers consider better product quality a prerequisite to satisfy customers’ needs and requirements and sustain their competitiveness in the marketplaces.

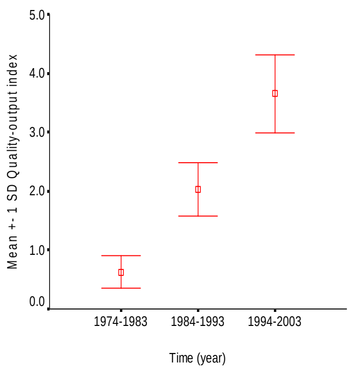


Figure 6-8a The ‘quality’ output index against different periods of time for the ‘Technometric’ performance attribute – ‘product’

Figure 6-8b The ‘quality’ output index against different periods of time for the ‘Technometric’ performance attribute – ‘process’

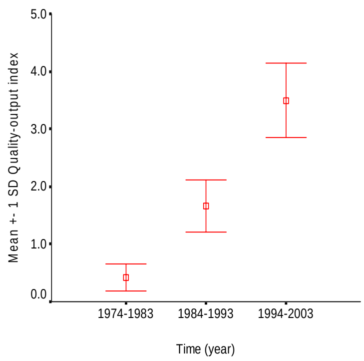


Figure 6-8c The ‘quality’ output index against different periods of time for the ‘Technometric’ performance attribute – ‘service’

6.3.5.2 The second 'Technometric' performance attribute – 'process'

Table 6-2 shows that there is a positive relationship between the 'quality' output index and company staff size. More staff in a company would increase the output index of the 'quality'. The more staff the company has, the higher the customer satisfaction in process quality which can be achieved due to intensive process quality management and evaluation conducted by company staff. Figures 6-8b also shows the mean 'quality' output index of the 'Technometric' performance attribute - 'process' increased steadily during the time periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). Comparing Figure 6.8a with Figures 6-8b and 6-8c, the growth rate of the mean 'quality' output index in the attribute 'process' was much lower than other attributes for the time periods from P_0 (1974 to 1983), P_1 (1984 to 1993) to P_2 (1994 to 2003). General speaking, process quality was in the position of lower priority among product and service quality as HKTC manufacturers consider better product and service quality a prerequisite to satisfy customers' needs and requirements and sustain their competitiveness in the marketplaces. The level of the process quality varies depending upon individual company's achievements on effective production management and control.

6.3.5.3 The third 'Technometric' performance attribute – 'service'

Table 6-2 shows that there is a positive relationship between the 'quality' output index and company staff size. More staff in a company would increase the output index of the 'quality'. The more staff the company has, the higher the customer satisfaction in service quality which can be achieved due to intensive service quality management and evaluation conducted by company staff. Figures 6-8c also shows the mean 'quality' output index of the 'Technometric' performance attribute - 'service' increased steadily during the time periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). Comparing Figure 6-8a with Figures 6-8b and 6-8c, the growth rate of the mean 'quality' output index in the attribute 'service' was better than the attribute – 'process' for the time periods from P_0 (1974 to 1983), P_1 (1984 to 1993) to P_2 (1994 to 2003). In general, service quality was in the position of second priority to product quality as HKTC manufacturers consider better service quality a prerequisite to satisfy customers' needs and requirements and sustain their competitiveness in the marketplaces.

6.3.6 Relationship between the 'quality' indices and current Government policy

As stated in paragraph 5.3.3.2, the implementation of 'Technological Infrastructural

Policy' and 'inward investment policy', the key constituents 'Technology Policy' in 1960, 1967 and 1975 provided the quality management infrastructure and support to local manufacturers to fulfil customer's needs and requirements in accordance with international standards and requirements. The implementation of 'Innovation and Technology Policy', one of the key constituents of the 'Technology Policy' provided funding support for research institutions and industrial support organizations, in collaboration with HKTCI, to enhance the overall quality management of product, process and service. In this regard, the 'Technology Policy' raised the key indicator 'quality' output indices in the periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003) as shown in Figures 6.8a to 6.8c. The input indices of the 'quality' also increased significantly as manufacturers had the confidence to invest due to global economical growth and the booming world TC business.

6.4 'Flexibility'

As defined in Chapter 4, 'flexibility' was the third of the 5 key indicators for measuring the technological development of the TC industry, which included 2 input indices and 4 output indices for the 'Technometric' performance attribute 'product', 7 input indices and 4 output indices for the attribute 'process', and 4 input indices and 2 output indices for the attribute ‘service’. These indices provided the necessary information to indicate the level of flexibility in HKTCI from various perspectives. To obtain a clear picture of the trend of development for flexibility, it was necessary to aggregate all the individual scores of the indices into an overall score for the entire spectrum of ‘flexibility’ indices, so that comparison and analysis could be made across performance attributes, time periods and across companies.

6.4.1 Overall ‘flexibility’ input and output indices

To calculate the overall ‘flexibility’ indices, the individual ‘Technometric’ index k^* was calculated for the 30 local TC companies using the 3 performance attributes according to Equations (2-6) and (2-3) as shown in Appendices 10a to 10c. Then, the overall ‘flexibility’ input and output indices were defined as follows:

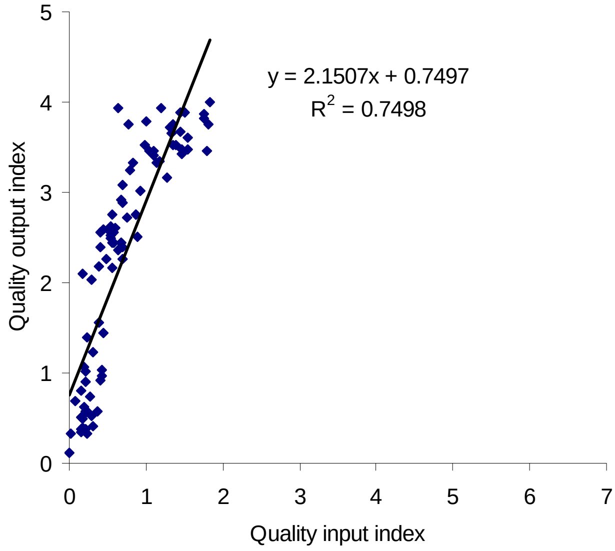
$$F_{input} = \sum_{ijk} a_{ijk} x_{ijk} \qquad (6\text{-}5)$$

$$F_{output} = \sum_{ijk} b_{ijk} x_{ijk} \qquad (6\text{-}6)$$

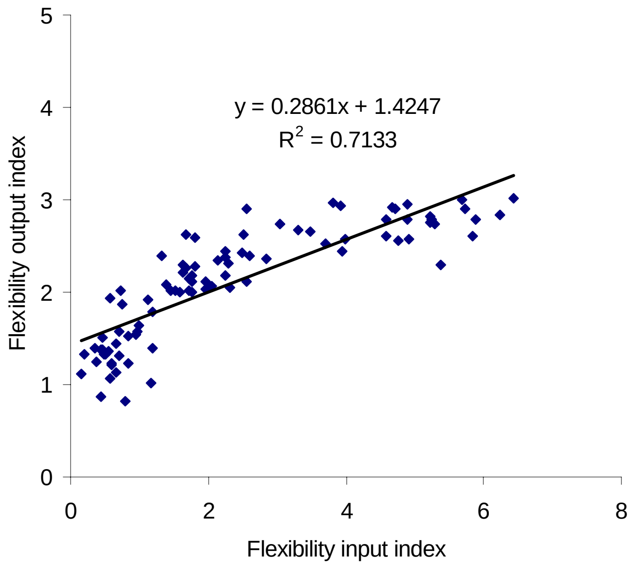
As referred to in Figure 4-4, which shows the final version of the questionnaire, x_{ijk} represents, for instance, the input indices of the ‘flexibility’, i.e., $x_{.3.1.5}$ and $x_{.3.1.7}$ and output indices of the ‘productivity’, i.e., $x_{.3.2.1}$, $x_{.3.2.2}$, $x_{.3.2.3}$ and $x_{.3.2.4}$ for the performance attribute – ‘product’. F_{input} and F_{output} are the overall ‘flexibility’ input and output indices respectively. The weights, which indicate the importance of the individual elements x_{ijk}s are described by a_{ijk} and b_{ijk} for input and output elements. As the individual elements are assumed to be of similar importance, the value of a_{ijk} and b_{ijk} are set as 1. The overall ‘flexibility’ input and output indices are calculated according to equations (6-5) and (6-6) for the individual companies for each performance attribute and time period with 90 observations in total.

6.4.2 Relationship between the overall ‘flexibility’ input and output indices

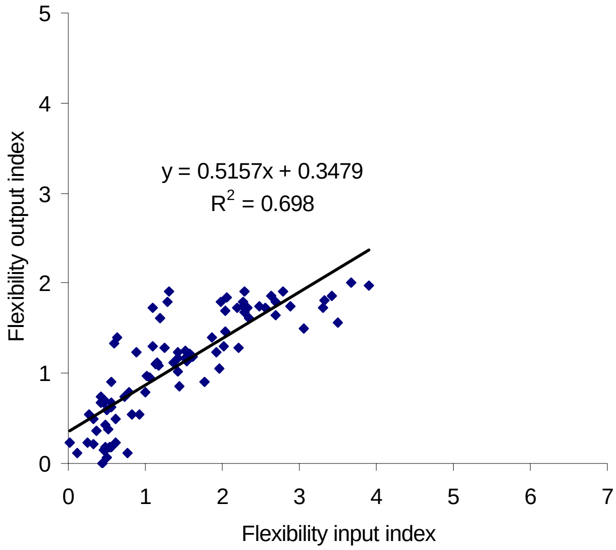
Figure 6-9 illustrates that there are linear relationships between the ‘flexibility’ input and output indices. The correlation coefficients of the indices in the 3 ‘Technometric’ performance attributes, i.e., ‘product’, ‘process’ and ‘service’ are 0.7498, 0.7133 and 0.698 respectively, significant at p-value < 0.001. The output ‘flexibility’ index is largely determined by the overall input ‘flexibility’ index, which includes a number of data such as technology input, flexibility manufacturing system, capital investment, human resources management, education and training programmes, skill and knowledge, improved remuneration scheme. This suggests that the overall ‘flexibility’ output index can be used as an indicator for ‘flexibility’.



(a) The ‘Technometric’ performance attribute ‘product’



(b) The ‘Technometric’ performance attribute ‘process’



(c) The 'Technometric' performance attribute 'service'

Figure 6-9 Relationship between the overall 'flexibility' input and output indices for the 3 'Technometric' performance attributes, i.e., 'product', 'process' and 'service' respectively

6.4.3 Overall trend

There was a significant increase in the overall 'flexibility' output index across the 3 'Technometric' performance attributes over the time period: P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003), as shown in Figure 6-10. The significance of their differences is at the level of p-value < 0.001.

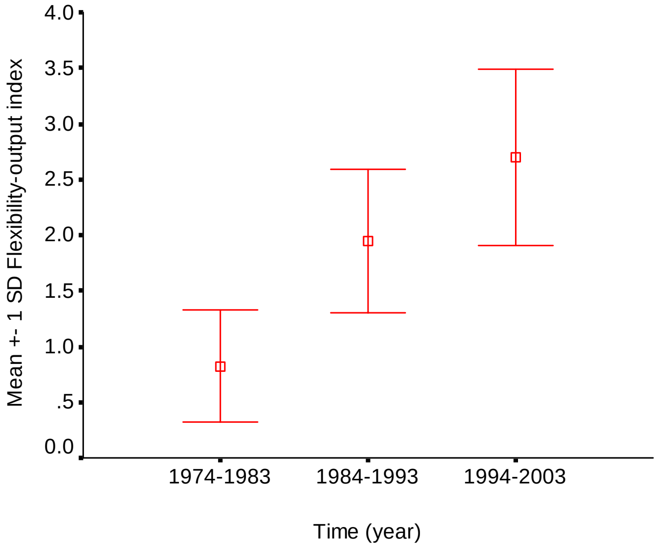


Figure 6-10 Comparison of the 'flexibility' output indices for the 3 'Technometric' performance attributes at different time periods

6.4.4 *Influence of time and company background*

One way analysis of variance was applied to the overall output 'flexibility' index. The overall 'flexibility' output index was significantly different for the different time periods at p-value < 0.001. Similarly, multivariate analysis of variance was applied to study the influence of time, company background and their interactions on the overall 'flexibility' output index. The results are summarized in Table 6-3 in terms of p-values. In terms of individual factors, 'year of establishment', 'number of staff', 'profile' and 'time period' were found to have significant influence on the overall 'flexibility' output index. In terms of interactions, 'business nature' with 'time period', 'year of establishment' with 'time period' and 'profile' with 'time period' also had significant influence on the 'flexibility' output index, showing that the overall 'flexibility' output index for individual companies was influenced by the business nature (textiles or clothing), year of establishment, and the profile (in product, process and/or services) in the specified time periods.

Table 6-3 Summary of multivariate analysis of variances of overall 'flexibility' output index against time period, company background, profile and their interactions

Factor	Significance (p-value)
Individual	
Business nature (BN)	------
Year of establishment (YE)	0.039
Number of staff (NS)	0.001
Profile (PR)	0.000
Time period (P)	0.000
Interaction	
BN*P	0.027
YE*P	0.022
PR*P	0.000

$p > 0.05$ is considered as not significant and marked as '------'.

Only the significant interactions are listed in the above table.

P: the time period, P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003)

6.4.5 Influence of profile

In terms of the 'Technometric' profile, it was found to have significant influence on the overall 'flexibility' output index. The influence is shown as follows:

6.4.5.1 The first 'Technometric' performance attribute – 'product'

Table 6-3 shows that there are positive relationships between the 'flexibility' output index and the factors, i.e., 'year of establishment', 'number of staff', 'profile' and 'time period'. It is significant that the year of company establishment increases the 'flexibility' output index of the 'Technometric' performance attribute – 'product'. The longer the establishment, the more knowledge and experience the company has gained to implement its flexible system to cope with market demands and fashion trends. More staff in a company increases the 'flexibility' output index. For the attribute 'product', the more staff the company has, the more flexible manufacturing can be achieved due to the human resource input to customized products manufacturing. For the 'Technometric' profile, flexible manufacturing of products as HKTC manufacturers offer products with short lead times and varieties in satisfying market needs and requirements. Figures 6-11a to 6-11c show the mean 'flexibility' output index value increased significantly during the time period P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). Comparing Figure 6.11a with Figures 6-11b and 6-11c, the growth rate of the mean 'flexibility' output index in the attribute 'product' was much higher than other attributes for the time periods from P_0 (1974 to 1983), P_1 (1984 to 1993) to P_2 (1994 to 2003). HKTC manufacturers consider that it is prerequisite to offer products with short lead times and varieties in satisfying market needs and requirements.

6.4.5.2 The second 'Technometric' performance attribute – 'process'

Table 6-3 shows that there are positive relationships between the 'flexibility' output index and the factors, i.e., 'year of establishment', 'number of staff', 'profile' and 'time period'. It is significant that the year of company establishment increases the 'flexibility' output index of the 'Technometric' performance attribute – 'process'. The longer the establishment, the more knowledge and experience the company has gained to implement its flexible manufacturing system to cope with market demands and fashion trends. The company with larger staff size would typically invest heavily in process innovation and development for more flexible manufacturing. For the 'Technometric' profile, the flexible manufacturing process that HKTC manufacturers utilized offer products with short lead times and varieties in satisfying market needs and requirements. Comparing Figure 6-11a with Figures 6-11b and 6-11c, the growth rate of the mean 'flexibility' output index in the attribute 'process' was much higher than the attribute - 'service', but lower than the attribute – 'product' for the time periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003).

HKTC manufacturers consider that it is the next priority to improve process flexibility to support product design and development.

6.4.5.3 The third 'Technometric' performance attribute – 'service'

Table 6-3 shows that there are positive relationships between the 'flexibility' output index and the factors, i.e., 'year of establishment', 'number of staff', 'profile' and 'time period'. It is significant that the year of company establishment increases the 'flexibility' output index of the 'Technometric' performance attribute – 'service'. The longer the establishment, the more knowledge and experience the company has gained to implement its flexible service system to cope with market demands and fashion trends. The company with more staff would have more resources to service renovation and improvement in order to provide flexible service to customers. For the 'Technometric' profile, flexible service system that HKTC manufacturers utilized offer products with short lead times and varieties in satisfying market needs and requirements. Comparing Figure 6.11a with Figures 6.11b and 6.11c, the growth rate of the mean 'flexibility' output index in the attribute 'service' was much lower than other attributes for the time periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). HKTC manufacturers consider that it is the last priority to improve process flexibility to support product design and development.

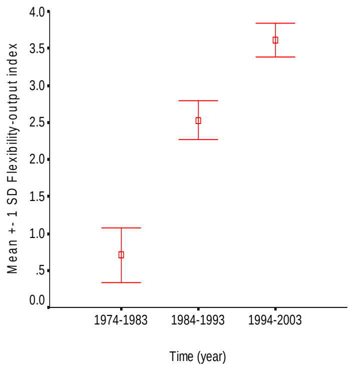


Figure 6-11a The 'flexibility' output index against different periods of time for the 'Technometric' performance attribute – 'product'

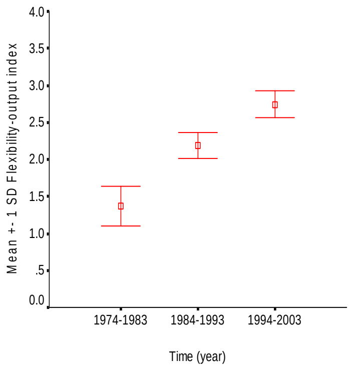


Figure 6-11b The 'flexibility' output index against different periods of time for the 'Technometric' performance attribute – 'process'

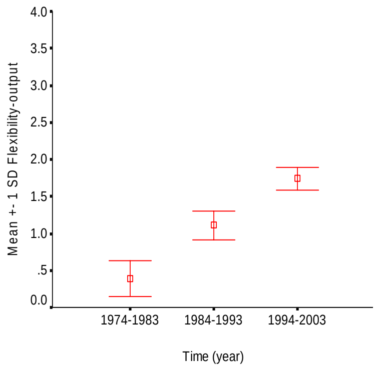


Figure 6-11c The 'flexibility' output index against different periods of time for the 'Technometric' performance attribute – 'service'

6.4.6 Relationship between the 'flexibility' indices and current Government policy

Paragraph 5.3.3.2, which discussed the implementation of 'Technological Infrastructural Policy' and 'Inward Investment Policy', identifies that the key constituents 'Technology Policy' in 1960, 1967 and 1975 provided the technological infrastructure and support to local manufacturers to cope with customer's needs and requirements when manufacturing small quantities of customized products in different styles. Moreover, the implementation of the 'Innovation and Technology Policy', one of the key constituents of the 'Technology Policy' in 1994 provided funding for research institutions and industrial support organizations, in collaboration with

HKTCI, to enhance flexible manufacture of product, process and service. In this regard, the 'Technology Policy' raised the key indicator 'flexibility' output indices in the periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003) as shown in Figures 6-11a to 11c. The input index of 'flexibility' also increased prominently as manufacturers had confidence to invest due to global economical growth and the booming world TC business in the 30-year period under discussion.

6.5 'Skill'

As defined in Chapter 4, 'skill' was the fourth of the 5 key indicators for measuring the technological development of the TC industry, which included 5 input indices and 6 output indices for the 'Technometric' performance attribute 'product', 2 input indices and 5 output indices for the attribute 'process', and 5 input indices and 6 output indices for the attribute 'service'. These indices provided the necessary information to indicate the level of skill in HKTCI from various perspectives. To obtain a clear picture of the trend of development for skill, it was necessary to aggregate all the individual scores of the indices into an overall score for the entire spectrum of 'skill' indices, so that comparison and analysis could be made across performance attributes, time periods and across companies.

6.5.1 *Overall 'skill' input and output indices*

To calculate the overall 'skill' indices, the individual 'Technometric' index k^* was calculated for the 30 local TC companies using the 3 performance attributes according to Equations (2-6) and (2-3) as shown in Appendices 10a to 10c. Then, the overall 'skill' input and output indices were defined as follows:

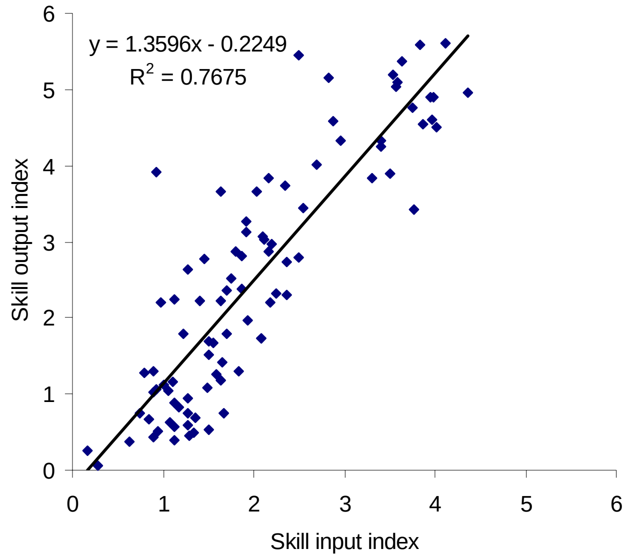
$$S_{input} = \sum_{ijk} a_{ijk} x_{ijk} \qquad (6\text{-}7)$$

$$S_{output} = \sum_{ijk} b_{ijk} x_{ijk} \qquad (6\text{-}8)$$

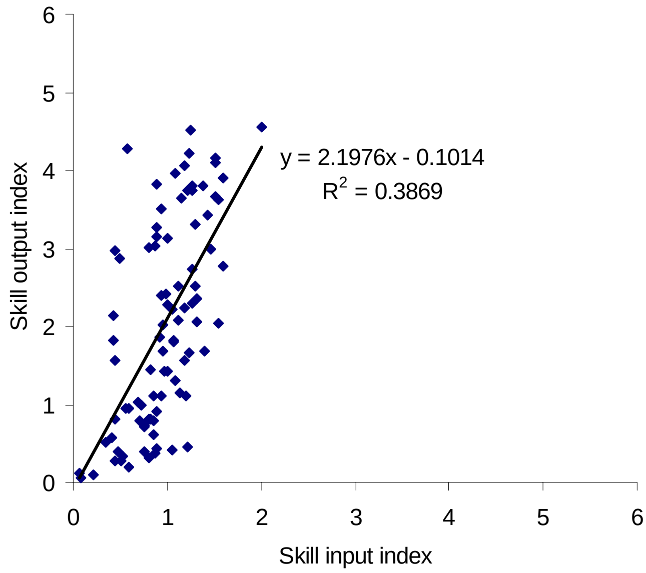
As referred to in Figure 4-4, which shows the final version of the questionnaire, x_{ijk} represents, for instance, the input indices of the 'skill', i.e. $x_{\cdot 4.1.1}$, $x_{\cdot 4.1.2}$, $x_{\cdot 4.1.3}$, $x_{\cdot 4.1.4}$, and $x_{\cdot 4.1.5}$ and output indices of the 'skill', i.e. $x_{\cdot 4.2.1}$, $x_{\cdot 4.2.2}$, $x_{\cdot 4.2.3}$, $x_{\cdot 4.2.4}$, $x_{\cdot 4.2.5}$ and $x_{\cdot 4.2.7}$ for the performance attribute – 'product'. S_{input} and S_{output} are the overall 'skill' input and output indices respectively. The weights, which indicate the importance of the individual elements x_{ijk}s are described by a_{ijk} and b_{ijk} for input and output elements. As the individual elements are assumed to be of similar importance, the value of a_{ijk} and b_{ijk} are set as 1. The overall 'skill' input and output indices are calculated according to equations (6-7) and (6-8) for the individual companies in each performance attribute and time period with 90 observations in total.

6.5.2 Relationship between the overall 'skill' input and output indices

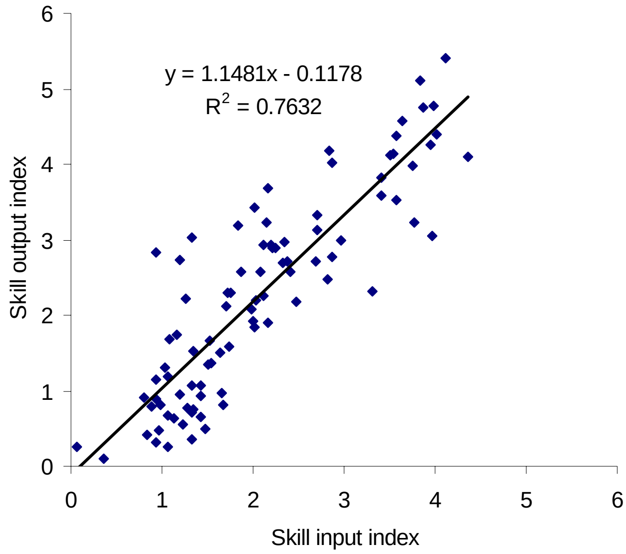
Figure 6-12 illustrates that there are linear relationships between the 'skill' input and output indices. The correlation coefficients of the indices in the 3 'Technometric' performance attributes, i.e., 'product', 'process' and 'service' are 0.7675, 0.3869 and 0.7632 respectively, significant at p-value < 0.001. The output 'skill' index is largely determined by the overall input 'skill' index, which includes a number of data such as human resources, education and training programmes, skill acquisition, technology upgrading, and government support. This suggests that the overall 'skill' output index can be used as an indicator for 'skill'.



(a) The ‘Technometric’ performance attribute ‘product’



(a) The ‘Technometric’ performance attribute ‘process’



(c) The 'Technometric' performance attribute 'service'

Figure 6-12 Relationship between the overall 'skill' input and output indices for the 3 'Technometric' performance attributes, i.e., 'product', 'process' and 'service' respectively

6.5.3 Overall trend

There was a significant increase in the overall 'skill' output index across the 3 'Technometric' performance attributes over the time periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003), as shown in Figure 6-13. The significance of their differences is at the level of p-value < 0.001.

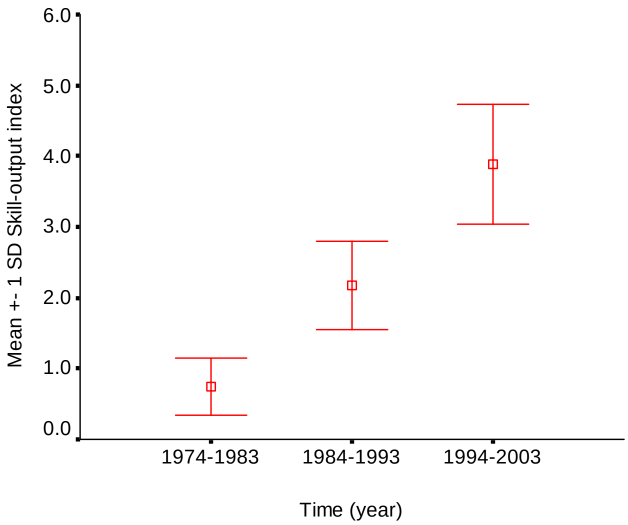


Figure 6-13 Comparison of the 'skill' output indices for the 3 'Technometric' performance attributes at different time periods

6.5.4 Influence of time period and company background

One way analysis of variance was applied to the overall output 'skill' index, as shown in Table 6-4. The overall 'skill' output index was significantly different for the different time periods at p-value < 0.001. Similarly, multivariate analysis of variance was applied to study the influence of time, company background and their interactions on the overall 'skill' output index. The results are summarized in Table 6.4 in terms of p-values. In terms of individual factors, 'year of establishment', 'number of staff', 'profile' and 'time period' were found to have significant influence on the overall 'skill' output index. In terms of interactions, 'business nature' with 'time period', 'year of establishment' with 'time period' and 'profile' with 'time period' also had significant influence on the 'skill' output index, showing that the overall 'skill' output index for individual companies was influenced by the business nature (textiles or clothing), year of establishment, and the profile (in product, process and/or services) in the specified time periods.

Table 6-4 Summary of multivariate analysis of variances of overall 'skill' output index against time period, company background, profile and their interactions

Factor	Significance (p-value)
Individual	
Business nature (BN)	------
Year of establishment (YE)	0.002
Number of staff (NS)	0.000
Profile (PR)	0.000
Time period (P)	0.000
Interaction	
BN*P	0.022
YE*P	0.004
PR*P	0.000

P > 0.05 is considered as not significant and marked as '------'.

Only the significant interactions are listed in the above table.

P: the time period, P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003)

6.5.5 *Influence of profile*

In terms of the 'Technometric' profile, it was found to have significant influence on the overall 'skill' output index. The influence is shown as follows:

6.5.5.1 *The first 'Technometric' performance attribute – 'product'*

Table 6.4 shows that there are positive relationships between the ‘skill’ output index and the factors, i.e., ‘year of establishment’, ‘number of staff’, ‘profile’ and ‘time period’. It is significant that the year of company establishment increased the output index of ‘skill’ for the ‘Technometric’ performance attribute – ‘product’. The longer the company had been established, the more skill the company acquired from past experience and learning to handle both technical and management issues encountered in product manufacture. More staff in a company increases the output index of the ‘skill’. For the attribute ‘product’, the larger the staff size, the greater the probability of more experienced personnel being trained in product design and development as compared with a company of smaller size. For the ‘Technometric’ profile, HKTC manufacturers place more emphasis on skill enhancement/improvement of product rather than process and service since it is imperative to fulfill customers’ needs and requirements for products. Figures 6.14a to 6.14c show the mean ‘skill’ output index value increased significantly during the study periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). Comparing Figure 6-8a with Figures 6-8b and 6-8c, the growth rate of the mean output index of ‘skill’ in the attribute ‘product’ was much higher than other attributes for the time periods from P_0 (1974 to 1983), P_1 (1984 to 1993) to P_2 (1994 to 2003) whereas the attribute ‘process’ was the lowest. HKTC manufacturers place more emphasis on skill enhancement/improvement of product rather than process and service since it is imperative to fulfill customers’ needs and requirements for products.

6.5.5.2 The second ‘Technometric’ performance attribute – ‘process’

Table 6-4 shows that there are positive relationships between the ‘skill’ output index and the factors, i.e., ‘year of establishment’, ‘number of staff’, ‘profile’ and ‘time period’. It is significant that the year of company establishment increases the ‘skill’ output index of the ‘Technometric’ performance attribute – ‘process’. The longer the company had been established, the more skill the company acquired from past experience and learning to handle both technical and management issues encountered in process. More staff in a company increases the output index of the ‘skill’. The attribute ‘process’ was found to be the same as the attribute ‘product’ in that that skill acquisition can be easily achieved in the production processes. For the ‘Technometric’ profile, HKTC manufacturers place more emphasis on skill enhancement/improvement of product rather than process and service. Comparing Figure 6-14a with Figures 6-14b and 6-14c, the growth rate of the mean output index of ‘skill’ in the attribute ‘process’ was much lower than other attributes for the time periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). Deskilling of the manufacturing process has been popular recently and many machine builders offer advanced machinery to replace skillful workers. In this connection, most of 30 interviewed manufacturers did rely upon vendors to furnish advanced machinery and equipment that require simple operations, rather than complicated models which required skillful labour.

6.5.5.3 The third 'Technometric' performance attribute – 'service'

Table 6-4 shows that there are positive relationships between the 'skill' output index and the factors, i.e., 'year of establishment', 'number of staff', 'profile' and 'time period'. It is significant that the year of company establishment increases the 'skill' output index of the 'Technometric' performance attribute – 'service'. The longer the company had been established, the more skill the company acquired from past experience and learning to handle both technical and management issues encountered in service. More staff in a company increases the output index of the 'skill'. For the attribute 'service', the more staff the company has, the more skilled employees who will be trained to offer customer orientated services. For the 'Technometric' profile, HKTC manufacturers place more emphasis on skill enhancement/improvement of product rather than process and service. Comparing Figure 6-14a with Figures 6-14b and 6-14c, the growth rate of the mean output index of 'skill' in the attribute 'service' was only lower than the attribute 'product' for the time periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). HKTC manufacturers place more emphasis on skill enhancement/improvement of service development rather than process since it is imperative to fulfill customers' needs and requirements for services.

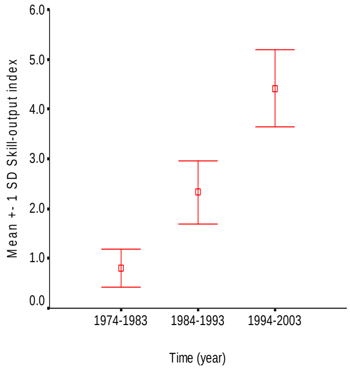


Figure 6-14a The 'skill' output index against different periods of time for the 'Technometric' performance attribute – 'product'

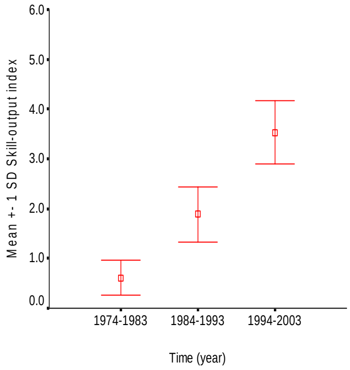


Figure 6-14b The 'skill' output index against different periods of time for the 'Technometric' performance attribute – 'process'

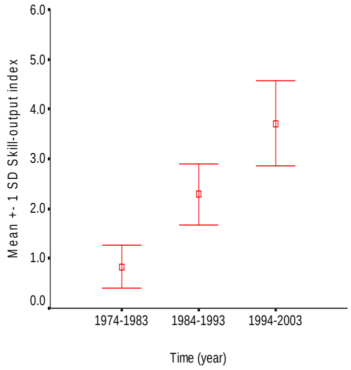


Figure 6-14c The 'skill' output index against different periods of time for the 'Technometric' performance attribute – 'service'

6.5.6 Relationship between the 'skill' indices and current Government policy

As referred to in paragraph 5.3.3.2, the implementation of 'Technological Infrastructural Policy' and 'Inward Investment Policy', the key constituents

‘Technology Policy’ in 1960, 1967 and 1975 provided the necessary technology infrastructure and support to local manufacturers to train skilled personnel. The implementation of ‘Innovation and Technology Policy’, one of the key constituents of the ‘Technology Policy’ in 1994 provided funding support for research institutions and industrial support organizations, in collaboration with HKTCI, to upgrade technological know-how for the ‘Technometric’ profile, i.e., ‘product’, ‘process’ and ‘service’. In this regard, the ‘Technology Policy’ raised the output indices of ‘skill’ in the periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003) as shown in Figures 6-14a to 6-14c. The input index of ‘skill’ also increased significantly as manufacturers had the necessary confidence to invest in human resource development due to global economical growth and the booming world TC business in the aforesaid 30 years.

6.6 ‘Innovation’

As defined in Chapter 4, ‘innovation’ was the fifth of the 5 key indicators for measuring the technological development of the TC industry, which included 9 input indices and 10 output indices for the ‘Technometric’ performance attribute ‘product’, 9 input indices and 8 output indices for the attribute ‘process’, and 3 input indices and

6 output indices for the attribute ‘services’. These indices provided the necessary information to indicate the level of innovation in HKTCI from various perspectives. To obtain a clear picture of the trend of development for innovation, it was necessary to aggregate all the individual scores of the indices into an overall score for the entire spectrum of ‘innovation’ indices, so that comparison and analysis could be made across performance attributes, time periods and across companies.

6.6.1 Overall ‘innovation’ input and output indices

To calculate the overall ‘innovation’ indices, the individual ‘Technometric’ index k^* was calculated for the 30 local TC companies using the 3 performance attributes according to Equations (2-6) and (2-3) as shown in Appendices 10a to 10c. Then, the overall ‘innovation’ input and output indices were defined as follows:

$$I_{input} = \sum_{ijk} a_{ijk} x_{ijk} \qquad (6\text{-}9)$$

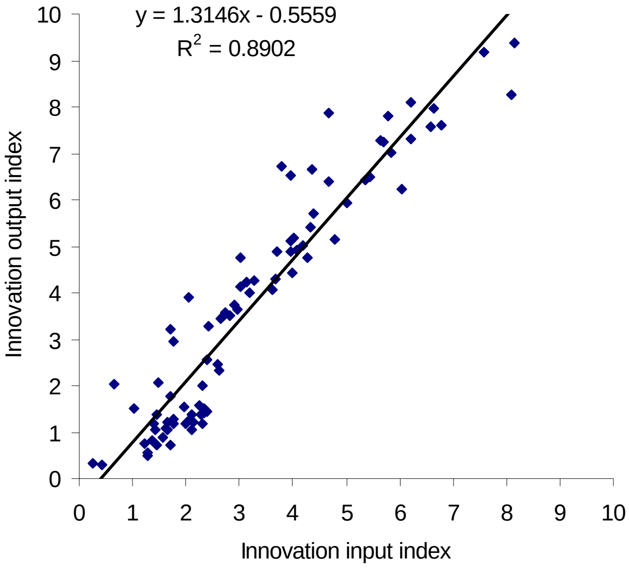
$$I_{output} = \sum_{ijk} b_{ijk} x_{ijk} \qquad (6\text{-}10)$$

As referred to Figure 4-4, which shows the final version of the questionnaire, x_{ijk} represents, for instance, the input indices of the ‘innovation’, i.e., $x_{.5.1.1}$, $x_{.5.1.2}$, $x_{.5.1.3}$,

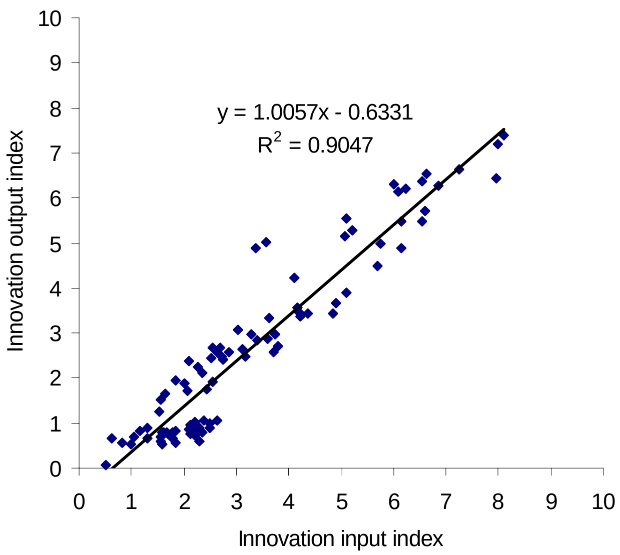
$x_{.5.1.4}$, $x_{.5.1.5}$, $x_{.5.1.6}$, $x_{.5.1.7}$, $x_{.5.1.8}$ and $x_{.5.1.9}$ and output indices of the 'innovation', i.e., $x_{.5.2.1}$, $x_{.5.2.3}$, $x_{.5.2.4}$, $x_{.5.2.5}$, $x_{.5.2.6}$, $x_{.5.2.7}$, $x_{.5.2.8}$, $x_{.5.2.9}$, $x_{.5.2.10}$ and $x_{.5.2.11}$ for the performance attribute – 'product' I_{input} and I_{output} are the overall 'skill' input and output indices respectively. The weights, which indicate the importance, of the individual elements x_{ijk}s are described by a_{ijk} and b_{ijk} for input and output elements. As the individual elements are assumed to be of similar importance, the value of a_{ijk} and b_{ijk} are set as 1. The overall 'innovation' input and output indices are calculated according to equations (6-9) and (6-10) for the individual companies in each performance attribute and time period with 90 observations in total.

6.6.2 Relationship between the overall 'innovation' input and output indices

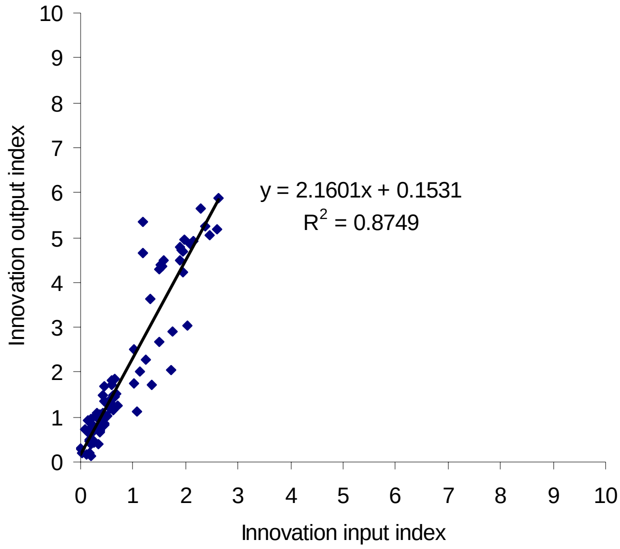
Figure 6-15 illustrates that there are linear relationships between the 'innovation' input and output indices. The correlation coefficients of the indices in the 3 'Technometric' performance attributes, i.e. 'product', 'process' and 'service' are 0.8902, 0.9047 and 0.8749 respectively, significant at p-value < 0.001. The output 'innovation' index is largely determined by the overall input 'innovation' index, which includes a number of data such as capital investment, technology development, R & D expenditure, R & D personnel, new knowledge, government support, research contribution, technology transfer, and education and training. This suggests that the overall ‘innovation’ output index can be used as an indicator for ‘innovation’.



(a) The ‘Technometric’ performance attribute ‘product’



(a) The ‘Technometric’ performance attribute ‘process’



(a) The 'Technometric' performance attribute 'service'

Figures 6-15 Relationship between the overall 'innovation' input and output indices for the 3 'Technometric' performance attributes, i.e., 'product', 'process' and 'service' respectively

6.6.3 Overall trend

There was a significant increase in the overall 'innovation' output index across the 3 'Technometric' performance attributes for the time periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003), as shown in Figure 6-16. The significance of their differences is at the level of p-value < 0.001.

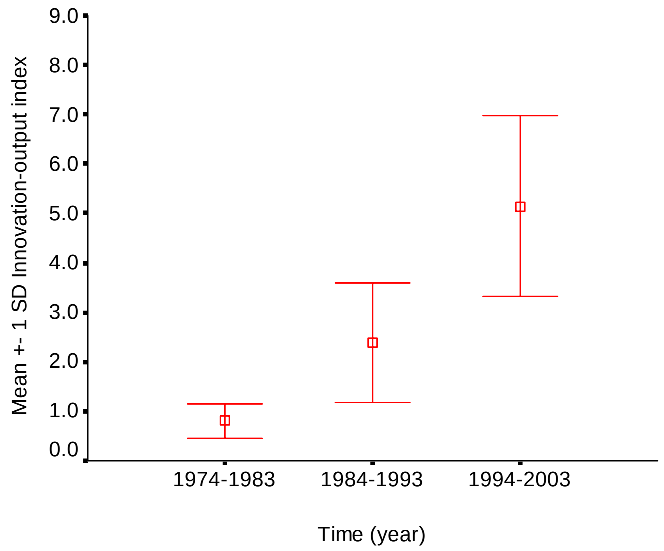


Figure 6-16 Comparison of the 'innovation' output indices for the 3 'Technometric' performance attributes at different time periods

6.6.4 Influence of time period and company background

One way analysis of variance was applied to the overall output 'innovation' index. The overall 'innovation' output index was significantly different for the different time periods at p-value < 0.001. Similarly, multivariate analysis of variance was applied to study the influence of time, company background and their interactions on the overall 'innovation' output index. The results are summarized in Table 6.5 in terms of p-values. In terms of individual factors, 'business nature', 'number of staff', 'profile' and 'time period' were found to have significant influence on the overall 'productivity' output index. In terms of interactions, 'profile' with 'time period' also had significant influence on the 'innovation' output index, showing that the overall ‘innovation’ output index for individual companies was influenced by the number of staff and the profile (in product, process and/or service) in the specified time periods.

Table 6-5 Summary of multivariate analysis of variances of overall ‘innovation’ output index against time period, company background, profile and their interactions

Factor	Significance (p)
Individual	
Business nature (BN)	0.047
Year of establishment (YE)	------
Number of staff (NS)	0.000
Profile (PR)	0.000
Time period (P)	0.000
Interaction	
PR*P	0.000

P > 0.05 is considered as not significant and marked as ‘------‘.

Only the significant interactions are listed in the above table.

P: the time period, P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003)

6.6.5 Influence of profile

In terms of the ‘Technometric’ profile, it was found to have significant influence on the overall ‘innovation’ output index. The influence is shown as follows:

6.6.5.1 The first ‘Technometric’ performance attribute – ‘product’

Table 6-5 shows that there are positive relationships between the ‘innovation’ output index and the factors, i.e., ‘business nature’, ‘number of staff’, ‘profile’ and ‘time period' For the 'business nature', textile manufacturers emphasize innovation in material development whereas clothing manufacturers emphasize innovation in developing apparel design and development. The more staff that the company has, the greater the capability to invest in people and innovation than the company with fewer staff. The company with larger staff size would typically invest heavily in product innovation and development. For the 'Technometric' profile, HKTC manufacturers place more emphasis on product innovation in order to offer new products and product diversification. Figures 6-17a to 6-17c show the mean 'innovation' output index value increased significantly in time periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). Comparing Figure 6.17a with Figures 6.17b and 6.17c, the growth rate of the mean 'innovation' output index in the attribute 'product' was much higher than other attributes for the time periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). HKTC manufacturers emphasize innovation in new product development.

6.6.5.2 The second 'Technometric' performance attribute – 'process'

Table 6-5 shows that there are positive relationships between the 'innovation' output index and the factors, i.e., 'business nature', 'number of staff', 'profile' and 'time period' For the 'business nature', both TC manufacturers expressed interest in innovative process design and development, i.e., shape memory fibre spinning, plasma fabric finishing, seamless knitting, reactive pattern design, etc. The more staff that the company has, the greater the capability to invest in people and innovation than the company with fewer staff. The company with larger staff size would typically invest heavily in process innovation and development. For the 'Technometric' profile, HKTC manufacturers place more emphasis on process innovation in order to produce new products. Comparing Figure 6-17a with Figures 6-17b and 6-17c, the growth rate of the mean 'innovation' output index in the attribute 'process' was much higher than the attribute 'service' for the time periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). HKTC manufacturers emphasize innovation in new process development.

6.6.5.3 The third 'Technometric' performance attribute – 'service'

Table 6-5 shows that there are positive relationships between the 'innovation' output index and the factors, i.e., 'business nature', 'number of staff', 'profile' and 'time period' For the 'business nature', most of TC manufacturers had developed innovative services to enter new markets. The more staff that the company has, the greater the capability to invest in people and innovation than the company with fewer staff. The company with larger staff size would typically invest heavily in service innovation and development. For the 'Technometric' profile, HKTC manufacturers place more emphasis on innovation in order to offer new services. Comparing Figure 6-17a with Figures 6-17b and 6-17c, the growth rate of the mean 'innovation' output index in the attribute 'service' was much lower than other attributes in the time periods P_0 (1974 to 1983), P_1 (1984 to 1993) to P_2 (1994 to 2003). HKTC manufacturers emphasize less innovation in new service development.

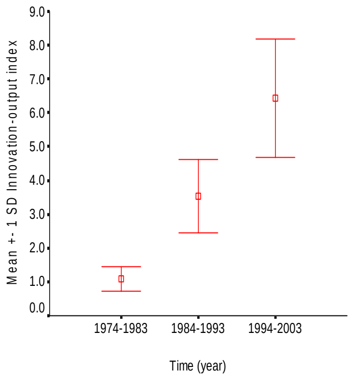


Figure 6-17a The 'innovation' output index against different periods of time for the 'Technometric' performance attribute – 'product'

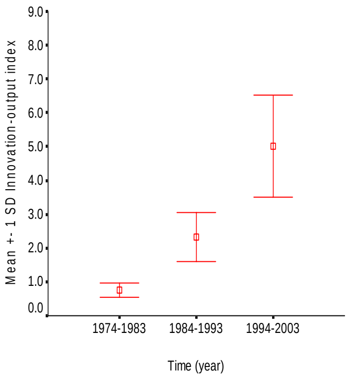


Figure 6-17b The 'innovation' output index against different periods of time for the 'Technometric' performance attribute – 'process'

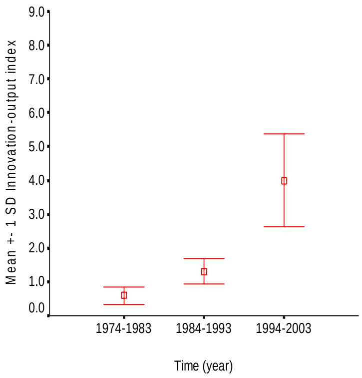


Figure 6-17c The 'innovation' output index against different periods of time for the 'Technometric' performance attribute – 'service'

6.6.6 Relationship between the 'innovation' indices and current Government policy

As referred to in paragraph 5.3.3.2 the implementation of 'Intellectual Property Policy', 'Technological Infrastructural Policy' and 'Inward Investment Policy', the key constituents 'Technology Policy' in 1954, 1967 and 1975 provided the necessary technology infrastructure and support to local manufacturers to train skilled personnel. The implementation of 'Innovation and Technology Policy', one of key constituents of the 'Technology Policy' in 1994 provided funding support for research institutions and industrial support organizations, in collaboration with HKTCI, to improve its innovation and technology. In this regard, the 'Technology Policy' raised the key indicator 'innovation' output indices in the periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003) as shown in Figures 6.17a to 6.17c. The 'innovation' input index also increased considerably as manufacturers had confidence to invest in innovation and technology due to global economical growth and the booming world TC business in the 30-year period.

6.7 Statistical significance of time, company background and their interactions on 5 key indicators

The influence of time, company background and their interactions on the 5 key indicators' input and output indices for the 3 'Technometric' performance attributes, i.e. product, process and service is summarized in Table 6-6. 3 individual factors, 'number of staff', 'profile' and 'time period' were found to have significant influence on all 5 key indicators' input and output indices, and the interactions between 'profile' and 'time period'.

Table 6-6 Influence of time, company background and their interactions on 5 key indicators' input and output indices for the 3 'Technometric' performance attributes

	'productivity'		'quality'		'flexibility'		'skill'		'innovation'	
Factor	In.	Out.	In.	Out.	In.	Out.	In.	Out.	In.	Out.
BN	------	------	0.000	------	------	------	0.024	------	0.007	0.047
YE	0.027	------	------	------	------	0.039	------	0.002	0.042	------
NS	0.000	0.000	0.000	0.001	0.005	0.001	0.000	0.000	0.000	0.000
PR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NS*PR	------	------	------	------	------	------	------	------	0.000	------
BN*P	------	------	0.008	------	------	0.027	------	0.022	------	------
YE*P	------	------	------	------	------	0.022	------	0.004	------	------
NS*P	0.000	0.000	0.000	------	------	------	------	------	0.000	------
PR*P	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000

In.: input indices of 'Technometric' performance attributes

Out.: output indices of 'Technometric' performance attributes

6.8 Summary

This Chapter identified the linear relationships between input and output indices of 5 key indicators of the 3 'Technometric' performance attributes, i.e., 'product', 'process' and 'service'. The correlation coefficient, r, was over 0.7 in average (p-value<0.001), which indicates that the linear relationship between two indices is strong. This indicates that both input and output indices can be utilized as indicators for 5 key indicators of the 'Technometric' performance attributes. It also demonstrates the influence of time period and company background, i.e., business nature, year of establishment, number of staff, and profile. Based on the statistical analysis, it was proven that the output index of 5 key indicators positively improves the 'Technometric' profile, i.e., 'product', 'process' and 'service'. It was also identified that the government industrial policy influences the growth of the 'Technometric' profile. It also reinforced findings discussed in paragraph 5.5.3.2 that there is a significant relationship between the change of 'Technometric' profile and the Government's industrial policy.

Chapter 7 Technology Development and Performance of HKTCI

7.1 Introduction

In Chapter 6, the indices of individual indicators are calculated for each company in the 3 periods and performance attributes, then the overall indices of the 5 key indicators (i.e., 'productivity', 'quality', 'flexibility', 'skill' and 'innovation') are defined and calculated for all the 30 HKTC companies by aggregating all the relevant indicators in each category. A statistical analysis is applied to the key indicators to study the relationship between the overall input and output indices of the individual key indicators, and their relationships with time periods, company background, and the relevant government industrial policies. In this Chapter, the technology development pattern of 30 HKTC companies is analysed in terms of the 5 overall key indicators with the change of the Government's industrial policy in the 3 performance attribute areas. An Overall Technology Development Index (OTDI) is defined and calculated by further aggregating all the overall indices of the 5 key indicators in order to investigate their relationship with the change of the Government's industrial policy and macroeconomic indices.

The distribution of key indicators, 'productivity', 'quality', 'flexibility', 'skill' and ‘innovation’ in the 3 ‘Technometric’ performance attributes, i.e., ‘product’, ‘process’ and ‘service’, were examined by using the radar chart. In the chapter, OTDI comprises of $OTDI_i$ and $OTDI_o$, which are aggregated from the overall input and output indices of the 5 key indicators in the 3 performance attribute areas respectively. A statistical analysis was conducted on the OTDI to study the technological development of HKTCI in the last 3 decades in relation to company background, business profile and relevant government’s industrial policy. Linear regression was performed to study the relationships between $OTDI_i$ and $OTDI_o$. Error bar charts were used, together with one way and multivariate analysis of variances, to illustrate the changes in the OTDI over time periods in relation to relevant Government’s policies. The statistical significance and power were calculated in terms of sample size. Further, the relationship between OTDI and the total export figures (US$ billion) of HKTCI was also studied.

7.2 Development pattern of the ‘Technometric’ performance attributes

It was necessary to identify the change pattern of the ‘Technometric’ performance attributes of different ‘Technometric’ performance attributes in relation to the time periods P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). Based upon the change patterns shown in Figures 7-1 to 7-4, the growth rate of individual key indicators, i.e., ‘productivity’, ‘quality’, ‘flexibility’, ‘skill’ and ‘innovation’ of different ‘Technometric’ performance attributes over the aforesaid periods could be utilized for further analysis.

7.2.1 Overall development pattern of the 3 ‘Technometric’ performance attributes

Figure 7-1 illustrates the grand mean of overall output indices of the 5 key indicators across the ‘Technometric’ profile (i.e., ‘product’, ‘process’ and ‘service’) in the 3 time periods. In general, all the 3 overall output indices have increased over the 3 periods, i.e. P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). The ‘innovation’ of HKTCI has the largest increase from 1.0 in P_0 to 5.0 in P_1, particularly in P_2, followed by ‘skill’, ‘quality’ and ‘productivity’. The ‘flexibility’ shows the smallest changes in the last three decades from 1.4 in P_0 to 1.9 in P_2. It seems that Hong Kong Government’s industrial policy has had a positive impact on the 3 ‘Technometric’ performance attributes of ‘innovation’, ‘skill’, ‘quality’ and ‘productivity’. Although Hong Kong Government has adopted ‘Technology Policy’ since 1954 to enable the local TC industry in technological upgrading, the ‘flexibility’ was much relied upon the company’s capabilities in acquiring required technology and management to cope with short lead time production with varieties of styles and sizes.

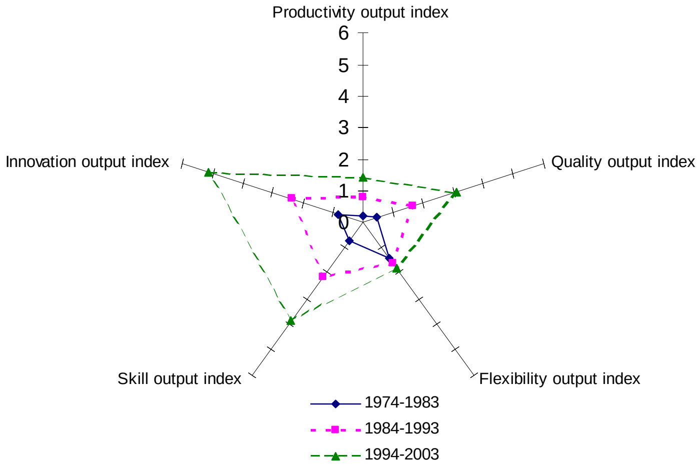


Figure 7-1 Overall development pattern of the 5 'Technometric' key indicators in HKTCI in the last 3 decades

7.2.2 The development pattern in 'Technometric' performance attribute – 'product'

Figure 7-2 shows overall mean output indices of the 5 key indicators in the 'Technometric' performance attribute – 'product' over the 3 periods, i.e., P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). The growth rate of the 'innovation' mean output indices between 1983 (≈1), 1993 (≈3.5) and 2003 (≈6.5) is ranked the highest indicating that the Hong Kong 'Technology Policy' implemented since 1954 had given a positive impact to the 'innovation' of the performance attribute 'product'. Especially, the 'Innovation and Technology Policy', one of the key constituents of the 'Technology Policy', implemented in 1994 has led the TC industry towards product innovation. The growth rate of the 'skill' mean output indices between 1983 (≈0.9), 1993 (≈2.5) and 2003 (≈4.5) is ranked the second highest as Hong Kong's 'Technology Policy' has pushed up the skill level of the industry corresponding with uprising market demands on innovative products with high skill input. The growth rate of the 'flexibility' mean output indices between 1983 (≈ 0.8), 1993 (≈2.5) and 2003 (≈3.5) is ranked the third highest. Although Hong Kong Government has adopted the 'Technology Policy' to upgrade technology of the TC industry, the 'flexibility' was much relied upon the company's capabilities in acquiring the necessary technology to manage short lead time production with varieties of styles and sizes. The growth rate of the 'quality' mean output indices between 1983 (≈0.5), 1993 (≈2.) and 2003 (≈3.5) is ranked the fourth highest. The 'quality' is the performances of product accepted by customer. The growth rate of the output indices between the said time periods was lower than the former attributes. Finally, the growth rate of the 'productivity' mean output indices between 1983 (≈0.25), 1993 (≈0.5.) and 2003 (≈1) is ranked the lowest. Although the Hong Kong Government has adopted 'Technology Policy' and 'Trade Policy' since 1954 and 1960 respectively, the productivity of HKTCI is restricted by limited annual growth rate of export quota and global market demands for small quantities of customized products.

Technology upgrading is only to maintain target productivity with optimum utilization of investment and labour. More importantly, off-shore production with the utilization of other countries' export quota might have influenced the lower growth rate of the 'productivity' output indices.

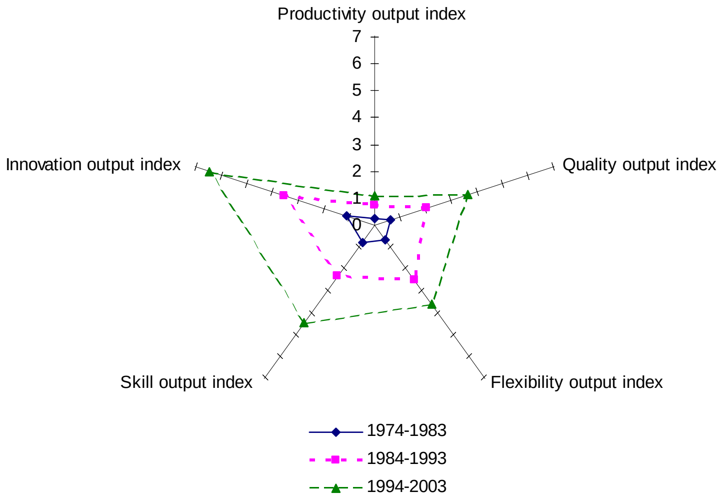


Figure 7-2 The development pattern of 5 key indicators in the 'Technometric' performance attribute – 'product' in the last 3 decades

7.2.3 The development pattern for 'Technometric' performance attribute – 'process'

Figure 7-3 shows the overall change in the 5 key indicators mean output indices in the 'Technometric' performance attribute – 'process' - over the 3 periods, i.e., P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). The growth rate of the 'innovation' mean output indices between 1983 (≈0.8), 1993 (≈2.5) and 2003 (≈5) ranked the highest. This indicates that the Hong Kong's 'Technology Policy' implemented since 1954 had a positive impact upon the 'innovation' of performance attribute 'product'. In particular, the 'Innovation and Technology Policy', one of the key constituents of the 'Technology Policy', implemented in 1994 led the TC industry towards process innovation. The growth rate of the 'skill' mean output indices between 1983 (≈0.8), 1993 (≈2) and 2003 (≈3.5) is ranked the second highest as Hong Kong's 'Technology Policy' raised the skill level of the industry corresponding with rising market demand for new products produced using innovative processes. The growth rate of the 'flexibility' mean output indices between 1983 (≈ 1.5), 1993 (≈2.2) and 2003 (≈2.8) ranked the third highest. Although the Government intended that that the 'Technology Policy' would upgrade the technology of the TC industry, the key indicator 'flexibility' is reliant upon the company's capabilities in acquiring necessary technology to enhance flexible process to permit short lead-time production with varieties of styles and sizes. The growth rate of the 'quality' mean output indices between 1983 (≈0.4), 1993 (≈1.2) and 2003 (≈2.2) ranked the fourth highest. The key indicator 'quality' is the performance of process and very much dependent upon how the company has invested in hardware and software to enhance the process quality instead of relying upon the Government's industrial policy. The long-term business relationship between Hong Kong and the overseas marketplaces permitted manufacturers to increase their knowledge and thereby to achieve higher process standards and quality. Finally, the growth rate of the 'productivity' mean output indices between 1983 (≈0.2), 1993 (≈1.2) and 2003 (≈1.8) is ranked the lowest. Although Hong Kong Government adopted the 'Technology Policy' and 'Trade Policy' since 1954 and 1960 respectively, the productivity of HKTCI is restricted by limited annual growth rate of export quota and global market demands small quantities of customized products. The aim of the process is to achieve target productivity with optimum utilization of investment and labour. More importantly, off-shore production using other countries' export quota might have influenced the lower growth rate of the key indicator 'productivity' output indices.

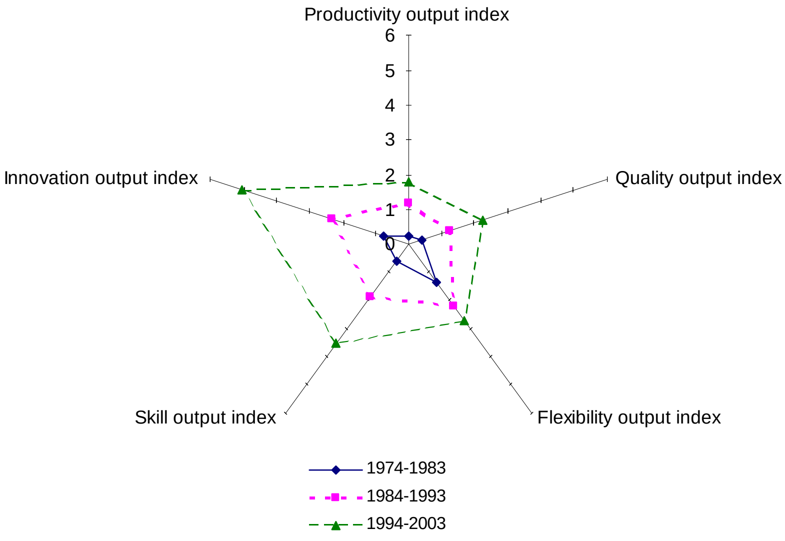


Figure 7-3 The development pattern of 5 key indicators in 'Technometric' performance attribute – 'process' in the last 3 decades

7.2.4 *The development pattern in 'Technometric' performance attribute – 'service'*

Figure 7-4 shows the overall mean output indices of 5 key indicators of the 'Technometric' performance attribute – 'service' over the 3 periods, i.e., P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003). The growth rate of the 'innovation' mean output indices between P_0 (≈0.5), P_1 (≈1.5) and P_2 (≈4) ranked the highest. This indicates that the Hong Kong 'Technology Policy' implemented in 1954 had a positive impact on the key indicator 'innovation' of attribute 'product'. The 'Innovation and Technology Policy', one of the key constituents of the 'Technology Policy', implemented in 1994 has led the TC industry towards service innovation. The growth rate of the key indicator 'skill' mean output indices between 1983 (≈0.8), 1993 (≈2.3) and 2003 (≈3.8) ranked the second highest, as Hong Kong's 'Technology Policy' raised the skill level of the industry corresponding with rising demands for services to support the products and processes provided. The growth rate of the key indicator 'quality' mean output indices between 1983 (≈ 0.5), 1993 (≈1.7) and 2003 (≈3.5) ranked the third highest. The key indicator 'quality' referred to the performance of services provided and very much depended upon how the company has invested in hardware and software to enhance the service activities. As a consequence of the long established business relationship between Hong Kong and the overseas marketplaces, manufacturers respond both quickly and well to customers' requirements, providing important services. The growth rate of the key indicator 'flexibility' mean output indices between 1983 (≈0.4), 1993 (≈1.2) and 2003 (≈1.8) ranked the fourth highest. The growth rate of the output indices for the given time periods was predictably lower than that for the other 3 attributes. Although the Government introduced the 'Technology Policy' to upgrade technology of the TC industry, the key indicator 'flexibility' relied upon the company's capabilities in acquiring the necessary technology to enhance flexible services to satisfy customers' requirements. Finally, the growth rate of the key indicator 'productivity' mean output indices between 1983 (≈0.2), 1993 (≈0.5) and 2003 (≈1.3) ranked the lowest. The key indicator 'productivity' of the service is related to the productivity of product and process. Since the productivity of product and process was traditionally affected by the limited growth of export quota and keen competition from developing countries, the key indicator 'productivity' of the service was predictably lower than other key indicators. In addition, manufacturers pay more attentions to the matter of improving the scope and quality of service provided in order to enhance business activities.

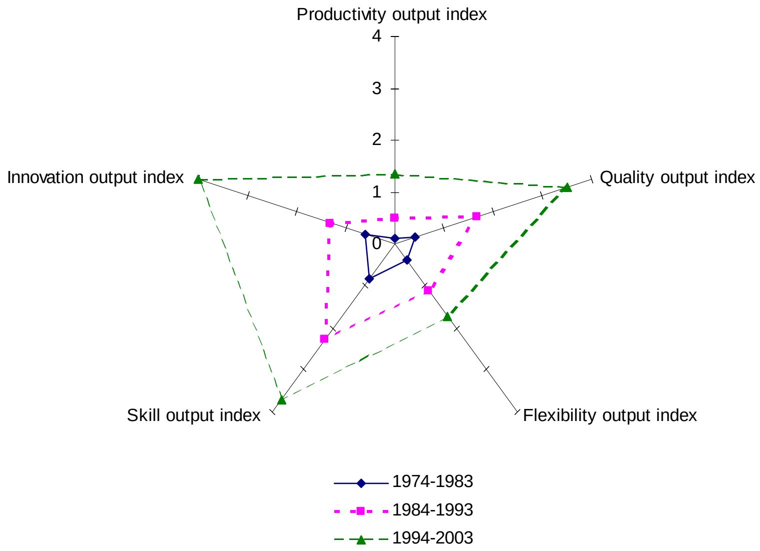


Figure 7-4 The development pattern of 5 key indicators in 'Technometric' performance attribute – 'service' in the last 3 decades

7.3 Overall Technology Development Index (OTDI)

In the Figures 7-1 to 7-4 show the overall output indices of the 5 key indicators, i.e., 'productivity', 'quality', 'skill', 'flexibility' and 'innovation', the technological development of HKTCI. However, it is desirable to aggregate these 5 indicators into an Overall Technology Development Index (OTDI) as the indicator for objective measurement of the technological development in HKTCI, so that the technological development in micro-scale can be linked to the macro-economic indices related to the TC industry.

7.3.1 The definition of $OTDI_i$ and $OTDL_o$

The $OTDI_i$ (the 'Technometric' input index) is defined as the sum of all mean input indices of 5 key indicators, whereas the $OTDI_o$ (the 'Technometric' output index) as the sum of all mean output indices of 5 key indicators, which are calculated for individual companies in respect of the 3 'Technometric' performance attributes in the periods, as shown in the following equations:

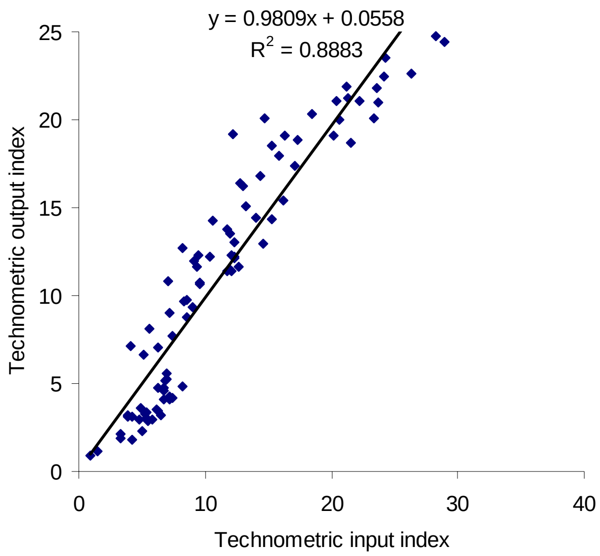
$$OTDI_i = \sum_{ijk} a_{ijk} TA_{ijk} = P_{input} + Q_{input} + F_{input} + S_{input} + I_{input} \qquad (7\text{-}1)$$

$$OTDI_o = \sum_{ijk} a_{ijk} TA_{ijk} = P_{output} + Q_{output} + F_{output} + S_{output} + I_{output} \qquad (7\text{-}2)$$

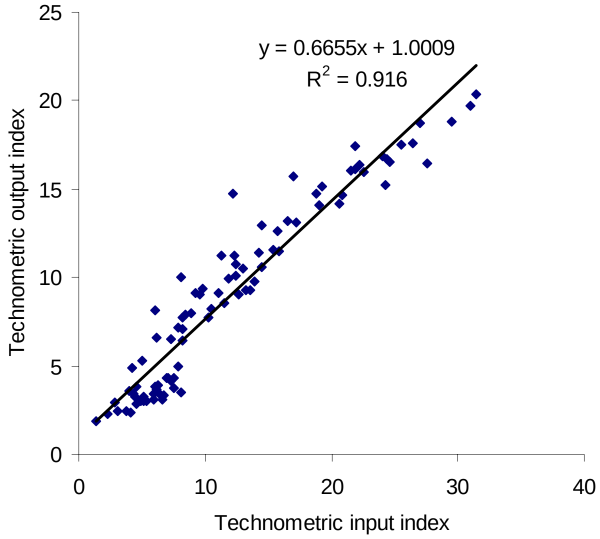
The individual elements TA_{ijk}s include P_{input} and $P_{output,,}$ Q_{input} and $Q_{output,,}$ F_{input} and $F_{output,}$ S_{input} and $S_{output,}$ and I_{input} and I_{output}, which are defined as the same as in equations (6-1) to (6-10) respectively. The weights, which indicate the importance, of the individual elements TA_{ijk}s are described by a_{ijk} for input and output elements. As the individual elements are assumed to be equal importance, the value of a_{ijk} is set as 1.

7.3.2 *Relationship between $OTDI_i$ and $OTDI_o$*

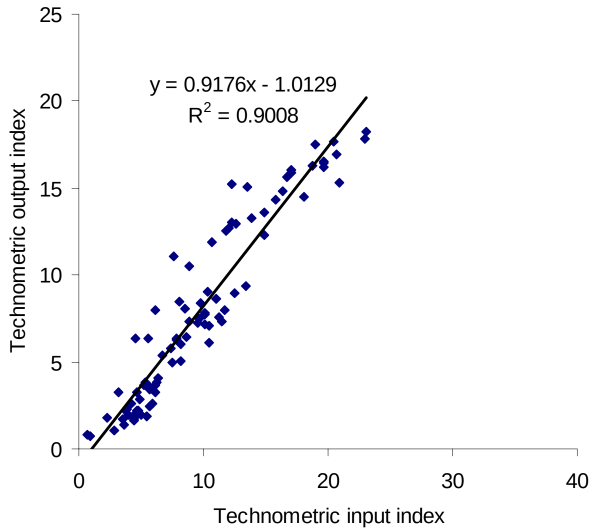
Figures 7-5a to 7-5c illustrate that the overall technology development output index $OTDL_o$ is linearly correlated with the overall technology development input index $OTDI_i$ in all the 3 'Technometric' performance attributes of 'product', 'process' and 'service' with R2 of 0.888, 0.916 and 0.901 respectively, significant at p-value < 0.001 level. This suggests that the $OTDL_o$ can be utilized for measuring the technological development of the TC industry. Comparing the 3 figures, the $OTDL_o$ output index increases with $OTDI_i$ input index with highest rate in the 'Technometric' performance attribute 'product', followed by 'service' and then 'process', showing the differences in different industrial sectors.



(a) 'Product'



(b) 'Process'



(c) 'Service'

Figure 7-5 Relationship between $OTDI_i$ and $OTDI_o$ in 'product', 'process' and 'service'

7.4 Factors influencing OTDI (including $OTDI_i$ and $OTDI_o$)

7.4.1 Influence of time period

Figures 7-6 and 7-7 show that both $OTDI_i$ and $OTDI_o$ increase with the time periods, from P_0 (1974 to 1983), P_1 (1984 to 1993) to P_2 (1994 to 2003), showing that HKTCI has invested substantial resources to improve and upgrade the technological level in the last three decades, and has achieved significant progress. The increases in both $OTDI_i$ and $OTDI_o$ are significant at p-value < 0.001 levels between the time periods. The growth rate of the $OTDI_i$, as compared with the $OTDI_o$, is slightly higher during the study periods. It is understandable that there be a gap of the $OTDI_o$ lagging behind the $OTDI_i$ as the positive effects of the latter would appear in time depending upon the industry's adaptation.

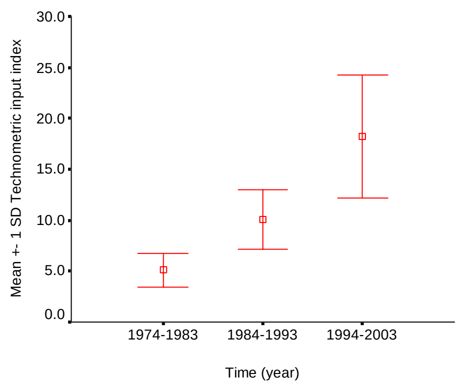


Figure 7-6 The influence of time period on the $OTDI_i$

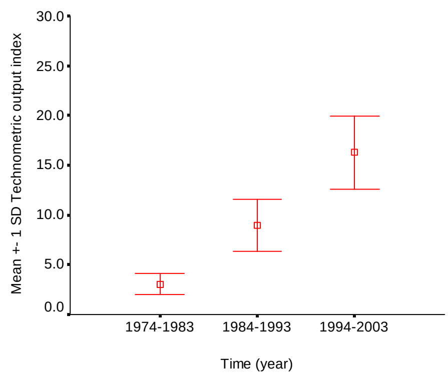


Figure 7-7 The influence of time period on the $OTDI_o$

7.4.2 Influence of company business factors

The influences of business nature, number of staff, profile and time are summarized in

Table 7-1, in which only the p-values are listed to show the statistical significance of the factors.

Table 7-1 Influence of company business factors to the OTDI

	OTDI	
Company Business Factors	**$OTDI_i$**	**$OTDI_o$**
Individual		
Business nature (BN)	0.006	------
Year of establishment (YE)	------	------
Number of staff (NS)	0.000	0.000
Profile (PR)	0.000	0.000
Time Periods (P)	0.000	0.000
Interaction		
NS*P	0.000	0.023
PR*P	0.000	0.000

$OTDI_i$ is significantly influenced by 'business nature', 'number of staff', 'profile', and 'time', showing that the overall input in technological development is significantly dependent on company size, industrial sectors (product, process or service) and the time periods. On the other hand, $OTDI_o$ is affected by 3 factors, including 'number of staff', 'profile', and 'time periods'. In terms of interactions, 'number of staff' and 'time' and 'profile' and 'time' also have significant influence on $OTDI_i$ and $OTDI_o$, indicating that the overall input and output in technological development in HKTCI are affected by the size of company in different time periods and in different business sectors.

7.5 OTDI and Government Industrial Policy

As shown in Figures 7-6 to 7-7, the $OTDI_i$ and $OTDI_o$ have significant increased in the time periods from P_0 (1974 to 1983), P_1 (1984 to 1993) to P_2 (1994 to 2003). The substantial progress in technological development of HKTCI may be attributed, at a significant degree, to the implementation of the Government's industrial policy in Hong Kong. As shown in Figures 5-3 and 5-4, the Hong Kong Government developed and implemented a series of industrial policies in the last few decades, including:

1. 1950s to 1970s – export orientation (laissez-faire, education, infrastructure, institutional support);
2. 1980s – improved institutional support for industry; and
3. 1990s – upgraded support for technology.

The early industrial policies established fundamental industrial and business infrastructures to encourage industrial investments and developments, which led to the significant increase in technological development in HKTCI from P_0 to P_1. The industrial policies implemented in the 1980's and particularly those in late 1990s for further industrial support and technology innovations stimulated substantial increase in technological development in HKTCI from P_1 to P_2, especially in the area of technology innovation as shown in Figures 7-1 to 7-4.

7.5.1 Total exports of HKTCI and OTDI

The significant progress in technological development has created sustainable competitiveness for HKTCI. The total value of exports (including domestic exports and re-exports in US$ term) of the HKTC products had steadily increased as shown in Table A7-3 of Appendix 7.

In Figures 7-8 and 7-9, the total exports of HKTCI are plotted against $OTDI_i$ and $OTDI_o$ respectively. The total exports of HKTCI are averaged for the 3 periods (P_1, P_1 and P_2) to correspond with $OTDI_i$ and $OTDI_o$ in the same periods. From the figures, it may be seen that the total exports is positively related to the overall input and output of technological development in the HKTCI. This provides the evidences that Hong Kong Government's industrial policies stimulated the technological development in HKTCI, which in turn led to the increase of total exports in the last 3 decades.

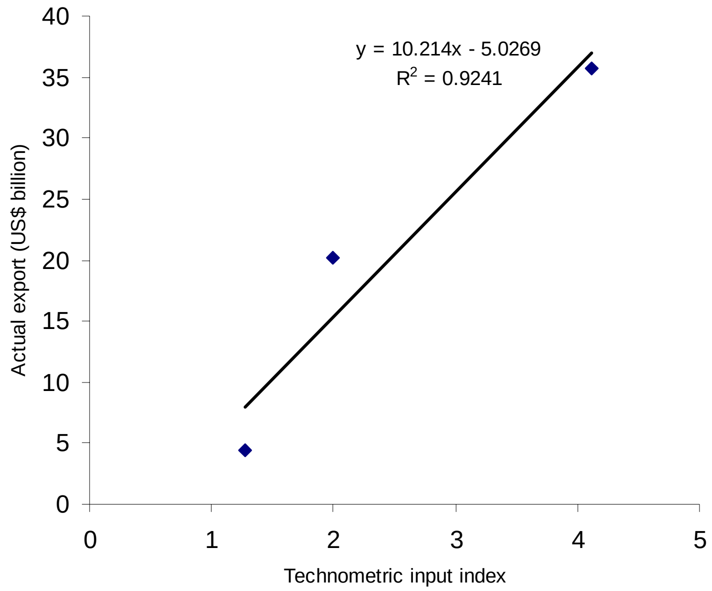


Figure 7-8 Relationship of total exports of HKTCI and $OTDI_i$

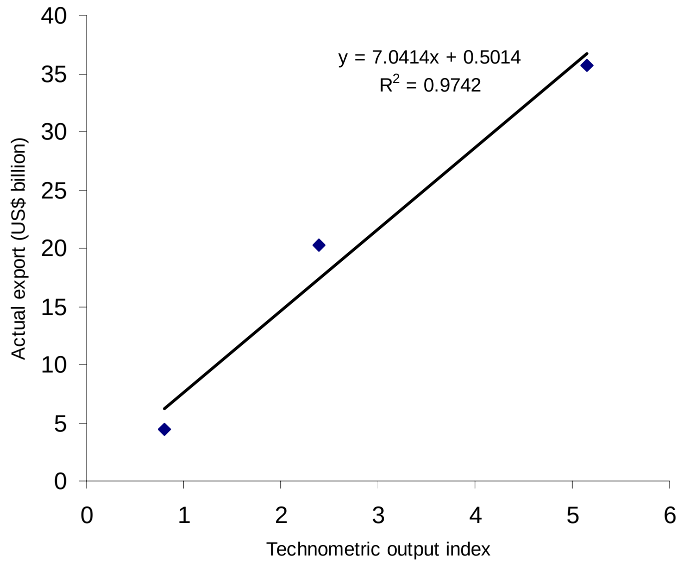


Figure 7-9 Relationship of total exports of HKTCI and $OTDI_o$

7.6 Government industrial policy

The above analysis has shown that the Government's industrial policies played important roles in directing and stimulating the technological developments in

HKTCI, which contributed significantly to the competitiveness of the industry as shown in the steady increase in total export in the last 3 decades from HKTCI. This supports with the analysis in paragraphs 5.3.3.2 and 5.4 of Chapter 5, the change of 3 'Technometric' performance attributes in the period P_0 (1974 to 1983), P_1 (1984 to 1993) and P_2 (1994 to 2003) are related to the change of the Government's industrial policy, which provide the infrastructure for achieving the sustainable competitiveness of HKTCI.

Amongst the periods before P_0 , P_1 to P_2 , the 'Intellectual Property Policy' implemented in 1954, 'Inward Investment Policy' implemented in 1975 and 'Innovation and Technology Policy' implemented in 1994 are the main constituents of the 'Technology Policy' and have direct influence on the technological development of HKTCI. These policies work with other policies, i.e., Trade Policy, Tax Policy and Competition Policy, to constitute business infrastructure that has direct or indirect influence on the technological development of HKTCI.

As may be seen from Figure 5-1 macro industrial policy and Figure 5-4 industrial policy affecting the technological development of Hong Kong industries in the Chapter 5, it is identified that only 'Technology Policy', one of the main constituents of the industrial policy, is directly influencing the technological development of Hong Kong industries, including the TC industry. ‘Trade policy’, ‘Tax Policy’ and ‘Competition Policy’ of the industrial policy would facilitate the industrial operations and businesses in Hong Kong. This is confirmed by the results of analysis shown in Figures 7-1 to 7-4 that the overall innovation output indices have a quantum jump in the period P_2, in which the ‘Innovation and Technology Policy’ was introduced in 1994. Therefore, it is critical to pay special attention to develop and implement more constituents of ‘Technology Policy’ in order to achieve sustainable competitiveness of HKTCI.

When the ‘Technology Policy’ adopted by other countries, i.e., USA, EU, etc. (shown in Figure 5-1) and Hong Kong (shown in Figure 5-4) are compared, the results are summarized in Table 7-2. The ‘Innovation and Technology Policy’ adopted by Hong Kong and ‘Science and Technology Policy’ adopted by other countries are basically similar but the former only covers the ‘Science and Technology Policy’ and ‘R & D Policy’ in mid-stream and down-stream research activities. However, other countries such as USA and EU have adopted the ‘Science and Technology Policy’ and ‘R & D Policy’ to support up-stream/basic research in academic institutions and research organizations. As such, Hong Kong is also lacking a government procurement policy to stimulate local industry to achieve product innovation and technology upgrading. The emphasis which the Hong Kong Government places on ‘Inward Investment Policy’ is less than other countries on ‘Foreign Direct Investment Policy’, but some concessions such as by providing tax holiday, duties exemption, etc. are given to attract foreign direct investment to improve local employment, skill and technology upgrading [120].

Table 7-2 Comparison of ‘technology policy’ in Hong Kong and other countries

	Technology policy adopted by developed countries, i.e. USA, EU, etc.	**Technology policy adopted by Hong Kong Government**
Main constituents of government’s industrial policy	• Science and Technology Policy • R & D Policy • Technological Infrastructure Policy • Government Procurement Policy • Intellectual Property Policy • Foreign Direct Investment Policy	• Innovation and Technology Policy • Technology Infrastructure Policy • Intellectual Property Policy • Inward Investment Policy

Summing up the above, it is recommended that Hong Kong Government should review its industrial policy for the local TC industry as follows:

1. The ‘Innovation and Technology Policy’ should cover basic research in order to strengthen the R & D of local academic institutions and research organizations.

2. Hong Kong should implement the new 'Government Procurement Policy' to stimulate interested local vendors to follow the Government's product standards and specifications in an attempt to upgrade the technologies of local TC industry.
3. The Government should review the current 'Inward Investment Policy' having taken into account the merits of 'Foreign Direct Investment Policy' adopted by other countries.

7.7 Summary

In this Chapter, the development patterns of the overall output indices of the 5 key indicators are analyzed for the 3 'Technometric' performance attributes separately. The Overall Technology Development Index is defined as an indicator to measure the overall technological development of HKTCI. Relationships of this index with company business nature, size and time periods are analyzed in relation to the evolution and implementation of the Government's industrial policies. It is found that the Government's industrial policies played important roles in directing and stimulating the technological developments in HKTCI, which contributed significantly to the competitiveness of the industry as shown in the steady increase in total exports in the last 3 decades from HKTCI.

Chapter 8 Conclusion and Future Work

8.1 Summary of the study

The main objective of this study is to develop a 'Technometric' model for measuring technology development in HKTCI industry and to apply the model for identifying how government industrial policies influence the technological development and competitiveness of HKTCI. This objective has been achieved through the research described in the previously chapters.

In Chapter 2, a mathematical model of the 'Technometric' model was developed for quantitative description of the technological development in an industry on the basis of the 'Technometric' approach developed for measuring the technology strategy of a firm at the micro level through 'Technometric' feature-by-feature comparison of individual products in a dynamic perspective.

In Chapter 3, the design and development of the theoretical framework – 'Technometric' performance attributes were developed for measuring technological change of the TC industry. 5 key indicators, i.e., 'productivity', 'quality', 'flexibility', 'skill' and 'innovation' as well as their input and output parameters were identified in the 3 ‘Technometric’ performance attributes, i.e., ‘product’, ‘process’ and ‘service’, together with the external factors affecting the technological development of HKTCI through critical analysis of related literature.

In Chapter 4, an instrument was developed to measure the technological development of HKTCI and pilot test was conducted to determine the significance and relationship of the 5 key indicators and the 3 ‘Technometric’ performance attributes in measuring the technological development of the TC Industry. The instrument was validated through the pilot test and reliability test to measure the internal consistency of each ‘Technometric’ performance attribute. The instrument was finalized as an enhanced ‘Technometric’ model for measuring the technological development of the industry.

In Chapter 5, an enhanced ‘Technometric’ model was applied to evaluate the levels of technological development in HKTCI by analyzing the results of the industrial survey using the instrument developed in Chapter 4. The evolution and implementation of Hong Kong Government’s industrial policies was reviewed over the past 30 years for the purpose comparing with the technological developments measured by the enhanced ‘Technometric’ model. It was found that the measured results of the ‘Technometric’ model matched with the changing pattern of the Government’s policy in the domain field, implying that the ‘Technometric’ model could effectively measure the performance of technological development of HKTCI.

In Chapter 6, the ‘Technometric’ indices for all the indicators were calculated for each of 30 HKTC companies, from which the overall ‘Technometric’ indices for the 5 key indicators (i.e., ‘productivity’, ‘quality’, ‘flexibility’, ‘skill’ and ‘innovation’) were defined and computed by aggregating the indices of individual indicators in each category respectively. Statistical analyses were carried out on the 5 overall key ‘Technometric’ indices to study the technological development of HKTCI in the last 3 decades in relation to company background, business profile and relevant government industrial policy. The five sets of overall ‘Technometric’ indices were influenced by time period and company background, i.e., ‘business nature’, ‘year of establishment’, ‘number of staff’ and ‘profile’. All overall output indices of 5 key indicators, which indicate the technological development levels in the 5 areas, increased steadily in the last 3 decades in the 3 ‘Technometric’ performance attributes, i.e., ‘product’, ‘process’ and ‘service’. It was also identified that the Government’s industrial policies could have significant influence on the technological developments in all the 5 key areas.

In Chapter 7, the development patterns of the overall output indices of the 5 key indicators were analyzed for the 3 ‘Technometric’ performance attributes separately. The Overall Technology Development Index is defined as the indicator to measure the overall technological development of HKTCI. Relationships of this index with company business nature, size and time periods were analyzed in relation to the evolution and implementation of the Government’s industrial policies. It was found that that the Government’s industrial policies played important roles in directing and stimulating the technological developments in HKTCI in the last 3 decades, which contributed significantly to the competitiveness of the industry as shown in the steady increase in total exports of HKTCI in the last 3 decades. Therefore, it was concluded that it is critical for the Hong Kong Government to pay special attention to develop and implement more constituents of ‘Technology Policy’ in order to achieve sustainable competitiveness of HKTCI.

8.2 Main contributions

One of the most complex problems facing the TC industry is how to benchmark the TC industry objectively with validated indicators in order to derive guidelines and recommendations on how to develop industrial policy to achieve the sustainable competitiveness of HKTCI. The main contribution of this study was to develop a ‘Technometric’ model with which to measure the technological development of HKTCI. The model permits quantitative comparisons of the technological development between companies, industries and nations, and would be helpful in the process of constructing corporate innovation strategy and technology policy. By measuring the technical change of the industry, a ‘Technometric’ industry-by-industry comparison was taken for the periods 1974 to 1983, 1984 to 1993 and 1994 to 2003 respectively. A simplified and direct measurement unit in metric space from 0 to 1 was then defined for each of the ‘Technometric’ performance attributes. The model was validated by comparing the technological development of the HKTCI with the change of the Government’s industrial policy in the stated, 3 ten-year periods from 1974 to 1983, 1984 to 1993 and 1994 to 2003 respectively. The study also reviewed the Government’s industrial policy for technological development of the TC industry. It identified 5 key constituents of industrial policy adopted by the EU and the USA - namely, competition, regional, trade, tax and technology policy, which directly or indirectly influence the technological development of the TC industry. Although Hong Kong does not have regional policy, it should be counted as one of main constituents of industrial policy in line with the EU and the US counterparts in formatting the change model for Hong Kong’s industrial policy.

The study established the relationship between the technological performance levels of HKTCI, measured using the ‘Technometric’ model, with the change of the Government’s industrial policy over a thirty-year period, i.e., from 1974 to 1983, 1984 to 1993 and 1994 to 2003 respectively.

8.3 Limitations of the study

Difficulties were experienced in finding a sufficiently representative sample of local TC manufacturing companies established 30 or more years before: some of the targeted respondents declined to be interviewed, whereas others had ceased their business some years before. If the number of the companies surveyed were more than 30, the evaluation results for the performance of the 3 ‘Technometric’ performance attributes, i.e., ‘product’, ‘process’ and ‘service’ would conceivably have approached the full population mean of the target 300 TC manufacturing companies (10% of the total population of TC manufacturing companies in Hong Kong) founded more than 30 years before.

Due to limitation in time and resources, the development of the ‘Technometric’ model was limited to the measurement of the technological development of the TC industry, to the review of the industrial policy of Hong Kong government for technological development of the TC industry, and to the establishment of the relationship between the technological performance levels of the HKTCI and the government industrial policy in the last three decades. The model could be further used to measure the technological development of Italian and US TC industries for comparison, which could help identifying the most successful key constituents of industrial policies implemented by the governments to enhance the competitiveness of their TC industries through innovation and technology.

8.4 Future work

The 'Technometric' model can be extended further to measure the technological development of TC industries of the most active countries and regions in international TC trading (including both developed countries such as Italy and USA, and developing countries such as China and India), and to review the relevant government industrial policies in these countries in order to benchmark relevant industrial policies and compare the technological development trends and competitiveness TC industries in the world, particularly in the emerging "free trade" international trading environments.

The study period could be extended further from 30 years to 40 or 50 years so that the change of the Government's industrial policy and its influence on the technological development of TC industry can revealed more clearly. In particular, the extension of the study from 2003 to 2013 can exploit importance of the technological development of TC industries for sustaining their competitiveness in the global marketplaces after the implementation of WTO quota free regulation in 2005. Furthermore, the 'Technometric' model developed in the study can be utilized for study of the technological development of other key industries in Hong Kong such as footwear industry, leather goods industry, home electronics industry, toys industry and watches industry, so that good industrial policies can be developed to enhance the competitiveness of these industries in global market places.

Appendix 1

1st Version Questionnaire for interviewing Hong Kong TC Experts

Company Name ______________________________ Date: ________________

Name of Respondent: ______________ Position: ________________ Tel. No: ______________

Part I General Information and Background of the Company

1.1 What type of textiles and garment manufacturing is carried out in your company?

☐ Yarn manufacturing ☐ Fabric manufacturing
☐ Dyeing, printing and finishing
☐ Cut & sewn garment manufacturing ☐ Knitted sweater manufacturing
☐ Others, please specify ______________________________

1.2 Your company has been in operation for____year(s).

1.3 Does your company own any production facilities?

☐ Yes ☐ No

1.4 Does your company subcontract any manufacturing process off-shore?

☐ Yes Which area? __________ ☐ No

1.5 How many staff are employed in your company?

Managers ____________________

Technologists ____________________

Technicians ____________________

Craftsmen ____________________

Operators ____________________

Clerks ____________________

1.6 In the last 12 months, your average outputs per month was _____ kgs/yds/pcs.

1.7 The major market is in ______________________.

For the First 'Technometric' Performance Attribute 'Product'

Part II Details of Technological Level of the Textiles and Clothing Industry (TCI)
For the following indicators, please state the level of importance for measuring the technological level of the company:

	Key Indicators for Measuring the Technological Development of TCI	7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
1	**'productivity'**	☐	☐	☐	☐	☐	☐	☐
1.1	Input data for 'productivity'							
1.1.1	Capital investment	☐	☐	☐	☐	☐	☐	☐
1.1.2	Labour employment	☐	☐	☐	☐	☐	☐	☐
1.1.4	Technology input	☐	☐	☐	☐	☐	☐	☐
1.1.5	Raw material	☐	☐	☐	☐	☐	☐	☐
1.1.6	Skill acquisition	☐	☐	☐	☐	☐	☐	☐
1.1.7	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
1.1.10	Equipment investment	☐	☐	☐	☐	☐	☐	☐
1.1.11	Economies of scale	☐	☐	☐	☐	☐	☐	☐
1.1.12	Legal-human environment	☐	☐	☐	☐	☐	☐	☐
1.2	Output data for 'productivity'							
1.2.2	Technological change	☐	☐	☐	☐	☐	☐	☐
1.2.3	Economic growth	☐	☐	☐	☐	☐	☐	☐
2.	**'quality'**							
2.1	Input data for 'quality'							
2.1.1	Capital investment	☐	☐	☐	☐	☐	☐	☐
2.1.2	Human resources management	☐	☐	☐	☐	☐	☐	☐

		7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
2.1.3	Strategic quality planning	☐	☐	☐	☐	☐	☐	☐
2.1.4	Quality management system implementation	☐	☐	☐	☐	☐	☐	☐
2.1.5	Technology input	☐	☐	☐	☐	☐	☐	☐
2.1.6	Customer focus	☐	☐	☐	☐	☐	☐	☐
2.1.7	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
2.1.8	Skill and knowledge acquisition	☐	☐	☐	☐	☐	☐	☐
2.1.9	Communication facilities	☐	☐	☐	☐	☐	☐	☐
2.1.10	Government support	☐	☐	☐	☐	☐	☐	☐

2.2 Output data for ‘quality’

2.2.1	Quality management	☐	☐	☐	☐	☐	☐	☐
2.2.2	Customer satisfaction	☐	☐	☐	☐	☐	☐	☐
2.2.4	Quality accreditation	☐	☐	☐	☐	☐	☐	☐
2.2.5	Positive impact on society	☐	☐	☐	☐	☐	☐	☐
2.2.6	Market share	☐	☐	☐	☐	☐	☐	☐

3 ‘flexibility’

3.1 Input data for ‘flexibility’

3.1.6	Technology input	☐	☐	☐	☐	☐	☐	☐
3.1.8	Flexible manufacturing system	☐	☐	☐	☐	☐	☐	☐

3.2 Output data for ‘flexibility’

3.2.1	Short product life cycle	☐	☐	☐	☐	☐	☐	☐
3.2.2	Customized product	☐	☐	☐	☐	☐	☐	☐
3.2.3	Short lead time	☐	☐	☐	☐	☐	☐	☐

		7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
3.2.4	Flexible corporation	☐	☐	☐	☐	☐	☐	☐

4 ‘skill’

4.1 Input data for ‘skill’

4.1.1*	***Capital investment***	☐	☐	☐	☐	☐	☐	☐
4.1.2	Human resources	☐	☐	☐	☐	☐	☐	☐
4.1.3	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
4.1.4	Skill acquisition scheme	☐	☐	☐	☐	☐	☐	☐
4.1.5	Technology upgrading	☐	☐	☐	☐	☐	☐	☐
4.1.6*	***Retain low labour turnover rate***	☐	☐	☐	☐	☐	☐	☐
4.1.7	Government support for skill development and acquisition	☐	☐	☐	☐	☐	☐	☐

4.2 Output data for ‘skill’

4.2.1	New skill and knowledge	☐	☐	☐	☐	☐	☐	☐
4.2.2	Acceptable performance	☐	☐	☐	☐	☐	☐	☐
4.2.3	Human resources improvement	☐	☐	☐	☐	☐	☐	☐
4.2.4	Productivity improvement	☐	☐	☐	☐	☐	☐	☐
4.2.5	Quality improvement	☐	☐	☐	☐	☐	☐	☐
4.2.7	Organization improvement	☐	☐	☐	☐	☐	☐	☐

5. ‘innovation’

5.1 Input data for ‘innovation’

		7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
5.1.1	Capital investment (including foreign direct investment)	☐	☐	☐	☐	☐	☐	☐
5.1.2	Technology development	☐	☐	☐	☐	☐	☐	☐
5.1.3	R & D expenditure	☐	☐	☐	☐	☐	☐	☐
5.1.4	R & D personnel	☐	☐	☐	☐	☐	☐	☐
5.1.5	New knowledge expenditure	☐	☐	☐	☐	☐	☐	☐
5.1.6	Government support	☐	☐	☐	☐	☐	☐	☐
5.1.7	Research contribution of local academic institution	☐	☐	☐	☐	☐	☐	☐
5.1.8	Technology transfer	☐	☐	☐	☐	☐	☐	☐
5.1.9	Education and training programmes	☐	☐	☐	☐	☐	☐	☐

5.2 Output data for ‘innovation’

5.2.1	New product development	☐	☐	☐	☐	☐	☐	☐
5.2.3	New quality development	☐	☐	☐	☐	☐	☐	☐
5.2.4	New organization development	☐	☐	☐	☐	☐	☐	☐
5.2.5	New system development	☐	☐	☐	☐	☐	☐	☐
5.2.6	No. of patents generated	☐	☐	☐	☐	☐	☐	☐
5.2.7	No. of R & D personnel	☐	☐	☐	☐	☐	☐	☐
5.2.8	No. of publications	☐	☐	☐	☐	☐	☐	☐
5.2.9	No. of R & D firms and activities	☐	☐	☐	☐	☐	☐	☐
5.2.10	Technological change	☐	☐	☐	☐	☐	☐	☐
5.2.11	Economic change	☐	☐	☐	☐	☐	☐	☐

<u>Part III</u>

<u>Remarks</u>:

Since items 4.1.1.and 4.1.6 do not have any connection with the 3 'Technometric' performance attributes, i.e., 'product', 'process' and 'service', advice was sought from 5 Hong Kong TC expert's on:

1. Whether the item 4.1.1 'capital investment' be deleted from all 'Technometric' performance attributes in the questionnaire.
2. Whether the item 4.1.6 'retain low labour turnover rate' be deleted from the questionnaire.

Other comments:

For the second 'Technometric' Performance Attribute 'Process'

Part II Details of Technological Level of Textiles and Clothing Industry
For the following indicators, please state the level of importance for measuring the technological level of the company:

	Key Indicators for Measuring the Technological development of TCI	**7 extremely important**	**6 most important**	**5 important**	**4 neutral**	**3 less important**	**2 least important**	**1 insignificant**
1	**'productivity'**							
1.1	Input data for 'productivity'							
1.1.1	Capital investment	☐	☐	☐	☐	☐	☐	☐
1.1.2	Labour energy	☐	☐	☐	☐	☐	☐	☐
1.1.3	Energy	☐	☐	☐	☐	☐	☐	☐
1.1.4	Technology input	☐	☐	☐	☐	☐	☐	☐
1.1.5	Raw material	☐	☐	☐	☐	☐	☐	☐
1.1.6	Skill acquisition	☐	☐	☐	☐	☐	☐	☐
1.1.7	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
1.1.8	Government regulation and demand policy	☐	☐	☐	☐	☐	☐	☐
1.1.9	Improved resources allocation	☐	☐	☐	☐	☐	☐	☐
1.1.10	Equipment investment	☐	☐	☐	☐	☐	☐	☐
1.1.11	Economies of scale	☐	☐	☐	☐	☐	☐	☐
1.1.12	Legal-human environment	☐	☐	☐	☐	☐	☐	☐
1.2	Output data for 'productivity'							
1.2.1	Productivity growth	☐	☐	☐	☐	☐	☐	☐
1.2.2	Technological change	☐	☐	☐	☐	☐	☐	☐
1.2.3	Economic growth	☐	☐	☐	☐	☐	☐	☐

		7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
2.	**‘quality’**							
2.1	Input data for ‘quality’							
2.1.1	Capital for quality improvement	☐	☐	☐	☐	☐	☐	☐
2.1.2	Human resources management	☐	☐	☐	☐	☐	☐	☐
2.1.3	Strategic quality planning	☐	☐	☐	☐	☐	☐	☐
2.1.5	Technology input	☐	☐	☐	☐	☐	☐	☐
2.1.6	Customer focus	☐	☐	☐	☐	☐	☐	☐
2.1.7	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
2.1.8	Skill and knowledge	☐	☐	☐	☐	☐	☐	☐
2.1.9	Communication facilities	☐	☐	☐	☐	☐	☐	☐
2.1.10	Government support	☐	☐	☐	☐	☐	☐	☐
2.2	Output data for ‘quality’							
2.2.1	Quality management	☐	☐	☐	☐	☐	☐	☐
2.2.3	People satisfaction	☐	☐	☐	☐	☐	☐	☐
2.2.4	Quality accreditation	☐	☐	☐	☐	☐	☐	☐
3	**‘flexibility’**							
3.1	Input data for ‘flexibility’’							
3.1.1	Capital investment	☐	☐	☐	☐	☐	☐	☐
3.1.2	Organization change	☐	☐	☐	☐	☐	☐	☐
3.1.3	Human resources development	☐	☐	☐	☐	☐	☐	☐
3.1.4	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
3.1.5	Skill and knowledge	☐	☐	☐	☐	☐	☐	☐
3.1.6	Technology input	☐	☐	☐	☐	☐	☐	☐

		7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
3.1.7	Improved remuneration scheme	☐	☐	☐	☐	☐	☐	☐
3.1.8	Flexible manufacturing system	☐	☐	☐	☐	☐	☐	☐

3.2 Output data for ‘flexibility’’

		7	6	5	4	3	2	1
3.2.2	Customized product	☐	☐	☐	☐	☐	☐	☐
3.2.3	Short lead time	☐	☐	☐	☐	☐	☐	☐
3.2.4	Flexible corporation	☐	☐	☐	☐	☐	☐	☐
3.2.5	Diversified production	☐	☐	☐	☐	☐	☐	☐
3.2.6	Improved stock management (with lower buffer stock)	☐	☐	☐	☐	☐	☐	☐

4 ‘skill’

4.1 Input data for ‘skill’

		7	6	5	4	3	2	1
4.1.5	Technology upgrading	☐	☐	☐	☐	☐	☐	☐
4.1.7	Government support for skill development and acquisition	☐	☐	☐	☐	☐	☐	☐

4.2 Output data for ‘skill’

		7	6	5	4	3	2	1
4.2.1	New skill and knowledge	☐	☐	☐	☐	☐	☐	☐
4.2.2	Acceptable performance	☐	☐	☐	☐	☐	☐	☐
4.2.4	Productivity improvement	☐	☐	☐	☐	☐	☐	☐
4.2.6	Flexibility improvement	☐	☐	☐	☐	☐	☐	☐
4.2.7	Organization improvement	☐	☐	☐	☐	☐	☐	☐

		7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
5.	**'innovation'**							
5.1	Input data for 'innovation'							
5.1.1	Capital investment (including foreign direct investment)	☐	☐	☐	☐	☐	☐	☐
5.1.2	Technology development	☐	☐	☐	☐	☐	☐	☐
5.1.3	R & D expenditure	☐	☐	☐	☐	☐	☐	☐
5.1.4	R & D personnel	☐	☐	☐	☐	☐	☐	☐
5.1.5	New knowledge expenditure	☐	☐	☐	☐	☐	☐	☐
5.1.6	Government support	☐	☐	☐	☐	☐	☐	☐
5.1.7	Research contribution of local academic institution	☐	☐	☐	☐	☐	☐	☐
5.1.8	Technology transfer	☐	☐	☐	☐	☐	☐	☐
5.1.9	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
5.2	Output data for 'innovation'							
5.2.2	New process development	☐	☐	☐	☐	☐	☐	☐
5.2.4	New organization development	☐	☐	☐	☐	☐	☐	☐
5.2.5	New system development	☐	☐	☐	☐	☐	☐	☐
5.2.6	No. of patents generated	☐	☐	☐	☐	☐	☐	☐
5.2.7	No. of R & D personnel	☐	☐	☐	☐	☐	☐	☐
5.2.8	No. of publications	☐	☐	☐	☐	☐	☐	☐

		7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
5.2.9	No. of R & D firms and activities	☐	☐	☐	☐	☐	☐	☐
5.2.10	Technological change	☐	☐	☐	☐	☐	☐	☐

Other comments :

For the Third ‘Technometric’ Performance Attribute ‘Service’

Part II Details of Technological Level of Textiles and Clothing Industry
In the following indicators, please state the level of importance for measuring the technological level of your company:

	Key Indicators for Measuring the Technological Development of HKTCI	7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
1	**‘productivity’**	☐	☐	☐	☐	☐	☐	☐
1.1	Input data for ‘productivity’							
1.1.1	Capital investment	☐	☐	☐	☐	☐	☐	☐
1.1.2	Labour employment	☐	☐	☐	☐	☐	☐	☐
1.1.4	Technology input	☐	☐	☐	☐	☐	☐	☐
1.1.6	Skill acquisition	☐	☐	☐	☐	☐	☐	☐
1.1.7	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
1.2	Output data for ‘productivity’							
1.2.2	Technological change	☐	☐	☐	☐	☐	☐	☐
1.2.3	Economic growth	☐	☐	☐	☐	☐	☐	☐
2.	**‘quality’**							
2.1	Input data for ‘quality’							
2.1.1	Capital for quality improvement	☐	☐	☐	☐	☐	☐	☐
2.1.2	Human resources management	☐	☐	☐	☐	☐	☐	☐
2.1.3	Strategic quality planning	☐	☐	☐	☐	☐	☐	☐
2.1.4	Quality management system implementation	☐	☐	☐	☐	☐	☐	☐
2.1.5	Technology input	☐	☐	☐	☐	☐	☐	☐
2.1.6	Customer focus	☐	☐	☐	☐	☐	☐	☐

		7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
2.1.7	Education and training programmes	☐	☐	☐	☐	☐	☐	☐

in

2.1.8	Skill and knowledge acquisition	☐	☐	☐	☐	☐	☐	☐
2.1.9	Communication facilities	☐	☐	☐	☐	☐	☐	☐
2.1.10	Government support	☐	☐	☐	☐	☐	☐	☐

2.2 Output data for 'quality'

2.2.1	Quality management	☐	☐	☐	☐	☐	☐	☐
2.2.2	Customer satisfaction	☐	☐	☐	☐	☐	☐	☐
2.2.4	Quality accreditation	☐	☐	☐	☐	☐	☐	☐
2.2.5	Positive impact on society	☐	☐	☐	☐	☐	☐	☐
2.2.6	Market impact on society	☐	☐	☐	☐	☐	☐	☐

3 'flexibility'

3.1 Input data for 'flexibility''

3.1.4	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
3.1.5	Skill and knowledge	☐	☐	☐	☐	☐	☐	☐
3.1.6	Technology input	☐	☐	☐	☐	☐	☐	☐
3.1.7	Improved remuneration scheme	☐	☐	☐	☐	☐	☐	☐

3.2 Output data for 'flexibility''

3.2.4	Flexible corporation	☐	☐	☐	☐	☐	☐	☐
3.2.6	Improved stock management (with lower buffer stock)	☐	☐	☐	☐	☐	☐	☐

4 **‘skill’**		**7 extremely important**	**6 most important**	**5 important**	**4 neutral**	**3 less important**	**2 least important**	**1 insignificant**
4.1 Input data for ‘skill’								
4.1.2	Human resources	☐	☐	☐	☐	☐	☐	☐
4.1.3	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
4.1.4	Skill acquisition scheme	☐	☐	☐	☐	☐	☐	☐
4.1.5	Technology upgrading	☐	☐	☐	☐	☐	☐	☐
4.1.7	Government support for skill development and acquisition	☐	☐	☐	☐	☐	☐	☐
4.2 Output data for ‘skill’								
4.2.1	New skill and knowledge	☐	☐	☐	☐	☐	☐	☐
4.2.2	Acceptable performance	☐	☐	☐	☐	☐	☐	☐
4.2.3	Human resources improvement	☐	☐	☐	☐	☐	☐	☐
4.2.4	Productivity improvement	☐	☐	☐	☐	☐	☐	☐
4.2.5	Quality improvement	☐	☐	☐	☐	☐	☐	☐
4.2.7	Organization improvement	☐	☐	☐	☐	☐	☐	☐
5. ‘innovation’								
5.1 Input data of ‘innovation’								
5.1.1	Capital investment (including foreign direct investment)	☐	☐	☐	☐	☐	☐	☐
5.1.6	Government support	☐	☐	☐	☐	☐	☐	☐
5.1.9	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
5.2 Output data for ‘innovation’								

		7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
5.2.3	New quality development	☐	☐	☐	☐	☐	☐	☐
5.2.4	New organization development	☐	☐	☐	☐	☐	☐	☐
5.2.5	New system development	☐	☐	☐	☐	☐	☐	☐
5.2.6	No. of patents generated	☐	☐	☐	☐	☐	☐	☐
5.2.8	No. of publications	☐	☐	☐	☐	☐	☐	☐
5.2.11	Economic change	☐	☐	☐	☐	☐	☐	☐

Other comments :

Appendix 2

2nd Version Questionnaire for Interviewing in 10 Manufacturing Companies in HK, Italy and the USA respectively

Company Name ________________________ Date: ____________

Name of Respondent: ____________ Position: ____________ Tel. No: ____________

Part I General Information and Background of the Company

1.1 What type of textiles and garment manufacturing is carried out in your company?

☐ Yarn manufacturing ☐ Fabric manufacturing
☐ Dyeing, printing and finishing
☐ Cut & sewn garment manufacturing ☐ Knitted sweater manufacturing
☐ Others, please specify ________________________

1.2 Your company has been in operation for____year(s).

1.3 Does your company own any production facilities?

☐ Yes ☐ No

1.4 Does your company subcontract any manufacturing process off-shore?

☐ Yes Which area? __________ ☐ No

1.5 How many staff are employed in your company?

Managers ____________
Technologists ____________
Technicians ____________
Craftsmen ____________
Operators ____________
Clerk ____________

1.6 In the last 12 months, your average output per month was _____ kgs/yds/pcs.

1.7 The major market is in ____________________.

For the First 'Technometric' Performance Attribute 'Product'

Part II Details of Technological Level of the Textiles and Clothing Industry (TCI)
For the following indicators, please state the level of importance for measuring the technological level of the company:

	Key Indicators for Measuring the Technological Development of TCI	7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
1	**'productivity'**	☐	☐	☐	☐	☐	☐	☐
1.1	Input data of 'productivity'							
1.1.1	Capital investment	☐	☐	☐	☐	☐	☐	☐
1.1.2	Labour employment	☐	☐	☐	☐	☐	☐	☐
1.1.3	Technology input	☐	☐	☐	☐	☐	☐	☐
1.1.4	Raw material	☐	☐	☐	☐	☐	☐	☐
1.1.5	Skill acquisition	☐	☐	☐	☐	☐	☐	☐
1.1.6	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
1.1.8	Equipment investment	☐	☐	☐	☐	☐	☐	☐
1.2	Output data of 'productivity'							
1.2.2	Technological change	☐	☐	☐	☐	☐	☐	☐
1.2.3	Economic growth	☐	☐	☐	☐	☐	☐	☐
2.	**'quality'**							
2.1	Input data of 'quality'							
2.1.1	Capital investment	☐	☐	☐	☐	☐	☐	☐
2.1.2	Human resources management	☐	☐	☐	☐	☐	☐	☐
2.1.3	Strategic quality planning	☐	☐	☐	☐	☐	☐	☐
2.1.4	Quality management system implementation	☐	☐	☐	☐	☐	☐	☐

		7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
2.1.5	Technology input	☐	☐	☐	☐	☐	☐	☐
2.1.6	Customer focus	☐	☐	☐	☐	☐	☐	☐
2.1.7	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
2.1.8	Skill and knowledge acquisition	☐	☐	☐	☐	☐	☐	☐
2.1.9	Communication facilities	☐	☐	☐	☐	☐	☐	☐
2.1.10	Government support	☐	☐	☐	☐	☐	☐	☐

2.2 Output data of ‘quality’

2.2.1	Quality management	☐	☐	☐	☐	☐	☐	☐
2.2.2	Customer satisfaction	☐	☐	☐	☐	☐	☐	☐
2.2.4	Quality accreditation	☐	☐	☐	☐	☐	☐	☐
2.2.5	Positive impact on society	☐	☐	☐	☐	☐	☐	☐
2.2.6	Market share	☐	☐	☐	☐	☐	☐	☐

3 ‘flexibility’

3.1 Input data of ‘flexibility’

3.1.5	Technology input	☐	☐	☐	☐	☐	☐	☐
3.1.7	Flexible manufacturing system	☐	☐	☐	☐	☐	☐	☐

3.2 Output data of ‘flexibility’

3.2.1	Short product life cycle	☐	☐	☐	☐	☐	☐	☐
3.2.2	Customized product	☐	☐	☐	☐	☐	☐	☐
3.2.3	Short lead time	☐	☐	☐	☐	☐	☐	☐
3.2.4	Flexible corporation	☐	☐	☐	☐	☐	☐	☐

		7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
4	**‘skill’**							
4.1	Input data of ‘skill’							
4.1.1	Human resources	☐	☐	☐	☐	☐	☐	☐
4.1.2	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
4.1.3	Skill acquisition scheme	☐	☐	☐	☐	☐	☐	☐
4.1.4	Technology upgrading	☐	☐	☐	☐	☐	☐	☐
4.1.5	Government support for skill development and acquisition	☐	☐	☐	☐	☐	☐	☐
4.2	Output data of ‘skill’							
4.2.1	New skill and knowledge	☐	☐	☐	☐	☐	☐	☐
4.2.2	Acceptable performance	☐	☐	☐	☐	☐	☐	☐
4.2.3	Human resources improvement	☐	☐	☐	☐	☐	☐	☐
4.2.4	Productivity improvement	☐	☐	☐	☐	☐	☐	☐
4.2.5	Quality improvement	☐	☐	☐	☐	☐	☐	☐
4.2.7	Organization improvement	☐	☐	☐	☐	☐	☐	☐

5. ‘innovation’

5.1	Input data of ‘innovation’							
5.1.1	Capital investment (including foreign direct investment)	☐	☐	☐	☐	☐	☐	☐
5.1.2	Technology development	☐	☐	☐	☐	☐	☐	☐
5.1.3	R & D expenditure	☐	☐	☐	☐	☐	☐	☐
5.1.4	R & D personnel	☐	☐	☐	☐	☐	☐	☐

		7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
5.1.5	New knowledge expenditure	☐	☐	☐	☐	☐	☐	☐
5.1.6	Government support	☐	☐	☐	☐	☐	☐	☐
5.1.7	Research contribution of local academic institution	☐	☐	☐	☐	☐	☐	☐
5.1.8	Technology transfer	☐	☐	☐	☐	☐	☐	☐
5.1.9	Education and training programmes	☐	☐	☐	☐	☐	☐	☐

5.2 Output data of 'innovation'

5.2.1	New product development	☐	☐	☐	☐	☐	☐	☐
5.2.3	New quality development	☐	☐	☐	☐	☐	☐	☐
5.2.4	New organization development	☐	☐	☐	☐	☐	☐	☐
5.2.5	New system development	☐	☐	☐	☐	☐	☐	☐
5.2.6	No. of patents generated	☐	☐	☐	☐	☐	☐	☐
5.2.7	No. of R & D personnel	☐	☐	☐	☐	☐	☐	☐
5.2.8	No. of publications	☐	☐	☐	☐	☐	☐	☐
5.2.9	No. of R & D firms and activities	☐	☐	☐	☐	☐	☐	☐
5.2.10	Technological change	☐	☐	☐	☐	☐	☐	☐
5.2.11	Economic change	☐	☐	☐	☐	☐	☐	☐

Part III

Other comments:

For the second 'Technometric' Performance Attribute 'Process'
Part II Details of Technological Level of Textiles and Clothing Industry (TCI)
For the following indicators, please state the level of importance for measuring the technological level of your company:

	Key Indicators for Measuring the Technological Development of TCI	7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
1	**'productivity'**	☐	☐	☐	☐	☐	☐	☐
1.1	Input data of 'productivity'							
1.1.1	Capital investment	☐	☐	☐	☐	☐	☐	☐
1.1.2	Labour energy	☐	☐	☐	☐	☐	☐	☐
1.1.3	Technology input	☐	☐	☐	☐	☐	☐	☐
1.1.4	Raw material	☐	☐	☐	☐	☐	☐	☐
1.1.5	Skill acquisition	☐	☐	☐	☐	☐	☐	☐
1.1.6	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
1.1.7	Improved resources allocation	☐	☐	☐	☐	☐	☐	☐
1.1.8	Equipment investment	☐	☐	☐	☐	☐	☐	☐
1.2	Output data of 'productivity'							
1.2.1	Productivity growth	☐	☐	☐	☐	☐	☐	☐
1.2.2	Technological change	☐	☐	☐	☐	☐	☐	☐
1.2.3	Economic growth	☐	☐	☐	☐	☐	☐	☐
2.	**'quality'**							
2.1	Input data of 'quality'							
2.1.1	Capital for quality improvement	☐	☐	☐	☐	☐	☐	☐
2.1.2	Human resources management	☐	☐	☐	☐	☐	☐	☐

		7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
2.1.3	Strategic quality planning	☐	☐	☐	☐	☐	☐	☐
2.1.5	Technology input	☐	☐	☐	☐	☐	☐	☐
2.1.6	Customer focus	☐	☐	☐	☐	☐	☐	☐
2.1.7	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
2.1.8	Skill and knowledge acquisition	☐	☐	☐	☐	☐	☐	☐
2.1.9	Communication facilities	☐	☐	☐	☐	☐	☐	☐
2.1.10	Government support	☐	☐	☐	☐	☐	☐	☐

2.2 Output data of ‘quality’

2.2.1	Quality management	☐	☐	☐	☐	☐	☐	☐
2.2.3	People satisfaction	☐	☐	☐	☐	☐	☐	☐
2.2.4	Quality accreditation	☐	☐	☐	☐	☐	☐	☐

3 ‘flexibility’

3.1 Input data of ‘flexibility’

3.1.1	Capital investment	☐	☐	☐	☐	☐	☐	☐
3.1.2	Human resources development	☐	☐	☐	☐	☐	☐	☐
3.1.3	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
3.1.4	Skill and knowledge acquisition	☐	☐	☐	☐	☐	☐	☐
3.1.5	Technology input	☐	☐	☐	☐	☐	☐	☐
3.1.6	Improved remuneration scheme	☐	☐	☐	☐	☐	☐	☐
3.1.7	Flexible manufacturing system	☐	☐	☐	☐	☐	☐	☐

3.2 Output data of 'flexibility'

		7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
3.2.2	Customized product	☐	☐	☐	☐	☐	☐	☐
3.2.3	Short lead time	☐	☐	☐	☐	☐	☐	☐
3.2.4	Flexible corporation	☐	☐	☐	☐	☐	☐	☐
3.2.5	Improved stock management (with lower buffer stock)	☐	☐	☐	☐	☐	☐	☐

4 'skill'

4.1 Input data of 'skill'

4.1.4	Technology upgrading	☐	☐	☐	☐	☐	☐	☐
4.1.5	Government support on skill development and acquisition	☐	☐	☐	☐	☐	☐	☐

4.2 Output data of 'skill'

4.2.1	New skill and knowledge development	☐	☐	☐	☐	☐	☐	☐
4.2.2	Acceptable performance	☐	☐	☐	☐	☐	☐	☐
4.2.4	Productivity improvement	☐	☐	☐	☐	☐	☐	☐
4.2.6	Flexibility improvement	☐	☐	☐	☐	☐	☐	☐
4.2.7	Organization improvement	☐	☐	☐	☐	☐	☐	☐

5. 'innovation'

5.1 Input data of 'innovation'

5.1.1	Capital investment (including foreign direct investment)	☐	☐	☐	☐	☐	☐	☐

		7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
5.1.2	Technology development	☐	☐	☐	☐	☐	☐	☐
5.1.3	R & D expenditure	☐	☐	☐	☐	☐	☐	☐
5.1.4	R & D personnel	☐	☐	☐	☐	☐	☐	☐
5.1.5	New knowledge expenditure	☐	☐	☐	☐	☐	☐	☐
5.1.6	Government support	☐	☐	☐	☐	☐	☐	☐
5.1.7	Research contribution of local academic institution	☐	☐	☐	☐	☐	☐	☐
5.1.8	Technology transfer	☐	☐	☐	☐	☐	☐	☐
5.1.9	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
5.2	Output data of 'innovation'							
5.2.2	New process development	☐	☐	☐	☐	☐	☐	☐
5.2.4	New organization development	☐	☐	☐	☐	☐	☐	☐
5.2.5	New system development	☐	☐	☐	☐	☐	☐	☐
5.2.6	No. of patents generated	☐	☐	☐	☐	☐	☐	☐
5.2.7	No. of R & D personnel	☐	☐	☐	☐	☐	☐	☐
5.2.8	No. of publications	☐	☐	☐	☐	☐	☐	☐
5.2.9	No. of R & D firms and related activities	☐	☐	☐	☐	☐	☐	☐
5.2.10	Technological change	☐	☐	☐	☐	☐	☐	☐

Other comments :

For the third 'Technometric' Performance Attribute 'Service'

Part II Details of Technological Level of Textiles and Clothing Industry (TCI)
For the following indicators, please state the level of importance for measuring the technological level of your company:

	Key Indicators for Measuring the Technological Development of TCI	**7 extremely important**	**6 most important**	**5 important**	**4 neutral**	**3 less important**	**2 least important**	**1 insignificant**
1	**'productivity'**	☐	☐	☐	☐	☐	☐	☐
1.1	Input data of 'productivity'							
1.1.1	Capital investment	☐	☐	☐	☐	☐	☐	☐
1.1.2	Labour employment	☐	☐	☐	☐	☐	☐	☐
1.1.3	Technology input	☐	☐	☐	☐	☐	☐	☐
1.1.5	Skill acquisition	☐	☐	☐	☐	☐	☐	☐
1.1.6	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
1.2	Output data of 'productivity'							
1.2.2	Technological change	☐	☐	☐	☐	☐	☐	☐
1.2.3	Economic growth	☐	☐	☐	☐	☐	☐	☐
2.	**'quality'**							
2.1	Input data of 'quality'							
2.1.1	Capital for quality improvement	☐	☐	☐	☐	☐	☐	☐
2.1.2	Human resources management	☐	☐	☐	☐	☐	☐	☐
2.1.3	Strategic quality planning	☐	☐	☐	☐	☐	☐	☐
2.1.4	Quality management system implementation	☐	☐	☐	☐	☐	☐	☐
2.1.5	Technology input	☐	☐	☐	☐	☐	☐	☐
2.1.6	Customer focus	☐	☐	☐	☐	☐	☐	☐
2.1.7	Education and training programmes	☐	☐	☐	☐	☐	☐	☐

		7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
2.1.8	Skill and knowledge acquisition	☐	☐	☐	☐	☐	☐	☐
2.1.9	Communication facilities	☐	☐	☐	☐	☐	☐	☐
2.1.10	Government support	☐	☐	☐	☐	☐	☐	☐

2.2 Output data of 'quality'

2.2.1	Quality management	☐	☐	☐	☐	☐	☐	☐
2.2.2	Customer satisfaction	☐	☐	☐	☐	☐	☐	☐
2.2.4	Quality accreditation	☐	☐	☐	☐	☐	☐	☐
2.2.5	Positive impact on society	☐	☐	☐	☐	☐	☐	☐
2.2.6	Market impact on society	☐	☐	☐	☐	☐	☐	☐

3 'flexibility'

3.1 Input data of 'flexibility'

3.1.3	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
3.1.4	Skill and knowledge	☐	☐	☐	☐	☐	☐	☐
3.1.5	Technology input	☐	☐	☐	☐	☐	☐	☐
3.1.6	Improved remuneration scheme	☐	☐	☐	☐	☐	☐	☐

3.2 Output data of 'flexibility'

3.2.4	Flexible corporation	☐	☐	☐	☐	☐	☐	☐
3.2.5	Improved stock management (with lower buffer stock)	☐	☐	☐	☐	☐	☐	☐

4 'skill'

4.1 Input data of 'skill'		**7 extremely important**	**6 most important**	**5 important**	**4 neutral**	**3 less important**	**2 least important**	**1 insignificant**
4.1.1	Human resources	☐	☐	☐	☐	☐	☐	☐
4.1.2	Education and training programmes	☐	☐	☐	☐	☐	☐	☐
4.1.3	Skill acquisition scheme	☐	☐	☐	☐	☐	☐	☐
4.1.4	Technology upgrading	☐	☐	☐	☐	☐	☐	☐
4.1.5	Government support on skill development and acquisition	☐	☐	☐	☐	☐	☐	☐
4.2 Output data of 'skill'								
4.2.1	New skill and knowledge	☐	☐	☐	☐	☐	☐	☐
4.2.2	Acceptable performance	☐	☐	☐	☐	☐	☐	☐
4.2.3	Human resources improvement	☐	☐	☐	☐	☐	☐	☐
4.2.4	Productivity improvement	☐	☐	☐	☐	☐	☐	☐
4.2.5	Quality improvement	☐	☐	☐	☐	☐	☐	☐
4.2.7	Organization improvement	☐	☐	☐	☐	☐	☐	☐

5. 'innovation'

5.1 Input data of 'innovation'								
5.1.1	Capital investment (including foreign direct investment)	☐	☐	☐	☐	☐	☐	☐
5.1.6	Government support	☐	☐	☐	☐	☐	☐	☐
5.1.9	Education and training programmes	☐	☐	☐	☐	☐	☐	☐

5.2 Output data of 'innovation'

		7 extremely important	6 most important	5 important	4 neutral	3 less important	2 least important	1 insignificant
5.2.3	New quality development	☐	☐	☐	☐	☐	☐	☐
5.2.4	New organization development	☐	☐	☐	☐	☐	☐	☐
5.2.5	New system development	☐	☐	☐	☐	☐	☐	☐
5.2.6	No. of patents generated	☐	☐	☐	☐	☐	☐	☐
5.2.8	No. of publications	☐	☐	☐	☐	☐	☐	☐
5.2.11	Economic change	☐	☐	☐	☐	☐	☐	☐

Other comments :

Personal interview with 5 HKTC Experts for Rating on the importance of the key 'Technometric' Performance Attribute: 'Product' **Appendix 3**

E	Q1	q1.1.1	q1.1.2	q1.1.3	q1.1.4	q1.1.5	q1.1.6	q1.1.7	q1.1.8	q1.1.9	q1.1.10	q1.1.11	q1.1.12	q1.2.1	q1.2.2	q1.2.3	Q2	q2.1.1	q2.1.2	q2.1.3	q2.1.4
1		4	5		5	4	7	5			5	3	4		6	5		6	5	5	5
2		5	5		4	5	5	4			4	4	2		5	6		5	5	7	6
3		5	5		6	6	6	5			6	4	3		6	6		7	6	6	6
4		6	5		4	5	6	5			4	5	3		7	6		6	5	6	7
5		5	6		6	6	5	6			6	4	3		6	7		6	5	6	6
Mean		5.000	5.200		5.000	5.200	5.800	5.000			5.000	4.000	3.000		6.000	6.000		6.000	5.200	6.000	6.000

E	q2.1.5	q2.1.6	q2.1.7	q2.1.8	q2.1.9	q2.1.10	q2.2.1	q2.2.2	q2.2.3	q2.2.4	q2.2.5	q2.2.6	Q3	q3.1.1	q3.1.2	q3.1.3	q3.1.4	q3.1.5	q3.1.6	q3.1.7	q3.1.8
1	7	5	5	5	5	6	6	6		7	5	6							6		6
2	7	7	6	6	5	5	5	6		6	5	6							5		6
3	6	7	7	6	6	7	6	7		7	7	5							5		6
4	7	6	6	6	5	6	7	5		7	6	7							6		5
5	6	7	6	6	5	5	5	6		7	6	6							6		6
Mean	6.600	6.400	6.000	5.800	5.200	5.800	5.800	6.000		6.800	5.800	6.000							5.600		5.800

E	q3.2.1	q3.2.2	q3.2.3	q3.2.4	q3.2.5	q3.2.6	Q4	q4.1.1	q4.1.2	q4.1.3	q4.1.4	q4.1.5	q4.1.6	q4.1.7	q4.2.1	q4.2.2	q4.2.3	q4.2.4	q4.2.5	q4.2.6	q4.2.7
1	7	7	6	5					4	4	6	5		5	5	5	5	6	6		6
2	6	7	5	6					5	5	5	7		4	6	5	5	7	5		5
3	5	6	6	6					5	6	5	6		6	6	6	6	6	5		6
4	6	7	6	7					6	5	6	6		7	6	5	6	7	6		6
5	6	6	6	6					5	6	6	5		4	6	5	7	7	6		6
Mean	6.000	6.600	5.800	6.000					5.000	5.200	5.600	5.800		5.200	5.800	5.200	5.800	6.600	5.600		5.800

E	q5.1.1	q5.1.2	q5.1.3	q5.1.4	q5.1.5	q5.1.6	q5.1.7	q5.1.8	q5.1.9	q5.2.1	q5.2.2	q5.2.3	q5.2.4	q5.2.5	q5.2.6	q5.2.7	q5.2.8	q5.2.9	q5.2.10	q5.2.11
1	7	6	5	6	6	7	5	5	6	6		7	7	7	6	6	5	5	5	6
2	5	7	6	7	7	6	6	6	7	6		7	6	6	7	7	6	6	5	7
3	6	6	7	7	6	6	7	7	7	7		6	7	6	6	7	6	6	6	7
4	5	7	5	5	7	6	5	6	5	5		5	7	5	7	5	5	6	6	7
5	5	7	5	6	7	5	6	5	5	5		6	7	6	7	6	6	6	7	6
Mean	5.600	6.600	5.600	6.200	6.600	6.000	5.800	5.800	6.000	5.800		6.200	6.800	6.000	6.600	6.200	5.600	5.800	5.800	6.600

Remarks:
E: Hong Kong Textiles and Clothing Experts

Personal interview with 5 Hong Kong T & C Experts for Rating on the importance of the key 'Technometric' Performance Attribute: 'Process'

E	Q1	q1.1.1	q1.1.2	q1.1.3	q1.1.4	q1.1.5	q1.1.6	q1.1.7	q1.1.8	q1.1.9	q1.1.10	q1.1.11	q1.1.12	q1.2.1	q1.2.2	q1.2.3	Q2	q2.1.1	q2.1.2	q2.1.3	q2.1.4
1		5	6	4	5	6	7	5	3	6	6	3	4	5	6	5		5	5	5	
2		6	6	5	4	7	5	6	4	5	7	3	5	4	7	4		4	5	4	
3		4	5	3	6	5	7	6	3	4	6	2	4	6	6	5		6	6	5	
4		4	6	4	4	6	6	5	5	5	5	4	4	4	5	5		5	5	6	
5		6	6	4	6	6	6	5	4	6	6	3	3	6	6	6		6	5	5	
Mean		5.000	5.800	4.000	5.000	6.000	6.200	5.400	3.800	5.200	6.000	3.000	4.000	5.000	6.000	5.000		5.200	5.200	5.000	

E	q2.1.5	q2.1.6	q2.1.7	q2.1.8	q2.1.9	q2.1.10	q2.2.1	q2.2.2	q2.2.3	q2.2.4	q2.2.5	q2.2.6	Q3	q3.1.1	q3.1.2	q3.1.3	q3.1.4	q3.1.5	q3.1.6	q3.1.7	q3.1.8
1	5	7	5	5	4	7	5		7	4				5	5	6	6	5	6	4	6
2	5	6	7	4	5	7	4		6	6				7	4	5	5	6	7	5	6
3	6	4	6	6	6	7	6		7	7				6	3	7	6	6	6	6	6
4	4	6	6	5	5	6	6		5	7				6	4	6	7	6	5	5	5
5	5	6	6	5	6	7	5		6	7				6	4	6	7	7	5	6	6
Mean	5.000	5.800	6.000	5.000	5.200	6.800	5.200		6.200	6.200				6.000	4.000	6.000	6.200	6.000	5.800	5.200	5.800

E	q3.2.1	q3.2.2	q3.2.3	q3.2.4	q3.2.5	q3.2.6	Q4	q4.1.1	q4.1.2	q4.1.3	q4.1.4	q4.1.5	q4.1.6	q4.1.7	q4.2.1	q4.2.2	q4.2.3	q4.2.4	q4.2.5	q4.2.6	q4.2.7
1		6	7	5	4	6						5		5	5	5		6		6	6
2		5	7	6	3	5						7		6	6	5		7		5	5
3		6	6	6	4	4						6		6	6	6		6		5	6
4		7	7	7	4	5						6		7	6	5		7		4	6
5		6	7	6	5	5						5		6	6	5		7		5	6
Mean		6.000	6.800	6.000	4.000	5.000						5.800		6.000	5.800	5.200		6.600		5.000	5.800

E	q5.1.1	q5.1.2	q5.1.3	q5.1.4	q5.1.5	q5.1.6	q5.1.7	q5.1.8	q5.1.9	q5.2.1	q5.2.2	q5.2.3	q5.2.4	q5.2.5	q5.2.6	q5.2.7	q5.2.8	q5.2.9	q5.2.10	q5.2.11
1	7	7	5	6	7	7	5	6	6		5		5	7	7	6	6	5	7	
2	6	7	6	7	7	6	6	6	7		5		6	6	7	7	6	7	7	
3	6	6	7	7	6	6	7	7	7		7		5	6	6	7	7	6	7	
4	7	7	5	5	7	6	5	6	5		6		7	5	7	5	5	5	6	
5	7	7	5	6	7	5	6	5	5		6		7	6	7	6	6	6	7	
Mean	6.600	6.800	5.600	6.200	6.800	6.000	5.800	6.000	6.000		5.800		6.000	6.000	6.800	6.200	6.000	5.800	6.800	

Remarks:
E: Hong Kong Textiles and Clothing Experts

Personal interview with 5 Hong Kong T & C Experts for Rating on the importance of the key 'Technometric' Performance Attribute: 'Service'

E	Q1	q1.1.1	q1.1.2	q1.1.3	q1.1.4	q1.1.5	q1.1.6	q1.1.7	q1.1.8	q1.1.9	q1.1.10	q1.1.11	q1.1.12	q1.2.1	q1.2.2	q1.2.3	Q2	q2.1.1	q2.1.2	q2.1.3	q2.1.4
1		5	5		6		6	5							5	5		5	5	6	7
2		4	5		5		5	6							4	5		5	5	7	7
3		5	4		6		6	5							6	6		6	6	6	6
4		6	5		5		6	5							6	5		4	5	5	7
5		5	6		7		5	6							5	5		5	5	6	7
Mean		5.000	5.000		5.800		5.600	5.400							5.200	5.200		5.000	5.200	6.000	6.800

E	q2.1.5	q2.1.6	q2.1.7	q2.1.8	q2.1.9	q2.1.10	q2.2.1	q2.2.2	q2.2.3	q2.2.4	q2.2.5	q2.2.6	Q3	q3.1.1	q3.1.2	q3.1.3	q3.1.4	q3.1.5	q3.1.6	q3.1.7	q3.1.8
1	7	5	7	5	5	6	4	6		5	5	6					5	6	7	5	
2	7	6	6	4	5	7	5	7		4	5	6					6	7	6	5	
3	6	7	7	4	5	5	6	6		5	4	7					6	5	7	4	
4	7	6	6	6	5	6	5	5		6	5	5					5	6	6	5	
5	6	7	7	6	5	5	5	6		5	6	6					7	6	7	6	
Mean	6.600	6.200	6.600	5.000	5.000	5.800	5.000	6.000		5.000	5.000	6.000					5.800	6.000	6.600	5.000	

E	q3.2.1	q3.2.2	q3.2.3	q3.2.4	q3.2.5	q3.2.6	Q4	q4.1.1	q4.1.2	q4.1.3	q4.1.4	q4.1.5	q4.1.6	q4.1.7	q4.2.1	q4.2.2	q4.2.3	q4.2.4	q4.2.5	q4.2.6	q4.2.7
1				7		6			5	6	7	5		6	6	5	5	7	5		6
2				6		5			4	5	5	6		6	6	5	5	7	5		5
3				6		5			5	6	6	6		6	7	6	6	6	5		6
4				6		5			6	6	6	6		7	5	5	5	7	7		6
5				6		6			5	6	6	5		4	6	5	4	7	4		6
Mean				6.200		5.400			5.000	5.800	6.000	5.600		5.800	6.000	5.200	5.000	6.800	5.200		5.800

E	q5.1.1	q5.1.2	q5.1.3	q5.1.4	q5.1.5	q5.1.6	q5.1.7	q5.1.8	q5.1.9	q5.2.1	q5.2.2	q5.2.3	q5.2.4	q5.2.5	q5.2.6	q5.2.7	q5.2.8	q5.2.9	q5.2.10	q5.2.11
1	5					6			6			6	5	6	6		5			5
2	6					4			7			7	6	6	6		6			5
3	5					6			7			6	6	6	6		5			7
4	5					4			5			5	6	5	7		5			7
5	5					5			5			6	7	6	6		5			6
Mean	5.200					5.000			6.000			6.000	6.000	5.800	6.200		5.200			6.000

Remarks:
E: Hong Kong Textiles and Clothing Experts

Personal interview with 10 TC manufacturing companies in 3 selected countries, i.e., HKSAR of China, Italy and the USA respectively in December 2001 to determine key 'Technometric' Performance Attributes (in 'Product') **Appendix 4**

	Q1	q1.1.1	q1.1.2	q1.1.3	q1.1.4	q1.1.5	q1.1.6	q1.1.8	q1.2.2	q1.2.3	Q2	q2.1.1	q2.1.2	q2.1.3	q2.1.4	q2.1.5	q2.1.6
1		6	6	5	5	6	5	5	6	5		5	5	5	5	5	6
1		5	5	6	6	6	5	6	5	6		5	5	5	6	6	6
1		6	5	6	6	6	6	6	6	6		7	7	6	6	6	7
1		6	6	7	6	7	6	6	7	6		6	6	6	6	7	7
1		6	6	6	6	6	5	6	6	5		5	5	6	6	6	6
1		5	5	6	5	6	6	5	6	5		5	5	5	5	6	5
1		5	5	5	5	6	5	5	5	5		5	6	5	6	5	5
1		6	6	7	6	7	7	6	7	7		6	7	7	6	7	7
1		6	6	7	6	6	7	6	6	6		6	6	6	7	6	6
1		5	6	5	6	5	5	5	5	5		5	5	5	5	5	6
2		6	6	6	6	6	5	6	5	5		3	5	5	6	5	5
2		6	5	6	6	6	5	6	5	5		5	6	5	5	6	6
2		6	5	5	5	5	4	5	6	5		4	5	6	4	4	4
2		6	6	6	5	6	5	5	5	6		4	6	6	5	6	6
2		6	5	6	5	5	5	6	6	5		5	5	6	6	5	7
2		5	4	5	5	6	6	6	6	5		5	5	5	6	6	6
2		5	5	5	4	6	5	6	5	5		5	6	5	6	5	5
2		6	5	6	5	6	5	6	7	6		5	6	6	6	5	6
2		5	5	6	6	6	5	5	5	4		6	5	6	5	5	5
2		6	5	6	5	5	6	5	6	5		5	6	5	5	6	5
3		6	6	6	5	6	5	5	7	5		5	5	5	6	5	6
3		5	5	6	5	6	6	6	6	6		5	5	5	6	5	7
3		6	5	6	5	4	4	5	6	5		6	5	6	4	4	6
3		6	6	5	5	5	6	5	7	6		6	6	5	7	5	6
3		7	6	6	4	6	5	6	6	5		5	6	6	6	5	7
3		6	5	6	5	5	6	6	6	4		6	5	5	6	6	7
3		5	5	6	5	6	5	5	6	5		5	6	5	6	5	6
3		4	5	4	5	4	4	5	4	5		5	4	4	5	5	4
3		5	5	4	4	5	6	5	5	5		6	5	4	4	5	5
3		6	6	6	4	5	5	5	7	5		5	5	5	6	5	6
Mean		5.633	5.367	5.733	5.200	5.667	5.333	5.500	5.833	5.267		5.200	5.467	5.367	5.600	5.400	5.867

	q2.1.7	q2.1.8	q2.1.9	q2.1.10	q2.2.1	q2.2.2	q2.2.4	q2.2.5	q2.2.6	Q3	q3.1.5	q3.1.7	q3.2.1	q3.2.2	q3.2.3	q3.2.4
1	5	5	6	4	5	6	5	5	6		5	4	4	5	4	5
1	6	6	6	5	5	6	6	5	6		6	5	5	5	5	6
1	7	6	7	7	6	7	6	7	7		6	5	6	6	6	6
1	6	6	6	6	6	7	6	6	7		7	6	6	6	7	7
1	6	6	6	5	5	6	6	6	6		6	6	5	6	6	6
1	6	6	6	5	5	6	5	5	6		6	5	6	5	6	5
1	5	5	5	5	5	5	5	5	5		5	4	6	5	5	5
1	7	6	6	6	6	7	6	6	6		7	6	6	7	7	6
1	6	7	6	7	6	6	6	6	6		6	7	6	6	6	6
1	6	5	5	5	5	6	6	6	6		6	5	6	5	6	5
2	5	6	5	5	6	6	5	4	5		6	5	5	5	6	6
2	4	5	6	5	5	5	6	5	5		6	5	5	5	5	5
2	6	6	5	5	5	5	5	6	6		6	4	5	5	6	5
2	4	5	5	6	6	6	5	5	5		5	5	6	5	6	5
2	5	6	5	5	5	5	5	6	6		5	6	5	6	5	5
2	5	6	5	4	5	6	5	5	5		5	6	4	4	5	5
2	4	6	5	5	5	6	6	6	5		6	6	5	6	5	6
2	6	6	5	5	6	6	6	5	5		6	5	6	5	6	4
2	6	5	5	5	6	6	5	4	5		6	5	5	7	6	5
2	5	6	5	5	5	6	5	5	5		6	6	5	5	5	5
3	5	6	5	4	5	6	5	4	5		5	6	6	5	6	6
3	6	5	6	5	5	6	4	5	6		6	6	7	6	7	5
3	6	6	5	5	5	6	5	4	6		6	7	5	4	5	5
3	5	5	6	5	6	7	4	5	6		5	6	6	4	6	6
3	5	6	5	5	6	6	5	5	6		5	5	7	6	5	5
3	5	5	6	5	5	7	5	5	5		5	5	6	5	6	5
3	6	5	5	4	5	6	6	5	5		6	6	6	6	6	6
3	5	5	4	5	4	5	5	4	5		5	6	4	4	5	4
3	5	5	5	5	6	6	4	5	5		5	5	4	4	5	5
3	4	5	5	4	6	7	5	5	7		6	5	6	5	5	5
Mean	5.400	5.600	5.400	5.067	5.367	6.033	5.267	5.167	5.633		5.700	5.433	5.467	5.267	5.633	5.333

	Q4	q4.1.1	q4.1.2	q4.1.3	q4.1.4	q4.1.5	q4.2.1	q4.2.2	q4.2.3	q4.2.4	q4.2.5	q4.2.7	Q5	q5.1.1	q5.1.2	q5.1.3	q5.1.4
1		5	6	5	5	4	5	5	4	4	6	4		5	5	5	5
1		5	6	6	6	5	5	5	5	5	6	6		5	5	6	6
1		6	7	6	6	7	6	6	6	6	7	7		7	7	7	6
1		6	6	6	6	6	6	6	6	7	7	6		7	7	7	7
1		5	6	6	6	6	6	6	5	5	5	5		6	6	5	5
1		5	6	6	6	5	6	5	5	6	6	5		5	6	6	6
1		6	5	5	5	4	6	5	5	5	5	5		5	5	5	5
1		7	6	6	7	6	7	6	7	6	6	6		7	6	6	6
1		7	7	6	6	6	6	7	6	6	7	6		6	6	6	6
1		6	6	6	6	5	6	5	5	5	6	5		5	6	5	5
2		7	6	5	6	5	6	5	5	6	6	5		5	6	6	5
2		6	5	5	5	5	5	4	5	6	6	5		5	5	6	5
2		6	5	6	5	4	6	5	6	5	5	6		6	6	7	6
2		6	5	5	6	5	6	4	5	5	6	5		5	6	6	5
2		5	5	6	6	6	5	5	6	6	5	5		4	5	5	5
2		6	5	6	5	5	5	5	5	6	6	6		6	6	5	5
2		5	6	5	6	6	5	6	5	6	5	5		6	5	6	5
2		6	6	6	5	5	6	5	6	5	6	5		5	6	5	4
2		5	5	5	6	5	6	6	6	6	6	5		5	6	6	5
2		6	6	5	6	5	5	5	5	5	5	5		5	5	6	5
3		5	5	5	5	6	5	4	4	5	5	5		6	6	5	5
3		5	6	3	5	4	5	5	4	5	4	4		6	6	5	5
3		4	5	4	6	4	4	4	5	6	5	5		5	4	4	5
3		5	6	4	7	5	5	5	4	5	6	5		5	5	6	6
3		5	5	5	5	5	5	5	5	6	6	4		6	6	5	5
3		6	6	5	6	5	6	5	5	5	5	4		5	6	6	6
3		5	5	6	7	5	5	5	5	5	6	5		5	6	5	5
3		4	5	5	4	4	4	5	4	5	5	4		5	5	4	5
3		4	5	4	5	4	5	4	5	6	4	5		5	5	5	5
3		5	6	6	6	5	6	5	4	5	5	4		6	5	5	5
Mean		5.467	5.633	5.300	5.700	5.067	5.467	5.100	5.100	5.467	5.600	5.067		5.467	5.633	5.533	5.300

	q5.1.5	q5.1.6	q5.1.7	q5.1.8	q5.1.9	q5.2.1	q5.2.3	q5.2.4	q5.2.5	q5.2.6	q5.2.7	q5.2.8	q5.2.9	q5.2.10	q5.2.11
1	4	4	4	4	5	6	6	4	5	5	5	4	4	4	5
1	5	5	5	4	5	6	5	5	5	5	5	2	3	4	4
1	6	5	5	6	6	7	6	5	5	5	5	4	4	5	5
1	7	6	5	6	6	7	6	6	5	6	6	5	5	6	6
1	5	5	5	5	5	5	6	6	6	5	5	5	5	5	5
1	6	6	5	5	5	5	5	5	4	5	5	5	5	4	4
1	5	4	5	5	5	5	5	4	5	4	5	4	4	5	4
1	6	6	6	6	7	6	6	6	6	7	7	6	7	7	6
1	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
1	5	6	5	6	6	6	5	5	5	5	5	5	5	6	5
2	6	5	5	6	5	7	7	5	4	5	4	4	3	6	4
2	5	5	6	5	5	6	6	6	5	5	5	5	6	5	6
2	5	5	5	6	6	6	6	5	5	5	6	6	5	5	6
2	6	5	6	6	5	5	4	6	3	5	5	4	4	7	5
2	6	6	5	5	6	5	6	5	6	4	5	5	5	6	5
2	6	5	6	6	5	5	6	5	4	5	5	5	4	5	6
2	6	6	5	6	5	6	7	6	5	6	5	5	6	6	6
2	5	5	6	5	5	6	6	7	3	5	7	4	4	7	5
2	6	5	6	6	6	5	6	5	6	6	7	4	5	6	5
2	6	5	6	5	5	5	7	5	5	5	5	5	5	7	5
3	5	4	5	6	5	6	6	5	5	6	5	6	6	5	5
3	5	5	4	6	5	6	7	5	5	5	4	6	5	5	4
3	6	5	5	5	6	7	6	5	6	6	5	7	6	6	6
3	6	5	5	5	5	6	6	5	6	7	6	5	6	6	4
3	5	5	5	6	5	6	7	5	5	6	5	6	5	5	6
3	5	4	4	6	5	7	6	4	5	6	5	4	7	5	5
3	6	5	5	6	5	6	7	5	6	5	5	6	5	6	4
3	6	5	5	5	4	4	5	4	5	4	6	5	6	5	5
3	5	5	5	5	5	4	4	4	5	6	4	5	6	5	4
3	6	4	5	5	5	6	6	5	6	5	5	5	5	5	5
Mean	5.567	5.067	5.167	5.467	5.300	5.767	5.900	5.133	5.067	5.333	5.267	4.933	5.067	5.500	5.033

Note :
1. : T&C Companies in HKSAR of China
2. : T&C Companies in Italy
3. : T&C Companies in the USA

Personal interview with 10 TC manufacturing companies in 3 selected countries, i.e., HKSAR of China, Italy and the USA respectively in December 2001 to determine key 'Technometric' Performance Attributes (in 'Process')

	Q1	q1.1.1	q1.1.2	q1.1.3	q1.1.4	q1.1.5	q1.1.6	q1.1.7	q1.1.8	q1.2.1	q1.2.2	q1.2.3
1		6	6	5	5	6	5	5	5	5	6	5
1		5	5	6	6	5	5	5	4	5	5	5
1		6	5	6	6	6	6	7	6	6	5	6
1		6	5	5	6	5	6	5	5	6	5	6
1		5	6	6	5	6	5	5	6	5	5	5
1		6	5	6	5	6	6	6	5	5	6	5
1		5	6	5	5	6	5	6	5	6	5	5
1		6	7	6	6	7	6	6	6	6	7	6
1		6	6	6	6	6	7	6	6	7	6	6
1		5	6	5	6	5	5	5	5	6	5	5
2		6	5	6	5	6	5	5	6	6	5	5
2		6	5	6	6	6	5	5	6	5	6	5
2		6	5	5	5	5	4	5	5	6	6	5
2		5	6	5	5	6	5	5	5	5	5	6
2		6	5	6	5	5	6	5	6	5	6	5
2		5	4	5	5	6	6	5	6	5	6	5
2		5	6	5	4	6	5	6	6	5	5	5
2		6	5	6	5	6	5	5	6	6	5	6
2		6	5	6	6	6	5	5	5	6	5	4
2		5	5	6	5	5	6	5	5	6	5	5
3		6	6	6	5	6	5	5	5	6	7	5
3		5	5	6	5	6	6	5	6	7	6	6
3		6	5	6	5	4	4	5	5	6	6	5
3		6	6	5	5	5	6	5	5	6	7	6
3		5	6	5	4	6	5	5	6	7	6	5
3		6	5	6	5	5	6	4	6	6	6	4
3		5	5	6	5	6	5	5	5	6	6	5
3		4	5	4	5	4	4	5	5	4	4	5
3		5	5	4	4	5	6	5	5	4	5	5
3		6	6	5	4	5	5	4	5	6	6	5
Mean		5.533	5.400	5.500	5.133	5.567	5.333	5.167	5.400	5.667	5.600	5.200

	Q2	q2.1.1	q2.1.2	q2.1.3	q2.1.5	q2.1.6	q2.1.7	q2.1.8	q2.1.9	q2.1.10	q2.2.1	q2.2.3	q2.2.4
1		5	5	5	5	6	5	5	5	4	5	5	5
1		5	5	5	5	6	6	5	6	5	5	6	6
1		7	7	6	6	7	6	6	6	7	6	7	6
1		6	6	5	7	7	6	6	5	6	6	6	6
1		5	5	6	6	5	6	5	6	5	5	6	6
1		5	5	6	6	5	6	5	6	5	5	5	6
1		5	5	5	6	5	5	6	5	6	5	5	5
1		6	7	6	7	6	7	6	6	5	6	7	6
1		6	5	6	6	5	6	7	6	7	6	5	6
1		5	6	5	5	6	6	5	5	5	5	5	6
2		6	5	5	5	5	5	6	5	5	6	5	5
2		5	6	6	6	6	4	5	6	5	6	5	6
2		4	5	6	4	5	6	6	5	5	5	6	5
2		4	6	6	6	6	4	5	6	6	6	5	5
2		5	5	6	5	6	5	6	5	5	5	6	5
2		5	5	5	5	6	5	6	5	4	5	5	5
2		5	5	5	5	5	4	6	5	6	5	5	6
2		5	6	6	5	6	6	6	5	5	6	7	6
2		6	6	6	5	5	6	5	5	5	6	6	5
2		5	6	5	6	5	5	6	5	5	5	5	5
3		5	5	5	5	6	5	6	5	4	5	5	5
3		5	5	5	5	7	6	5	6	5	5	5	4
3		6	5	6	4	6	6	6	5	5	5	6	5
3		6	6	5	5	6	5	5	6	5	6	5	4
3		5	6	6	5	7	5	6	5	5	6	4	5
3		6	5	5	6	7	5	5	6	5	5	5	5
3		5	6	5	5	6	6	5	5	4	5	4	6
3		5	4	5	5	4	5	5	4	5	4	4	5
3		6	5	4	5	5	5	5	5	5	6	5	4
3		5	5	5	5	6	4	5	5	4	6	4	5
Mean		5.300	5.433	5.400	5.367	5.767	5.367	5.533	5.333	5.100	5.400	5.300	5.300

	Q3	q3.1.1	q3.1.2	q3.1.3	q3.1.4	q3.1.5	q3.1.6
1		5	5	5	5	5	6
1		5	5	6	6	6	5
1		6	6	7	6	6	7
1		6	7	6	6	7	6
1		7	6	6	7	6	6
1		5	5	6	6	6	5
1		5	5	5	5	5	5
1		6	7	7	7	7	6
1		6	7	6	6	6	6
1		5	5	6	5	6	5
2		4	4	5	7	6	4
2		5	5	6	6	6	5
2		5	4	4	5	6	6
2		4	5	5	6	5	5
2		5	5	5	6	5	5
2		6	5	6	6	5	6
2		5	4	5	5	6	5
2		5	5	5	6	6	5
2		5	4	5	6	6	5
2		6	4	4	5	6	5
3		5	5	6	6	5	5
3		6	6	5	5	6	5
3		5	4	4	6	6	4
3		5	4	6	6	5	5
3		6	6	5	5	5	4
3		5	5	6	6	5	6
3		6	5	5	5	6	5
3		5	5	4	5	5	5
3		6	5	6	5	5	4
3		6	5	5	5	6	5
Mean		5.367	5.100	5.400	5.700	5.700	5.200

	q3.1.7	q3.2.2	q3.2.3	q3.2.4	q3.2.5	Q4	q4.1.4	q4.1.5	q4.2.1	q4.2.2	q4.2.4	q4.2.6	q4.2.7
1	5	5	4	5	5		5	6	5	5	5	5	5
1	5	5	5	6	6		6	5	5	5	5	6	6
1	5	6	6	6	7		6	7	6	6	6	7	7
1	6	6	7	6	6		6	6	6	6	7	7	6
1	6	6	6	6	5		6	6	6	6	5	5	5
1	5	5	6	5	6		6	5	6	5	6	6	5
1	4	5	5	5	5		5	4	6	5	5	5	5
1	6	7	7	6	6		7	6	7	6	6	7	6
1	7	6	6	6	6		6	6	6	7	6	6	6
1	5	5	6	5	5		6	5	6	5	5	5	5
2	5	5	6	6	5		6	5	6	5	6	6	5
2	5	5	6	5	5		5	5	5	4	6	5	5
2	4	5	6	5	4		5	4	6	5	5	6	6
2	5	5	6	5	6		6	5	6	4	5	6	5
2	6	6	5	5	5		6	6	5	5	6	5	5
2	6	4	5	5	5		5	5	5	5	6	5	6
2	6	6	5	6	5		6	6	5	6	6	6	5
2	5	5	6	4	5		5	5	6	5	5	6	5
2	5	7	6	5	6		6	5	6	6	6	5	5
2	6	5	5	5	5		6	5	5	5	5	6	5
3	6	5	6	6	5		5	6	5	4	5	6	5
3	6	6	7	5	5		5	4	5	5	5	6	4
3	7	4	5	5	6		6	4	4	4	6	4	5
3	6	4	6	6	5		7	5	5	5	5	6	5
3	5	6	5	5	6		5	5	5	5	6	6	4
3	5	5	6	5	5		6	5	6	5	5	7	4
3	6	6	6	6	5		7	5	5	5	5	6	5
3	6	4	5	4	4		4	4	4	5	5	4	4
3	5	4	5	5	4		5	4	5	4	6	4	5
3	5	5	5	6	5		6	5	6	5	5	7	4
Mean	5.467	5.267	5.667	5.333	5.267		5.700	5.133	5.467	5.100	5.500	5.700	5.100

	Q5	q5.1.1	q5.1.2	q5.1.3	q5.1.4	q5.1.5	q5.1.6	q5.1.7	q5.1.8	q5.1.9
1		5	6	5	5	4	5	4	5	5
1		5	5	6	6	5	5	5	4	5
1		7	7	7	6	6	5	5	6	6
1		7	7	7	7	7	6	5	6	6
1		6	6	5	5	5	5	5	5	5
1		5	6	6	6	6	6	6	5	5
1		5	5	5	5	5	4	5	5	5
1		7	6	6	6	6	6	6	6	7
1		6	6	6	6	6	6	6	6	6
1		5	6	5	5	5	6	5	6	6
2		5	6	6	5	6	5	5	6	5
2		5	5	6	5	5	5	6	5	5
2		6	6	7	6	5	5	5	6	6
2		5	6	6	5	6	5	6	6	5
2		4	5	5	5	6	6	5	5	6
2		6	6	5	5	6	5	6	6	5
2		6	5	6	5	6	6	5	6	5
2		5	6	5	4	5	5	6	5	5
2		5	6	6	5	6	5	6	6	6
2		5	5	6	5	6	5	6	5	5
3		6	6	5	5	5	4	5	6	5
3		6	6	5	5	5	5	4	6	5
3		5	4	4	5	6	5	5	5	6
3		5	5	6	6	6	5	5	5	5
3		6	6	5	5	5	5	5	6	5
3		5	6	6	6	5	4	4	6	5
3		5	6	5	5	6	5	5	6	5
3		5	5	4	5	6	5	5	5	4
3		5	5	5	5	5	5	5	5	5
3		6	5	5	5	6	4	5	5	5
Mean		5.467	5.667	5.533	5.300	5.567	5.100	5.200	5.500	5.300

	q5.2.2	q5.2.4	q5.2.5	q5.2.6	q5.2.7	q5.2.8	q5.2.9	q5.2.10
1	6	5	5	5	5	4	6	4
1	5	5	5	5	5	6	5	4
1	6	5	5	5	5	4	4	5
1	5	6	5	6	6	5	5	6
1	5	6	6	5	5	5	5	5
1	5	5	4	5	5	5	5	4
1	4	4	5	4	5	4	4	5
1	6	6	6	7	7	6	7	7
1	6	6	6	6	6	6	6	6
1	6	5	5	5	5	5	5	6
2	5	5	4	5	4	4	3	6
2	5	6	5	5	5	5	6	5
2	5	5	5	5	6	6	5	5
2	4	6	5	5	5	4	4	7
2	6	5	6	4	5	5	5	6
2	6	5	4	5	5	5	4	5
2	6	6	5	6	5	5	6	6
2	7	7	6	5	7	6	5	7
2	7	5	6	6	7	4	5	6
2	5	5	5	5	5	5	5	7
3	6	5	5	6	5	6	6	5
3	7	5	5	5	4	6	5	5
3	6	5	6	5	5	7	6	6
3	6	5	6	7	6	5	6	6
3	6	5	5	6	5	6	5	5
3	5	4	5	6	5	4	7	5
3	5	5	6	5	5	6	5	6
3	5	4	5	4	6	5	6	5
3	5	4	5	6	4	5	6	5
3	6	5	6	5	5	5	5	5
Mean	5.567	5.167	5.233	5.300	5.267	5.133	5.233	5.500

Note :
1. : T&C Companies in HKSAR of China
2. : T&C Companies in Italy
3. : T&C Companies in the USA

Personal interview with 10 TC manufacturing companies in 3 selected countries, i.e., HKSAR of China, Italy and the USA respectively in December 2001 to determine key 'Technometric' Performance Attributes (in 'Service')

	Q1	q1.1.1	q1.1.2	q1.1.3	q1.1.5	q1.1.6	q1.2.2	q1.2.3	Q2	q2.1.1	q2.1.2	q2.1.3	q2.1.4	q2.1.5	q2.1.6	q2.1.7	q2.1.8	q2.1.9	q2.1.10	q2.2.1	q2.2.2	q2.2.4	q2.2.5	q2.2.6	Q3	q3.1.3	q3.1.4
1		6	6	5	6	5	6	5		5	5	5	6	5	6	5	6	6	5	5	6	5	5	6		6	5
1		5	5	6	6	5	5	6		5	5	5	6	6	5	6	5	6	5	5	6	6	5	6		6	5
1		6	5	6	6	6	6	6		7	7	6	6	6	7	7	6	7	7	6	7	5	7	5		7	6
1		6	6	7	7	6	7	6		6	6	6	6	7	6	6	5	6	5	6	7	5	6	7		6	6
1		6	6	6	6	5	6	5		5	5	6	6	6	5	6	5	6	5	5	6	6	6	6		6	5
1		5	5	6	6	6	6	5		5	5	5	5	6	5	6	6	6	5	5	6	5	5	6		6	6
1		5	5	5	6	5	5	5		5	6	5	6	5	6	5	5	6	5	5	6	6	5	6		5	5
1		6	6	7	7	7	7	7		6	7	7	6	5	6	5	6	5	6	6	5	6	5	6		7	7
1		6	6	7	6	7	6	6		6	6	6	5	6	6	6	5	6	7	6	5	5	6	6		6	6
1		5	6	5	5	5	5	5		5	5	5	5	5	6	6	5	5	5	5	6	6	5	6		6	5
2		6	6	6	6	5	5	5		3	5	5	6	5	5	5	6	5	5	6	5	5	4	5		5	7
2		6	5	6	6	5	5	5		5	6	5	5	6	6	4	5	6	5	5	5	6	5	5		6	6
2		6	5	5	5	4	6	5		4	5	6	5	4	5	6	6	5	5	5	5	5	6	6		4	5
2		6	6	6	6	5	5	6		4	6	6	5	6	6	5	5	5	6	6	6	5	5	5		5	6
2		6	5	6	5	5	6	5		5	5	6	6	5	7	5	6	5	5	5	5	5	6	5		5	6
2		5	4	5	6	6	6	5		5	5	5	6	5	6	5	6	5	4	5	6	5	6	5		6	6
2		5	5	5	6	5	5	5		5	6	5	6	5	5	5	6	5	6	5	6	6	6	5		5	5
2		6	5	6	6	5	7	6		5	6	6	6	5	6	6	6	5	5	6	5	5	5	5		5	6
2		5	5	6	6	5	5	4		6	5	6	5	5	5	6	5	5	5	6	6	5	4	5		5	6
2		6	5	6	5	6	6	5		5	6	5	5	6	5	5	6	5	6	5	6	6	5	6		4	5
3		6	6	6	6	5	7	5		5	5	5	6	5	6	5	6	5	4	5	6	5	4	5		6	6
3		5	5	6	6	6	6	6		5	5	5	6	5	5	6	5	6	5	5	6	6	5	6		5	5
3		6	5	6	4	4	6	5		6	5	6	5	4	6	5	6	5	5	5	6	5	4	6		5	6
3		6	6	5	5	6	7	6		6	6	5	6	5	6	5	5	6	5	6	7	4	5	6		6	6
3		7	6	6	6	5	6	5		5	6	6	6	5	6	5	6	5	5	6	6	5	5	6		5	5
3		6	5	6	5	6	6	4		6	5	5	6	6	7	5	5	6	5	5	7	5	5	5		6	6
3		5	5	6	6	5	6	5		5	6	5	6	5	6	6	5	5	4	5	6	6	5	5		5	5
3		4	5	4	4	4	4	5		5	4	4	5	5	4	5	5	4	5	4	5	5	4	5		4	5
3		5	5	4	5	6	5	5		6	5	4	4	5	5	6	5	6	5	6	6	4	5	5		6	5
3		6	6	6	5	5	7	5		5	5	5	5	5	6	4	5	5	5	6	5	5	5	6		5	5
Mean		5.633	5.367	5.733	5.667	5.333	5.833	5.267		5.200	5.467	5.367	5.567	5.300	5.700	5.400	5.467	5.433	5.167	5.367	5.833	5.267	5.133	5.567		5.467	5.600

	q3.1.5	q3.1.6	q3.2.4	q3.2.5	Q4	q4.1.1	q4.1.2	q4.1.3	q4.1.4	q4.1.5	q4.2.1	q4.2.2	q4.2.3	q4.2.4	q4.2.5	q4.2.7	Q5	q5.1.1	q5.1.6	q5.1.9	q5.2.3	q5.2.4	q5.2.5	q5.2.6	q5.2.8	q5.2.11
1	5	6	5	4		5	6	5	5	4	5	5	4	4	6	4		5	4	5	6	4	5	5	4	5
1	6	5	6	6		5	6	6	6	5	5	5	5	5	6	6		5	5	5	5	5	5	5	2	4
1	6	5	6	5		6	5	6	6	7	6	6	6	6	6	5		7	5	6	6	5	5	5	4	5
1	7	6	5	6		6	6	6	5	6	6	6	6	7	6	6		7	6	6	6	6	5	6	5	6
1	6	5	6	5		5	6	6	6	6	6	6	5	5	5	5		6	5	5	6	6	6	5	5	5
1	6	5	5	6		5	6	6	5	5	6	5	5	6	6	5		5	6	5	5	5	4	5	5	4
1	5	5	5	5		6	5	5	5	4	6	5	5	5	5	5		5	4	5	5	4	5	4	4	4
1	7	6	6	6		7	6	6	7	6	7	6	7	6	6	6		7	6	7	6	6	6	7	6	6
1	6	6	6	6		7	7	6	6	6	6	7	6	6	7	6		6	6	6	6	6	6	6	6	6
1	6	5	5	5		6	6	6	6	5	6	5	5	5	6	5		5	6	6	5	5	5	5	5	5
2	6	4	6	5		7	6	5	5	5	6	5	5	6	5	5		5	5	5	7	5	4	5	4	4
2	6	5	5	5		6	5	5	6	5	5	4	5	6	6	5		5	5	5	6	6	5	5	5	6
2	6	5	5	4		4	5	4	5	4	6	5	6	5	5	6		6	5	6	6	5	5	5	6	6
2	5	5	5	6		6	5	5	6	5	6	4	5	5	6	5		5	5	5	4	6	3	5	4	5
2	5	5	5	5		5	5	6	6	6	5	5	6	6	5	5		4	6	6	6	5	6	4	5	5
2	5	6	5	5		4	5	6	5	5	5	5	5	6	6	6		6	5	5	6	5	4	5	5	6
2	6	5	6	5		5	6	5	6	6	5	6	5	6	5	5		6	6	5	7	6	5	6	5	6
2	6	5	4	5		6	6	6	5	5	6	5	6	5	6	5		5	5	5	6	7	3	5	4	5
2	4	5	5	6		5	5	5	6	5	6	6	6	6	6	5		5	5	6	6	5	6	6	4	5
2	6	5	5	5		5	6	5	5	5	5	6	5	5	5	5		5	5	5	7	5	5	5	5	5
3	5	5	6	5		5	5	5	6	6	5	4	4	5	5	5		6	4	5	6	5	5	6	6	5
3	6	5	5	5		5	6	3	5	4	5	5	4	5	4	4		6	5	5	7	5	5	5	6	4
3	6	4	5	6		4	5	4	6	4	4	4	5	6	5	5		5	5	6	6	5	6	6	7	6
3	5	5	6	5		5	6	4	5	5	6	5	4	5	6	5		5	5	5	6	5	6	7	5	4
3	5	4	5	6		5	5	5	5	5	5	5	5	6	5	4		6	5	5	7	5	5	6	6	6
3	5	6	5	5		6	6	5	6	6	6	5	5	5	5	4		5	4	5	6	4	5	6	4	5
3	6	5	6	5		5	5	6	6	5	5	5	5	5	6	5		5	5	5	7	5	6	5	6	4
3	5	5	4	4		4	5	5	4	4	6	5	4	5	5	4		5	5	4	5	4	5	4	5	5
3	5	4	5	4		4	5	4	5	6	5	4	5	6	4	5		5	5	5	4	4	5	6	5	4
3	6	5	5	5		5	6	6	6	5	6	5	4	5	6	4		6	4	5	6	5	6	5	5	5
Mean	5.633	5.067	5.267	5.167		5.300	5.567	5.233	5.533	5.167	5.567	5.133	5.100	5.467	5.500	5.000		5.467	5.067	5.300	5.900	5.133	5.067	5.333	4.933	5.033

Note :
1. : T&C Companies in HKSAR of China
2. : T&C Companies in Italy
3. : T&C Companies in the USA

Personal interview with 10 HKTC Experts for Rating on the importance of the key 'Technometric' Performance Attribute: 'Product' **Appendix 5**

E	Q1	q1.1.1	q1.1.2	q1.1.3	q1.1.4	q1.1.5	q1.1.6	q1.1.8	q1.2.2	q1.2.3	Q2	q2.1.1	q2.1.2	q2.1.3	q2.1.4	q2.1.5	q2.1.6	q2.1.7	q2.1.8	q2.1.9	q2.1.10
1		6	6	7	4	7	5	5	6	5		4	5	6	5	5	7	7	5	4	6
2		5	5	7	5	5	4	6	5	7		5	5	7	6	5	7	6	6	6	6
3		6	7	6	6	6	5	6	5	7		5	6	6	6	7	7	5	6	5	5
4		6	6	7	5	6	5	6	7	5		5	5	6	7	5	6	6	6	6	6
5		6	6	7	6	5	6	6	6	6		6	5	6	6	5	7	6	5	6	5
6		6	6	7	6	7	5	5	5	5		6	4	5	5	7	7	5	6	5	5
7		5	5	7	5	5	4	6	6	6		5	5	6	6	5	7	6	6	6	6
8		6	6	6	6	6	5	7	5	7		5	6	7	7	6	7	7	5	4	7
9		6	6	7	5	6	6	6	7	6		5	6	6	6	7	6	6	7	6	7
10		7	6	6	5	5	6	6	6	5		4	5	6	6	6	7	4	6	4	6
Mean		5.900	5.900	6.700	5.300	5.800	5.100	5.900	5.800	5.900		5.000	5.200	6.100	6.000	5.800	6.800	5.800	5.800	5.200	5.900

E	q2.2.1	q2.2.2	q2.2.4	q2.2.5	q2.2.6	Q3	q3.1.5	q3.1.7	q3.2.1	q3.2.2	q3.2.3	q3.2.4	Q4	q4.1.1	q4.1.2	q4.1.3	q4.1.4	q4.1.5	q4.2.1	q4.2.2
1	7	5	7	5	5		7	6	5	7	6	6		6	5	6	7	6	5	6
2	7	7	7	4	5		7	5	7	7	6	7		5	4	5	6	7	6	6
3	6	7	6	6	6		6	6	5	7	5	5		5	5	7	7	6	6	7
4	7	6	7	5	6		7	7	5	6	7	7		5	4	6	7	6	6	5
5	6	6	7	5	5		7	5	7	7	6	6		6	6	5	7	5	5	6
6	6	6	6	7	7		7	7	6	7	6	6		6	4	5	7	5	5	5
7	5	5	7	5	6		7	6	6	7	7	7		5	7	5	6	7	7	7
8	6	6	6	5	7		6	6	7	7	6	6		5	5	7	7	6	6	6
9	6	6	7	4	6		7	5	5	6	6	6		5	4	6	7	6	6	7
10	5	5	7	5	5		7	6	7	6	5	5		5	6	6	7	7	7	6
Mean	6.100	5.900	6.700	5.100	5.800		6.800	5.900	6.000	6.700	6.000	6.100		5.300	5.000	5.800	6.800	6.100	5.900	6.100

E	q4.2.3	q4.2.4	q4.2.5	q4.2.7	Q5	q5.1.1	q5.1.2	q5.1.3	q5.1.4	q5.1.5	q5.1.6	q5.1.7	q5.1.8	q5.1.9	q5.2.1	q5.2.3	q5.2.4	q5.2.5	q5.2.6	q5.2.7	q5.2.8
1	6	5	7	7		6	6	6	6	5	7	6	5	6	6	7	6	7	6	6	6
2	6	5	7	6		7	6	5	7	6	6	7	6	6	6	6	5	7	7	6	7
3	5	6	6	6		5	6	6	5	7	6	5	6	6	5	7	6	7	7	5	5
4	6	6	7	6		7	7	7	6	6	7	7	6	7	5	5	7	6	6	7	7
5	6	6	5	5		6	6	5	7	6	6	6	6	5	7	6	5	7	7	6	6
6	7	7	6	7		6	6	7	6	7	6	6	7	7	7	5	7	7	6	6	6
7	7	6	6	5		7	7	6	6	6	7	7	7	7	6	7	6	6	7	7	7
8	5	6	6	6		6	6	6	7	5	7	6	6	6	7	6	6	7	7	6	6
9	7	6	5	7		6	7	5	5	6	6	6	6	6	6	5	5	6	7	6	6
10	5	6	6	6		5	6	6	7	6	5	5	7	6	7	7	6	7	7	5	6
Mean	6.000	5.900	6.100	6.100		6.100	6.300	5.900	6.200	6.000	6.300	6.100	6.200	6.200	6.200	6.100	5.900	6.700	6.700	6.000	6.200

E	q5.2.9	q5.2.10	q5.2.11
1	5	6	5
2	6	7	7
3	6	6	5
4	7	6	5
5	5	5	7
6	7	6	6
7	5	6	6
8	6	6	7
9	7	7	5
10	7	6	7
Mean	6.100	6.100	6.000

Remarks:
E: Hong Kong Textiles and Clothing Experts

Personal interview with 10 HKTC Experts for Rating on the importance of the key 'Technometric' Performance Attribute: 'Process'

E	Q1	q1.1.1	q1.1.2	q1.1.3	q1.1.4	q1.1.5	q1.1.6	q1.1.7	q1.1.8	q1.2.1	q1.2.2	q1.2.3	Q2	q2.1.1	q2.1.2	q2.1.3	q2.1.5	q2.1.6	q2.1.7	q2.1.8	q2.1.9
1		6	6	7	5	6	6	5	5	6	7	6		5	5	6	6	7	7	7	5
2		7	6	7	6	7	6	4	6	7	7	6		5	6	7	7	6	7	5	4
3		6	5	7	6	5	7	6	3	6	6	7		5	5	5	6	7	6	6	5
4		7	6	6	5	6	6	5	5	5	7	6		6	5	6	5	7	7	7	6
5		5	6	6	5	6	7	5	6	6	6	7		6	5	6	5	6	7	5	5
6		6	6	7	4	7	5	6	4	6	7	5		5	4	7	6	6	6	7	5
7		6	7	7	6	5	7	5	6	7	6	6		5	5	5	5	7	7	6	5
8		6	6	7	4	6	6	5	5	6	7	6		6	4	6	6	7	7	6	5
9		7	6	6	6	6	6	5	5	6	7	7		6	5	6	7	7	7	7	5
10		6	7	7	6	6	7	5	7	6	6	6		4	6	7	6	7	7	6	5
Mean		6.200	6.100	6.700	5.300	6.000	6.300	5.100	5.200	6.100	6.600	6.200		5.300	5.000	6.100	5.900	6.700	6.800	6.200	5.000

E	q2.1.10	q2.2.1	q2.2.3	q2.2.4	Q3	q3.1.1	q3.1.2	q3.1.3	q3.1.4	q3.1.5	q3.1.6	q3.1.7	q3.2.2	q3.2.3	q3.2.4	q3.2.5	Q4	q4.1.4	q4.1.5	q4.2.1	q4.2.2
1	7	5	6	6		7	6	5	6	7	7	6	6	7	6	5		7	6	6	5
2	7	6	7	6		6	7	7	6	7	5	6	7	6	6	7		7	5	6	6
3	7	6	5	7		7	6	5	5	6	5	6	5	7	6	6		6	6	7	7
4	6	5	6	6		7	6	5	6	7	6	5	6	7	6	5		7	7	6	6
5	6	5	6	7		7	6	6	7	7	6	7	6	7	5	6		7	6	7	7
6	7	6	7	5		7	6	5	6	6	7	5	7	6	6	5		7	6	5	5
7	7	6	6	7		6	7	6	6	7	5	6	5	7	6	6		7	6	6	6
8	7	5	6	6		6	6	7	6	7	7	6	6	6	5	5		7	7	6	6
9	6	6	6	6		7	6	7	7	6	5	6	6	7	6	7		6	7	7	7
10	7	6	6	7		6	6	6	7	7	6	5	5	7	7	6		7	6	5	5
Mean	6.700	5.600	6.100	6.300		6.600	6.200	5.900	6.200	6.700	5.900	5.800	5.900	6.700	5.900	5.800		6.800	6.200	6.100	6.000

E	q4.2.4	q4.2.6	q4.2.7	Q5	q5.1.1	q5.1.2	q5.1.3	q5.1.4	q5.1.5	q5.1.6	q5.1.7	q5.1.8	q5.1.9	q5.2.2	q5.2.4	q5.2.5	q5.2.6	q5.2.7	q5.2.8	q5.2.9	q5.2.10
1	7	4	5		6	6	7	6	7	7	6	6	6	7	6	6	7	6	7	6	7
2	6	5	7		7	5	5	7	7	6	6	7	7	6	7	6	6	6	6	6	7
3	6	5	5		7	6	6	6	7	5	6	6	6	7	6	5	7	6	6	7	6
4	6	6	5		6	6	6	6	6	6	7	6	5	5	6	5	6	7	6	6	7
5	6	5	6		7	7	6	6	6	7	7	6	6	6	7	6	7	7	6	7	7
6	7	5	5		7	6	7	6	7	6	6	6	6	7	6	5	6	6	7	5	7
7	6	5	6		7	7	5	6	6	7	6	6	7	6	6	6	6	6	6	6	7
8	6	5	7		6	6	7	7	7	6	6	7	7	6	6	6	7	7	7	6	6
9	7	6	7		7	5	5	6	7	7	6	6	6	7	6	7	7	6	5	7	7
10	5	5	5		7	6	5	6	6	7	6	6	6	6	5	6	7	5	6	6	6
Mean	6.200	5.100	5.800		6.700	6.000	5.900	6.200	6.600	6.400	6.200	6.200	6.200	6.300	6.100	5.800	6.600	6.200	6.200	6.200	6.700

Remarks:
E: Hong Kong Textiles and Clothing Experts

Personal interview with 10 HKTC Experts for Rating on the importance of the key 'Technometric' Performance Attribute: 'Service'

E	Q1	q1.1.1	q1.1.2	q1.1.3	q1.1.5	q1.1.6	q1.2.2	q1.2.3	Q2	q2.1.1	q2.1.2	q2.1.3	q2.1.4	q2.1.5	q2.1.6	q2.1.7	q2.1.8	q2.1.9	q2.1.10
1		5	5	6	6	5	6	5		5	6	5	6	5	7	6	6	6	6
2		5	6	7	5	6	7	5		6	7	6	5	6	7	6	5	7	7
3		6	7	7	6	5	6	6		6	7	7	5	6	7	5	6	7	6
4		5	6	6	6	6	7	5		5	6	6	6	7	6	7	7	5	6
5		6	6	7	6	7	6	6		6	6	7	5	5	5	6	6	6	7
6		7	6	7	5	6	7	7		6	7	7	6	6	6	6	7	5	6
7		7	5	6	7	6	7	7		7	6	5	6	6	7	5	6	6	6
8		7	6	5	6	5	6	7		5	7	6	6	5	7	6	7	7	6
9		5	6	6	7	6	7	5		6	5	7	6	6	7	7	7	7	7
10		7	6	5	7	7	7	7		6	6	6	5	5	7	7	5	6	6
Mean		6.000	5.900	6.200	6.100	5.900	6.600	6.000		5.800	6.300	6.200	5.600	5.700	6.600	6.100	6.200	6.200	6.300

E	q2.2.1	q2.2.2	q2.2.4	q2.2.5	q2.2.6	Q3	q3.1.3	q3.1.4	q3.1.5	q3.1.6	q3.2.4	q3.2.5	Q4	q4.1.1	q4.1.2	q4.1.3	q4.1.4	q4.1.5	q4.2.1	q4.2.2	q4.2.3
1	6	5	6	6	6		6	7	7	7	6	7		6	6	5	6	7	6	5	6
2	6	6	6	7	6		5	6	6	6	6	7		6	6	7	6	6	6	6	7
3	6	7	6	6	5		6	7	6	7	5	6		6	6	5	6	6	6	5	6
4	7	6	6	6	7		5	6	7	6	6	7		7	5	6	7	6	6	7	6
5	7	6	6	5	6		7	6	6	6	5	6		6	6	6	7	7	6	6	6
6	6	7	6	6	6		6	6	7	7	6	6		7	5	5	6	5	6	7	6
7	7	6	5	6	7		6	7	6	5	7	7		6	6	6	6	7	6	6	6
8	7	6	6	6	6		6	6	6	6	6	6		7	7	6	7	7	7	5	7
9	6	6	5	6	7		6	7	6	7	6	7		7	7	7	6	5	6	5	6
10	7	6	7	6	6		6	6	6	6	5	6		6	7	5	7	6	6	7	6
Mean	6.500	6.100	5.900	6.000	6.200		5.900	6.400	6.300	6.300	5.800	6.500		6.400	6.100	5.800	6.400	6.200	6.100	5.900	6.200

E	q4.2.4	q4.2.5	q4.2.4	q4.2.5	q4.2.7	q5.1.1	q5.1.6	q5.1.9	q5.2.3	q5.2.4	q5.2.5	q5.2.6	q5.2.8	q5.2.11
1	7	7	5	5	6	7	5	6	7	5	5	6	6	6
2	6	7	6	6	7	6	6	7	6	5	6	7	6	7
3	7	6	5	6	6	6	5	6	6	6	5	6	7	6
4	6	6	6	7	6	5	7	6	5	6	7	6	6	6
5	7	5	7	7	6	7	5	6	6	6	6	6	7	7
6	7	6	5	6	7	6	6	7	6	7	5	5	6	6
7	5	7	6	6	6	6	5	6	7	6	5	6	7	6
8	6	6	6	6	6	5	7	6	6	6	6	5	6	7
9	7	6	7	6	6	6	6	6	6	5	6	7	6	6
10	6	6	6	7	5	6	6	7	6	6	6	6	6	7
Mean	6.400	6.200	5.900	6.200	6.100	6.000	5.800	6.300	6.100	5.800	5.700	6.000	6.300	6.400

Remarks:
E: Hong Kong Textiles and Clothing Experts

Appendix 6

Reliability test (Cronbach's Coefficient of Alpha) to validate the internal consistency of each key 'Technometric' attributes

RELIABILITY TEST ON PRODUCT

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q111	32.8000	6.9931	.3986	.7475
Q112	33.0667	7.3747	.3258	.7597
Q113	32.7000	5.5276	.7456	.6643
Q114	33.2333	6.8747	.3880	.7508
Q115	32.7667	6.0471	.6047	.7021
Q116	33.1000	6.4379	.4302	.7452
Q118	32.9333	7.0989	.4835	.7341

Reliability Coefficients

N of Cases = 30.0 N of Items = 7

Alpha = .7609

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q122	5.2667	.4092	.3632	.
Q123	5.8333	.6264	.3632	.

Reliability Coefficients

N of Cases = 30.0 N of Items = 2

Alpha = .5242

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q211	49.1667	17.5920	.4753	.8256
Q212	48.9000	17.2655	.6138	.8125
Q213	49.0000	17.5172	.5791	.8158
Q214	48.7667	18.0471	.3921	.8340

Q215	48.9667	17.3437	.5535	.8177
Q216	48.5000	16.4655	.5729	.8161
Q217	48.9667	17.4126	.4611	.8279
Q218	48.7667	19.0126	.3819	.8325
Q219	48.9667	17.3437	.6715	.8088
Q2110	49.3000	16.9069	.6168	.8113

Reliability Coefficients

N of Cases = 30.0 N of Items = 10

Alpha = .8355

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q221	22.1000	3.5414	.3592	.6587
Q222	21.4333	3.2195	.4552	.6198
Q224	22.2000	3.5448	.2691	.6969
Q225	22.3000	2.7000	.5481	.5710
Q226	21.8333	2.9023	.5499	.5735

Reliability Coefficients

N of Cases = 30.0 N of Items = 5

Alpha = .6793

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q315	5.4333	.5989	.2168	.
Q317	5.7000	.3552	.2168	.

Reliability Coefficients

N of Cases = 30.0 N of Items = 2

Alpha = .3466

Item-total Statistics

	Scale Mean if Item	Scale Variance if Item	Corrected Item-Total	Alpha if Item

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q321	16.2333	3.0126	.5270	.6845
Q322	16.4333	2.9437	.5472	.6724
Q323	16.0667	3.0299	.6545	.6123
Q324	16.3667	3.6885	.4166	.7385

Reliability Coefficients

N of Cases = 30.0 N of Items = 4

Alpha = .7393

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q411	21.7000	4.5621	.4966	.7142
Q412	21.5333	5.1540	.5154	.7095
Q413	21.8667	4.6713	.4860	.7172
Q414	21.4667	5.0851	.4399	.7312
Q415	22.1000	4.2310	.6578	.6484

Reliability Coefficients

N of Cases = 30.0 N of Items = 5

Alpha = .7498

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q421	26.3333	7.4023	.5084	.8078
Q422	26.7000	7.1138	.5611	.7974
Q423	26.7000	6.2862	.7594	.7515
Q424	26.3333	7.7471	.4597	.8164
Q425	26.2000	6.8552	.5712	.7960
Q427	26.7333	6.6851	.6587	.7759

Reliability Coefficients

N of Cases = 30.0 N of Items = 6

Alpha = .8207

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q511	43.0333	10.7230	.5412	.7904
Q512	42.8667	10.8092	.5887	.7841
Q513	42.9667	10.2402	.6045	.7815
Q514	43.2000	11.3379	.5361	.7916
Q515	42.9333	11.3747	.4921	.7964
Q516	43.4333	11.3575	.4820	.7976
Q517	43.3333	12.5057	.2361	.8239
Q518	43.0333	11.1368	.5510	.7893
Q519	43.2000	11.2690	.5550	.7894

Reliability Coefficients

N of Cases = 30.0 N of Items = 9

Alpha = .8130

<u>Item-total Statistics</u>

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q521	47.2333	19.2195	.2660	.7521
Q523	47.1000	18.5759	.3716	.7377
Q524	47.8667	18.9471	.3638	.7387
Q525	47.9333	18.8230	.3182	.7452
Q526	47.6667	17.6092	.5673	.7120
Q527	47.7333	18.7540	.3564	.7397
Q528	48.0667	16.7540	.5082	.7169
Q529	47.9333	16.6851	.4919	.7198
Q5210	47.5000	18.2586	.3796	.7370
Q5211	47.9667	17.7575	.5353	.7161

Reliability Coefficients

N of Cases = 30.0 N of Items = 10

Alpha = .7522

RELIABILITY TEST ON PROCESS

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q111	37.5000	6.4655	.3560	.6591
Q112	37.6333	7.0678	.1127	.7123
Q113	37.5333	5.9816	.4702	.6318
Q114	37.9000	6.4379	.3112	.6695
Q115	37.4667	5.4989	.5863	.5985
Q116	37.7000	5.9414	.3979	.6496
Q117	37.8667	6.2575	.4113	.6468
Q118	37.6333	6.4471	.3713	.6560

Reliability Coefficients

N of Cases = 30.0 N of Items = 8

Alpha = .6845

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q121	10.8000	.9241	.4258	.2090
Q122	10.8667	1.0851	.3384	.3814
Q123	11.2667	1.5126	.2239	.5471

Reliability Coefficients

N of Cases = 30.0 N of Items = 3

Alpha = .5076

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q211	43.3000	9.3897	.4199	.6950
Q212	43.1667	8.6954	.5828	.6641
Q213	43.2000	9.8897	.3621	.7053

Q215	43.2333	8.9437	.4724	.6845
Q216	42.8333	9.5920	.2710	.7253
Q217	43.2333	9.3575	.3306	.7131
Q218	43.0667	10.2713	.2436	.7226
Q219	43.2667	9.5816	.4755	.6891
Q2110	43.5000	8.8103	.4669	.6853

Reliability Coefficients

N of Cases = 30.0 N of Items = 9

Alpha = .7232

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q221	10.6000	1.4897	.1906	.4907
Q223	10.7000	.7690	.4089	.0717
Q224	10.7000	1.2517	.2698	.3747

Reliability Coefficients

N of Cases = 30.0 N of Items = 3

Alpha = .4550

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q311	32.5667	7.8402	.4930	.6998
Q312	32.8333	6.3506	.6728	.6459
Q313	32.5333	7.0851	.5509	.6829
Q314	32.2333	8.3230	.3689	.7255
Q315	32.2333	8.4609	.3799	.7235
Q316	32.7333	7.7885	.4601	.7063
Q317	32.4667	8.5333	.2500	.7526

Reliability Coefficients

N of Cases = 30.0 N of Items = 7

Alpha = .7390

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q322	16.2667	2.1333	.5952	.5496
Q323	15.8667	2.7402	.4296	.6619
Q324	16.2000	2.9931	.4272	.6636
Q325	16.2667	2.6851	.4829	.6293

Reliability Coefficients

N of Cases = 30.0 N of Items = 4

Alpha = .6955

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q414	5.1333	.6023	.3923	.
Q415	5.7000	.4931	.3923	.

Reliability Coefficients

N of Cases = 30.0 N of Items = 2

Alpha = .5615

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q421	21.4000	3.8345	.5788	.5995
Q422	21.7667	3.7713	.5661	.6023
Q424	21.3667	4.8609	.2596	.7170
Q426	21.1667	3.5920	.4461	.6630
Q427	21.7667	4.0471	.4502	.6521

Reliability Coefficients

N of Cases = 30.0 N of Items = 5

Alpha = .6993

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q511	43.1667	9.7299	.5399	.7658
Q512	42.9667	10.1023	.5198	.7688
Q513	43.1000	9.1966	.6212	.7525
Q514	43.3333	10.2299	.5608	.7643
Q515	43.0667	10.5471	.4387	.7797
Q516	43.5333	10.6713	.4240	.7814
Q517	43.4333	11.4954	.2067	.8077
Q518	43.1333	10.6023	.4811	.7746
Q519	43.3333	10.2299	.5608	.7643

Reliability Coefficients

N of Cases = 30.0 N of Items = 9

Alpha = .7940

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q522	36.8333	11.3851	.4204	.7284
Q524	37.2333	11.5644	.4473	.7240
Q525	37.1667	11.2471	.6049	.7015
Q526	37.1000	11.2655	.4673	.7199
Q527	37.1333	10.6713	.5639	.7010
Q528	37.2667	11.4437	.3724	.7380
Q529	37.1667	11.1092	.3784	.7392
Q5210	36.9000	11.2655	.3759	.7385

Reliability Coefficients

N of Cases = 30.0 N of Items = 8

Alpha = .7499

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Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q111	22.1000	4.0241	.4500	.6916
Q112	22.3667	4.3092	.3874	.7127
Q113	22.0000	3.1724	.6805	.5903
Q115	22.0667	3.5816	.5295	.6598
Q116	22.4000	3.7655	.3985	.7171

Reliability Coefficients

N of Cases = 30.0 N of Items = 5

Alpha = .7251

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q122	5.2667	.4092	.3632	.
Q123	5.8333	.6264	.3632	.

Reliability Coefficients

N of Cases = 30.0 N of Items = 2

Alpha = .5242

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q211	48.8667	9.7747	.4463	.6940
Q212	48.6000	9.2828	.6577	.6572
Q213	48.7000	10.0103	.4776	.6893
Q214	48.5000	11.2931	.2257	.7264
Q215	48.7667	10.6678	.3258	.7137
Q216	48.3667	10.0333	.4387	.6954

Q217	48.6667	10.8506	.2638	.7239
Q218	48.6000	12.1793	.0117	.7494
Q219	48.6333	10.1023	.4985	.6871
Q2110	48.9000	9.9552	.4613	.6915

Reliability Coefficients

N of Cases = 30.0 N of Items = 10

Alpha = .7261

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q221	22.1000	3.5414	.3592	.6587
Q222	21.4333	3.2195	.4552	.6198
Q224	22.2000	3.5448	.2691	.6969
Q225	22.3000	2.7000	.5481	.5710
Q226	21.8333	2.9023	.5499	.5735

Reliability Coefficients

N of Cases = 30.0 N of Items = 5

Alpha = .6793

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q313	16.3000	1.5276	.4961	.3476
Q314	16.1667	2.0747	.3467	.4953
Q315	16.1333	2.1885	.2254	.5893
Q316	16.7000	2.1483	.3469	.4976

Reliability Coefficients

N of Cases = 30.0 N of Items = 4

Alpha = .5650

Item-total Statistics

	Scale Mean if Item	Scale Variance if Item	Corrected Item-Total	Alpha if Item

	Deleted	Deleted	Correlation	Deleted
Q324	5.1667	.4195	.2434	.
Q325	5.2667	.3402	.2434	.

Reliability Coefficients

N of Cases = 30.0 N of Items = 2

Alpha = .3898

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q411	21.5000	3.9138	.5665	.6477
Q412	21.2333	5.4264	.3395	.7292
Q413	21.5667	4.2540	.5121	.6708
Q414	21.2667	4.8920	.4893	.6830
Q415	21.6333	4.2402	.5466	.6556

Reliability Coefficients

N of Cases = 30.0 N of Items = 5

Alpha = .7270

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q421	26.2000	5.9586	.3971	.7499
Q422	26.6333	5.2747	.5236	.7186
Q423	26.6667	4.6437	.7170	.6578
Q424	26.3000	6.0103	.3758	.7549
Q425	26.2667	5.7195	.4227	.7451
Q427	26.7667	5.4264	.5753	.7059

Reliability Coefficients

N of Cases = 30.0 N of Items = 6

Alpha = .7596

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted

Q511	10.3667	1.1368	.3041	.6552
Q516	10.7667	1.2195	.3645	.5429
Q519	10.5333	1.0851	.5666	.2627

Reliability Coefficients

N of Cases = 30.0 N of Items = 3

Alpha = .5920

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q523	25.5000	6.5345	.3948	.6113
Q524	26.2667	7.3747	.2249	.6651
Q525	26.3333	6.8506	.2918	.6481
Q526	26.0667	6.6161	.4126	.6059
Q528	26.4667	5.4299	.5274	.5541
Q5211	26.3667	6.3782	.4754	.5839

Reliability Coefficients

N of Cases = 30.0 N of Items = 6

Alpha = .6567

Table A7-1 - Exports (US$ billion) of Textiles and Clothing in Three Selected Countries : HKSAR of China (HKSAR), Italy and US

	Textiles			Clothing		
	HKSAR	**Italy**	**US**	**HKSAR**	**Italy**	**US**
1973	0.46	1.53	1.22	1.39	1.30	0.29
1974	0.72	1.78	1.80	1.69	1.53	0.42
1975	0.59	1.95	1.62	2.03	1.84	0.42
1976	0.63	2.04	1.97	2.85	2.11	0.56
1977	0.57	2.48	1.96	2.92	2.58	0.67
1978	0.61	3.35	2.25	3.32	3.35	0.75
1979	0.81	4.15	3.18	3.99	4.39	0.96
1980	0.91	4.11	3.62	4.64	4.63	1.22
1981	0.94	4.08	3.61	5.01	4.32	1.26
1982	0.83	4.01	2.77	4.73	4.41	0.88
1983	0.97	4.19	2.36	4.68	4.53	0.88
1984	2.72	4.37	2.38	6.75	4.83	0.85
1985	3.02	4.69	2.35	6.72	5.36	0.72
1986	3.95	5.92	2.56	8.39	7.57	0.88
1987	5.65	7.20	2.90	10.71	9.11	1.14
1988	6.37	7.44	3.89	11.79	9.07	1.64
1989	7.57	7.89	4.37	13.99	9.44	2.21
1990	8.21	9.49	5.04	15.41	11.84	2.57
1991	9.77	9.39	5.61	17.96	11.75	3.32
1992	10.78	10.15	5.89	20.06	12.25	4.21
1993	11.21	10.04	6.03	21.00	11.83	4.95
1994	12.57	10.86	6.59	21.40	12.53	5.62
1995	13.82	12.80	7.37	21.30	14.18	6.65
1996	14.15	13.21	8.01	21.98	16.17	7.51
1997	14.60	12.91	9.19	23.11	14.86	8.67
1998	13.04	13.03	9.22	22.16	14.74	8.79
1999	12.27	11.78	9.51	22.37	13.24	8.27
2000	13.44	11.96	10.96	24.22	13.22	8.65
2001	12.21	12.15	10.47	23.45	14.20	7.01
2002	12.42	12.13	10.66	22.43	14.65	6.03
2003	13.08	13.58	10.89	23.15	16.20	5.54

Footnote

(i) Export figures of textiles and clothing from HKSAR, Italy and the USA are derived from :
   - (a) 1973-1987 : UN, Commodity Trade Statistics and GATT, International Trade.
   - (b) 1988-1992 : GATT, International Trade.
   - (c) 1993-2000 : World Trade Organisation.
   - (d) 2001-2003 : UN, Statistics Division.

(ii) Exports of textiles and clothing from HKSAR include domestic exports and re-exports of textiles and clothing from HKSAR.

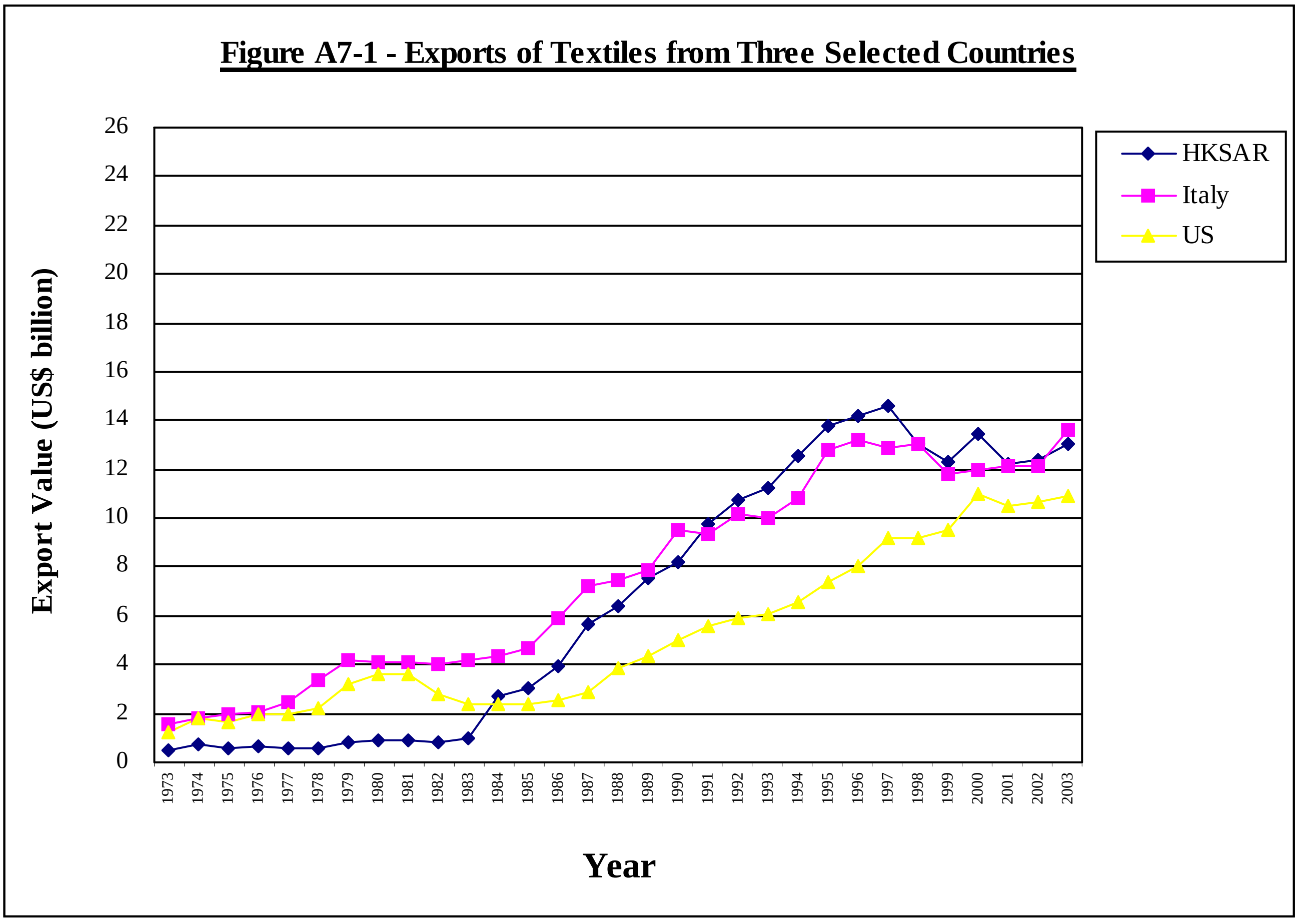


Figure A7-1 - Exports of Textiles from Three Selected Countries
Export Value (US$ billion)
Year
HKSAR
Italy
US

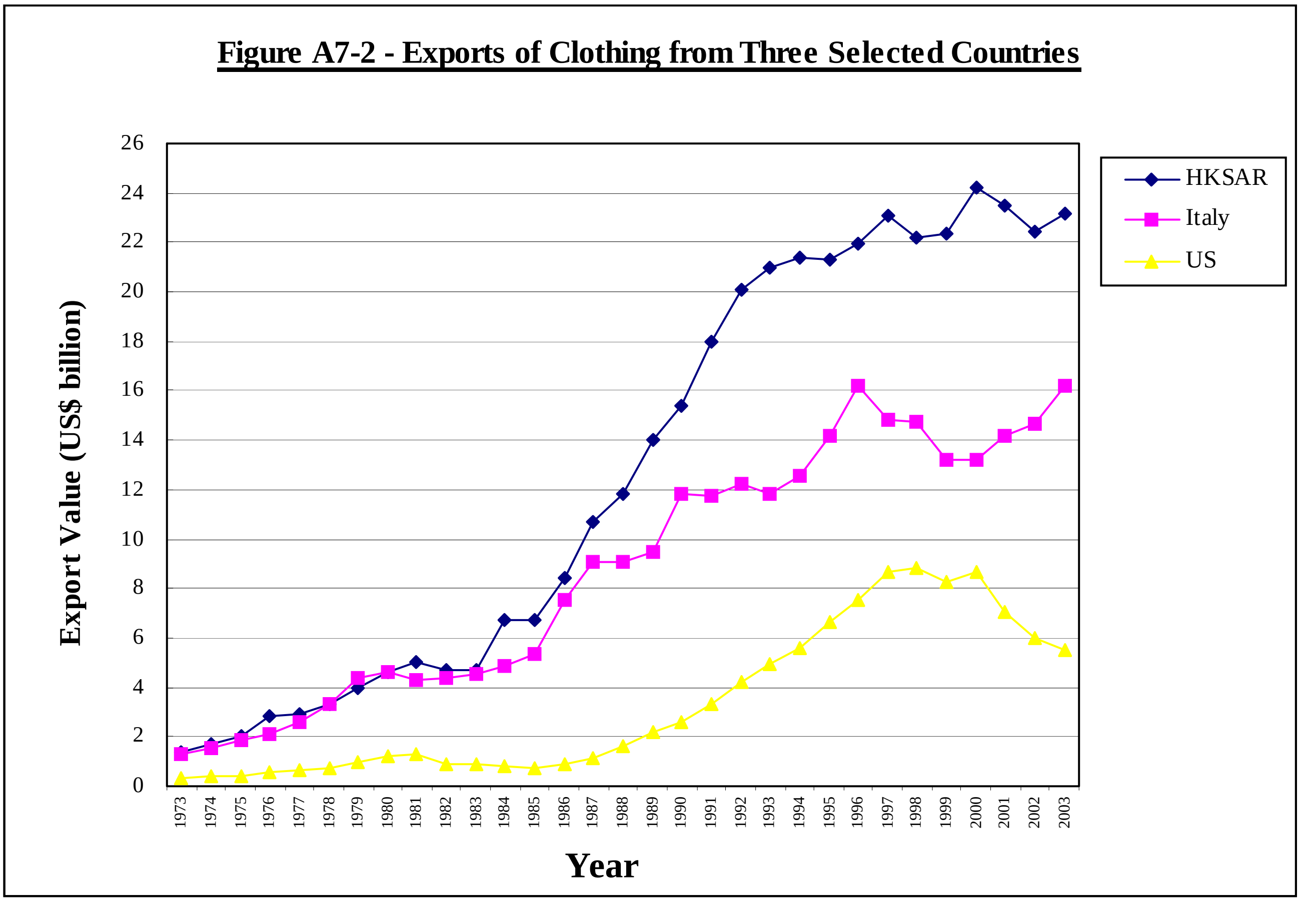


Figure A7-2 - Exports of Clothing from Three Selected Countries
Export Value (US$ billion)
Year
HKSAR
Italy
US

Table A7-2 - Imports (US$ Billion) of Textiles and Clothing in Three Selected Countries : HKSAR of China (HKSAR), Italy and US

	Textiles			Clothing		
Year	HKSAR	Italy	US	HKSAR	Italy	US
1973	0.94	0.91	1.58	0.12	0.19	2.17
1974	0.90	1.06	1.63	0.10	0.26	3.95
1975	0.97	0.87	1.23	0.10	0.22	3.78
1976	1.37	1.24	1.65	0.15	0.26	3.61
1977	1.40	1.33	1.79	0.20	0.34	4.12
1978	1.82	1.49	2.24	0.28	0.35	5.42
1979	2.35	2.33	2.29	0.39	0.53	6.14
1980	2.97	2.61	2.54	0.69	0.80	6.94
1981	3.43	2.01	3.07	0.93	0.75	8.12
1982	2.79	2.11	2.85	1.06	0.68	8.79
1983	3.26	1.97	3.27	1.17	0.63	13.69
1984	4.16	2.27	4.61	1.48	0.66	14.60
1985	3.02	2.51	4.97	1.70	0.79	16.21
1986	3.95	3.33	5.83	2.53	1.16	18.70
1987	5.65	4.40	6.50	3.34	1.68	22.13
1988	8.01	4.82	6.28	4.10	1.88	23.06
1989	9.22	5.23	6.42	5.70	2.03	26.06
1990	10.18	6.13	6.73	6.91	2.58	26.98
1991	12.07	5.74	7.33	8.60	3.42	27.70
1992	13.09	5.63	8.22	10.35	4.29	32.95
1993	12.78	4.63	8.86	11.81	3.80	35.61
1994	15.29	5.62	9.66	12.46	3.97	38.64
1995	16.86	6.39	10.44	12.65	4.65	41.37
1996	16.52	6.15	10.70	13.63	5.03	43.32
1997	16.21	6.42	12.46	15.02	5.31	50.30
1998	13.48	6.61	13.46	14.30	5.86	55.72
1999	12.56	5.83	14.31	14.76	5.84	58.79
2000	13.72	6.12	15.71	16.01	6.07	66.39
2001	12.18	6.06	15.39	16.10	6.69	66.39
2002	12.06	6.07	16.95	15.70	7.57	66.73
2003	12.93	6.75	18.25	15.95	9.34	71.28

Footnote

(i) Import figures of textiles and clothing in HKSAR, Italy and the USA are derived from :
- (a) 1973-1987 : UN, Commodity Trade Statistics and GATT, International Trade.
- (b) 1988-1992 : GATT, International Trade.
- (c) 1993-2000 : World Trade Organisation.
- (d) 2001-2003 : UN, Statistics Division.

(ii) Imports of textiles and clothing from HKSAR include retained imports and re-exports of textiles and clothing through HKSAR.

Figure A7-3 - Imports of Textiles from Three Selected Countries

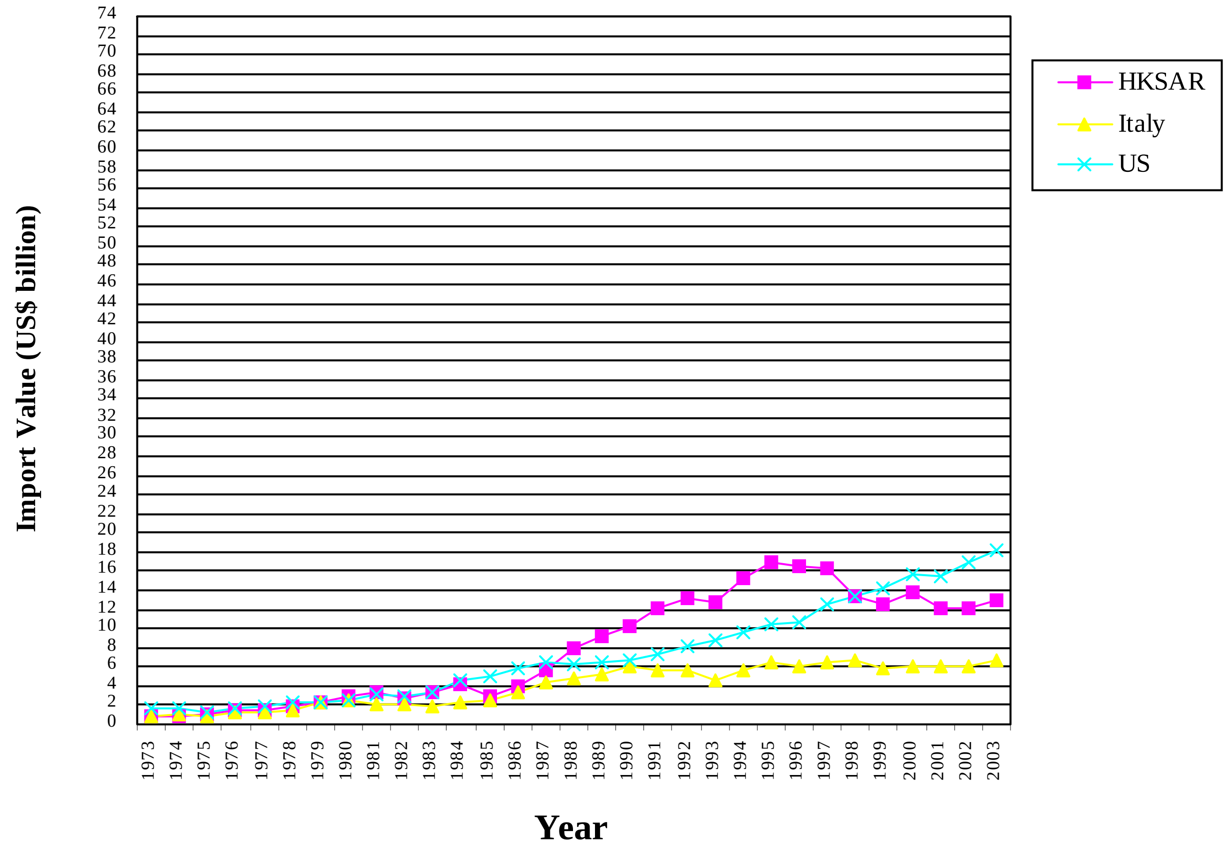


Figure A7-4 - Imports of Clothing from Three Selected Countries

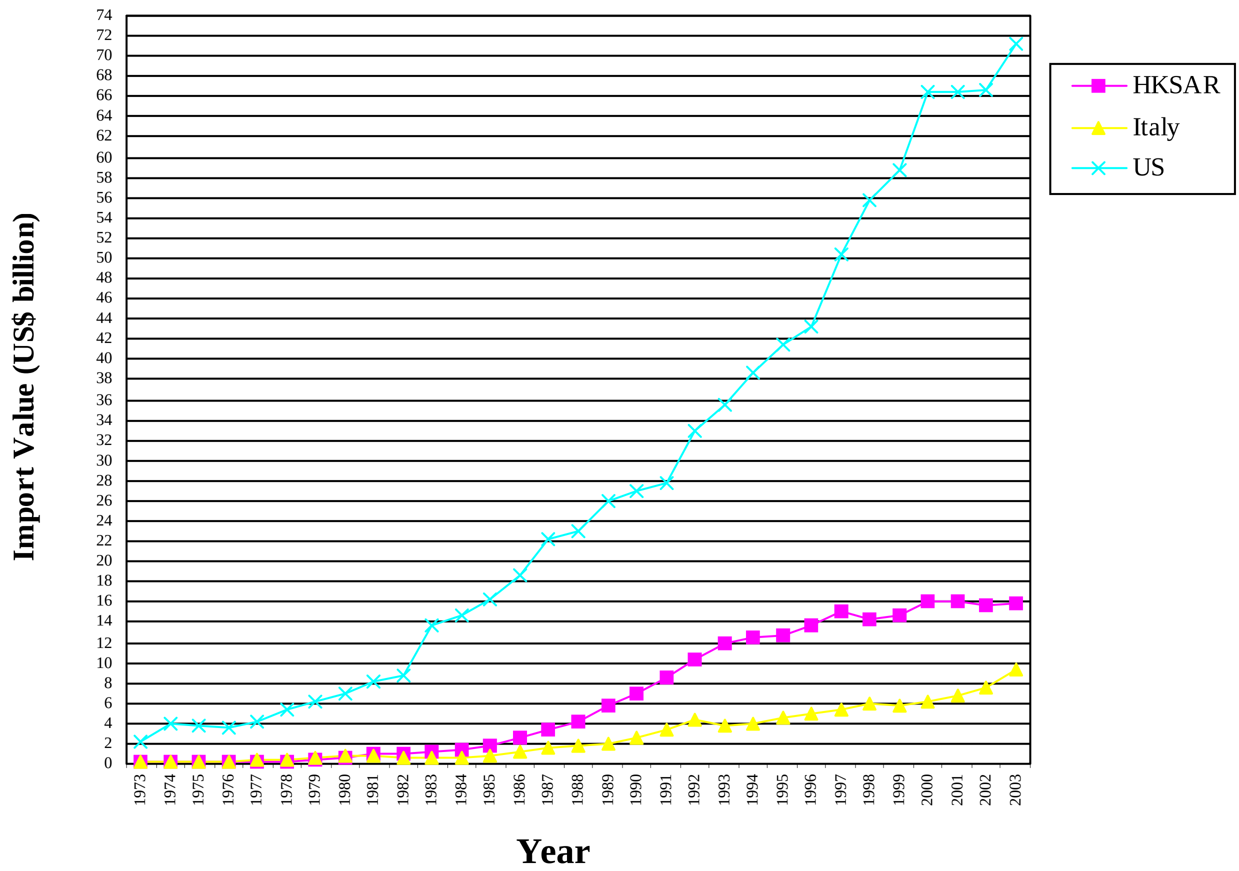


Figure A7-5 - Exports Vs Imports of Textiles in HKSAR of China

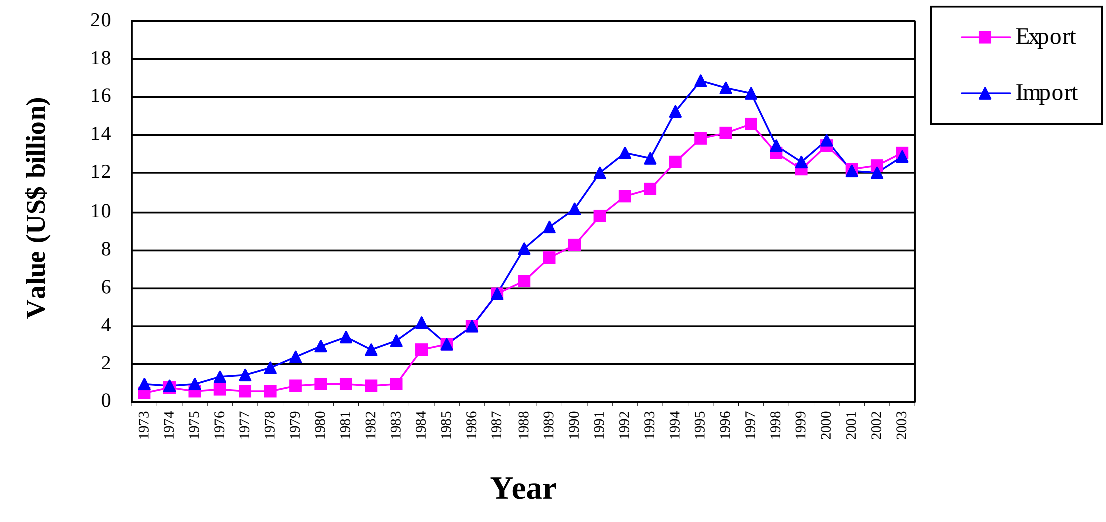


Figure A7-6 - Exports Vs Imports of Textiles in Italy

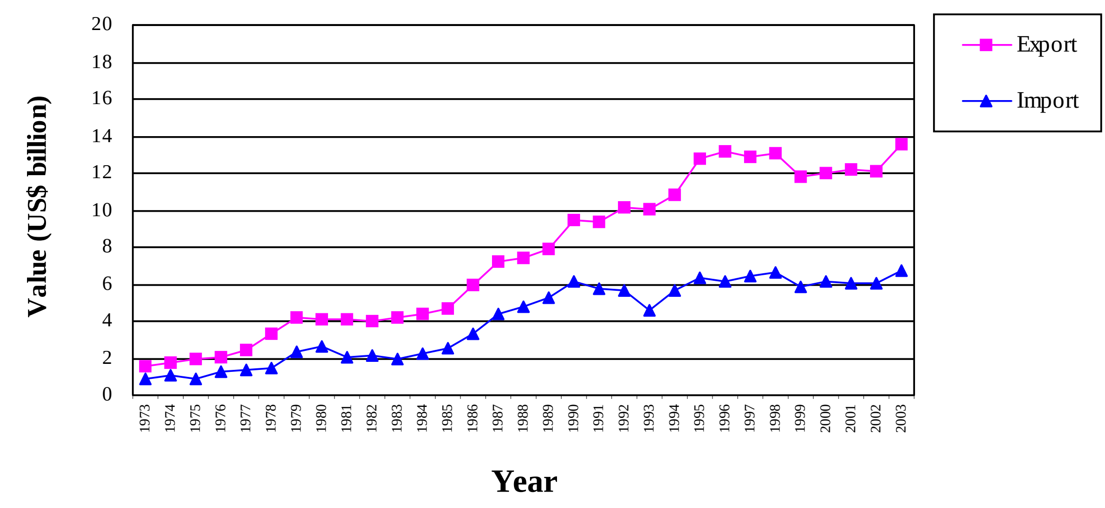


Figure A7-7 - Exports Vs Imports of Textiles in US

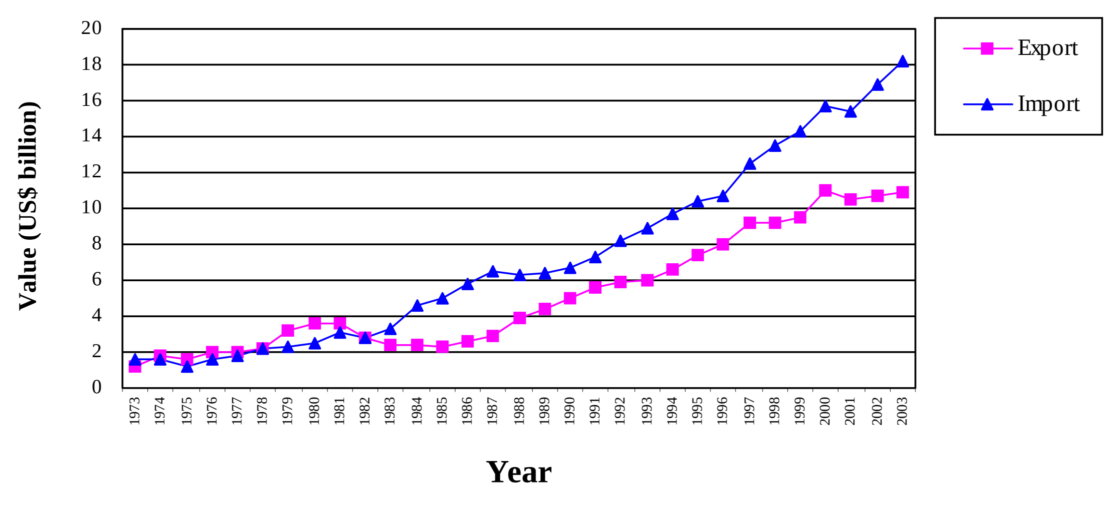


Figure A7-8 - Exports Vs Imports of Clothing in HKSAR of China

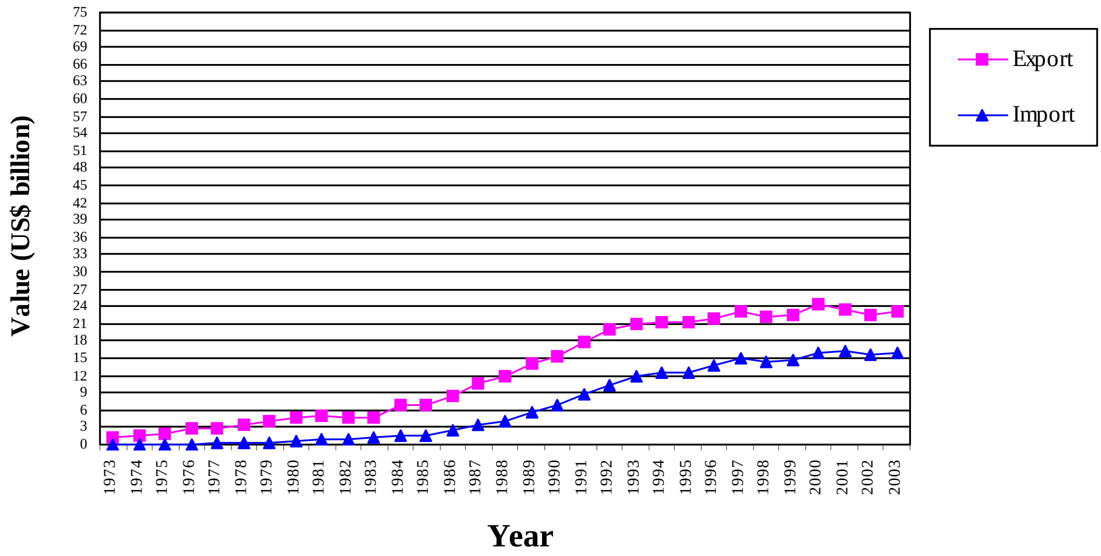


Figure A7-9 - Exports Vs Imports of Clothing in Italy

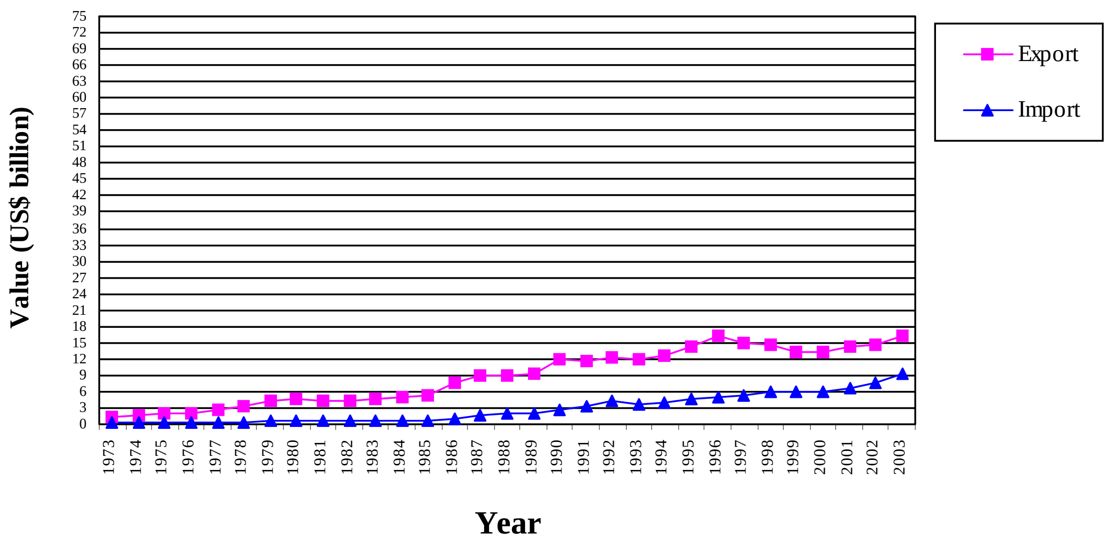


Figure A7-10 - Exports Vs Imports of Clothing in US

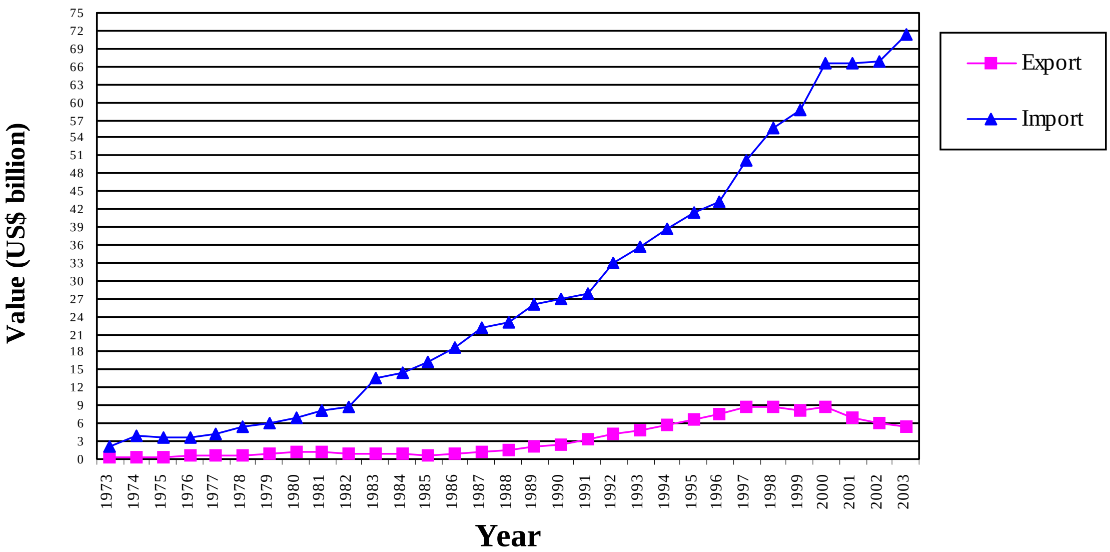


Table A7-3 - Domestic Exports (US$ Billion) and Re-exports (US$ Billion) of Textiles and Clothing in HKSAR of China

	Textiles			Clothing		
	Domestic Exports	Re-exports	Total Exports	Domestic Exports	Re-exports	Total Exports
1973	0.32	0.14	0.46	1.36	0.03	1.39
1974	0.54	0.18	0.72	1.65	0.04	1.69
1975	0.43	0.16	0.59	1.99	0.04	2.03
1976	0.48	0.15	0.63	2.76	0.06	2.85
1977	0.39	0.18	0.57	2.86	0.06	2.92
1978	0.37	0.24	0.61	3.23	0.10	3.32
1979	0.48	0.33	0.81	3.81	0.18	3.99
1980	0.47	0.44	0.91	4.64	0.31	4.95
1981	0.41	0.53	0.94	4.65	0.36	5.01
1982	0.37	0.46	0.83	4.28	0.45	4.73
1983	0.47	0.46	0.97	4.14	0.54	4.68
1984	1.10	1.62	2.72	5.96	0.79	6.75
1985	1.00	2.02	3.02	5.73	0.99	6.72
1986	1.41	2.54	3.95	6.67	1.72	8.39
1987	2.10	3.55	5.65	8.40	2.31	10.71
1988	1.99	4.38	6.37	8.63	3.16	11.79
1989	2.17	5.40	7.57	9.20	4.79	13.99
1990	2.17	6.04	8.21	9.27	6.14	15.41
1991	2.27	7.50	9.77	9.76	8.20	17.96
1992	2.23	8.55	10.78	9.97	10.09	20.06
1993	2.09	9.12	11.21	9.29	11.71	21.00
1994	1.95	10.62	12.57	9.46	11.94	21.40
1995	1.81	12.01	13.82	9.54	11.76	21.30
1996	1.77	12.38	14.15	8.98	12.99	21.98
1997	1.64	12.96	14.60	9.33	13.78	23.11
1998	1.39	11.65	13.04	9.67	12.49	22.16
1999	1.22	11.05	12.27	9.57	12.80	22.37
2000	1.18	12.26	13.44	9.93	14.29	24.22
2001	1.05	11.16	12.21	9.27	14.18	23.45
2002	0.98	11.44	12.42	8.34	14.09	22.43
2003	0.75	12.33	13.08	8.20	14.95	23.15

Footnote

(i) Export figures of HKSAR are derived from :
   (a) 1973-1987 : UN, Commodity Trade Statistics; GATT, International Trade; and Hong Kong Annual Reports, Hong Kong Government (1973-1983).
   (b) 1988-1992 : GATT, International Trade.
   (c) 1993-2000 : World Trade Organisation.
   (d) 2001-2003 : UN, Statistics Division.

(ii) Exports of textiles and clothing from HKSAR include domestic exports and re-exports of textiles and clothing from HKSAR.

Figure A7-11 - Domestic Exports and Re-exports (US$ Billion) of Textiles in HKSAR

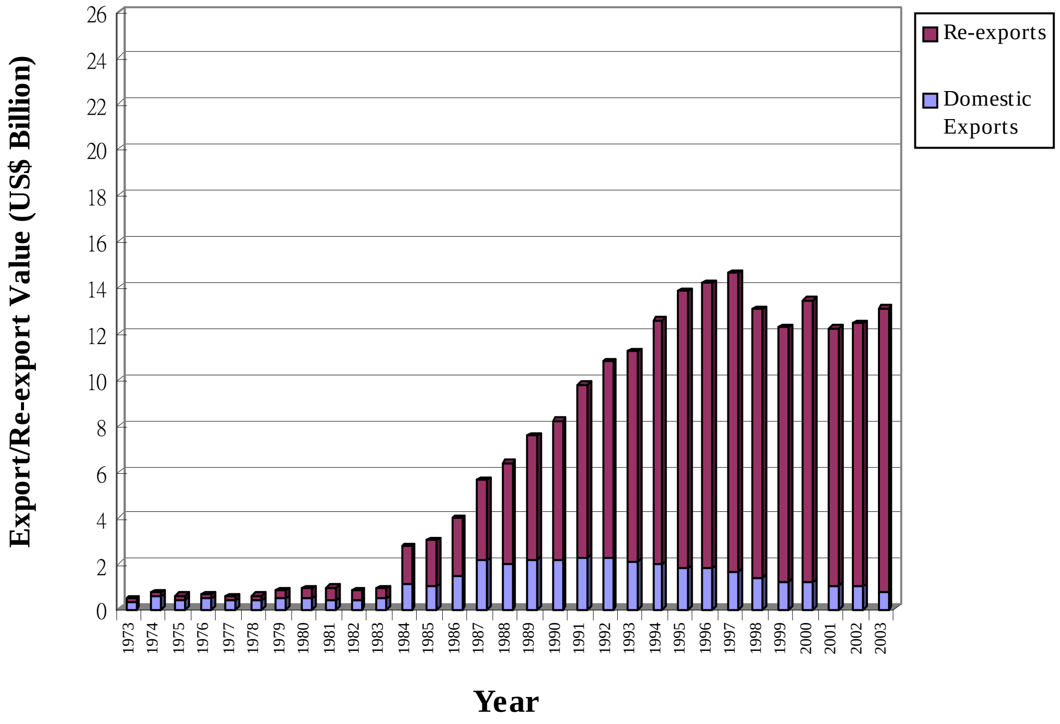


Figure A7-12 - Domestic Exports and Re-exports (US$ Billion) of Clothing in HKSAR

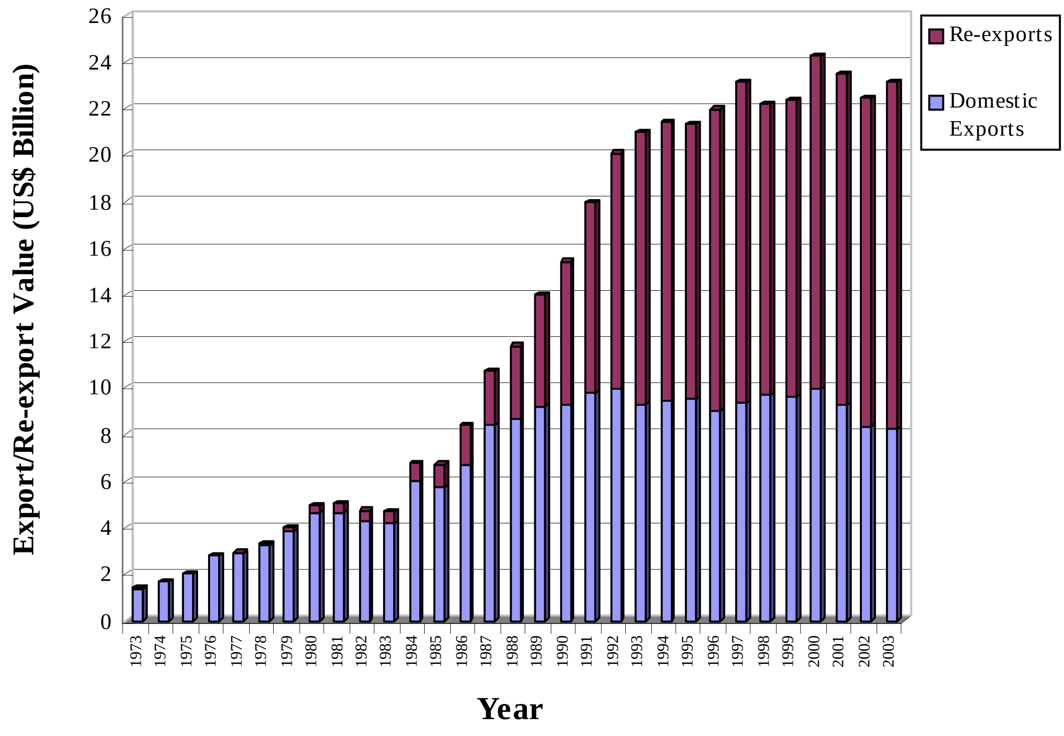


Table A7-4 - Exports of Textiles and Clothing in Three Selected Countries : HKSAR of China (HKSAR), Italy and US

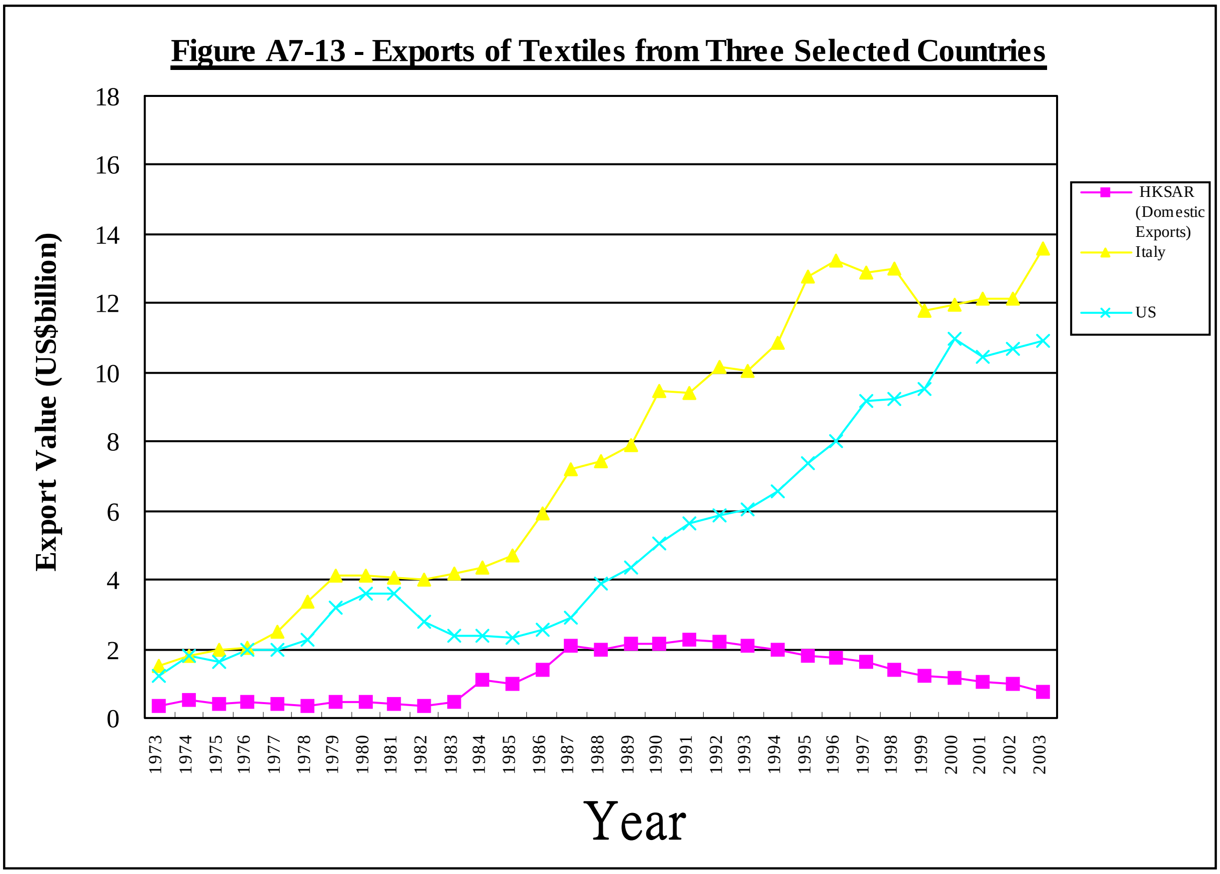
(US$ billion)

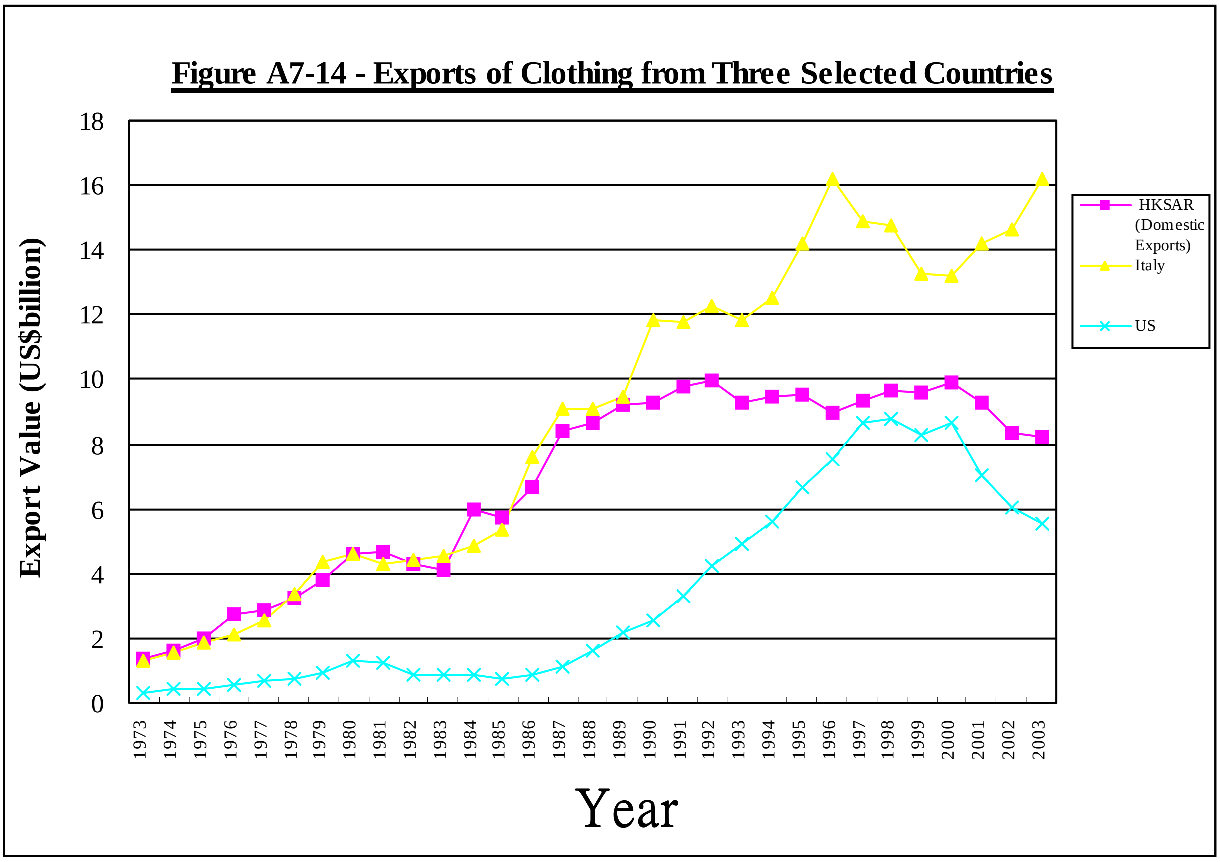
Year	Textiles			Clothing		
	HKSAR (Domestic Exports)	Italy	US	HKSAR (Domestic Exports)	Italy	US
1973	0.32	1.53	1.22	1.36	1.30	0.29
1974	0.54	1.78	1.80	1.65	1.53	0.42
1975	0.43	1.95	1.62	1.99	1.84	0.42
1976	0.48	2.04	1.97	2.76	2.11	0.56
1977	0.39	2.48	1.96	2.86	2.58	0.67
1978	0.37	3.35	2.25	3.23	3.35	0.75
1979	0.48	4.15	3.18	3.81	4.39	0.96
1980	0.47	4.11	3.62	4.64	4.63	1.32
1981	0.41	4.08	3.61	4.65	4.32	1.26
1982	0.37	4.01	2.77	4.28	4.41	0.88
1983	0.47	4.19	2.36	4.14	4.53	0.88
1984	1.10	4.37	2.38	5.96	4.83	0.85
1985	1.00	4.69	2.35	5.73	5.36	0.72
1986	1.41	5.92	2.56	6.67	7.57	0.88
1987	2.10	7.20	2.90	8.40	9.11	1.14
1988	1.99	7.44	3.89	8.63	9.07	1.64
1989	2.17	7.89	4.37	9.20	9.44	2.21
1990	2.17	9.49	5.04	9.27	11.84	2.57
1991	2.27	9.39	5.61	9.76	11.75	3.32
1992	2.23	10.15	5.89	9.97	12.25	4.21
1993	2.09	10.04	6.03	9.29	11.83	4.95
1994	1.95	10.86	6.59	9.46	12.53	5.62
1995	1.81	12.80	7.37	9.54	14.18	6.65
1996	1.77	13.21	8.01	8.98	16.17	7.51
1997	1.64	12.91	9.19	9.33	14.86	8.67
1998	1.39	13.03	9.22	9.67	14.74	8.79
1999	1.22	11.78	9.51	9.57	13.24	8.27
2000	1.18	11.96	10.96	9.93	13.22	8.65
2001	1.05	12.15	10.47	9.27	14.20	7.01
2002	0.98	12.13	10.66	8.34	14.65	6.03
2003	0.75	13.58	10.89	8.20	16.20	5.54

Footnote

Export figures of HKSAR are derived from :

(a) 1973-1987 : UN, Commodity Trade Statistics; GATT, International Trade: and Hong Kong Annual Reports, Hong Kong Government (1973-1983).
(b) 1988-1992 : GATT, International Trade.
(c) 1993-2000 : World Trade Organisation.
(d) 2001-2003 : UN, Statistics Division.





[SO-11\Statistic - Textiles Vs Clothing (Excel & Word)]

Inflation rate of Hong Kong from 1972 to 2000 **Appendix 8**

Year	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
PC	17130	22844	26520	28505	33144	39126	48541	58902	76022	102730	119302	139426	158605	169855
MP	14078	16346	16475	17062	19219	30626	35984	39389	44811	91878	97067	104866	110620	115076
Base Year	1966	1966	1966	1966	1966	1973	1973	1973	1973	1980	1980	1980	1980	1980

Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
PC	191677	221756	255865	284581	329192	390913	451670	514239	592665	654496	722098	798450	762234	734440	732821
MP	125267	138489	150127	154131	163786	178876	386519	415618	443571	450450	471766	501015	463695	467027	466626
Base Year	1980	1980	1980	1980	1980	1980	1990	1990	1990	1990	1990	1990	1990	1990	1990

Remarks:
PC: Private consumption expenditure
MP : Constant market prices

Year	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
	1.217	1.398	1.610	1.671	1.725	1.278	1.349	1.495	1.697	1.118	1.229	1.330

Remarks:
In 1972, the inflation=PC(17130)/MP(14078)=1.217

Inflation+1		1.149	1.152	1.038	1.032	1.035	1.056	1.109	1.134	1.118	1.099	1.082

Deflator (1974-1983) : ***2.255608***

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
	1.434	1.476	1.530	1.601	1.704	1.846	2.010	2.185	1.169	1.237
Inflation+1	1.078	1.029	1.037	1.046	1.064	1.083	1.089	1.087	1.075	1.059

Deflator (1984-1993) : ***1.870398***

Year	1994	1995	1996	1997	1998	1999	2000
	1.336	1.453	1.531	1.594	1.644	1.573	1.570
Inflation+1	1.080	1.087	1.053	1.041	1.031	0.957	0.999

Deflator (1994-2000) : ***1.269283***

Remarks
Inflation rate for 1973 = 1.398/1.217
Deflator for the period 1974 to 1983 = 1.152x1.038x1.032x1.035x1.056x1.109x1.134x1.118x1.099x1.082

Deflator

74-83	84-93	94-00
2.260	1.870	1.270

Remarks
Inflation rates of 2001,2002 and 2003 are not available

Variable labs: Bus=Busines: 1=Textiles, 2= Clothing
1.1=Production: 1=yarn, 2=knitted fabric, 3=woven fabric, 4= BDPF, 5=cut & sewn garment, 6=sweater, 7=other garment
1.2=Years of establishment
1.3=Does company own any production facilities: 1=yes, 2=no
1.4=Does compay conduct any manufacturing process off-shore? 1=yes, 2=no
1.4.1=which area conduct any manufacturing process off-shore? 1=China,2=Asia,3=Africa,4=Others
1.5=Staff No: Including Hong Kong, the Mainland and overseas employees
1.6=Market: 1=USA, 2=Europe, 3=Asia, 4= China, 5=Hong Kong, 6=Others
Profile: Three Technometric Performance Attributes, i.e. 1=product, 2=process, 3=service
t=Period: 0= 1974-1983, 1=1984-1993, 2=1994-2003

Company	Bus	1.1	1.1.1	1.1.2	1.2	1.3	1.4	1.4.1	1.5	1.6.1	1.6.2	1.6.3	1.6.4	Profile	t	q1.1.1	q1.1.2	q1.1.3	q1.1.4	q1.1.5
1	1	4	3	0	32	1	1	1	500	1	2	5	0	1	0	400000	200	200000	200000	100000
1	1	4	3	0	32	1	1	1	500	1	2	5	0	1	1	834500	1200	873000	153000	231200
1	1	4	3	0	32	1	1	1	500	1	2	5	0	1	2	2340000	2500	1987000	566050	451200
2	1	2	0	0	30	1	1	1	300	1	3	5	0	1	0	1200000	500	1000000	300000	250000
2	1	2	0	0	30	1	1	1	300	1	3	5	0	1	1	652300	1000	439000	145000	256800
2	1	2	0	0	30	1	1	1	300	1	3	5	0	1	2	1860000	3580	2367000	345604	234500
3	1	1	2	0	33	1	1	1	1500	1	4	5	0	1	0	150000	100	150000	250000	150000
3	1	1	2	0	33	1	1	1	1500	1	4	5	0	1	1	1659000	500	956000	236000	341900
3	1	1	2	0	33	1	1	1	1500	1	4	5	0	1	2	3245000	2460	1325000	645300	545000
4	1	1	2	4	40	1	1	1	3500	1	2	5	0	1	0	450000	200	350000	250000	150000
4	1	1	2	4	40	1	1	1	3500	1	2	5	0	1	1	1345000	1500	1165000	325000	427600
4	1	1	2	4	40	1	1	1	3500	1	2	5	0	1	2	3545900	1800	2590000	936000	435600
5	1	2	4	0	35	1	1	1	5000	3	5	0	0	1	0	100000	120	100000	140000	100000
5	1	2	4	0	35	1	1	1	5000	3	5	0	0	1	1	1896000	3000	1120000	349000	474000
5	1	2	4	0	35	1	1	1	5000	3	5	0	0	1	2	3712300	4000	2657000	846800	560800
6	1	1	0	0	30	1	1	1	2000	3	5	0	0	1	0	1400000	500	400000	300000	200000
6	1	1	0	0	30	1	1	1	2000	3	5	0	0	1	1	1789000	2500	854300	234000	356800
6	1	1	0	0	30	1	1	1	2000	3	5	0	0	1	2	2656000	3600	2150000	785300	546000
7	1	1	0	0	33	1	1	1	1500	3	5	0	0	1	0	500000	200	500000	300000	200000
7	1	1	0	0	33	1	1	1	1500	3	5	0	0	1	1	1543000	2800	754000	254000	231300
7	1	1	0	0	33	1	1	1	1500	3	5	0	0	1	2	2345600	4500	2123000	759200	253000
8	1	2	4	0	32	1	1	1	3000	3	5	0	0	1	0	300000	150	300000	200000	180000
8	1	2	4	0	32	1	1	1	3000	3	5	0	0	1	1	1435000	2900	889000	355000	298000
8	1	2	4	0	32	1	1	1	3000	3	5	0	0	1	2	3524000	3500	2804000	645200	388000
9	1	2	4	0	36	1	1	1	1000	3	5	0	0	1	0	100000	120	100000	150000	230000
9	1	2	4	0	36	1	1	1	1000	3	5	0	0	1	1	1678000	1800	564000	187000	253400
9	1	2	4	0	36	1	1	1	1000	3	5	0	0	1	2	2312900	3000	1580000	664500	343500
10	1	3	4	0	40	1	1	1	2000	3	5	0	0	1	0	500000	250	300000	250000	200000
10	1	3	4	0	40	1	1	1	2000	3	5	0	0	1	1	1230000	2200	934000	213000	397800
10	1	3	4	0	40	1	1	1	2000	3	5	0	0	1	2	1569000	3500	2360000	671200	486000
11	1	4	0	0	32	1	1	1	500	3	5	0	0	1	0	300000	130	300000	130000	100000
11	1	4	0	0	32	1	1	1	500	3	5	0	0	1	1	346500	1300	345000	153000	278500
11	1	4	0	0	32	1	1	1	500	3	5	0	0	1	2	1245000	2500	2145000	232390	288500
12	1	4	0	0	37	1	1	1	80	4	0	0	0	1	0	200000	100	200000	120000	80000
12	1	4	0	0	37	1	1	1	80	4	0	0	0	1	1	274500	1000	118500	143000	145300
12	1	4	0	0	37	1	1	1	80	4	0	0	0	1	2	456000	350	268000	156700	155000
13	1	2	4	0	33	1	1	1	100	1	2	3	5	1	0	600000	300	500000	200000	230000
13	1	2	4	0	33	1	1	1	100	1	2	3	5	1	1	235600	1000	345000	145000	118500
13	1	2	4	0	33	1	1	1	100	1	2	3	5	1	2	867500	500	435000	214300	112000
14	1	3	4	0	30	1	1	1	2000	3	5	0	0	1	0	1500000	1000	1000000	350000	230000
14	1	3	4	0	30	1	1	1	2000	3	5	0	0	1	1	125600	2500	723000	189000	423500
14	1	3	4	0	30	1	1	1	2000	3	5	0	0	1	2	2568000	5000	2356000	567230	412300
15	1	4	0	0	31	1	1	1	100	4	0	0	0	1	0	200000	150	200000	150000	120000
15	1	4	0	0	31	1	1	1	100	4	0	0	0	1	1	345800	800	234000	142000	311090
15	1	4	0	0	31	1	1	1	100	4	0	0	0	1	2	783400	500	424500	341197	322000
16	2	6	0	0	40	1	1	1	5000	1	2	3	4	1	0	350000	250	250000	250000	150000
16	2	6	0	0	40	1	1	1	5000	1	2	3	4	1	1	1734000	2500	1185000	353000	423000
16	2	6	0	0	40	1	1	1	5000	1	2	3	4	1	2	3738000	4500	2556000	875600	537500
17	2	5	0	0	33	1	1	1	500	1	2	3	5	1	0	200000	140	200000	150000	100000
17	2	5	0	0	33	1	1	1	500	1	2	3	5	1	1	543600	1200	523000	167800	322100
17	2	5	0	0	33	1	1	1	500	1	2	3	5	1	2	2143000	2300	853000	452300	334500
18	2	5	0	0	30	1	1	1	200	1	0	0	0	1	0	200000	150	200000	200000	200000
18	2	5	0	0	30	1	1	1	200	1	0	0	0	1	1	531200	500	432000	158900	223300
18	2	5	0	0	30	1	1	1	200	1	0	0	0	1	2	1453400	2500	656000	342100	224500
19	2	6	0	0	35	1	1	1	3000	1	2	3	5	1	0	400000	300	400000	200000	200000
19	2	6	0	0	35	1	1	1	3000	1	2	3	5	1	1	1756000	2700	854000	265000	413900
19	2	6	0	0	35	1	1	1	3000	1	2	3	5	1	2	2895000	3600	2550000	578300	423900
20	2	6	0	0	36	1	1	1	1000	1	2	3	5	1	0	1300000	450	1000000	300000	220000
20	2	6	0	0	36	1	1	1	1000	1	2	3	5	1	1	1289000	1600	756000	234500	421390
20	2	6	0	0	36	1	1	1	1000	1	2	3	5	1	2	1453000	2500	1723000	651375	425580
21	2	5	0	0	30	1	1	1	500	1	2	0	0	1	0	500000	240	400000	250000	180000
21	2	5	0	0	30	1	1	1	500	1	2	0	0	1	1	562300	600	456000	185600	276530
21	2	5	0	0	30	1	1	1	500	1	2	0	0	1	2	893400	2400	968000	545000	425030
22	2	5	0	0	31	1	1	1	1000	1	2	3	0	1	0	600000	250	500000	200000	200000
22	2	5	0	0	31	1	1	1	1000	1	2	3	0	1	1	1523000	2500	675000	289000	311760
22	2	5	0	0	31	1	1	1	1000	1	2	3	0	1	2	2123000	3000	1586000	640000	311760
23	2	5	0	0	30	1	1	1	800	1	2	0	0	1	0	200000	150	200000	150000	160000
23	2	5	0	0	30	1	1	1	800	1	2	0	0	1	1	1623000	1900	523000	167800	254300
23	2	5	0	0	30	1	1	1	800	1	2	0	0	1	2	1564000	1500	855000	526000	254300
24	2	6	0	0	38	1	1	1	150	1	0	0	0	1	0	200000	120	200000	150000	180000
24	2	6	0	0	38	1	1	1	150	1	0	0	0	1	1	781200	1200	256000	154300	134000
24	2	6	0	0	38	1	1	1	150	1	0	0	0	1	2	1567000	1800	150000	150000	135000
25	2	6	0	0	30	1	1	1	1000	1	2	4	0	1	0	600000	250	500000	200000	230000
25	2	6	0	0	30	1	1	1	1000	1	2	4	0	1	1	1529000	2800	578000	298700	332500
25	2	6	0	0	30	1	1	1	1000	1	2	4	0	1	2	2234760	1400	2456000	782300	332500
26	2	5	0	0	31	1	1	1	100	2	0	0	0	1	0	300000	150	300000	140000	130000
26	2	5	0	0	31	1	1	1	100	2	0	0	0	1	1	341200	200	254000	213000	175500
26	2	5	0	0	31	1	1	1	100	2	0	0	0	1	2	245000	450	1535000	321400	175500
27	2	6	0	0	32	1	1	1	1000	1	2	3	4	1	0	600000	250	350000	200000	200000
27	2	6	0	0	32	1	1	1	1000	1	2	3	4	1	1	1389000	2700	575000	324600	276300
27	2	6	0	0	32	1	1	1	1000	1	2	3	4	1	2	867000	4200	1865500	634500	526300
28	2	5	0	0	30	1	1	1	90	1	0	0	0	1	0	500000	150	360000	150000	190000
28	2	5	0	0	30	1	1	1	90	1	0	0	0	1	1	144000	1200	134500	167300	132400
28	2	5	0	0	30	1	1	1	90	1	0	0	0	1	2	150000	300	722000	235000	132400
29	2	6	0	0	33	1	1	1	300	1	2	0	0	1	0	600000	200	460000	200000	200000
29	2	6	0	0	33	1	1	1	300	1	2	0	0	1	1	475600	2400	493000	245000	245000
29	2	6	0	0	33	1	1	1	300	1	2	0	0	1	2	2312000	1240	950000	348900	245000
30	2	7	0	0	30	1	1	1	200	1	2	3	0	1	0	800000	260	250000	230000	200000
30	2	7	0	0	30	1	1	1	200	1	2	3	0	1	1	517500	1500	312200	231200	219300
30	2	7	0	0	30	1	1	1	200	1	2	3	0	1	2	1453600	600	1250000	165000	325500
															Max	3738000	5000	2804000	936000	560800
															Min	100000	100	100000	120000	80000

q1.1.6	q1.1.8	q1.2.2	q1.2.3	q2.1.1	q2.1.2	q2.1.3	q2.1.4	q2.1.5	q2.1.6	q2.1.7	q2.1.8	q2.1.9	q2.1.10	q2.2.1	q2.2.2	q2.2.4	q2.2.5	q2.2.6	q3.1.5	q3.1.7
5	600000	6	6	200000	230000	1	1	85600	35	5	195000	200000	0	20	50	1	6	5	400000	1
10	1987000	16	21	153000	165000	1	2	546050	50	6	156345	213455	23434	55	75	2	20	23	856903	3
18	2850000	20	25	234568	546050	2	2	546050	80	7	834500	546050	13240	80	86	2	40	30	1470000	6
6	800000	10	7	280000	260000	1	1	340000	30	7	160000	280000	0	15	60	0	6	6	900000	1
9	1567000	15	22	145123	154000	1	1	405604	55	8	147000	231420	23560	50	65	1	21	22	1050090	4
15	2560000	21	23	267456	405604	1	1	674589	85	6	652300	405604	23060	85	70	3	20	40	2450000	5
5	900000	5	4	250000	270000	1	1	450000	45	3	160000	250000	0	25	55	0	4	5	850000	1
9	1325000	15	25	236000	236000	2	2	698300	43	7	245000	256789	45678	50	55	1	25	23	936546	3
22	3560000	25	20	345829	698300	3	3	698300	80	10	1159000	698300	15678	80	85	2	35	30	3250000	7
5	850000	12	5	250000	260000	1	1	470000	50	5	180000	230000	0	28	65	1	5	6	950000	1
16	2190000	18	30	325000	355000	1	1	700000	60	5	325000	245676	41230	60	80	1	28	30	1183456	5
24	3556000	28	45	415340	934580	1	1	1121500	85	15	1256000	912340	22450	90	95	3	40	30	4739330	6
6	650000	11	4	295000	270000	1	1	483340	43	4	240000	260000	0	30	43	1	3	7	1000000	2
14	2257000	20	29	349000	473900	2	2	636200	70	6	473934	473933	47393	70	75	2	30	29	105568	6
25	4339000	30	40	467290	836200	3	2	836200	100	18	1284000	934579	56074	95	95	3	40	48	2750000	7
7	550000	14	9	300000	230000	1	1	320000	32	8	200000	230000	0	28	43	1	8	8	650000	1
11	2160000	16	24	234000	247000	1	1	551230	65	7	275000	355000	45340	68	69	1	28	27	950033	3
20	2767000	28	34	367534	751230	1	2	751230	83	16	1089000	751230	23400	91	90	2	50	50	3580000	8
8	500000	10	6	300000	290000	1	1	340000	40	6	180000	290000	0	19	55	0	6	6	500000	1
12	2059000	13	23	254000	285000	1	2	543900	50	8	358000	259000	32345	55	60	0	19	18	845232	3
15	2896000	19	36	335678	543900	2	2	543900	85	15	943000	543900	21200	90	89	3	45	40	4150000	1
5	680000	10	6	200000	250000	1	1	482000	45	6	150000	250000	0	20	40	1	5	6	750000	2
10	2370000	15	24	355500	435000	2	2	645200	45	3	415000	423000	34500	45	65	1	23	23	1184834	5
18	3894000	23	38	365432	645200	2	3	645200	82	14	843500	645200	19870	95	92	4	48	49	2980000	7
5	100000	12	5	150000	180000	1	1	286000	35	5	190000	180000	0	16	38	0	5	5	550000	1
11	1987000	11	18	187000	285000	1	1	563400	65	4	298000	218670	23182	65	68	0	26	20	1126225	3
14	2980000	17	20	435626	563400	1	1	563400	90	13	1078000	563400	18560	86	85	3	40	38	3350000	6
6	650000	13	8	250000	260000	1	1	312000	29	7	200000	260000	0	18	32	1	6	6	760000	1
15	1856000	13	26	213000	235000	1	2	671200	60	7	335000	235500	28790	65	70	1	19	15	1022463	4
19	2458000	19	19	286715	671200	3	2	671200	95	12	1030000	671200	19320	95	90	4	40	42	3460000	5
5	350000	8	5	130000	150000	1	1	325000	35	5	100000	150000	0	15	52	0	5	6	450000	0
9	2145000	10	19	153234	256000	1	1	232390	45	5	346000	312900	31250	50	55	0	16	13	845231	3
11	1259000	16	20	282312	232390	1	1	232390	90	4	346500	232390	16400	80	75	3	30	28	2343000	4
5	200000	5	3	50000	50000	1	1	156000	15	3	80000	60000	0	11	30	0	3	5	200000	0
8	368000	6	12	143000	185000	1	2	95500	59	3	234300	242300	5689	59	65	1	10	11	368045	1
10	425000	10	12	150094	156700	2	2	156700	80	14	95670	156700	5689	80	70	1	25	26	2050500	3
7	500000	9	6	200000	220000	1	1	213000	19	6	140000	220000	0	12	34	0	6	6	500000	1
9	234000	9	13	145000	195000	1	2	214300	55	9	205050	223760	15670	55	60	0	20	21	425029	4
12	825000	9	15	194534	214300	2	2	214300	86	5	235600	214300	15670	76	70	3	23	22	2830000	7
10	1000000	15	10	300000	300000	1	1	320000	39	11	230000	300000	0	19	45	1	10	10	900000	2
10	1756000	17	18	189000	285000	1	2	567230	62	10	283000	311090	34256	62	65	1	19	10	985760	4
16	2456000	19	20	412627	567230	3	3	567230	85	7	125600	567230	14530	90	85	2	35	40	186920	6
5	250000	6	4	150000	160000	1	1	190000	19	4	120000	160000	0	10	30	0	4	5	200000	1
9	424500	11	11	118483	236000	1	1	85600	50	6	265000	253000	32140	50	60	0	13	13	235645	3
14	657400	9	14	186723	341197	1	2	341197	80	15	345800	341197	21300	75	70	2	20	23	4340000	7
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q3.2.1	q3.2.2	q3.2.3	q3.2.4	q4.1.1	q4.1.2	q4.1.3	q4.1.4	q4.1.5	q4.2.1	q4.2.2	q4.2.3	q4.2.4	q4.2.5	q4.2.7	q5.1.1	q5.1.2	q5.1.3	q5.1.4	q5.1.5	q5.1.6
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60	5000	30	75	28037	6	6	67854	12140	45	50	6	5	5	5	365237	28037	86734	45	86734	86700
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180	80000	90	30	70000	2	0	140000	5000	5	10	4	1	1	4	50000	140000	50000	6	140000	0
90	20000	60	30	326000	1	1	23696	14500	12	49	4	4	4	4	56845	126000	126000	10	367000	0
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60	10000	45	50	346200	6	2	183420	17898	12	50	3	3	3	3	162364	146200	146200	25	410500	0
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180	100000	90	90	747664	12	10	560747	28037	50	90	9	9	8	8	934579	373832	560748	100	571429	500000
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q5.1.7	q5.1.8	q5.1.9	q5.2.1	q5.2.3	q5.2.4	q5.2.5	q5.2.6	q5.2.7	q5.2.8	q5.2.9	q5.2.10	q5.2.11
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0	200000	4	300	1	2	3	0	5	0	0	6	8
1	245300	4	650	2	4	5	1	49	0	1	20	13
2	334000	5	700	2	5	5	1	55	1	1	40	36
1	220000	5	350	1	2	4	0	8	0	0	7	6
2	394560	6	500	2	5	7	1	35	0	1	29	15
2	394000	4	650	3	4	4	2	75	1	2	43	38
0	150000	3	280	1	2	3	0	7	0	0	6	7
1	296850	5	600	2	3	8	1	30	0	1	20	11
3	397000	6	550	3	6	6	1	62	1	1	30	20
1	250000	4	430	1	2	4	0	5	0	0	8	6
1	298730	4	650	2	4	7	1	45	0	2	25	13
2	286700	5	650	3	5	5	2	50	1	3	40	19
0	160000	3	130	0	1	3	0	3	0	0	5	5
1	275680	3	500	1	3	6	1	25	0	1	18	10
2	254600	4	800	2	4	4	1	54	0	1	35	20
0	0	0	100	0	1	1	0	7	0	0	5	5
0	164360	2	100	1	1	2	0	3	0	1	13	6
0	152000	8	200	0	4	8	1	5	0	0	15	10
0	200000	2	300	1	3	3	0	8	0	0	7	6
1	39856	4	300	3	2	3	1	19	0	1	15	9
3	194500	9	500	3	3	9	2	65	1	1	40	15
1	240000	3	450	1	1	2	0	6	0	0	8	8
1	412600	6	600	1	3	5	1	45	0	2	20	17
1	412600	6	850	3	6	6	2	70	1	2	45	20
0	150000	2	150	0	1	2	0	7	0	0	7	6
0	89560	5	150	1	2	4	0	10	0	0	15	11
2	86734	7	350	2	7	7	0	40	0	0	18	14
1	250000	5	250	1	2	4	0	10	0	0	10	8
2	442600	5	600	2	5	8	1	45	0	2	28	19
4	432200	10	950	4	8	10	2	62	1	2	50	40
0	150000	3	140	0	2	3	0	6	0	0	5	7
1	244500	4	140	2	3	4	0	20	0	1	16	10
2	237654	6	500	2	6	6	1	53	0	1	36	38
0	200000	3	150	0	1	3	0	8	0	0	6	8
1	59780	3	150	1	3	3	0	10	0	1	12	9
3	193400	8	450	3	5	8	1	61	0	1	25	21
1	300000	4	300	1	2	4	0	6	0	0	8	9
2	426800	5	750	2	4	6	1	43	0	2	30	15
2	413845	9	850	2	7	9	1	68	1	2	45	39
0	280000	3	450	1	3	3	0	8	0	0	7	7
1	345230	5	450	2	3	5	1	25	0	2	19	10
2	321256	7	500	2	7	7	2	60	1	2	40	21
0	250000	2	240	1	2	2	0	7	0	0	6	7
1	67590	3	350	1	2	6	1	35	0	1	24	8
3	145000	8	550	3	8	8	1	50	1	1	33	20
1	200000	3	250	1	2	2	0	8	0	0	6	6
2	245640	4	250	2	3	7	0	25	0	2	20	19
1	234900	6	600	1	6	6	2	45	1	2	25	23
0	150000	3	150	0	2	3	0	5	0	0	5	5
1	342890	3	650	2	3	6	0	15	0	2	16	16
1	325700	5	800	1	5	5	2	55	0	0	40	25
0	150000	3	120	0	2	3	0	7	0	0	7	7
1	285460	2	200	1	3	5	0	15	0	1	12	5
3	276500	7	500	3	7	7	1	60	0	0	25	16
1	200000	4	250	1	2	3	0	6	0	0	6	9
1	395670	4	350	2	4	7	0	20	0	2	20	18
2	386456	5	850	2	6	5	2	65	1	1	40	35
0	140000	4	150	1	3	2	0	5	0	0	6	6
0	379680	4	250	1	4	7	0	10	0	1	15	11
3	167000	5	350	3	5	5	1	65	1	1	30	15
1	200000	3	250	1	2	3	0	8	0	0	8	9
2	412690	3	450	2	3	8	1	25	0	2	23	14
1	410500	4	500	2	4	4	2	66	1	2	45	36
0	65000	2	30	0	2	2	0	0	0	0	5	0
0	23697	1	350	1	2	4	1	7	0	0	10	9
1	28037	1	400	1	2	3	0	25	0	0	20	15
0	200000	3	200	1	2	3	0	7	0	0	7	5
1	325600	4	500	2	3	5	1	25	0	1	23	12
2	342000	8	650	2	7	8	1	50	1	1	35	23
0	230000	3	260	1	2	4	0	6	0	0	8	6
1	89430	5	550	2	3	6	1	30	0	1	22	16
1	245000	6	700	2	6	6	1	64	1	1	40	25
4	571429	10	1000	4	8	10	2	80	1	3	50	40
0	0	0	30	0	1	1	0	0	0	0	5	0

Input and Output Data of the 'Technometric' Performance Attribute 'Process' from 1974-1983, 1984-1993 and 1994-2003 for 30 HKTC Companies

Variable labs:
- Bus=Busines: 1=Textiles, 2= Clothing
- 1.1=Production: 1=yarn, 2=knitted fabric, 3=woven fabric, 4= BDPF, 5=cut & sewn garment, 6=sweater, 7=other garment
- 1.2=Years of establishment
- 1.3=Does company own any production facilities: 1=yes, 2=no
- 1.4=Does compay conduct any manufacturing process off-shore? 1=yes, 2=no
- 1.4.1=which area conduct any manufacturing process off-shore? 1=China,2=Asia,3=Africa,4=Others
- 1.5=Staff No: Including Hong Kong, the Mainland and overseas employees
- 1.6=Market: 1=USA, 2=Europe, 3=Asia, 4= China, 5=Hong Kong, 6=Others
- Profile: Three Technometric Performance Attributes, i.e. 1=product, 2=process, 3=service
- t=Period: 0= 1974-1983, 1=1984-1993, 2=1994-2003

Company	Bus	1.1	1.1.1	1.1.2	1.2	1.3	1.4	1.4.1	1.5	1.6.1	1.6.2	1.6.3	1.6.4	Profile	t	q1.1.1	q1.1.2	q1.1.3	q1.1.4	q1.1.5
1	1	4	3	0	32	1	1	1	500	1	2	5	0	2	0	350000	200	230000	220000	95000
1	1	4	3	0	32	1	1	1	500	1	2	5	0	2	1	834500	500	546050	234000	256000
1	1	4	3	0	32	1	1	1	500	1	2	5	0	2	2	2340000	2500	1587000	566050	451200
2	1	2	0	0	30	1	1	1	300	1	3	5	0	2	0	1300000	500	1000000	350000	250000
2	1	2	0	0	30	1	1	1	300	1	3	5	0	2	1	652300	800	405604	256000	245000
2	1	2	0	0	30	1	1	1	300	1	3	5	0	2	2	1860000	3800	2057000	345604	234500
3	1	1	2	0	33	1	1	1	1500	1	4	5	0	2	0	250000	100	250000	300000	160000
3	1	1	2	0	33	1	1	1	1500	1	4	5	0	2	1	1659000	1000	698300	356000	378900
3	1	1	2	0	33	1	1	1	1500	1	4	5	0	2	2	3245000	2460	1226000	645300	545000
4	1	1	2	4	40	1	1	1	3500	1	2	5	0	2	0	450000	200	350000	250000	180000
4	1	1	2	4	40	1	1	1	3500	1	2	5	0	2	1	1345000	600	984000	450237	474000
4	1	1	2	4	40	1	1	1	3500	1	2	5	0	2	2	3545900	1800	2180000	936000	435600
5	1	2	4	0	35	1	1	1	5000	3	5	0	0	2	0	100000	120	150000	120000	110000
5	1	2	4	0	35	1	1	1	5000	3	5	0	0	2	1	1896000	450	836200	423000	413500
5	1	2	4	0	35	1	1	1	5000	3	5	0	0	2	2	3712300	4000	1865000	846800	560800
6	1	1	0	0	30	1	1	1	2000	3	5	0	0	2	0	1400000	500	430000	320000	200000
6	1	1	0	0	30	1	1	1	2000	3	5	0	0	2	1	1546000	2000	751230	367000	324500
6	1	1	0	0	30	1	1	1	2000	3	5	0	0	2	2	2656000	3600	2150000	785300	546000
7	1	1	0	0	33	1	1	1	1500	3	5	0	0	2	0	550000	200	500000	310000	200000
7	1	1	0	0	33	1	1	1	1500	3	5	0	0	2	1	1230000	1500	543900	334000	314500
7	1	1	0	0	33	1	1	1	1500	3	5	0	0	2	2	2345600	4500	2003000	759200	253000
8	1	2	4	0	32	1	1	1	3000	3	5	0	0	2	0	300000	150	300000	230000	180000
8	1	2	4	0	32	1	1	1	3000	3	5	0	0	2	1	1689000	1400	645200	394000	386740
8	1	2	4	0	32	1	1	1	3000	3	5	0	0	2	2	3524000	3500	2243000	645200	388000
9	1	2	4	0	36	1	1	1	1000	3	5	0	0	2	0	100000	120	100000	130000	230000
9	1	2	4	0	36	1	1	1	1000	3	5	0	0	2	1	1345000	1000	563400	397000	386750
9	1	2	4	0	36	1	1	1	1000	3	5	0	0	2	2	2312900	3000	1580000	664500	343500
10	1	3	4	0	40	1	1	1	2000	3	5	0	0	2	0	500000	250	340000	250000	200000
10	1	3	4	0	40	1	1	1	2000	3	5	0	0	2	1	1675000	900	671200	286700	224550
10	1	3	4	0	40	1	1	1	2000	3	5	0	0	2	2	1569000	3500	1978000	671200	486000
11	1	4	0	0	32	1	1	1	500	3	5	0	0	2	0	330000	130	350000	150000	100000
11	1	4	0	0	32	1	1	1	500	3	5	0	0	2	1	569320	800	232390	254600	231200
11	1	4	0	0	32	1	1	1	500	3	5	0	0	2	2	1245000	2500	2145000	232390	288500
12	1	4	0	0	37	1	1	1	80	4	0	0	0	2	0	250000	100	200000	120000	80000
12	1	4	0	0	37	1	1	1	80	4	0	0	0	2	1	118485	250	156700	152000	146600
12	1	4	0	0	37	1	1	1	80	4	0	0	0	2	2	456000	350	268000	156700	155000
13	1	2	4	0	33	1	1	1	100	1	2	3	5	2	0	600000	300	500000	230000	230000
13	1	2	4	0	33	1	1	1	100	1	2	3	5	2	1	1789000	500	214300	194500	186750
13	1	2	4	0	33	1	1	1	100	1	2	3	5	2	2	867500	500	435000	214300	112000
14	1	3	4	0	30	1	1	1	2000	3	5	0	0	2	0	1500000	1000	1000000	350000	230000
14	1	3	4	0	30	1	1	1	2000	3	5	0	0	2	1	1543000	3000	567230	412600	402320
14	1	3	4	0	30	1	1	1	2000	3	5	0	0	2	2	2568000	5000	2150000	567230	412300
15	1	4	0	0	31	1	1	1	100	4	0	0	0	2	0	250000	150	200000	150000	120000
15	1	4	0	0	31	1	1	1	100	4	0	0	0	2	1	435000	500	341197	186700	176530
15	1	4	0	0	31	1	1	1	100	4	0	0	0	2	2	783400	500	415000	341197	322000
16	2	6	0	0	40	1	1	1	5000	1	2	3	4	2	0	350000	250	250000	250000	150000
16	2	6	0	0	40	1	1	1	5000	1	2	3	4	2	1	1678000	2500	875600	432200	412320
16	2	6	0	0	40	1	1	1	5000	1	2	3	4	2	2	3738000	4500	1895000	875600	537500
17	2	5	0	0	33	1	1	1	500	1	2	3	5	2	0	200000	140	200000	150000	100000
17	2	5	0	0	33	1	1	1	500	1	2	3	5	2	1	730700	300	452300	237600	195643
17	2	5	0	0	33	1	1	1	500	1	2	3	5	2	2	2143000	2300	755000	452300	334500
18	2	5	0	0	30	1	1	1	200	1	0	0	0	2	0	200000	150	200000	200000	200000
18	2	5	0	0	30	1	1	1	200	1	0	0	0	2	1	646500	500	342100	193400	192200
18	2	5	0	0	30	1	1	1	200	1	0	0	0	2	2	1453400	2500	625000	342100	224500
19	2	6	0	0	35	1	1	1	3000	1	2	3	5	2	0	500000	300	400000	230000	200000
19	2	6	0	0	35	1	1	1	3000	1	2	3	5	2	1	1674500	2000	578300	413800	418760
19	2	6	0	0	35	1	1	1	3000	1	2	3	5	2	2	2895000	3600	2100000	578300	423900
20	2	6	0	0	36	1	1	1	1000	1	2	3	5	2	0	1300000	450	1000000	300000	220000
20	2	6	0	0	36	1	1	1	1000	1	2	3	5	2	1	1735600	1200	651375	321200	310320
20	2	6	0	0	36	1	1	1	1000	1	2	3	5	2	2	1453000	2500	1610000	651375	425580
21	2	5	0	0	30	1	1	1	500	1	2	0	0	2	0	500000	240	450000	250000	180000
21	2	5	0	0	30	1	1	1	500	1	2	0	0	2	1	125600	1500	545000	145000	134000
21	2	5	0	0	30	1	1	1	500	1	2	0	0	2	2	893400	2400	954000	545000	425030
22	2	5	0	0	31	1	1	1	1000	1	2	3	0	2	0	600000	250	500000	200000	200000
22	2	5	0	0	31	1	1	1	1000	1	2	3	0	2	1	1745800	1000	640000	234900	215600
22	2	5	0	0	31	1	1	1	1000	1	2	3	0	2	2	2123000	3000	1586000	640000	311760
23	2	5	0	0	30	1	1	1	800	1	2	0	0	2	0	200000	150	200000	250000	160000
23	2	5	0	0	30	1	1	1	800	1	2	0	0	2	1	1734000	600	526000	325700	312540
23	2	5	0	0	30	1	1	1	800	1	2	0	0	2	2	1564000	1500	855000	526000	254300
24	2	6	0	0	38	1	1	1	150	1	0	0	0	2	0	200000	120	250000	150000	180000
24	2	6	0	0	38	1	1	1	150	1	0	0	0	2	1	543600	600	118500	276500	256450
24	2	6	0	0	38	1	1	1	150	1	0	0	0	2	2	1567000	1800	149530	149535	135000
25	2	6	0	0	30	1	1	1	1000	1	2	4	0	2	0	600000	250	550000	200000	250000
25	2	6	0	0	30	1	1	1	1000	1	2	4	0	2	1	1731200	800	782300	386000	312340
25	2	6	0	0	30	1	1	1	1000	1	2	4	0	2	2	2234760	1400	2056000	782300	332500
26	2	5	0	0	31	1	1	1	100	2	0	0	0	2	0	350000	150	300000	150000	140000
26	2	5	0	0	31	1	1	1	100	2	0	0	0	2	1	756000	450	321400	167000	154500
26	2	5	0	0	31	1	1	1	100	2	0	0	0	2	2	245000	450	1535000	321400	175500
27	2	6	0	0	32	1	1	1	1000	1	2	3	4	2	0	600000	250	350000	200000	190000
27	2	6	0	0	32	1	1	1	1000	1	2	3	4	2	1	1589000	2000	634500	410500	405600
27	2	6	0	0	32	1	1	1	1000	1	2	3	4	2	2	867000	4200	1865500	634500	526300
28	2	5	0	0	30	1	1	1	90	1	0	0	0	2	0	500000	150	360000	150000	190000
28	2	5	0	0	30	1	1	1	90	1	0	0	0	2	1	562300	200	235000	142000	118500
28	2	5	0	0	30	1	1	1	90	1	0	0	0	2	2	149533	300	722000	235000	132400
29	2	6	0	0	33	1	1	1	300	1	2	0	0	2	0	600000	200	460000	200000	230000
29	2	6	0	0	33	1	1	1	300	1	2	0	0	2	1	1523000	250	348900	342000	314230
29	2	6	0	0	33	1	1	1	300	1	2	0	0	2	2	2312000	1240	950000	348900	245000
30	2	7	0	0	30	1	1	1	200	1	2	3	0	2	0	860000	260	280000	230000	220000
30	2	7	0	0	30	1	1	1	200	1	2	3	0	2	1	1623000	500	165000	245000	245000
30	2	7	0	0	30	1	1	1	200	1	2	3	0	2	2	1453600	600	1150000	165000	325500
															Max	3738000	5000	2243000	936000	560800
															Min	100000	100	100000	120000	80000

q1.1.6	q1.1.7	q1.1.8	q1.2.1	q1.2.2	q1.2.3	q2.1.1	q2.1.2	q2.1.3	q2.1.5	q2.1.6	q2.1.7	q2.1.8	q2.1.9	q2.1.10	q2.2.1	q2.2.3	q2.2.4	q3.1.1	q3.1.2	q3.1.3
5	220000	550000	4	6	5	150000	320000	0	250000	23	2	200000	200000	0	34	30	0	400000	600000	0
11	1245000	1345000	20	25	13	124500	234000	2	523450	55	8	546050	165000	13240	60	55	2	856903	856800	3
18	2850000	2660000	23	25	25	234568	451200	2	897000	60	10	897000	834500	43400	80	60	2	1470000	1540000	8
6	1000000	1000000	6	8	7	160000	342000	0	350000	24	2	250000	250000	0	24	20	0	900000	700000	0
10	1324000	1245000	15	20	10	132400	256234	1	405604	50	7	395690	154000	23060	55	50	1	1050090	1103956	4
19	2560000	2450000	24	26	26	267456	234500	1	1057000	70	15	1057000	652300	62120	85	70	3	2450000	2480000	7
5	240000	530000	3	7	9	150000	460000	0	400000	19	2	230000	230000	0	29	20	0	850000	800000	0
13	2267000	2135000	25	18	12	226700	356000	2	698300	50	5	653400	236000	15678	54	50	1	936546	834126	5
23	3560000	3250000	19	29	29	345829	545000	3	926000	80	15	926000	1159000	59870	80	70	2	3250000	3154000	10
5	360000	560000	4	5	5	180000	480000	0	440000	40	3	340000	340000	0	35	30	0	900000	950000	0
14	2350000	2134000	28	33	24	235000	592417	1	710900	60	6	710900	355000	22450	65	60	1	1183456	1025640	4
22	3556000	3256000	40	45	45	415340	670498	1	1100000	80	18	1113000	1256000	58560	90	80	3	4739330	4739330	11
6	160000	800000	3	6	7	200000	500000	0	500000	38	2	500000	250000	0	45	40	0	1000000	1000000	0
16	2370000	2370000	30	35	28	237000	423000	2	636200	70	7	623450	473933	23697	75	70	2	105568	115645	7
25	4339000	4245000	38	43	43	467290	650800	3	1055000	100	20	1055000	1284000	59320	100	100	3	2750000	1985000	12
7	420000	500000	5	7	8	200000	350000	0	330000	32	2	250000	250000	0	40	40	0	650000	550000	0
12	2124000	2000000	28	30	22	124000	367000	1	551230	68	8	523490	247000	23400	70	68	1	950033	853487	5
21	2767000	2367000	32	32	32	367534	346000	1	950000	90	16	950000	1089000	46400	95	90	2	3580000	3145000	10
8	550000	600000	4	8	10	180000	340000	0	240000	30	4	190000	150000	0	20	20	0	500000	600000	0
11	894500	893560	19	23	20	134500	334000	2	543900	55	5	523400	285000	21200	58	55	0	845232	891204	6
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q3.1.4	q3.1.5	q3.1.6	q3.1.7	q3.2.2	q3.2.3	q3.2.4	q3.2.5	q4.1.4	q4.1.5	q4.2.1	q4.2.2	q4.2.4	q4.2.6	q4.2.7	q5.1.1	q5.1.2	q5.1.3	q5.1.4	q5.1.5	q5.1.6
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180000	80000	1	1	60000	90	5	20000	60000	15000	11	18	1	1	1	35000	80000	85000	0	154300	0
276500	287545	3	3	18000	60	30	10000	305000	4739	15	50	2	2	2	74532	285460	134000	15	276500	0
154500	183400	3	7	5000	30	75	2000	153422	5607	48	60	3	3	3	37383	118483	37383	50	145287	276500
230000	330000	1	1	60000	90	20	20000	150000	16000	7	35	1	1	1	75000	200000	332500	15	298700	0
386456	397651	2	3	15000	45	45	6000	345000	26570	24	55	4	4	4	156346	395670	332500	20	386000	0
1205600	1132320	5	5	5000	15	70	600	332623	26570	42	65	7	7	7	783428	682300	783428	85	332856	386000
130000	176000	1	1	80000	90	30	15000	50000	5000	10	10	1	1	1	50000	140000	175500	12	213000	0
167000	185562	3	3	20000	60	30	10000	326000	14500	15	49	4	4	4	23697	379680	175500	10	367000	0
453400	546900	3	3	5000	30	70	3000	183425	14500	48	68	5	5	5	342162	121400	342162	50	186454	367000
200000	276300	1	1	75000	60	12	10000	120000	18000	10	39	2	2	2	90000	200000	276300	15	267500	0
410500	435415	4	4	10000	45	50	8000	346200	17898	28	50	3	3	3	183420	412690	576300	25	410500	0
1023000	1195600	4	4	1000	15	85	900	534626	17898	40	60	5	5	5	645235	634500	645235	65	634198	410500
190000	90000	1	0	100000	90	15	20000	30000	2000	5	20	1	1	1	0	65000	54200	11	167300	0
71900	71900	2	2	20000	60	20	10000	75696	21500	15	55	2	1	1	34252	118483	54363	10	23697	0
112150	112150	3	1	10000	15	50	4000	95643	8456	35	60	5	2	2	253847	120000	253847	10	56343	23697
200000	245000	1	1	60000	90	20	15000	120000	10000	9	33	1	1	1	55000	200000	245000	13	245000	0
342000	345654	3	4	10000	60	45	6000	223000	15600	20	46	4	4	4	123236	325600	245000	25	342000	0
564500	654500	5	8	5000	15	70	700	234121	15600	40	70	8	6	6	348926	348900	348926	70	267347	342000
200000	219300	1	1	86000	90	25	20000	150000	6000	10	26	1	1	1	60000	230000	219300	14	231200	0
245000	298756	3	5	9000	60	50	7000	235236	15100	23	54	5	5	5	74230	142341	324500	30	75000	0
614500	834520	6	6	8000	30	75	800	218462	15100	45	55	9	7	7	184345	165000	184345	65	327619	75000
1284000	1284000	6	10	100000	90	90	20000	560747	28037	60	100	10	8	8	934579	747664	934579	100	654206	500000
50000	50000	1	0	200	15	5	100	30000	0	5	10	1	1	1	0	50000	0	0	0	0

q5.1.7	q5.1.8	q5.1.9	q5.2.2	q5.2.4	q5.2.5	q5.2.6	q5.2.7	q5.2.8	q5.2.9	q5.2.10
1	150000	3	4	3	2	0	8	0	0	7
1	156345	5	9	4	4	0	15	0	2	21
2	234154	7	10	7	7	2	35	1	2	40
0	180000	2	3	2	3	0	9	0	0	8
1	147000	6	8	5	6	0	17	0	1	22
3	256234	6	9	7	6	1	39	0	1	45
0	140000	2	2	2	2	0	10	0	0	6
1	215000	6	10	3	5	0	19	0	2	25
3	356000	8	12	6	8	2	46	1	2	39
1	160000	3	4	3	3	0	11	0	0	10
2	225000	8	11	4	7	0	20	0	2	30
3	373830	6	13	6	6	2	34	1	2	48
1	190000	3	4	3	3	0	12	0	0	6
2	236967	7	10	4	8	0	15	0	2	29
4	312465	7	15	7	7	2	50	1	2	50
1	130000	2	3	3	2	0	10	0	0	6
1	195000	6	9	3	6	0	16	0	1	24
3	315613	8	12	7	8	1	40	1	2	45
0	185000	4	4	3	3	0	9	0	0	8
1	198000	5	10	3	5	0	15	0	1	23
2	305689	5	10	5	5	1	35	1	1	40
1	165000	3	5	2	4	0	12	0	0	6
2	208000	7	11	2	7	0	18	0	2	24
2	286734	4	12	4	4	2	33	1	2	43
0	135000	3	4	2	3	0	8	0	0	7
1	198000	4	8	3	8	0	15	0	1	18
3	298712	6	10	6	6	1	30	1	1	30
1	143000	4	4	2	4	0	9	0	0	6
1	185000	5	9	4	7	0	14	0	2	26
2	298455	5	11	5	5	2	35	1	3	40
0	175000	3	3	1	3	0	8	0	0	5
1	146000	4	6	3	6	0	13	0	1	19
2	328965	4	9	4	4	1	30	0	1	35
0	0	0	1	1	1	0	0	0	0	8
0	134300	2	1	1	2	0	3	0	1	12
0	251411	8	5	4	8	1	1	0	0	15
0	132400	2	3	3	3	0	7	0	0	7
1	175050	4	4	2	3	0	11	0	2	13
3	238324	9	8	3	9	2	12	1	1	40
1	176000	3	4	1	2	0	11	0	0	8
1	163000	8	9	3	5	0	16	0	2	18
1	318563	6	11	6	6	2	30	1	2	45
0	150000	2	4	1	2	0	8	0	0	7
0	23697	6	5	3	4	0	10	0	0	11
2	93425	7	13	7	7	0	15	0	0	18
1	184000	5	5	2	4	0	12	0	0	8
2	184000	7	12	4	8	0	19	0	2	29
4	313654	10	14	8	10	2	40	1	2	50
0	163000	3	3	2	3	0	10	0	0	7
1	196000	4	5	3	4	0	15	0	1	15
2	246393	6	6	6	6	1	26	0	1	36
0	125000	3	3	1	3	0	9	0	0	8
1	189234	3	4	3	3	0	13	0	1	14
3	215465	8	7	5	8	1	20	0	1	25
1	200000	4	4	2	4	0	8	0	0	7
2	143560	7	10	4	6	0	19	0	1	22
2	323445	9	14	7	9	1	40	1	2	45
0	190000	3	3	3	3	0	7	0	0	7
1	145237	6	11	3	5	0	15	0	2	15
2	341232	7	11	7	7	2	35	1	2	40
0	152000	2	4	3	2	0	6	0	0	8
1	154000	3	6	3	6	0	13	0	1	12
3	156342	8	10	8	8	1	20	1	1	33
1	154000	3	3	3	2	0	8	0	0	6
2	125000	4	9	2	7	0	12	0	2	18
1	243266	6	9	6	6	2	29	1	2	25
0	124000	3	3	2	3	0	9	0	0	5
1	175000	3	8	2	6	0	18	0	2	14
1	342526	5	8	5	5	2	30	0	0	40
0	125000	3	3	2	3	0	7	0	0	7
1	165000	2	6	3	5	0	12	0	1	15
3	268734	7	9	7	7	1	15	0	0	25
1	165000	4	4	2	3	0	10	0	0	5
1	145000	4	7	3	7	0	11	0	2	18
2	312372	5	8	6	5	2	35	1	1	40
0	135000	4	4	3	2	0	8	0	0	6
0	126000	4	5	2	7	0	9	0	1	10
3	189563	5	7	5	5	1	20	1	1	30
1	145000	3	3	3	3	0	11	0	0	5
2	146200	3	8	2	8	0	15	0	2	25
1	314573	4	6	4	4	2	40	1	2	45
0	65000	2	4	2	2	0	5	0	0	5
0	75696	1	4	1	4	0	0	0	0	10
1	28037	1	1	2	3	0	10	0	0	20
0	168000	3	3	2	3	0	6	0	0	7
1	123000	4	7	2	5	0	10	0	1	22
2	298675	8	7	7	8	1	29	1	1	35
0	165000	3	3	2	4	0	7	0	0	6
1	135236	5	8	3	6	0	12	0	1	26
1	245331	6	8	6	6	1	26	1	1	40
4	373830	10	15	8	10	2	50	1	3	50
0	0	0	1	1	1	0	0	0	0	5

Variable labs:

Bus=Busines: 1=Textiles, 2= Clothing
1.1=Production: 1=yam, 2=knitted fabric, 3=woven fabric, 4= BDPF, 5=cut & sewn garment, 6=sweater, 7=other garment
1.2=Years of establishment
1.3=Does company own any production facilities: 1=yes, 2=no
1.4=Does compay conduct any manufacturing process off-shore? 1=yes, 2=no
1.4.1=which area conduct any manufacturing process off-shore? 1=China,2=Asia,3=Africa,4=Others
1.5=Staff No: Including Hong Kong, the Mainland and overseas employees
1.6=Market: 1=USA, 2=Europe, 3=Asia, 4= China, 5=Hong Kong, 6=Others
Profile: Three Technometric Performance Attributes, i.e. 1=product, 2=process, 3=service
t=Period: 0= 1974-1983, 1=1984-1993, 2=1994-2003

Company	Bus	1.1	1.1.1	1.1.2	1.2	1.3	1.4	1.4.1	1.5	1.6.1	1.6.2	1.6.3	1.6.4	Profile	t	q1.1.1	q1.1.2	q1.1.3	q1.1.5
1	1	4	3	0	32	1	1	1	500	1	2	5	0	3	0	200000	80	230000	230000
1	1	4	3	0	32	1	1	1	500	1	2	5	0	3	1	254000	120	231200	193420
1	1	4	3	0	32	1	1	1	500	1	2	5	0	3	2	566050	250	845000	799850
2	1	2	0	0	30	1	1	1	300	1	3	5	0	3	0	300000	60	450000	450000
2	1	2	0	0	30	1	1	1	300	1	3	5	0	3	1	236000	86	256800	245650
2	1	2	0	0	30	1	1	1	300	1	3	5	0	3	2	345604	380	682300	734500
3	1	1	2	0	33	1	1	1	1500	1	4	5	0	3	0	250000	90	250000	250000
3	1	1	2	0	33	1	1	1	1500	1	4	5	0	3	1	358000	180	568000	524780
3	1	1	2	0	33	1	1	1	1500	1	4	5	0	3	2	645300	240	1560000	1235400
4	1	1	2	4	40	1	1	1	3500	1	2	5	0	3	0	150000	95	350000	350000
4	1	1	2	4	40	1	1	1	3500	1	2	5	0	3	1	473933	195	427600	413780
4	1	1	2	4	40	1	1	1	3500	1	2	5	0	3	2	934579	180	1350000	1124800
5	1	2	4	0	35	1	1	1	5000	3	5	0	0	3	0	50000	80	150000	150000
5	1	2	4	0	35	1	1	1	5000	3	5	0	0	3	1	413000	200	592417	592417
5	1	2	4	0	35	1	1	1	5000	3	5	0	0	3	2	846800	400	1804000	1804000
6	1	1	0	0	30	1	1	1	2000	3	5	0	0	3	0	250000	65	430000	430000
6	1	1	0	0	30	1	1	1	2000	3	5	0	0	3	1	267000	160	456800	413530
6	1	1	0	0	30	1	1	1	2000	3	5	0	0	3	2	785300	360	1560000	1345000
7	1	1	0	0	33	1	1	1	1500	3	5	0	0	3	0	250000	75	500000	500000
7	1	1	0	0	33	1	1	1	1500	3	5	0	0	3	1	234000	150	231300	213540
7	1	1	0	0	33	1	1	1	1500	3	5	0	0	3	2	759200	450	1560000	1246000
8	1	2	4	0	32	1	1	1	3000	3	5	0	0	3	0	180000	95	300000	300000
8	1	2	4	0	32	1	1	1	3000	3	5	0	0	3	1	394000	180	298000	257500
8	1	2	4	0	32	1	1	1	3000	3	5	0	0	3	2	645200	350	1689000	1567400
9	1	2	4	0	36	1	1	1	1000	3	5	0	0	3	0	40000	80	100000	100000
9	1	2	4	0	36	1	1	1	1000	3	5	0	0	3	1	297000	160	253400	223142
9	1	2	4	0	36	1	1	1	1000	3	5	0	0	3	2	664500	300	1345000	1126000
10	1	3	4	0	40	1	1	1	2000	3	5	0	0	3	0	230000	80	340000	340000
10	1	3	4	0	40	1	1	1	2000	3	5	0	0	3	1	286700	140	397600	352378
10	1	3	4	0	40	1	1	1	2000	3	5	0	0	3	2	671200	350	1675000	1453000
11	1	4	0	0	32	1	1	1	500	3	5	0	0	3	0	50000	70	350000	350000
11	1	4	0	0	32	1	1	1	500	3	5	0	0	3	1	254600	100	278500	256329
11	1	4	0	0	32	1	1	1	500	3	5	0	0	3	2	232390	250	569320	515600
12	1	4	0	0	37	1	1	1	80	4	0	0	0	3	0	40000	5	200000	200000
12	1	4	0	0	37	1	1	1	80	4	0	0	0	3	1	152000	10	145300	133200
12	1	4	0	0	37	1	1	1	80	4	0	0	0	3	2	156700	350	150000	150000
13	1	2	4	0	33	1	1	1	100	1	2	3	5	3	0	250000	40	500000	500000
13	1	2	4	0	33	1	1	1	100	1	2	3	5	3	1	68954	100	118500	118500
13	1	2	4	0	33	1	1	1	100	1	2	3	5	3	2	214300	500	1559000	1456000
14	1	3	4	0	30	1	1	1	2000	3	5	0	0	3	0	300000	100	450000	450000
14	1	3	4	0	30	1	1	1	2000	3	5	0	0	3	1	412600	180	423500	415000
14	1	3	4	0	30	1	1	1	2000	3	5	0	0	3	2	567230	500	1543000	1325000
15	1	4	0	0	31	1	1	1	100	4	0	0	0	3	0	180000	35	200000	200000
15	1	4	0	0	31	1	1	1	100	4	0	0	0	3	1	86700	60	311090	294560
15	1	4	0	0	31	1	1	1	100	4	0	0	0	3	2	341197	500	415000	550000
16	2	6	0	0	40	1	1	1	5000	1	2	3	4	3	0	250000	90	250000	250000
16	2	6	0	0	40	1	1	1	5000	1	2	3	4	3	1	432200	195	527400	515260
16	2	6	0	0	40	1	1	1	5000	1	2	3	4	3	2	875600	450	1530000	1456000
17	2	5	0	0	33	1	1	1	500	1	2	3	5	3	0	170000	85	200000	200000
17	2	5	0	0	33	1	1	1	500	1	2	3	5	3	1	237600	160	322100	412560
17	2	5	0	0	33	1	1	1	500	1	2	3	5	3	2	452300	230	730700	560000
18	2	5	0	0	30	1	1	1	200	1	0	0	0	3	0	200000	55	200000	200000
18	2	5	0	0	30	1	1	1	200	1	0	0	0	3	1	79685	130	223300	215340
18	2	5	0	0	30	1	1	1	200	1	0	0	0	3	2	342100	250	646500	632400
19	2	6	0	0	35	1	1	1	3000	1	2	3	5	3	0	230000	95	400000	400000
19	2	6	0	0	35	1	1	1	3000	1	2	3	5	3	1	413800	170	413900	408560
19	2	6	0	0	35	1	1	1	3000	1	2	3	5	3	2	578300	360	1674500	1546000
20	2	6	0	0	36	1	1	1	1000	1	2	3	5	3	0	300000	100	200000	100000
20	2	6	0	0	36	1	1	1	1000	1	2	3	5	3	1	321200	130	521390	493420
20	2	6	0	0	36	1	1	1	1000	1	2	3	5	3	2	651375	250	1835600	1584500
21	2	5	0	0	30	1	1	1	500	1	2	0	0	3	0	280000	65	450000	450000
21	2	5	0	0	30	1	1	1	500	1	2	0	0	3	1	65000	120	276530	254360
21	2	5	0	0	30	1	1	1	500	1	2	0	0	3	2	545000	240	165600	187600
22	2	5	0	0	31	1	1	1	1000	1	2	3	0	3	0	260000	95	500000	500000
22	2	5	0	0	31	1	1	1	1000	1	2	3	0	3	1	234900	150	311760	286540
22	2	5	0	0	31	1	1	1	1000	1	2	3	0	3	2	640000	300	165600	173250
23	2	5	0	0	30	1	1	1	800	1	2	0	0	3	0	150000	60	200000	200000
23	2	5	0	0	30	1	1	1	800	1	2	0	0	3	1	325700	100	254300	225690
23	2	5	0	0	30	1	1	1	800	1	2	0	0	3	2	526000	150	1854000	1654000
24	2	6	0	0	38	1	1	1	150	1	0	0	0	3	0	60000	50	250000	250000
24	2	6	0	0	38	1	1	1	150	1	0	0	0	3	1	276500	130	134000	125000
24	2	6	0	0	38	1	1	1	150	1	0	0	0	3	2	46729	180	543600	513400
25	2	6	0	0	30	1	1	1	1000	1	2	4	0	3	0	200000	60	430000	430000
25	2	6	0	0	30	1	1	1	1000	1	2	4	0	3	1	386000	170	332500	286430
25	2	6	0	0	30	1	1	1	1000	1	2	4	0	3	2	782300	140	1731200	1564300
26	2	5	0	0	31	1	1	1	100	2	0	0	0	3	0	50000	30	300000	300000
26	2	5	0	0	31	1	1	1	100	2	0	0	0	3	1	367000	50	175500	154560
26	2	5	0	0	31	1	1	1	100	2	0	0	0	3	2	321400	450	756000	715000
27	2	6	0	0	32	1	1	1	1000	1	2	3	4	3	0	60000	90	350000	350000
27	2	6	0	0	32	1	1	1	1000	1	2	3	4	3	1	410500	150	576300	532760
27	2	6	0	0	32	1	1	1	1000	1	2	3	4	3	2	634500	420	1589000	1346000
28	2	5	0	0	30	1	1	1	90	1	0	0	0	3	0	50000	20	100000	100000
28	2	5	0	0	30	1	1	1	90	1	0	0	0	3	1	59242	50	132400	123990
28	2	5	0	0	30	1	1	1	90	1	0	0	0	3	2	235000	12	562300	518000
29	2	6	0	0	33	1	1	1	300	1	2	0	0	3	0	200000	40	460000	460000
29	2	6	0	0	33	1	1	1	300	1	2	0	0	3	1	342000	110	245000	425700
29	2	6	0	0	33	1	1	1	300	1	2	0	0	3	2	348900	140	1323000	1125600
30	2	7	0	0	30	1	1	1	200	1	2	3	0	3	0	190000	50	280000	280000
30	2	7	0	0	30	1	1	1	200	1	2	3	0	3	1	75000	80	219300	325500
30	2	7	0	0	30	1	1	1	200	1	2	3	0	3	2	165000	400	1436080	1436000
															Max	934579	500	1854000	1804000
															Min	40000	5	100000	100000

Q1.1.6	q1.2.2	q1.2.3	q2.1.1	q2.1.2	q2.1.3	q2.1.4	q2.1.5	q2.1.6	q2.1.7	q2.1.8	q2.1.9	q2.1.10	q2.2.1	q2.2.2	q2.2.4	q2.2.5	q2.2.6
4	3	5	200000	430000	1	1	220000	35	2	200000	200000	0	20	5	1	10	10
7	6	16	231200	234154	2	2	156345	50	6	155000	164623	13240	55	16	2	20	23
6	13	35	234568	623450	2	2	234154	65	7	623450	546050	33240	55	35	2	45	45
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7	8	15	256800	256234	1	1	147000	45	4	135800	156732	23060	50	15	1	21	22
8	10	30	267456	505604	1	1	256234	80	6	505604	405604	53060	50	45	3	30	35
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6	5	18	327600	592417	1	1	325000	60	5	314500	321345	22450	55	18	1	28	30
9	16	50	435340	747664	1	1	542417	90	9	747664	912340	32450	75	50	3	45	48
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8	17	32	367534	551230	1	1	560747	95	9	551230	751230	43400	68	45	2	40	45
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q3.1.3	q3.1.4	q3.1.5	q3.1.6	q3.2.4	q3.2.5	q4.1.1	q4.1.2	q4.1.3	q4.1.4	q4.1.5	q4.2.1	q4.2.2	q4.2.3	q4.2.4	q4.2.5	q4.2.7	q5.1.1
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4	342000	342015	5	45	6000	223000	4	1	223000	15600	5	45	4	4	1	4	123236
5	564500	348900	8	70	700	348900	8	8	234121	15600	8	70	6	6	5	5	342000
1	200000	190000	4	25	20000	140000	2	1	140000	8000	3	20	1	1	1	1	60000
5	245000	245016	6	50	7000	435236	5	1	235236	15100	5	50	5	5	1	5	74230
6	614500	165000	6	75	800	165000	9	10	218462	15100	9	55	7	8	5	4	245000
7	1284000	934579	10	90	20000	747664	10	12	560748	28037	10	90	9	9	7	8	560748
1	50000	50000	1	5	100	20000	0	0	20000	0	0	5	1	1	1	1	0

q5.1.6	q5.1.9	q5.2.3	q5.2.4	q5.2.5	q5.2.6	q5.2.8	q5.2.11
0	1	1	3	2	0	0	7
0	3	2	4	4	0	0	16
254000	7	3	7	7	1	1	32
0	1	0	2	3	0	0	8
0	4	2	5	5	0	0	15
236000	6	2	7	7	0	0	33
0	1	0	2	2	0	0	6
0	4	2	3	3	0	0	15
358000	8	3	6	6	1	1	30
0	2	1	3	3	0	0	10
0	3	2	4	4	0	0	18
500000	6	3	6	6	1	1	40
0	2	1	3	2	0	0	6
0	3	2	4	4	0	0	20
413000	7	4	7	7	1	1	38
0	1	1	3	3	0	0	6
0	4	2	3	3	0	0	16
267000	8	2	7	7	1	1	30
0	1	0	3	3	0	0	8
0	4	2	3	3	0	0	13
234000	5	2	5	5	1	1	28
0	2	1	2	2	0	0	6
0	3	2	2	2	0	0	15
394000	4	3	4	4	1	1	35
0	1	0	2	2	0	0	7
0	3	2	3	3	0	0	11
297000	6	3	6	6	1	1	25
0	1	1	2	2	0	0	6
0	2	2	4	4	0	0	13
286700	5	3	5	5	1	1	24
0	1	0	1	1	0	0	5
0	2	1	3	3	0	0	10
254600	4	2	4	4	0	0	15
0	0	0	1	1	0	0	8
0	1	1	1	1	0	0	6
0	8	0	4	4	0	0	10
0	1	0	3	3	0	0	7
0	3	3	2	2	0	0	9
34500	9	3	3	3	1	1	12
0	1	1	1	1	0	0	8
0	4	1	3	3	0	0	17
412600	6	3	6	6	1	1	30
0	0	0	1	1	0	0	7
0	2	1	3	3	0	0	11
86700	7	2	7	7	0	0	12
0	2	1	2	2	0	0	8
0	3	2	4	4	0	0	19
432200	10	4	8	8	1	1	35
0	1	0	2	2	0	0	7
0	4	2	3	3	0	0	10
237600	6	2	6	6	0	0	30
0	1	0	1	1	0	0	8
0	3	1	3	3	0	0	9
53400	8	3	5	5	0	0	15
0	2	1	2	2	0	0	7
0	3	2	4	4	0	0	15
413800	9	2	7	7	1	1	33
0	1	0	3	3	0	0	7
0	2	2	3	3	0	0	10
321200	7	2	7	7	1	1	20
0	1	0	4	3	0	0	8
0	2	1	3	3	0	0	8
65000	8	3	8	8	1	1	24
0	2	1	2	2	0	0	6
0	3	2	2	2	0	0	19
234900	6	1	6	6	1	1	25
0	1	0	2	2	0	0	5
0	3	2	2	2	0	0	16
325700	5	1	5	5	0	0	26
0	1	0	2	2	0	0	7
0	2	1	3	3	0	0	5
276500	7	3	7	7	0	0	18
0	1	1	2	2	0	0	5
0	4	2	3	3	0	0	18
386000	5	2	6	6	1	1	30
0	0	0	3	3	0	0	6
0	4	1	2	2	0	0	11
367000	5	3	5	5	1	1	20
0	2	1	2	2	0	0	5
0	3	2	2	2	0	0	14
410500	4	2	4	4	1	1	35
0	0	0	2	2	0	0	0
0	1	1	1	1	0	0	9
23697	1	1	2	2	0	0	13
0	1	0	2	2	0	0	7
0	2	2	2	2	0	0	12
342000	8	2	7	7	1	1	25
0	1	0	2	2	0	0	6
0	3	2	3	3	0	0	16
75000	6	2	6	6	1	1	29
500000	10	4	8	8	1	1	40
0	0	0	1	1	0	0	0

Variable labs:

Bus=Busines: 1=Textiles, 2= Clothing
1.1=Production: 1=yarn, 2=knitted fabric, 3=woven fabric, 4= BDPF, 5=cut & sewn garment, 6=sweater, 7=other garment
1.2=Years of establishment
1.3=Does company own any production facilities: 1=yes, 2=no
1.4=Does compay conduct any manufacturing process off-shore? 1=yes, 2=no
1.4.1=which area conduct any manufacturing process off-shore? 1=China,2=Asia,3=Africa,4=Others
1.5=Staff No: Including Hong Kong, the Mainland and overseas employees
1.6=Market: 1=USA, 2=Europe, 3=Asia, 4= China, 5=Hong Kong, 6=Others
Profile: Three Technometric Performance Attributes, i.e. 1=product, 2=process, 3=service
t=Period: 0= 1974-1983, 1=1984-1993, 2=1994-2003

Company	Bus	1.1	1.1.1	1.1.2	1.2	1.3	1.4	1.4.1	1.5	1.6.1	1.6.2	1.6.3	1.6.4	Profile	t	sq1.1.1	sq1.1.2
1	1	4	3	0	32	1	1	1	500	1	2	5	0	1	0	0.08	0.02
1	1	4	3	0	32	1	1	1	500	1	2	5	0	1	1	0.20	0.22
1	1	4	3	0	32	1	1	1	500	1	2	5	0	1	2	0.62	0.49
2	1	2	0	0	30	1	1	1	300	1	3	5	0	1	0	0.30	0.08
2	1	2	0	0	30	1	1	1	300	1	3	5	0	1	1	0.15	0.18
2	1	2	0	0	30	1	1	1	300	1	3	5	0	1	2	0.48	0.71
3	1	1	2	0	33	1	1	1	1500	1	4	5	0	1	0	0.01	0.00
3	1	1	2	0	33	1	1	1	1500	1	4	5	0	1	1	0.43	0.08
3	1	1	2	0	33	1	1	1	1500	1	4	5	0	1	2	0.86	0.48
4	1	1	2	4	40	1	1	1	3500	1	2	5	0	1	0	0.10	0.02
4	1	1	2	4	40	1	1	1	3500	1	2	5	0	1	1	0.34	0.29
4	1	1	2	4	40	1	1	1	3500	1	2	5	0	1	2	0.95	0.35
5	1	2	4	0	35	1	1	1	5000	3	5	0	0	1	0	0.00	0.00
5	1	2	4	0	35	1	1	1	5000	3	5	0	0	1	1	0.49	0.59
5	1	2	4	0	35	1	1	1	5000	3	5	0	0	1	2	0.99	0.80
6	1	1	0	0	30	1	1	1	2000	3	5	0	0	1	0	0.36	0.08
6	1	1	0	0	30	1	1	1	2000	3	5	0	0	1	1	0.46	0.49
6	1	1	0	0	30	1	1	1	2000	3	5	0	0	1	2	0.70	0.71
7	1	1	0	0	33	1	1	1	1500	3	5	0	0	1	0	0.11	0.02
7	1	1	0	0	33	1	1	1	1500	3	5	0	0	1	1	0.40	0.55
7	1	1	0	0	33	1	1	1	1500	3	5	0	0	1	2	0.62	0.90
8	1	2	4	0	32	1	1	1	3000	3	5	0	0	1	0	0.05	0.01
8	1	2	4	0	32	1	1	1	3000	3	5	0	0	1	1	0.37	0.57
8	1	2	4	0	32	1	1	1	3000	3	5	0	0	1	2	0.94	0.69
9	1	2	4	0	36	1	1	1	1000	3	5	0	0	1	0	0.00	0.00
9	1	2	4	0	36	1	1	1	1000	3	5	0	0	1	1	0.43	0.35
9	1	2	4	0	36	1	1	1	1000	3	5	0	0	1	2	0.61	0.59
10	1	3	4	0	40	1	1	1	2000	3	5	0	0	1	0	0.11	0.03
10	1	3	4	0	40	1	1	1	2000	3	5	0	0	1	1	0.31	0.43
10	1	3	4	0	40	1	1	1	2000	3	5	0	0	1	2	0.40	0.69
11	1	4	0	0	32	1	1	1	500	3	5	0	0	1	0	0.05	0.01
11	1	4	0	0	32	1	1	1	500	3	5	0	0	1	1	0.07	0.24
11	1	4	0	0	32	1	1	1	500	3	5	0	0	1	2	0.31	0.49
12	1	4	0	0	37	1	1	1	80	4	0	0	0	1	0	0.03	0.00
12	1	4	0	0	37	1	1	1	80	4	0	0	0	1	1	0.05	0.18
12	1	4	0	0	37	1	1	1	80	4	0	0	0	1	2	0.10	0.05
13	1	2	4	0	33	1	1	1	100	1	2	3	5	1	0	0.14	0.04
13	1	2	4	0	33	1	1	1	100	1	2	3	5	1	1	0.04	0.18
13	1	2	4	0	33	1	1	1	100	1	2	3	5	1	2	0.21	0.08
14	1	3	4	0	30	1	1	1	2000	3	5	0	0	1	0	0.38	0.18
14	1	3	4	0	30	1	1	1	2000	3	5	0	0	1	1	0.01	0.49
14	1	3	4	0	30	1	1	1	2000	3	5	0	0	1	2	0.68	1.00
15	1	4	0	0	31	1	1	1	100	4	0	0	0	1	0	0.03	0.01
15	1	4	0	0	31	1	1	1	100	4	0	0	0	1	1	0.07	0.14
15	1	4	0	0	31	1	1	1	100	4	0	0	0	1	2	0.19	0.08
16	2	6	0	0	40	1	1	1	5000	1	2	3	4	1	0	0.07	0.03
16	2	6	0	0	40	1	1	1	5000	1	2	3	4	1	1	0.45	0.49
16	2	6	0	0	40	1	1	1	5000	1	2	3	4	1	2	1.00	0.90
17	2	5	0	0	33	1	1	1	500	1	2	3	5	1	0	0.03	0.01
17	2	5	0	0	33	1	1	1	500	1	2	3	5	1	1	0.12	0.22
17	2	5	0	0	33	1	1	1	500	1	2	3	5	1	2	0.56	0.45
18	2	5	0	0	30	1	1	1	200	1	0	0	0	1	0	0.03	0.01
18	2	5	0	0	30	1	1	1	200	1	0	0	0	1	1	0.12	0.08
18	2	5	0	0	30	1	1	1	200	1	0	0	0	1	2	0.37	0.49
19	2	6	0	0	35	1	1	1	3000	1	2	3	5	1	0	0.08	0.04
19	2	6	0	0	35	1	1	1	3000	1	2	3	5	1	1	0.46	0.53
19	2	6	0	0	35	1	1	1	3000	1	2	3	5	1	2	0.77	0.71
20	2	6	0	0	36	1	1	1	1000	1	2	3	5	1	0	0.33	0.07
20	2	6	0	0	36	1	1	1	1000	1	2	3	5	1	1	0.33	0.31
20	2	6	0	0	36	1	1	1	1000	1	2	3	5	1	2	0.37	0.49
21	2	5	0	0	30	1	1	1	500	1	2	0	0	1	0	0.11	0.03
21	2	5	0	0	30	1	1	1	500	1	2	0	0	1	1	0.13	0.10
21	2	5	0	0	30	1	1	1	500	1	2	0	0	1	2	0.22	0.47
22	2	5	0	0	31	1	1	1	1000	1	2	3	0	1	0	0.14	0.03
22	2	5	0	0	31	1	1	1	1000	1	2	3	0	1	1	0.39	0.49
22	2	5	0	0	31	1	1	1	1000	1	2	3	0	1	2	0.56	0.59
23	2	5	0	0	30	1	1	1	800	1	2	0	0	1	0	0.03	0.01
23	2	5	0	0	30	1	1	1	800	1	2	0	0	1	1	0.42	0.37
23	2	5	0	0	30	1	1	1	800	1	2	0	0	1	2	0.40	0.29
24	2	6	0	0	38	1	1	1	150	1	0	0	0	1	0	0.03	0.00
24	2	6	0	0	38	1	1	1	150	1	0	0	0	1	1	0.19	0.22
24	2	6	0	0	38	1	1	1	150	1	0	0	0	1	2	0.40	0.35
25	2	6	0	0	30	1	1	1	1000	1	2	4	0	1	0	0.14	0.03
25	2	6	0	0	30	1	1	1	1000	1	2	4	0	1	1	0.39	0.55
25	2	6	0	0	30	1	1	1	1000	1	2	4	0	1	2	0.59	0.27
26	2	5	0	0	31	1	1	1	100	2	0	0	0	1	0	0.05	0.01
26	2	5	0	0	31	1	1	1	100	2	0	0	0	1	1	0.07	0.02
26	2	5	0	0	31	1	1	1	100	2	0	0	0	1	2	0.04	0.07
27	2	6	0	0	32	1	1	1	1000	1	2	3	4	1	0	0.14	0.03
27	2	6	0	0	32	1	1	1	1000	1	2	3	4	1	1	0.35	0.53
27	2	6	0	0	32	1	1	1	1000	1	2	3	4	1	2	0.21	0.84
28	2	5	0	0	30	1	1	1	90	1	0	0	0	1	0	0.11	0.01
28	2	5	0	0	30	1	1	1	90	1	0	0	0	1	1	0.01	0.22
28	2	5	0	0	30	1	1	1	90	1	0	0	0	1	2	0.01	0.04
29	2	6	0	0	33	1	1	1	300	1	2	0	0	1	0	0.14	0.02
29	2	6	0	0	33	1	1	1	300	1	2	0	0	1	1	0.10	0.47
29	2	6	0	0	33	1	1	1	300	1	2	0	0	1	2	0.61	0.23
30	2	7	0	0	30	1	1	1	200	1	2	3	0	1	0	0.19	0.03
30	2	7	0	0	30	1	1	1	200	1	2	3	0	1	1	0.11	0.29
30	2	7	0	0	30	1	1	1	200	1	2	3	0	1	2	0.37	0.10
															Max	1	1
															Min	0	0

sq1.1.3	sq1.1.4	sq1.1.5	sq1.1.6	sq1.1.8	P-input	sq1.2.2	sq1.2.3	P-output	sq2.1.1	sq2.1.2	sq2.1.3	sq2.1.4	sq2.1.5	sq2.1.6	sq2.1.7	sq2.1.8	sq2.1.9
0.04	0.10	0.04	0.00	0.11	**0.39**	0.04	0.07	**0.11**	0.36	0.20	0.00	0.00	0.00	0.28	0.21	0.12	0.16
0.29	0.04	0.31	0.25	0.41	**1.73**	0.44	0.43	**0.87**	0.25	0.13	0.00	0.50	0.47	0.44	0.26	0.09	0.18
0.70	0.55	0.77	0.65	0.60	**4.37**	0.60	0.52	**1.12**	0.44	0.56	0.50	0.50	0.47	0.78	0.32	0.64	0.56
0.33	0.22	0.35	0.05	0.15	**1.49**	0.20	0.10	**0.30**	0.55	0.24	0.00	0.00	0.28	0.22	0.32	0.09	0.25
0.13	0.03	0.37	0.20	0.32	**1.38**	0.40	0.45	**0.85**	0.23	0.12	0.00	0.00	0.34	0.50	0.37	0.08	0.20
0.84	0.28	0.32	0.50	0.54	**3.67**	0.64	0.48	**1.12**	0.52	0.40	0.00	0.00	0.59	0.83	0.26	0.49	0.40
0.02	0.16	0.15	0.00	0.17	**0.51**	0.00	0.02	**0.02**	0.48	0.25	0.00	0.00	0.38	0.39	0.11	0.09	0.22
0.32	0.14	0.54	0.20	0.27	**1.98**	0.40	0.52	**0.92**	0.45	0.21	0.50	0.50	0.61	0.37	0.32	0.16	0.23
0.45	0.64	0.97	0.85	0.76	**5.02**	0.80	0.40	**1.20**	0.71	0.73	1.00	1.00	0.61	0.78	0.47	0.90	0.73
0.09	0.16	0.15	0.00	0.16	**0.68**	0.28	0.05	**0.33**	0.48	0.24	0.00	0.00	0.40	0.44	0.21	0.11	0.19
0.39	0.25	0.72	0.55	0.46	**3.00**	0.52	0.64	**1.16**	0.66	0.34	0.00	0.00	0.61	0.56	0.21	0.22	0.21
0.92	1.00	0.74	0.95	0.76	**5.66**	0.92	1.00	**1.92**	0.88	1.00	0.00	0.00	1.00	0.83	0.74	0.98	0.97
0.00	0.02	0.04	0.05	0.12	**0.24**	0.24	0.02	**0.26**	0.59	0.25	0.00	0.00	0.41	0.37	0.16	0.15	0.23
0.38	0.28	0.82	0.45	0.47	**3.48**	0.60	0.62	**1.22**	0.72	0.48	0.50	0.50	0.55	0.67	0.26	0.34	0.47
0.95	0.89	1.00	1.00	0.93	**6.55**	1.00	0.88	**1.88**	1.00	0.89	1.00	0.50	0.74	1.00	0.89	1.00	1.00
0.11	0.22	0.25	0.10	0.10	**1.22**	0.36	0.14	**0.50**	0.60	0.20	0.00	0.00	0.26	0.24	0.37	0.12	0.19
0.28	0.14	0.58	0.30	0.45	**2.70**	0.44	0.50	**0.94**	0.44	0.22	0.00	0.00	0.47	0.61	0.32	0.18	0.34
0.76	0.82	0.97	0.75	0.58	**5.29**	0.92	0.74	**1.66**	0.76	0.79	0.00	0.50	0.66	0.81	0.79	0.84	0.79
0.15	0.22	0.25	0.15	0.09	**0.99**	0.20	0.07	**0.27**	0.60	0.27	0.00	0.00	0.28	0.33	0.26	0.11	0.26
0.24	0.16	0.31	0.35	0.43	**2.45**	0.32	0.48	**0.80**	0.49	0.27	0.00	0.50	0.47	0.44	0.37	0.25	0.23
0.75	0.78	0.36	0.50	0.61	**4.52**	0.56	0.79	**1.35**	0.68	0.56	0.50	0.50	0.47	0.83	0.74	0.72	0.55
0.07	0.10	0.21	0.00	0.13	**0.57**	0.20	0.07	**0.27**	0.36	0.23	0.00	0.00	0.41	0.39	0.26	0.08	0.22
0.29	0.29	0.45	0.25	0.50	**2.72**	0.40	0.50	**0.90**	0.73	0.44	0.50	0.50	0.56	0.39	0.11	0.30	0.42
1.00	0.64	0.64	0.65	0.83	**5.40**	0.72	0.83	**1.55**	0.76	0.67	0.50	1.00	0.56	0.80	0.68	0.64	0.67
0.00	0.04	0.31	0.00	0.00	**0.35**	0.28	0.05	**0.33**	0.24	0.15	0.00	0.00	0.23	0.28	0.21	0.11	0.14
0.17	0.08	0.36	0.30	0.41	**2.11**	0.24	0.36	**0.60**	0.33	0.27	0.00	0.00	0.49	0.61	0.16	0.20	0.18
0.55	0.67	0.55	0.45	0.63	**4.04**	0.48	0.40	**0.88**	0.92	0.58	0.00	0.00	0.49	0.89	0.63	0.83	0.58
0.07	0.16	0.25	0.05	0.12	**0.79**	0.32	0.12	**0.44**	0.48	0.24	0.00	0.00	0.25	0.21	0.32	0.12	0.23
0.31	0.11	0.66	0.50	0.38	**2.71**	0.32	0.55	**0.87**	0.39	0.21	0.00	0.50	0.59	0.56	0.32	0.23	0.20
0.84	0.68	0.84	0.70	0.52	**4.67**	0.56	0.38	**0.94**	0.57	0.70	1.00	0.50	0.59	0.94	0.58	0.79	0.70
0.07	0.01	0.04	0.00	0.05	**0.24**	0.12	0.05	**0.17**	0.19	0.11	0.00	0.00	0.27	0.28	0.21	0.04	0.10
0.09	0.04	0.41	0.20	0.45	**1.60**	0.20	0.38	**0.58**	0.25	0.23	0.00	0.00	0.18	0.39	0.21	0.24	0.29
0.76	0.14	0.43	0.30	0.25	**2.69**	0.44	0.40	**0.84**	0.56	0.21	0.00	0.00	0.18	0.89	0.16	0.24	0.20
0.04	0.00	0.00	0.00	0.02	**0.09**	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	0.11	0.06	0.11	0.02	0.00
0.01	0.03	0.14	0.15	0.06	**0.61**	0.04	0.21	**0.25**	0.22	0.15	0.00	0.50	0.06	0.54	0.11	0.15	0.21
0.06	0.04	0.16	0.25	0.07	**0.73**	0.20	0.21	**0.41**	0.24	0.12	0.50	0.50	0.11	0.78	0.68	0.04	0.11
0.15	0.10	0.31	0.10	0.09	**0.92**	0.16	0.07	**0.23**	0.36	0.19	0.00	0.00	0.16	0.10	0.26	0.07	0.18
0.09	0.03	0.08	0.20	0.03	**0.65**	0.16	0.24	**0.40**	0.23	0.16	0.00	0.50	0.16	0.50	0.42	0.13	0.19
0.12	0.12	0.07	0.35	0.16	**1.11**	0.16	0.29	**0.45**	0.35	0.19	0.50	0.50	0.16	0.84	0.21	0.15	0.18
0.33	0.28	0.31	0.25	0.20	**1.94**	0.40	0.17	**0.57**	0.60	0.28	0.00	0.00	0.26	0.32	0.53	0.15	0.27
0.23	0.08	0.71	0.25	0.36	**2.14**	0.48	0.36	**0.84**	0.33	0.27	0.00	0.50	0.49	0.58	0.47	0.19	0.29
0.83	0.55	0.69	0.55	0.52	**4.82**	0.56	0.40	**0.96**	0.87	0.58	1.00	1.00	0.49	0.83	0.32	0.06	0.58
0.04	0.04	0.08	0.00	0.03	**0.23**	0.04	0.02	**0.06**	0.24	0.12	0.00	0.00	0.14	0.10	0.16	0.06	0.11
0.05	0.03	0.48	0.20	0.07	**1.04**	0.24	0.19	**0.43**	0.16	0.21	0.00	0.00	0.05	0.44	0.26	0.17	0.22
0.12	0.27	0.50	0.45	0.12	**1.74**	0.16	0.26	**0.42**	0.33	0.33	0.00	0.50	0.28	0.78	0.74	0.24	0.32
0.06	0.16	0.15	0.05	0.17	**0.68**	0.12	0.05	**0.17**	0.48	0.24	0.00	0.00	0.38	0.32	0.21	0.08	0.23
0.40	0.29	0.71	0.50	0.41	**3.25**	0.56	0.62	**1.18**	0.73	0.39	0.50	0.50	0.59	0.42	0.32	0.31	0.42
0.91	0.93	0.95	0.90	1.00	**6.58**	0.96	0.88	**1.84**	0.92	0.93	0.50	0.50	0.77	0.89	1.00	0.88	0.93
0.04	0.04	0.04	0.05	0.10	**0.30**	0.04	0.05	**0.09**	0.24	0.15	0.00	0.00	0.19	0.37	0.21	0.04	0.14
0.16	0.06	0.50	0.20	0.17	**1.44**	0.20	0.29	**0.49**	0.28	0.35	0.00	0.00	0.38	0.36	0.26	0.28	0.34
0.28	0.41	0.53	0.40	0.51	**3.14**	0.84	0.95	**1.79**	0.45	0.45	0.00	0.00	0.38	0.83	0.47	0.40	0.45
0.04	0.10	0.25	0.00	0.09	**0.51**	0.00	0.02	**0.02**	0.36	0.18	0.00	0.00	0.20	0.43	0.16	0.12	0.17
0.12	0.05	0.30	0.15	0.10	**0.92**	0.16	0.26	**0.42**	0.26	0.24	0.00	0.50	0.28	0.33	0.26	0.19	0.27
0.21	0.27	0.30	0.35	0.29	**2.28**	0.40	0.43	**0.83**	0.34	0.33	0.50	0.50	0.28	0.84	0.53	0.39	0.32
0.11	0.10	0.25	0.05	0.14	**0.77**	0.12	0.12	**0.24**	0.36	0.20	0.00	0.00	0.38	0.28	0.42	0.15	0.19
0.28	0.18	0.69	0.45	0.32	**2.91**	0.40	0.45	**0.85**	0.52	0.31	0.50	0.00	0.50	0.63	0.37	0.24	0.30
0.91	0.56	0.72	0.70	0.54	**4.90**	0.96	0.86	**1.82**	0.87	0.60	1.00	1.00	0.50	0.88	0.89	0.73	0.59
0.33	0.22	0.29	0.15	0.19	**1.59**	0.20	0.14	**0.34**	0.58	0.25	0.00	0.00	0.28	0.40	0.37	0.14	0.30
0.24	0.14	0.71	0.40	0.30	**2.42**	0.20	0.29	**0.49**	0.44	0.43	0.00	0.50	0.57	0.56	0.42	0.32	0.39
0.60	0.65	0.72	0.85	0.30	**3.98**	0.76	0.43	**1.19**	0.65	0.68	0.50	0.50	0.57	0.78	0.74	0.84	0.68
0.11	0.16	0.21	0.15	0.07	**0.83**	0.28	0.07	**0.35**	0.48	0.24	0.00	0.00	0.23	0.28	0.26	0.11	0.22
0.13	0.08	0.41	0.35	0.36	**1.56**	0.12	0.21	**0.33**	0.32	0.28	0.00	0.00	0.47	0.39	0.32	0.17	0.19
0.32	0.52	0.72	0.75	0.17	**3.17**	0.76	0.40	**1.16**	0.28	0.56	0.00	0.00	0.47	0.78	0.47	0.42	0.55
0.15	0.10	0.25	0.05	0.12	**0.83**	0.20	0.07	**0.27**	0.36	0.20	0.00	0.00	0.25	0.20	0.26	0.12	0.19
0.21	0.21	0.48	0.30	0.27	**2.35**	0.56	0.36	**0.92**	0.57	0.28	0.50	0.50	0.56	0.50	0.37	0.22	0.34
0.55	0.64	0.48	0.90	0.44	**4.16**	0.64	0.48	**1.12**	0.44	0.67	1.00	1.00	0.56	0.88	0.58	0.87	0.66
0.04	0.04	0.17	0.00	0.05	**0.33**	0.04	0.05	**0.09**	0.24	0.12	0.00	0.00	0.28	0.32	0.21	0.09	0.11
0.16	0.06	0.36	0.25	0.17	**1.79**	0.44	0.26	**0.70**	0.28	0.25	0.00	0.00	0.45	0.56	0.26	0.18	0.19
0.28	0.50	0.36	0.75	0.49	**3.07**	0.48	0.52	**1.00**	0.66	0.54	0.00	0.00	0.45	0.89	0.53	0.95	0.53
0.04	0.04	0.21	0.00	0.05	**0.37**	0.00	0.02	**0.02**	0.24	0.16	0.00	0.00	0.23	0.09	0.16	0.11	0.15
0.06	0.04	0.11	0.25	0.00	**0.88**	0.00	0.29	**0.29**	0.25	0.36	0.00	0.00	0.03	0.37	0.21	0.26	0.30
0.02	0.04	0.11	0.50	0.31	**1.73**	0.24	0.31	**0.55**	0.54	0.07	0.00	0.00	0.07	0.78	0.74	0.04	0.05
0.15	0.10	0.31	0.05	0.10	**0.87**	0.20	0.07	**0.27**	0.36	0.20	0.00	0.00	0.29	0.28	0.26	0.13	0.19
0.18	0.22	0.53	0.30	0.33	**2.49**	0.52	0.36	**0.88**	0.60	0.33	0.00	0.50	0.60	0.50	0.32	0.24	0.34
0.87	0.81	0.53	0.55	0.61	**4.22**	0.40	0.76	**1.16**	0.81	0.83	1.00	1.00	0.69	0.83	0.53	0.79	0.83
0.07	0.02	0.10	0.00	0.08	**0.35**	0.08	0.02	**0.10**	0.22	0.14	0.00	0.00	0.18	0.00	0.00	0.07	0.13
0.06	0.11	0.20	0.40	0.35	**1.21**	0.24	0.17	**0.41**	0.39	0.31	0.00	0.50	0.26	0.43	0.21	0.22	0.35
0.53	0.25	0.20	0.25	0.04	**1.38**	0.16	0.29	**0.45**	0.28	0.31	0.50	0.50	0.26	0.78	0.58	0.24	0.30
0.09	0.10	0.25	0.05	0.14	**0.80**	0.20	0.05	**0.25**	0.36	0.19	0.00	0.00	0.32	0.32	0.21	0.11	0.16
0.18	0.25	0.41	0.20	0.38	**2.30**	0.36	0.52	**0.88**	0.66	0.31	0.50	0.50	0.55	0.44	0.21	0.24	0.22
0.65	0.83	0.93	0.40	0.39	**4.05**	0.28	0.79	**1.07**	0.86	0.66	1.00	1.00	0.55	0.83	0.63	0.76	0.66
0.10	0.04	0.23	0.00	0.03	**0.52**	0.08	0.02	**0.10**	0.04	0.02	0.00	0.00	0.06	0.11	0.11	0.00	0.01
0.01	0.06	0.11	0.15	0.09	**0.66**	0.16	0.17	**0.33**	0.28	0.08	0.00	0.00	0.08	0.33	0.16	0.02	0.04
0.23	0.14	0.11	0.25	0.01	**0.80**	0.12	0.29	**0.41**	0.24	0.21	0.00	0.50	0.18	0.83	0.21	0.01	0.20
0.13	0.10	0.25	0.00	0.09	**0.73**	0.12	0.10	**0.22**	0.36	0.20	0.00	0.00	0.28	0.26	0.32	0.13	0.18
0.15	0.15	0.34	0.25	0.07	**1.54**	0.28	0.45	**0.73**	0.47	0.23	0.00	0.00	0.29	0.39	0.37	0.14	0.21
0.31	0.28	0.34	0.50	0.55	**2.83**	0.32	0.48	**0.80**	0.70	0.34	0.00	0.00	0.29	0.84	0.47	0.34	0.33
0.06	0.13	0.25	0.05	0.11	**0.82**	0.20	0.14	**0.34**	0.43	0.21	0.00	0.00	0.23	0.18	0.26	0.12	0.18
0.08	0.14	0.29	0.35	0.05	**1.31**	0.44	0.55	**0.99**	0.43	0.32	0.00	0.50	0.12	0.44	0.42	0.31	0.20
0.43	0.06	0.51	0.60	0.38	**2.45**	0.40	0.52	**0.92**	0.47	0.13	0.50	0.50	0.12	0.88	0.63	0.38	0.12
1	1	1	1	1		1	1		1	1	1	1	1	1	1	1	1
0	0	0	0	0		0	0		0	0	0	0	0	0	0	0	0

sq2.1.10	Q-input	sq2.2.1	sq2.2.2	sq2.2.4	sq2.2.5	sq2.2.6	Q-output	sq3.1.5	sq3.1.7	F-input	sq3.2.1	sq3.2.2	sq3.2.3	sq3.2.4	F-output	sq4.1.1	sq4.1.2
0.00	1.33	0.12	0.31	0.25	0.12	0.10	0.90	0.06	0.13	0.19	0.00	0.45	0.00	0.18	0.63	0.16	0.17
0.42	2.73	0.53	0.69	0.50	0.40	0.46	2.58	0.16	0.38	0.54	0.67	0.90	0.40	0.53	2.50	0.19	0.33
0.24	4.99	0.82	0.86	0.50	0.80	0.60	3.59	0.30	0.75	1.05	0.89	0.92	1.00	0.65	3.46	0.83	0.75
0.00	1.95	0.06	0.46	0.00	0.12	0.12	0.76	0.17	0.13	0.30	0.00	0.35	0.00	0.06	0.41	0.25	0.25
0.42	2.25	0.47	0.54	0.25	0.42	0.44	2.12	0.20	0.50	0.70	0.67	0.91	0.40	0.41	2.39	0.17	0.50
0.41	3.90	0.88	0.62	0.75	0.40	0.80	3.45	0.51	0.63	1.13	0.89	0.93	0.80	0.71	3.33	0.67	0.83
0.00	1.91	0.18	0.38	0.00	0.08	0.10	0.74	0.16	0.13	0.29	0.00	0.35	0.00	0.18	0.53	0.18	0.17
0.81	4.15	0.47	0.38	0.25	0.50	0.46	2.07	0.18	0.38	0.56	0.67	0.91	0.40	0.47	2.45	0.31	0.42
0.28	7.21	0.82	0.85	0.50	0.70	0.60	3.47	0.68	0.88	1.55	0.89	0.99	1.00	0.59	3.47	0.93	0.58
0.00	2.07	0.21	0.54	0.25	0.10	0.12	1.22	0.18	0.13	0.31	0.44	0.55	0.00	0.24	1.23	0.23	0.25
0.74	3.55	0.59	0.77	0.25	0.56	0.60	2.77	0.23	0.63	0.86	0.67	0.90	0.60	0.59	2.76	0.42	0.50
0.40	6.80	0.94	1.00	0.75	0.80	0.60	4.09	1.00	0.75	1.75	1.00	0.99	1.00	0.82	3.82	1.00	1.00
0.00	2.16	0.24	0.20	0.25	0.06	0.14	0.89	0.19	0.25	0.44	0.44	0.70	0.00	0.29	1.44	0.11	0.25
0.85	5.34	0.71	0.69	0.50	0.60	0.58	3.08	0.00	0.75	0.75	0.67	0.95	0.40	0.71	2.72	0.62	0.58
1.00	9.02	1.00	1.00	0.75	0.80	0.96	4.51	0.57	0.88	1.45	0.89	1.00	1.00	1.00	3.89	0.85	0.92
0.00	1.99	0.21	0.20	0.25	0.16	0.16	0.98	0.12	0.13	0.24	0.00	0.15	0.00	0.18	0.33	0.16	0.17
0.81	3.39	0.68	0.60	0.25	0.56	0.54	2.63	0.18	0.38	0.56	0.67	0.95	0.60	0.53	2.75	0.35	0.50
0.42	6.36	0.95	0.92	0.50	1.00	1.00	4.38	0.75	1.00	1.75	1.00	0.99	1.00	0.88	3.87	0.73	0.92
0.00	2.12	0.11	0.38	0.00	0.12	0.12	0.73	0.09	0.13	0.21	0.00	0.35	0.00	0.21	0.56	0.66	0.25
0.58	3.59	0.53	0.46	0.00	0.38	0.36	1.73	0.16	0.38	0.54	0.67	0.90	0.40	0.59	2.56	0.46	0.50
0.38	5.94	0.94	0.91	0.75	0.90	0.80	4.30	0.87	0.13	1.00	0.89	0.95	1.00	0.94	3.78	0.72	0.83
0.00	1.95	0.12	0.15	0.25	0.10	0.12	0.74	0.14	0.25	0.39	0.67	0.20	0.40	0.29	1.56	0.25	0.33
0.62	4.55	0.41	0.54	0.25	0.46	0.46	2.12	0.23	0.63	0.86	0.89	0.97	0.60	0.29	2.75	0.54	0.58
0.35	6.64	1.00	0.95	1.00	0.96	0.98	4.89	0.62	0.88	1.50	1.00	1.00	1.00	0.88	3.88	0.86	0.83
0.00	1.36	0.07	0.12	0.00	0.10	0.10	0.39	0.10	0.13	0.22	0.44	0.33	0.00	0.13	0.90	0.11	0.25
0.41	2.64	0.65	0.58	0.00	0.52	0.40	2.16	0.22	0.38	0.60	0.67	0.95	0.40	0.59	2.61	0.38	0.42
0.33	5.25	0.89	0.85	0.75	0.80	0.76	4.05	0.70	0.75	1.45	0.89	0.97	1.00	0.82	3.68	0.75	1.00
0.00	1.85	0.09	0.03	0.25	0.12	0.12	0.61	0.14	0.13	0.27	0.00	0.50	0.00	0.24	0.74	0.21	0.33
0.51	3.50	0.65	0.62	0.25	0.38	0.30	2.19	0.20	0.50	0.70	0.67	0.97	0.60	0.65	2.89	0.43	0.67
0.34	6.72	1.00	0.92	1.00	0.80	0.84	4.56	0.72	0.63	1.35	1.00	0.99	1.00	0.76	3.76	0.89	0.83
0.00	1.20	0.06	0.34	0.00	0.10	0.12	0.62	0.08	0.00	0.08	0.00	0.45	0.00	0.24	0.69	0.19	0.25
0.56	2.35	0.47	0.38	0.00	0.32	0.26	1.44	0.16	0.38	0.54	0.67	0.90	0.40	0.65	2.62	0.45	0.50
0.29	2.72	0.82	0.69	0.75	0.60	0.56	3.43	0.48	0.50	0.98	0.89	0.95	0.80	0.88	3.52	0.10	0.67
0.00	0.30	0.01	0.00	0.00	0.06	0.10	0.17	0.02	0.00	0.02	0.00	0.10	0.00	0.22	0.32	0.18	0.00
0.10	2.04	0.58	0.54	0.25	0.20	0.22	1.78	0.06	0.13	0.18	0.67	0.80	0.40	0.24	2.10	0.05	0.17
0.10	3.18	0.82	0.62	0.25	0.50	0.52	2.71	0.42	0.38	0.80	0.89	0.90	0.80	0.65	3.24	0.10	0.08
0.00	1.33	0.02	0.06	0.00	0.12	0.12	0.33	0.09	0.13	0.21	0.00	0.20	0.00	0.18	0.38	0.19	0.25
0.28	2.57	0.53	0.46	0.00	0.40	0.42	1.81	0.07	0.50	0.57	0.67	0.82	0.60	0.35	2.44	0.25	0.25
0.28	3.36	0.78	0.62	0.75	0.46	0.44	3.04	0.59	0.88	1.46	1.00	0.91	0.80	0.76	3.48	0.27	0.75
0.00	2.41	0.11	0.23	0.25	0.20	0.20	0.99	0.17	0.25	0.42	0.44	0.40	0.00	0.12	0.96	0.22	0.17
0.61	3.73	0.61	0.54	0.25	0.38	0.20	1.98	0.19	0.50	0.69	0.67	0.85	0.40	0.35	2.27	0.36	0.67
0.26	5.99	0.94	0.85	0.50	0.70	0.80	3.79	0.02	0.75	0.77	0.89	0.99	1.00	0.88	3.76	0.75	0.83
0.00	0.94	0.00	0.00	0.00	0.08	0.10	0.18	0.02	0.13	0.15	0.00	0.10	0.00	0.24	0.34	0.04	0.17
0.57	2.10	0.47	0.46	0.00	0.26	0.26	1.45	0.03	0.38	0.40	0.67	0.90	0.40	0.59	2.56	0.09	0.17
0.38	3.89	0.76	0.62	0.50	0.40	0.46	2.74	0.91	0.88	1.79	0.89	0.95	0.80	0.82	3.46	0.01	0.50
0.00	1.94	0.22	0.23	0.25	0.10	0.12	0.92	0.17	0.25	0.42	0.00	0.34	0.40	0.29	1.03	0.23	0.42
0.75	4.92	0.45	0.40	0.25	0.58	0.46	2.14	0.17	0.75	0.92	0.89	0.99	0.60	0.53	3.01	0.57	0.50
0.35	7.67	0.94	0.77	1.00	0.90	0.98	4.59	0.83	1.00	1.83	1.00	1.00	1.00	1.00	4.00	0.90	1.00
0.00	1.33	0.19	0.38	0.00	0.10	0.14	0.81	0.02	0.13	0.15	0.00	0.30	0.00	0.21	0.51	0.08	0.25
0.58	2.84	0.41	0.54	0.00	0.52	0.44	1.91	0.14	0.50	0.64	0.67	0.82	0.40	0.47	2.36	0.52	0.17
0.33	3.77	0.94	0.77	0.75	0.68	0.64	3.78	0.60	0.75	1.35	0.89	0.95	0.80	0.88	3.52	0.59	0.50
0.00	1.62	0.06	0.31	0.00	0.08	0.12	0.57	0.02	0.13	0.15	0.00	0.20	0.00	0.18	0.38	0.14	0.25
0.78	3.12	0.47	0.38	0.00	0.30	0.32	1.48	0.11	0.38	0.49	0.67	0.85	0.40	0.35	2.27	0.37	0.17
0.35	4.39	0.85	0.77	0.75	0.48	0.58	3.43	0.72	0.63	1.34	0.89	0.95	1.00	0.82	3.66	0.44	0.42
0.00	1.99	0.22	0.15	0.25	0.16	0.16	0.95	0.16	0.25	0.41	0.00	0.40	0.40	0.12	0.92	0.25	0.33
0.62	3.98	0.71	0.69	0.50	0.58	0.50	2.98	0.19	0.50	0.69	0.89	0.95	0.60	0.65	3.09	0.44	0.50
0.26	7.33	0.98	0.92	1.00	0.78	0.90	4.58	0.94	0.88	1.81	1.00	0.99	1.00	0.76	3.76	0.77	0.83
0.00	2.31	0.15	0.23	0.00	0.14	0.14	0.66	0.10	0.13	0.22	0.00	0.95	0.00	0.06	1.01	0.19	0.25
0.66	4.29	0.61	0.62	0.25	0.48	0.40	2.36	0.21	0.38	0.58	0.67	0.95	0.40	0.53	2.55	0.58	0.58
0.30	6.23	0.82	0.69	0.75	0.86	0.88	4.01	0.53	0.75	1.28	0.89	0.94	0.80	0.53	3.16	0.87	0.83
0.00	1.81	0.14	0.15	0.00	0.10	0.10	0.50	0.06	0.13	0.19	0.44	0.50	0.00	0.12	1.06	0.15	0.17
0.74	2.87	0.41	0.38	0.25	0.48	0.46	1.99	0.18	0.50	0.68	0.67	0.90	0.40	0.47	2.44	0.32	0.42
0.28	3.81	0.82	0.69	0.50	0.50	0.44	2.96	0.68	0.50	1.18	0.89	0.95	0.80	0.71	3.35	0.72	1.00
0.00	1.59	0.12	0.08	0.25	0.10	0.12	0.66	0.11	0.25	0.36	0.00	0.40	0.00	0.18	0.58	0.25	0.17
0.64	4.47	0.54	0.54	0.25	0.42	0.40	2.15	0.16	0.38	0.54	0.67	0.91	0.60	0.35	2.53	0.42	0.42
0.33	6.99	0.88	0.77	0.50	0.64	0.70	3.49	0.57	0.63	1.20	1.00	0.99	1.00	0.94	3.93	0.85	0.83
0.00	1.38	0.06	0.15	0.00	0.08	0.12	0.41	0.02	0.13	0.15	0.44	0.20	0.00	0.15	0.80	0.10	0.25
0.44	2.62	0.62	0.54	0.25	0.34	0.38	2.13	0.16	0.25	0.41	0.67	0.91	0.40	0.41	2.39	0.35	0.42
0.36	4.91	0.80	0.62	0.75	0.58	0.66	3.41	0.77	0.63	1.39	0.89	0.95	0.80	0.88	3.52	0.70	0.50
0.00	1.13	0.00	0.00	0.00	0.08	0.14	0.22	0.05	0.13	0.18	0.00	0.40	0.00	0.00	0.40	0.05	0.25
0.08	1.86	0.47	0.31	0.00	0.24	0.30	1.32	0.02	0.38	0.39	0.67	0.82	0.40	0.29	2.18	0.09	0.33
0.09	2.37	0.76	0.62	0.75	0.20	0.30	2.63	0.72	0.38	1.10	0.89	0.95	0.80	0.82	3.46	0.10	0.42
0.00	1.72	0.02	0.15	0.25	0.10	0.16	0.69	0.11	0.13	0.23	0.00	0.40	0.00	0.18	0.58	0.15	0.25
0.47	3.89	0.53	0.54	0.25	0.30	0.32	1.94	0.08	0.38	0.45	0.67	0.85	0.60	0.47	2.59	0.45	0.50
0.36	7.66	0.94	0.77	0.75	0.40	0.46	3.32	0.68	0.63	1.31	1.00	0.95	1.00	0.76	3.72	0.91	0.83
0.00	0.73	0.01	0.00	0.00	0.00	0.12	0.13	0.04	0.13	0.17	0.00	0.20	0.00	0.29	0.49	0.07	0.17
0.62	3.30	0.46	0.46	0.00	0.22	0.24	1.38	0.18	0.38	0.56	0.67	0.80	0.40	0.29	2.16	0.42	0.08
0.33	4.08	0.93	0.77	0.50	0.38	0.40	2.98	0.72	0.38	1.10	0.89	0.95	0.80	0.76	3.41	0.14	0.58
0.00	1.68	0.02	0.29	0.25	0.10	0.10	0.77	0.11	0.13	0.23	0.67	0.25	0.40	0.08	1.40	0.19	0.25
0.68	4.31	0.47	0.54	0.25	0.24	0.32	1.82	0.17	0.50	0.67	0.89	0.90	0.60	0.53	2.92	0.45	0.50
0.31	7.27	0.76	0.62	0.75	0.50	0.60	3.23	0.14	0.50	0.64	1.00	0.99	1.00	0.94	3.93	0.84	0.83
0.00	0.34	0.04	0.18	0.00	0.06	0.10	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.12	0.00	0.08
0.44	1.42	0.53	0.46	0.25	0.20	0.22	1.66	0.03	0.25	0.28	0.67	0.80	0.40	0.18	2.04	0.01	0.17
0.30	2.68	0.71	0.54	0.50	0.40	0.30	2.44	0.46	0.38	0.83	0.89	0.90	1.00	0.53	3.32	0.05	0.58
0.00	1.73	0.06	0.05	0.00	0.14	0.14	0.38	0.09	0.13	0.21	0.00	0.40	0.00	0.18	0.58	0.19	0.25
0.81	2.91	0.42	0.40	0.25	0.26	0.30	1.63	0.18	0.50	0.68	0.67	0.90	0.40	0.47	2.44	0.28	0.58
0.28	3.69	0.82	0.69	0.75	0.70	0.66	3.63	0.92	0.63	1.54	0.89	0.95	1.00	0.76	3.61	0.45	0.67
0.00	1.62	0.12	0.09	0.00	0.10	0.16	0.47	0.07	0.13	0.20	0.00	0.14	0.00	0.24	0.38	0.08	0.33
0.63	3.38	0.52	0.54	0.25	0.30	0.40	2.01	0.27	0.63	0.89	0.67	0.91	0.40	0.53	2.51	0.57	0.50
0.24	3.96	0.94	0.77	1.00	0.80	0.58	4.09	0.72	0.75	1.47	0.89	0.92	0.80	0.82	3.43	0.20	0.83
1		1	1	1	1	1		1	1		1	1	1	1		1	1
0		0	0	0	0	0		0	0		0	0	0	0		0	0

sq4.1.3	sq4.1.4	sq4.1.5	S-input	sq4.2.1	sq4.2.2	sq4.2.3	sq4.2.4	sq4.2.5	sq4.2.7	S-output	sq5.1.1	sq5.1.2	sq5.1.3	sq5.1.4	sq5.1.5	sq5.1.6	sq5.1.7
0.10	0.32	0.54	**1.29**	0.02	0.31	0.13	0.00	0.00	0.00	**0.46**	0.05	0.49	0.09	0.12	0.35	0.00	0.25
0.10	0.19	0.84	**1.64**	0.33	0.56	0.38	0.38	0.29	0.29	**2.22**	0.14	0.39	0.28	0.35	0.44	0.00	0.25
0.60	0.39	0.84	**3.41**	0.89	0.61	0.63	0.63	0.71	0.86	**4.32**	0.70	0.38	0.42	0.65	0.41	0.51	0.50
0.00	0.25	0.43	**1.18**	0.04	0.25	0.13	0.13	0.14	0.14	**0.83**	0.05	0.40	0.08	0.11	0.42	0.00	0.00
0.20	0.20	0.84	**1.92**	0.22	0.50	0.63	0.63	0.57	0.57	**3.12**	0.14	0.36	0.26	0.45	0.41	0.00	0.25
0.80	0.43	0.84	**3.57**	0.73	0.69	0.88	0.88	1.00	0.86	**5.03**	0.68	0.36	0.46	0.80	0.45	0.47	0.75
0.10	0.25	0.64	**1.34**	0.07	0.31	0.13	0.00	0.00	0.00	**0.50**	0.09	0.40	0.15	0.10	0.40	0.00	0.00
0.10	0.37	0.56	**1.76**	0.44	0.50	0.50	0.50	0.29	0.29	**2.52**	0.17	0.64	0.44	0.45	0.63	0.00	0.25
0.70	0.99	0.56	**3.76**	0.89	0.81	0.75	0.75	0.86	0.71	**4.77**	0.69	0.61	0.63	0.75	0.62	0.72	0.75
0.10	0.29	0.71	**1.59**	0.09	0.38	0.25	0.25	0.14	0.14	**1.25**	0.10	0.45	0.16	0.13	0.44	0.00	0.25
0.30	0.39	0.76	**2.37**	0.51	0.63	0.38	0.38	0.43	0.43	**2.74**	0.15	0.58	0.40	0.50	0.83	0.00	0.50
0.50	0.75	0.76	**4.01**	1.00	0.94	0.50	0.50	0.57	1.00	**4.51**	1.00	0.86	0.97	0.90	1.00	1.00	0.75
0.10	0.33	0.71	**1.50**	0.09	0.31	0.13	0.00	0.00	0.00	**0.53**	0.10	0.51	0.17	0.12	0.47	0.00	0.25
0.10	0.40	0.85	**2.55**	0.56	0.75	0.50	0.50	0.57	0.57	**3.45**	0.19	0.61	0.42	0.40	0.72	0.00	0.50
0.60	1.00	1.00	**4.36**	1.00	1.00	0.63	0.63	0.71	1.00	**4.96**	0.89	0.92	0.75	1.00	0.74	0.83	1.00
0.10	0.33	0.36	**1.12**	0.07	0.28	0.13	0.13	0.14	0.14	**0.88**	0.06	0.51	0.10	0.11	0.49	0.00	0.25
0.20	0.35	0.80	**2.20**	0.51	0.73	0.50	0.38	0.43	0.43	**2.97**	0.18	0.55	0.38	0.46	0.47	0.00	0.25
0.70	0.81	0.80	**3.95**	0.96	0.88	0.75	0.75	0.86	0.71	**4.90**	0.84	0.61	1.00	0.95	0.64	0.53	0.75
0.10	0.29	0.54	**1.84**	0.00	0.38	0.38	0.25	0.14	0.14	**1.29**	0.06	0.45	0.10	0.15	0.51	0.00	0.00
0.30	0.12	0.80	**2.18**	0.31	0.56	0.38	0.38	0.29	0.29	**2.20**	0.18	0.50	0.35	0.49	0.41	0.00	0.25
0.80	0.39	0.80	**3.54**	0.89	0.56	0.88	0.88	1.00	1.00	**5.20**	0.81	0.66	0.60	0.65	0.58	0.47	0.50
0.10	0.24	0.71	**1.63**	0.04	0.35	0.25	0.25	0.14	0.14	**1.18**	0.11	0.37	0.18	0.14	0.35	0.00	0.25
0.30	0.30	0.77	**2.49**	0.33	0.44	0.25	0.63	0.57	0.57	**2.79**	0.20	0.55	0.38	0.38	0.69	0.00	0.50
0.50	0.54	0.77	**3.50**	0.67	0.94	0.50	0.50	0.57	0.71	**3.89**	0.96	1.00	0.70	0.85	0.69	0.79	0.50
0.10	0.31	0.50	**1.27**	0.07	0.31	0.25	0.13	0.00	0.00	**0.75**	0.09	0.48	0.15	0.10	0.26	0.00	0.00
0.20	0.12	0.76	**1.87**	0.24	0.69	0.25	0.50	0.57	0.57	**2.82**	0.17	0.50	0.35	0.38	0.52	0.00	0.25
0.40	0.51	0.76	**3.41**	0.89	0.69	0.63	0.63	0.71	0.71	**4.25**	0.74	0.50	0.71	0.75	0.69	0.59	0.75
0.10	0.33	0.54	**1.50**	0.09	0.24	0.38	0.25	0.29	0.29	**1.52**	0.08	0.51	0.13	0.11	0.44	0.00	0.25
0.30	0.22	0.74	**2.36**	0.29	0.69	0.38	0.38	0.29	0.29	**2.30**	0.14	0.47	0.33	0.40	0.50	0.00	0.25
0.70	0.69	0.74	**3.86**	0.67	0.81	0.75	0.75	0.86	0.71	**4.55**	0.71	0.55	0.92	0.90	0.50	0.57	0.50
0.00	0.14	0.43	**1.01**	0.02	0.31	0.25	0.25	0.14	0.14	**1.12**	0.06	0.23	0.11	0.09	0.23	0.00	0.00
0.30	0.06	0.40	**1.71**	0.22	0.50	0.25	0.25	0.29	0.29	**1.79**	0.06	0.36	0.26	0.25	0.45	0.00	0.25
0.50	0.49	0.40	**2.17**	0.78	0.50	0.50	0.63	0.71	0.71	**3.83**	0.48	0.37	0.45	0.65	0.45	0.51	0.50
0.00	0.10	0.00	**0.28**	0.00	0.06	0.00	0.00	0.00	0.00	**0.06**	0.02	0.17	0.04	0.04	0.00	0.00	0.00
0.10	0.38	0.20	**0.89**	0.02	0.61	0.25	0.13	0.14	0.14	**1.30**	0.03	0.32	0.24	0.05	0.27	0.00	0.00
0.30	0.24	0.20	**0.93**	0.89	0.61	0.63	0.50	0.71	0.57	**3.91**	0.10	0.35	0.27	0.55	0.27	0.00	0.00
0.00	0.22	0.18	**0.84**	0.02	0.11	0.13	0.13	0.14	0.14	**0.67**	0.05	0.34	0.09	0.08	0.35	0.00	0.00
0.20	0.39	0.56	**1.66**	0.11	0.56	0.38	0.38	0.00	0.00	**1.42**	0.06	0.44	0.31	0.19	0.06	0.00	0.25
0.90	0.03	0.56	**2.50**	0.89	0.56	1.00	1.00	1.00	1.00	**5.45**	0.23	0.35	0.35	0.48	0.34	0.07	0.75
0.10	0.25	0.36	**1.10**	0.02	0.36	0.25	0.25	0.14	0.14	**1.17**	0.08	0.49	0.13	0.12	0.52	0.00	0.25
0.30	0.27	0.51	**2.10**	0.31	0.65	0.63	0.63	0.43	0.43	**3.07**	0.18	0.40	0.29	0.45	0.72	0.00	0.25
1.00	0.74	0.51	**3.84**	0.78	0.81	1.00	1.00	1.00	1.00	**5.59**	0.61	0.45	0.74	0.86	0.72	0.83	0.25
0.00	0.18	0.36	**0.74**	0.09	0.11	0.13	0.13	0.14	0.14	**0.74**	0.07	0.28	0.12	0.06	0.26	0.00	0.00
0.20	0.08	0.43	**0.97**	0.13	0.50	0.50	0.50	0.29	0.29	**2.20**	0.07	0.01	0.04	0.10	0.15	0.00	0.00
0.60	0.08	0.43	**1.63**	0.89	0.50	0.63	0.50	0.57	0.57	**3.66**	0.39	0.02	0.15	0.45	0.15	0.17	0.50
0.10	0.24	0.57	**1.56**	0.11	0.36	0.38	0.25	0.29	0.29	**1.67**	0.10	0.37	0.17	0.14	0.44	0.00	0.25
0.30	0.35	0.44	**2.16**	0.53	0.48	0.50	0.50	0.43	0.43	**2.87**	0.20	0.46	0.33	0.49	0.76	0.00	0.50
0.70	0.94	0.44	**3.98**	0.96	0.88	0.75	0.75	0.71	0.86	**4.90**	0.92	0.95	1.00	0.90	0.76	0.86	1.00
0.00	0.14	0.43	**0.90**	0.02	0.35	0.25	0.13	0.14	0.14	**1.03**	0.04	0.23	0.06	0.07	0.26	0.00	0.00
0.20	0.08	0.45	**1.41**	0.47	0.44	0.38	0.38	0.29	0.29	**2.23**	0.08	0.50	0.35	0.20	0.42	0.00	0.25
0.60	0.56	0.45	**2.70**	0.78	0.56	0.63	0.63	0.71	0.71	**4.02**	0.48	0.42	0.42	0.60	0.42	0.48	0.50
0.00	0.33	0.36	**1.07**	0.02	0.36	0.25	0.00	0.00	0.00	**0.63**	0.05	0.51	0.08	0.08	0.35	0.00	0.00
0.10	0.09	0.48	**1.22**	0.22	0.50	0.25	0.25	0.29	0.29	**1.79**	0.04	0.48	0.34	0.10	0.09	0.00	0.25
0.60	0.39	0.48	**2.34**	0.84	0.50	0.63	0.63	0.57	0.57	**3.74**	0.34	0.39	0.34	0.55	0.34	0.11	0.75
0.10	0.31	0.68	**1.67**	0.07	0.31	0.38	0.00	0.00	0.00	**0.75**	0.09	0.48	0.15	0.10	0.35	0.00	0.25
0.10	0.36	0.52	**1.92**	0.53	0.75	0.50	0.63	0.43	0.43	**3.27**	0.19	0.35	0.26	0.43	0.72	0.00	0.50
0.80	0.72	0.52	**3.64**	0.87	0.75	0.88	0.88	1.00	1.00	**5.37**	0.63	0.69	0.74	0.90	0.72	0.83	0.50
0.10	0.31	0.43	**1.28**	0.02	0.33	0.25	0.00	0.00	0.00	**0.60**	0.07	0.47	0.12	0.09	0.44	0.00	0.00
0.10	0.25	0.60	**2.11**	0.40	0.65	0.63	0.50	0.43	0.43	**3.03**	0.14	0.35	0.26	0.25	0.56	0.00	0.25
0.90	0.91	0.60	**4.11**	0.67	0.94	1.00	1.00	1.00	1.00	**5.60**	0.73	0.63	0.57	0.80	0.56	0.64	0.50
0.00	0.29	0.29	**0.89**	0.00	0.31	0.13	0.00	0.00	0.00	**0.44**	0.03	0.45	0.05	0.05	0.44	0.00	0.00
0.10	0.27	0.40	**1.51**	0.38	0.25	0.25	0.25	0.29	0.29	**1.70**	0.10	0.38	0.27	0.18	0.11	0.00	0.25
0.70	0.48	0.40	**3.31**	0.11	0.50	0.75	0.75	0.86	0.86	**3.83**	0.60	0.47	0.26	0.85	0.25	0.13	0.75
0.10	0.33	0.43	**1.27**	0.07	0.23	0.25	0.13	0.14	0.14	**0.95**	0.10	0.51	0.17	0.09	0.35	0.00	0.25
0.20	0.28	0.56	**1.87**	0.33	0.58	0.25	0.38	0.43	0.43	**2.39**	0.19	0.30	0.22	0.25	0.41	0.00	0.50
0.80	0.54	0.56	**3.58**	0.78	0.58	0.88	0.88	1.00	1.00	**5.10**	0.70	0.76	0.42	0.65	0.41	0.47	0.25
0.00	0.25	0.32	**0.92**	0.04	0.36	0.25	0.13	0.14	0.14	**1.07**	0.05	0.40	0.09	0.08	0.26	0.00	0.00
0.20	0.23	0.73	**1.93**	0.22	0.66	0.25	0.25	0.29	0.29	**1.96**	0.20	0.44	0.31	0.15	0.57	0.00	0.25
0.60	0.43	0.73	**2.96**	0.98	0.66	0.63	0.63	0.71	0.71	**4.32**	0.56	0.42	0.58	0.68	0.57	0.65	0.25
0.00	0.29	0.54	**1.13**	0.04	0.10	0.25	0.00	0.00	0.00	**0.39**	0.04	0.45	0.06	0.00	0.26	0.00	0.00
0.10	0.09	0.17	**0.79**	0.11	0.50	0.25	0.13	0.14	0.14	**1.27**	0.03	0.41	0.29	0.15	0.48	0.00	0.25
0.50	0.24	0.20	**1.46**	0.96	0.50	0.50	0.25	0.29	0.29	**2.78**	0.04	0.38	0.49	0.08	0.48	0.55	0.75
0.10	0.29	0.57	**1.36**	0.00	0.31	0.38	0.00	0.00	0.00	**0.69**	0.08	0.49	0.13	0.08	0.35	0.00	0.25
0.10	0.25	0.95	**2.24**	0.16	0.56	0.38	0.38	0.43	0.43	**2.33**	0.13	0.35	0.26	0.20	0.68	0.00	0.25
0.70	0.58	0.95	**3.97**	0.82	0.56	0.75	0.75	0.86	0.86	**4.60**	0.84	0.76	0.69	0.80	0.68	0.77	0.50
0.00	0.22	0.18	**0.63**	0.00	0.00	0.38	0.00	0.00	0.00	**0.38**	0.05	0.34	0.09	0.06	0.24	0.00	0.00
0.10	0.00	0.52	**1.12**	0.16	0.49	0.38	0.38	0.43	0.43	**2.25**	0.06	0.30	0.22	0.10	0.64	0.00	0.00
0.50	0.30	0.52	**2.04**	0.96	0.56	0.50	0.50	0.57	0.57	**3.66**	0.37	0.31	0.30	0.85	0.29	0.73	0.75
0.10	0.31	0.64	**1.49**	0.07	0.36	0.25	0.13	0.14	0.14	**1.09**	0.10	0.48	0.16	0.08	0.35	0.00	0.25
0.20	0.30	0.64	**2.08**	0.16	0.50	0.25	0.25	0.29	0.29	**1.73**	0.17	0.36	0.26	0.25	0.72	0.00	0.50
0.50	0.95	0.64	**3.77**	0.78	0.50	0.50	0.50	0.57	0.57	**3.42**	0.69	0.86	0.73	0.65	0.72	0.82	0.25
0.00	0.00	0.07	**0.16**	0.00	0.13	0.13	0.00	0.00	0.00	**0.25**	0.00	0.00	0.00	0.01	0.11	0.00	0.00
0.10	0.02	0.77	**1.06**	0.11	0.56	0.25	0.13	0.00	0.00	**1.05**	0.07	0.16	0.13	0.10	0.04	0.00	0.00
0.20	0.13	0.30	**1.27**	0.67	0.56	0.63	0.50	0.14	0.14	**2.64**	0.27	0.13	0.03	0.55	0.05	0.05	0.25
0.10	0.24	0.36	**1.13**	0.04	0.29	0.25	0.00	0.00	0.00	**0.58**	0.06	0.38	0.10	0.08	0.35	0.00	0.00
0.10	0.19	0.56	**1.70**	0.18	0.45	0.50	0.38	0.43	0.43	**2.36**	0.16	0.29	0.22	0.25	0.60	0.00	0.25
0.80	0.39	0.56	**2.87**	0.78	0.63	0.88	0.88	0.71	0.71	**4.58**	0.37	0.64	0.61	0.65	0.60	0.68	0.50
0.10	0.22	0.21	**0.95**	0.07	0.20	0.25	0.00	0.00	0.00	**0.52**	0.06	0.38	0.11	0.10	0.40	0.00	0.00
0.10	0.09	0.54	**1.80**	0.18	0.55	0.50	0.50	0.57	0.57	**2.87**	0.13	0.33	0.24	0.30	0.13	0.00	0.25
0.90	0.36	0.54	**2.83**	0.89	0.55	1.00	1.00	0.86	0.86	**5.15**	0.20	0.60	0.44	0.86	0.43	0.15	0.25
1	1	1		1	1	1	1	1	1		1	1	1	1	1	1	1
0	0	0		0	0	0	0	0	0		0	0	0	0	0	0	0

sq5.1.8	sq5.1.9	I-inpit	sq5.2.1	sq5.2.3	sq5.2.4	sq5.2.5	sq5.2.6	sq5.2.7	sq5.2.8	sq5.2.9	sq5.2.10	sq5.2.11	I-output
0.44	0.20	**1.99**	0.18	0.25	0.29	0.11	0.00	0.08	0.00	0.00	0.11	0.18	**1.18**
0.41	0.40	**2.66**	0.48	0.50	0.14	0.33	0.50	0.44	0.00	0.33	0.32	0.40	**3.45**
0.41	0.70	**4.67**	0.64	0.75	0.86	0.67	1.00	0.75	1.00	0.67	0.79	0.75	**7.87**
0.31	0.20	**1.57**	0.23	0.00	0.14	0.22	0.00	0.06	0.00	0.00	0.09	0.15	**0.89**
0.35	0.60	**2.83**	0.64	0.50	0.14	0.56	0.00	0.50	0.00	0.33	0.47	0.38	**3.51**
0.45	0.60	**5.01**	0.79	0.50	0.86	0.56	0.50	0.63	0.00	0.33	0.89	0.88	**5.93**
0.44	0.20	**1.78**	0.33	0.25	0.14	0.11	0.00	0.06	0.00	0.00	0.09	0.20	**1.18**
0.60	0.50	**3.67**	0.54	0.50	0.14	0.44	0.50	0.61	0.00	0.67	0.53	0.38	**4.31**
0.62	0.80	**6.20**	0.90	0.75	0.71	0.78	1.00	0.63	1.00	0.67	0.77	0.90	**8.10**
0.44	0.30	**2.26**	0.36	0.25	0.29	0.22	0.00	0.10	0.00	0.00	0.11	0.25	**1.58**
0.83	0.40	**4.19**	0.74	0.50	0.29	0.67	0.50	0.63	0.00	0.67	0.57	0.45	**5.01**
1.00	0.60	**8.08**	0.74	0.75	0.71	0.56	1.00	0.88	1.00	0.67	0.96	1.00	**8.26**
0.51	0.20	**2.33**	0.48	0.25	0.14	0.22	0.00	0.09	0.00	0.00	0.13	0.20	**1.51**
0.70	0.50	**4.06**	0.79	0.50	0.14	0.78	0.50	0.56	0.00	0.67	0.49	0.50	**4.93**
0.74	0.70	**7.57**	1.00	1.00	0.86	0.67	1.00	1.00	1.00	0.67	1.00	1.00	**9.19**
0.40	0.20	**2.12**	0.38	0.25	0.29	0.11	0.00	0.10	0.00	0.00	0.11	0.15	**1.38**
0.45	0.40	**3.14**	0.55	0.50	0.14	0.56	0.50	0.50	0.00	0.67	0.43	0.40	**4.24**
0.64	0.80	**6.77**	0.74	0.50	0.86	0.78	0.50	0.84	1.00	0.67	0.89	0.85	**7.62**
0.35	0.40	**2.02**	0.28	0.25	0.14	0.22	0.00	0.06	0.00	0.00	0.06	0.20	**1.22**
0.43	0.40	**3.01**	0.64	0.50	0.43	0.44	0.50	0.61	0.00	0.33	0.36	0.33	**4.14**
0.58	0.50	**5.36**	0.69	0.50	0.57	0.44	0.50	0.69	1.00	0.33	0.79	0.90	**6.41**
0.38	0.50	**2.28**	0.33	0.25	0.14	0.33	0.00	0.10	0.00	0.00	0.09	0.15	**1.39**
0.69	0.60	**4.00**	0.48	0.50	0.57	0.67	0.50	0.44	0.00	0.33	0.55	0.38	**4.42**
0.69	0.40	**6.58**	0.64	0.75	0.43	0.33	1.00	0.94	1.00	0.67	0.85	0.95	**7.56**
0.26	0.30	**1.65**	0.26	0.25	0.14	0.22	0.00	0.09	0.00	0.00	0.06	0.18	**1.20**
0.52	0.50	**3.19**	0.59	0.50	0.29	0.78	0.50	0.38	0.00	0.33	0.36	0.28	**4.00**
0.69	0.60	**6.04**	0.54	0.75	0.71	0.56	0.50	0.78	1.00	0.33	0.57	0.50	**6.24**
0.44	0.40	**2.36**	0.41	0.25	0.14	0.33	0.00	0.06	0.00	0.00	0.11	0.15	**1.46**
0.52	0.40	**3.01**	0.64	0.50	0.43	0.67	0.50	0.56	0.00	0.67	0.47	0.33	**4.76**
0.50	0.50	**5.65**	0.64	0.75	0.57	0.44	1.00	0.63	1.00	1.00	0.79	0.48	**7.29**
0.28	0.30	**1.29**	0.10	0.00	0.00	0.22	0.00	0.04	0.00	0.00	0.00	0.13	**0.49**
0.48	0.30	**2.41**	0.48	0.25	0.29	0.56	0.50	0.31	0.00	0.33	0.32	0.25	**3.29**
0.45	0.40	**4.26**	0.79	0.50	0.43	0.33	0.50	0.68	0.00	0.33	0.68	0.50	**4.74**
0.00	0.00	**0.27**	0.07	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.04	0.13	**0.33**
0.29	0.20	**1.40**	0.07	0.25	0.00	0.11	0.00	0.04	0.00	0.33	0.21	0.15	**1.17**
0.27	0.80	**2.60**	0.18	0.00	0.43	0.78	0.50	0.06	0.00	0.00	0.26	0.25	**2.45**
0.35	0.20	**1.46**	0.28	0.25	0.29	0.22	0.00	0.10	0.00	0.00	0.09	0.15	**1.37**
0.07	0.40	**1.78**	0.28	0.75	0.14	0.22	0.50	0.24	0.00	0.33	0.26	0.23	**2.94**
0.34	0.90	**3.80**	0.48	0.75	0.29	0.89	1.00	0.81	1.00	0.33	0.79	0.38	**6.72**
0.42	0.30	**2.32**	0.43	0.25	0.00	0.11	0.00	0.08	0.00	0.00	0.11	0.20	**1.18**
0.72	0.60	**3.61**	0.59	0.25	0.29	0.44	0.50	0.56	0.00	0.67	0.36	0.43	**4.08**
0.72	0.60	**5.77**	0.85	0.75	0.71	0.56	1.00	0.88	1.00	0.67	0.89	0.50	**7.80**
0.26	0.20	**1.27**	0.12	0.00	0.00	0.11	0.00	0.09	0.00	0.00	0.09	0.15	**0.56**
0.16	0.50	**1.03**	0.12	0.25	0.14	0.33	0.00	0.13	0.00	0.00	0.26	0.28	**1.51**
0.15	0.70	**2.70**	0.33	0.50	0.86	0.67	0.00	0.50	0.00	0.00	0.32	0.35	**3.52**
0.44	0.50	**2.40**	0.23	0.25	0.14	0.33	0.00	0.13	0.00	0.00	0.15	0.20	**1.43**
0.77	0.50	**4.02**	0.59	0.50	0.57	0.78	0.50	0.56	0.00	0.67	0.53	0.48	**5.17**
0.76	1.00	**8.15**	0.95	1.00	1.00	1.00	1.00	0.78	1.00	0.67	1.00	1.00	**9.39**
0.26	0.30	**1.22**	0.11	0.00	0.14	0.22	0.00	0.08	0.00	0.00	0.04	0.18	**0.77**
0.43	0.40	**2.62**	0.11	0.50	0.29	0.33	0.00	0.25	0.00	0.33	0.28	0.25	**2.34**
0.42	0.60	**4.33**	0.48	0.50	0.71	0.56	0.50	0.66	0.00	0.33	0.70	0.95	**5.40**
0.35	0.30	**1.72**	0.12	0.00	0.00	0.22	0.00	0.10	0.00	0.00	0.06	0.20	**0.71**
0.10	0.30	**1.70**	0.12	0.25	0.29	0.22	0.00	0.13	0.00	0.33	0.19	0.23	**1.76**
0.34	0.80	**3.97**	0.43	0.75	0.57	0.78	0.50	0.76	0.00	0.33	0.47	0.53	**5.12**
0.52	0.40	**2.35**	0.28	0.25	0.14	0.33	0.00	0.08	0.00	0.00	0.11	0.23	**1.41**
0.75	0.50	**3.69**	0.74	0.50	0.43	0.56	0.50	0.54	0.00	0.67	0.57	0.38	**4.88**
0.72	0.90	**6.63**	0.85	0.50	0.86	0.89	0.50	0.85	1.00	0.67	0.89	0.98	**7.98**
0.49	0.30	**1.97**	0.43	0.25	0.29	0.22	0.00	0.10	0.00	0.00	0.09	0.18	**1.55**
0.60	0.50	**2.92**	0.43	0.50	0.29	0.44	0.50	0.31	0.00	0.67	0.34	0.25	**3.73**
0.56	0.70	**5.70**	0.48	0.50	0.86	0.67	1.00	0.75	1.00	0.67	0.79	0.53	**7.24**
0.44	0.20	**1.66**	0.22	0.25	0.14	0.11	0.00	0.09	0.00	0.00	0.06	0.18	**1.05**
0.12	0.30	**1.71**	0.33	0.25	0.14	0.56	0.50	0.44	0.00	0.33	0.45	0.20	**3.20**
0.25	0.80	**4.37**	0.54	0.75	1.00	0.78	0.50	0.63	1.00	0.33	0.64	0.50	**6.66**
0.35	0.30	**2.12**	0.23	0.25	0.14	0.11	0.00	0.10	0.00	0.00	0.06	0.15	**1.04**
0.43	0.40	**2.70**	0.23	0.50	0.29	0.67	0.00	0.31	0.00	0.67	0.36	0.48	**3.50**
0.41	0.60	**4.67**	0.59	0.25	0.71	0.56	1.00	0.56	1.00	0.67	0.47	0.58	**6.38**
0.26	0.30	**1.44**	0.12	0.00	0.14	0.22	0.00	0.06	0.00	0.00	0.04	0.13	**0.72**
0.60	0.30	**2.82**	0.64	0.50	0.29	0.56	0.00	0.19	0.00	0.67	0.28	0.40	**3.51**
0.57	0.50	**4.78**	0.79	0.25	0.57	0.44	1.00	0.69	0.00	0.00	0.79	0.63	**5.16**
0.26	0.30	**1.38**	0.09	0.00	0.14	0.22	0.00	0.09	0.00	0.00	0.09	0.18	**0.81**
0.50	0.20	**2.31**	0.18	0.25	0.29	0.44	0.00	0.19	0.00	0.33	0.19	0.13	**1.99**
0.48	0.70	**3.96**	0.48	0.75	0.86	0.67	0.50	0.75	0.00	0.00	0.47	0.40	**4.88**
0.35	0.40	**2.14**	0.23	0.25	0.14	0.22	0.00	0.08	0.00	0.00	0.06	0.23	**1.21**
0.69	0.40	**2.96**	0.33	0.50	0.43	0.67	0.00	0.25	0.00	0.67	0.36	0.45	**3.65**
0.68	0.50	**6.21**	0.85	0.50	0.71	0.44	1.00	0.81	1.00	0.33	0.79	0.88	**7.31**
0.24	0.40	**1.43**	0.12	0.25	0.29	0.11	0.00	0.06	0.00	0.00	0.06	0.15	**1.05**
0.66	0.40	**2.39**	0.23	0.25	0.43	0.67	0.00	0.13	0.00	0.33	0.26	0.28	**2.56**
0.29	0.50	**4.39**	0.33	0.75	0.57	0.44	0.50	0.81	1.00	0.33	0.57	0.38	**5.69**
0.35	0.30	**2.07**	0.23	0.25	0.14	0.22	0.00	0.10	0.00	0.00	0.11	0.23	**1.27**
0.72	0.30	**3.28**	0.43	0.50	0.29	0.78	0.50	0.31	0.00	0.67	0.43	0.35	**4.25**
0.72	0.40	**5.84**	0.48	0.50	0.43	0.33	1.00	0.83	1.00	0.67	0.89	0.90	**7.03**
0.11	0.20	**0.44**	0.00	0.00	0.14	0.11	0.00	0.00	0.00	0.00	0.04	0.00	**0.30**
0.04	0.10	**0.65**	0.33	0.25	0.14	0.33	0.50	0.09	0.00	0.00	0.15	0.23	**2.02**
0.05	0.10	**1.48**	0.38	0.25	0.14	0.22	0.00	0.31	0.00	0.00	0.36	0.38	**2.05**
0.35	0.30	**1.62**	0.18	0.25	0.14	0.22	0.00	0.09	0.00	0.00	0.09	0.13	**1.09**
0.57	0.40	**2.73**	0.48	0.50	0.29	0.44	0.50	0.31	0.00	0.33	0.43	0.30	**3.69**
0.60	0.80	**5.45**	0.64	0.50	0.86	0.78	0.50	0.63	1.00	0.33	0.68	0.58	**6.49**
0.40	0.30	**1.76**	0.24	0.25	0.14	0.33	0.00	0.08	0.00	0.00	0.11	0.15	**1.29**
0.16	0.50	**2.04**	0.54	0.50	0.29	0.56	0.50	0.38	0.00	0.33	0.40	0.40	**3.89**
0.43	0.60	**3.95**	0.69	0.50	0.71	0.56	0.50	0.80	1.00	0.33	0.79	0.63	**6.51**
1	1		1	1	1	1	1	1	1	1	1	1	
0	0		0	0	0	0	0	0	0	0	0	0	

Variable labs:
Bus=Busines: 1=Textiles, 2= Clothing
1.1=Production: 1=yarn, 2=knitted fabric, 3=woven fabric, 4= BDPF, 5=cut & sewn garment, 6=sweater, 7=other garment
1.2=Years of establishment
1.3=Does company own any production facilities:
1.4=Does compay conduct any manufacturing process ‹ 1=yes, 2=no
1.4.1=which area conduct any manufacturing process o· 1=China,2=Asia,3=Africa,4=Others
1.5=Staff I Including Hong Kong, the Mainland and overseas employees
1.6=Marke 1=USA, 2=Europe, 3=Asia, 4= China, 5=Hong Kong, 6=Others
Profile: Three Technometric Performance Attributes, i.e. 1=product, 2=process, 3=service
t=Period: 0= 1974-1983, 1=1984-1993, 2=1994-2003

Company	Bus	1.1	1.1.1	1.1.2	1.2	1.3	1.4	1.4.1	1.5	1.6.1	1.6.2	1.6.3	1.6.4	Profile	t	sq1.1.1	sq1.1.2
1	1	4	3	0	32	1	1	1	500	1	2	5	0	2	0	0.07	0.02
1	1	4	3	0	32	1	1	1	500	1	2	5	0	2	1	0.20	0.08
1	1	4	3	0	32	1	1	1	500	1	2	5	0	2	2	0.62	0.49
2	1	2	0	0	30	1	1	1	300	1	3	5	0	2	0	0.33	0.08
2	1	2	0	0	30	1	1	1	300	1	3	5	0	2	1	0.15	0.14
2	1	2	0	0	30	1	1	1	300	1	3	5	0	2	2	0.48	0.76
3	1	1	2	0	33	1	1	1	1500	1	4	5	0	2	0	0.04	0.00
3	1	1	2	0	33	1	1	1	1500	1	4	5	0	2	1	0.43	0.18
3	1	1	2	0	33	1	1	1	1500	1	4	5	0	2	2	0.86	0.48
4	1	1	2	4	40	1	1	1	3500	1	2	5	0	2	0	0.10	0.02
4	1	1	2	4	40	1	1	1	3500	1	2	5	0	2	1	0.34	0.10
4	1	1	2	4	40	1	1	1	3500	1	2	5	0	2	2	0.95	0.35
5	1	2	4	0	35	1	1	1	5000	3	5	0	0	2	0	0.00	0.00
5	1	2	4	0	35	1	1	1	5000	3	5	0	0	2	1	0.49	0.07
5	1	2	4	0	35	1	1	1	5000	3	5	0	0	2	2	0.99	0.80
6	1	1	0	0	30	1	1	1	2000	3	5	0	0	2	0	0.36	0.08
6	1	1	0	0	30	1	1	1	2000	3	5	0	0	2	1	0.40	0.39
6	1	1	0	0	30	1	1	1	2000	3	5	0	0	2	2	0.70	0.71
7	1	1	0	0	33	1	1	1	1500	3	5	0	0	2	0	0.12	0.02
7	1	1	0	0	33	1	1	1	1500	3	5	0	0	2	1	0.31	0.29
7	1	1	0	0	33	1	1	1	1500	3	5	0	0	2	2	0.62	0.90
8	1	2	4	0	32	1	1	1	3000	3	5	0	0	2	0	0.05	0.01
8	1	2	4	0	32	1	1	1	3000	3	5	0	0	2	1	0.44	0.27
8	1	2	4	0	32	1	1	1	3000	3	5	0	0	2	2	0.94	0.69
9	1	2	4	0	36	1	1	1	1000	3	5	0	0	2	0	0.00	0.00
9	1	2	4	0	36	1	1	1	1000	3	5	0	0	2	1	0.34	0.18
9	1	2	4	0	36	1	1	1	1000	3	5	0	0	2	2	0.61	0.59
10	1	3	4	0	40	1	1	1	2000	3	5	0	0	2	0	0.11	0.03
10	1	3	4	0	40	1	1	1	2000	3	5	0	0	2	1	0.43	0.16
10	1	3	4	0	40	1	1	1	2000	3	5	0	0	2	2	0.40	0.69
11	1	4	0	0	32	1	1	1	500	3	5	0	0	2	0	0.06	0.01
11	1	4	0	0	32	1	1	1	500	3	5	0	0	2	1	0.13	0.14
11	1	4	0	0	32	1	1	1	500	3	5	0	0	2	2	0.31	0.49
12	1	4	0	0	37	1	1	1	80	4	0	0	0	2	0	0.04	0.00
12	1	4	0	0	37	1	1	1	80	4	0	0	0	2	1	0.01	0.03
12	1	4	0	0	37	1	1	1	80	4	0	0	0	2	2	0.10	0.05
13	1	2	4	0	33	1	1	1	100	1	2	3	5	2	0	0.14	0.04
13	1	2	4	0	33	1	1	1	100	1	2	3	5	2	1	0.46	0.08
13	1	2	4	0	33	1	1	1	100	1	2	3	5	2	2	0.21	0.08
14	1	3	4	0	30	1	1	1	2000	3	5	0	0	2	0	0.38	0.18
14	1	3	4	0	30	1	1	1	2000	3	5	0	0	2	1	0.40	0.59
14	1	3	4	0	30	1	1	1	2000	3	5	0	0	2	2	0.68	1.00
15	1	4	0	0	31	1	1	1	100	4	0	0	0	2	0	0.04	0.01
15	1	4	0	0	31	1	1	1	100	4	0	0	0	2	1	0.09	0.08
15	1	4	0	0	31	1	1	1	100	4	0	0	0	2	2	0.19	0.08
16	2	6	0	0	40	1	1	1	5000	1	2	3	4	2	0	0.07	0.03
16	2	6	0	0	40	1	1	1	5000	1	2	3	4	2	1	0.43	0.49
16	2	6	0	0	40	1	1	1	5000	1	2	3	4	2	2	1.00	0.90
17	2	5	0	0	33	1	1	1	500	1	2	3	5	2	0	0.03	0.01
17	2	5	0	0	33	1	1	1	500	1	2	3	5	2	1	0.17	0.04
17	2	5	0	0	33	1	1	1	500	1	2	3	5	2	2	0.56	0.45
18	2	5	0	0	30	1	1	1	200	1	0	0	0	2	0	0.03	0.01
18	2	5	0	0	30	1	1	1	200	1	0	0	0	2	1	0.15	0.08
18	2	5	0	0	30	1	1	1	200	1	0	0	0	2	2	0.37	0.49
19	2	6	0	0	35	1	1	1	3000	1	2	3	5	2	0	0.11	0.04
19	2	6	0	0	35	1	1	1	3000	1	2	3	5	2	1	0.43	0.39
19	2	6	0	0	35	1	1	1	3000	1	2	3	5	2	2	0.77	0.71
20	2	6	0	0	36	1	1	1	1000	1	2	3	5	2	0	0.33	0.07
20	2	6	0	0	36	1	1	1	1000	1	2	3	5	2	1	0.45	0.22
20	2	6	0	0	36	1	1	1	1000	1	2	3	5	2	2	0.37	0.49
21	2	5	0	0	30	1	1	1	500	1	2	0	0	2	0	0.11	0.03
21	2	5	0	0	30	1	1	1	500	1	2	0	0	2	1	0.01	0.29
21	2	5	0	0	30	1	1	1	500	1	2	0	0	2	2	0.22	0.47
22	2	5	0	0	31	1	1	1	1000	1	2	3	0	2	0	0.14	0.03
22	2	5	0	0	31	1	1	1	1000	1	2	3	0	2	1	0.45	0.18
22	2	5	0	0	31	1	1	1	1000	1	2	3	0	2	2	0.56	0.59
23	2	5	0	0	30	1	1	1	800	1	2	0	0	2	0	0.03	0.01
23	2	5	0	0	30	1	1	1	800	1	2	0	0	2	1	0.45	0.10
23	2	5	0	0	30	1	1	1	800	1	2	0	0	2	2	0.40	0.29
24	2	6	0	0	38	1	1	1	150	1	0	0	0	2	0	0.03	0.00
24	2	6	0	0	38	1	1	1	150	1	0	0	0	2	1	0.12	0.10
24	2	6	0	0	38	1	1	1	150	1	0	0	0	2	2	0.40	0.35
25	2	6	0	0	30	1	1	1	1000	1	2	4	0	2	0	0.14	0.03
25	2	6	0	0	30	1	1	1	1000	1	2	4	0	2	1	0.45	0.14
25	2	6	0	0	30	1	1	1	1000	1	2	4	0	2	2	0.59	0.27
26	2	5	0	0	31	1	1	1	100	2	0	0	0	2	0	0.07	0.01
26	2	5	0	0	31	1	1	1	100	2	0	0	0	2	1	0.18	0.07
26	2	5	0	0	31	1	1	1	100	2	0	0	0	2	2	0.04	0.07
27	2	6	0	0	32	1	1	1	1000	1	2	3	4	2	0	0.14	0.03
27	2	6	0	0	32	1	1	1	1000	1	2	3	4	2	1	0.41	0.39
27	2	6	0	0	32	1	1	1	1000	1	2	3	4	2	2	0.21	0.84
28	2	5	0	0	30	1	1	1	90	1	0	0	0	2	0	0.11	0.01
28	2	5	0	0	30	1	1	1	90	1	0	0	0	2	1	0.13	0.02
28	2	5	0	0	30	1	1	1	90	1	0	0	0	2	2	0.01	0.04
29	2	6	0	0	33	1	1	1	300	1	2	0	0	2	0	0.14	0.02
29	2	6	0	0	33	1	1	1	300	1	2	0	0	2	1	0.39	0.03
29	2	6	0	0	33	1	1	1	300	1	2	0	0	2	2	0.61	0.23
30	2	7	0	0	30	1	1	1	200	1	2	3	0	2	0	0.21	0.03
30	2	7	0	0	30	1	1	1	200	1	2	3	0	2	1	0.42	0.08
30	2	7	0	0	30	1	1	1	200	1	2	3	0	2	2	0.37	0.10
															Max	1	1
															Min	0	0

sq1.1.3	sq1.1.4	sq1.1.5	sq1.1.6	sq1.1.7	sq1.1.8	P-input	sq1.2.1	sq1.2.2	s1.2.3	P-output	sq2.1.1	sq2.1.2	sq2.1.3	sq2.1.5	sq2.1.6	sq2.1.7	sq2.1.8
0.06	0.12	0.03	0.00	0.03	0.10	0.43	0.05	0.07	0.05	0.17	0.14	0.39	0.00	0.16	0.19	0.05	0.10
0.21	0.14	0.37	0.30	0.25	0.27	1.82	0.47	0.52	0.24	1.24	0.07	0.23	0.67	0.42	0.53	0.37	0.44
0.69	0.55	0.77	0.65	0.60	0.56	4.93	0.55	0.52	0.52	1.60	0.37	0.62	0.67	0.78	0.58	0.47	0.78
0.42	0.28	0.35	0.05	0.20	0.20	1.91	0.11	0.12	0.10	0.32	0.16	0.42	0.00	0.26	0.20	0.05	0.15
0.14	0.17	0.34	0.25	0.27	0.25	1.72	0.34	0.40	0.17	0.91	0.09	0.27	0.33	0.31	0.47	0.32	0.29
0.91	0.28	0.32	0.70	0.54	0.51	4.50	0.58	0.55	0.55	1.67	0.46	0.24	0.33	0.94	0.68	0.74	0.94
0.07	0.22	0.17	0.00	0.03	0.09	0.62	0.03	0.10	0.14	0.26	0.14	0.63	0.00	0.30	0.15	0.05	0.13
0.28	0.29	0.62	0.40	0.47	0.45	3.12	0.61	0.36	0.21	1.18	0.34	0.45	0.67	0.59	0.47	0.21	0.55
0.53	0.64	0.97	0.90	0.76	0.69	5.83	0.45	0.62	0.62	1.69	0.67	0.78	1.00	0.81	0.79	0.74	0.81
0.12	0.16	0.21	0.00	0.06	0.10	0.76	0.05	0.05	0.05	0.15	0.22	0.67	0.00	0.34	0.37	0.11	0.24
0.41	0.40	0.82	0.45	0.49	0.44	3.47	0.68	0.71	0.50	1.90	0.37	0.86	0.33	0.60	0.58	0.26	0.60
0.97	1.00	0.74	0.85	0.76	0.69	6.30	1.00	1.00	1.00	3.00	0.86	1.00	0.33	0.98	0.79	0.89	0.99
0.02	0.00	0.06	0.05	0.01	0.15	0.31	0.03	0.07	0.10	0.19	0.27	0.70	0.00	0.40	0.35	0.05	0.40
0.34	0.37	0.69	0.55	0.50	0.50	3.52	0.74	0.76	0.60	2.09	0.37	0.57	0.67	0.53	0.68	0.32	0.52
0.82	0.89	1.00	1.00	0.93	0.91	7.34	0.95	0.95	0.95	2.85	1.00	0.97	1.00	0.94	1.00	1.00	0.94
0.15	0.25	0.25	0.10	0.07	0.09	1.35	0.08	0.10	0.12	0.29	0.27	0.44	0.00	0.24	0.28	0.05	0.15
0.30	0.30	0.51	0.35	0.44	0.42	3.11	0.68	0.64	0.45	1.78	0.07	0.47	0.33	0.45	0.66	0.37	0.42
0.96	0.82	0.97	0.80	0.58	0.50	6.04	0.79	0.69	0.69	2.17	0.73	0.43	0.33	0.83	0.89	0.79	0.83
0.19	0.23	0.25	0.15	0.10	0.11	1.17	0.05	0.12	0.17	0.34	0.22	0.42	0.00	0.15	0.26	0.16	0.09
0.21	0.26	0.49	0.30	0.17	0.17	2.20	0.45	0.48	0.40	1.33	0.09	0.41	0.67	0.44	0.53	0.21	0.42
0.89	0.78	0.36	0.70	0.61	0.54	5.39	0.74	0.64	0.64	2.02	0.64	0.27	0.67	0.74	0.68	0.89	0.74
0.09	0.13	0.21	0.00	0.05	0.13	0.68	0.03	0.05	0.07	0.15	0.14	0.61	0.00	0.26	0.35	0.21	0.21
0.25	0.34	0.64	0.55	0.39	0.36	3.24	0.47	0.74	0.64	1.85	0.24	0.52	0.67	0.54	0.42	0.16	0.51
1.00	0.64	0.64	0.75	0.83	0.71	6.21	0.95	0.88	0.88	2.71	0.72	0.50	0.67	1.00	0.89	0.47	1.00
0.00	0.01	0.31	0.00	0.00	0.00	0.33	0.00	0.02	0.05	0.07	0.08	0.29	0.00	0.16	0.19	0.11	0.14
0.22	0.34	0.64	0.35	0.17	0.15	2.38	0.37	0.40	0.45	1.23	0.24	0.52	0.33	0.46	0.63	0.32	0.42
0.69	0.67	0.55	0.65	0.63	0.67	5.06	0.55	0.48	0.48	1.51	0.91	0.43	0.33	0.99	0.68	0.68	0.99
0.11	0.16	0.25	0.05	0.05	0.10	0.86	0.05	0.10	0.05	0.20	0.14	0.35	0.00	0.21	0.15	0.16	0.09
0.27	0.20	0.30	0.30	0.27	0.22	2.16	0.42	0.64	0.60	1.66	0.09	0.33	0.67	0.57	0.63	0.21	0.51
0.88	0.68	0.84	0.50	0.52	0.52	5.03	0.45	0.62	0.62	1.69	0.51	0.57	1.00	0.90	0.95	0.63	0.90
0.12	0.04	0.04	0.00	0.05	0.08	0.40	0.03	0.05	0.07	0.15	0.00	0.40	0.00	0.19	0.16	0.11	0.13
0.06	0.16	0.31	0.25	0.17	0.14	1.37	0.34	0.31	0.48	1.13	0.23	0.27	0.33	0.14	0.47	0.11	0.16
0.95	0.14	0.43	0.60	0.25	0.25	3.44	0.47	0.52	0.52	1.52	0.50	0.33	0.33	0.73	0.79	0.68	0.73
0.05	0.00	0.00	0.00	0.02	0.05	0.16	0.00	0.00	0.00	0.00	0.05	0.09	0.00	0.09	0.00	0.00	0.15
0.03	0.04	0.14	0.15	0.03	0.02	0.45	0.11	0.12	0.19	0.41	0.32	0.09	0.67	0.01	0.57	0.37	0.01
0.08	0.04	0.16	0.25	0.07	0.08	0.83	0.18	0.14	0.21	0.54	0.14	0.10	0.67	0.27	0.79	0.26	0.27
0.19	0.13	0.31	0.10	0.11	0.09	1.11	0.05	0.14	0.14	0.34	0.11	0.23	0.00	0.16	0.07	0.05	0.13
0.05	0.09	0.22	0.20	0.04	0.03	1.17	0.13	0.17	0.19	0.49	0.34	0.17	0.67	0.12	0.53	0.42	0.14
0.16	0.12	0.07	0.20	0.16	0.17	1.15	0.26	0.29	0.29	0.83	0.26	0.02	0.67	0.33	0.53	0.74	0.32
0.42	0.28	0.31	0.25	0.20	0.19	2.21	0.11	0.17	0.17	0.44	0.35	0.39	0.00	0.26	0.16	0.11	0.22
0.22	0.36	0.67	0.35	0.39	0.31	3.28	0.45	0.52	0.31	1.28	0.24	0.55	0.67	0.46	0.60	0.26	0.47
0.96	0.55	0.69	0.70	0.52	0.54	5.63	0.47	0.60	0.60	1.66	0.85	0.55	1.00	0.87	0.95	0.79	0.87
0.05	0.04	0.08	0.00	0.03	0.03	0.28	0.08	0.07	0.07	0.22	0.00	0.16	0.00	0.18	0.09	0.05	0.13
0.11	0.08	0.20	0.25	0.10	0.09	1.01	0.11	0.14	0.21	0.46	0.15	0.15	0.33	0.00	0.47	0.32	0.00
0.15	0.27	0.50	0.20	0.12	0.13	1.64	0.32	0.31	0.31	0.93	0.24	0.39	0.33	0.14	0.47	0.21	0.14
0.07	0.16	0.15	0.05	0.05	0.12	0.70	0.08	0.10	0.10	0.27	0.22	0.60	0.00	0.36	0.36	0.21	0.32
0.36	0.38	0.69	0.45	0.44	0.41	3.66	0.71	0.74	0.57	2.02	0.31	0.58	0.67	0.57	0.45	0.47	0.16
0.84	0.93	0.95	0.75	1.00	1.00	7.36	0.97	0.86	0.86	2.69	0.90	0.94	0.67	0.78	0.89	0.89	0.78
0.05	0.04	0.04	0.05	0.03	0.08	0.32	0.05	0.07	0.07	0.20	0.03	0.27	0.00	0.25	0.33	0.11	0.23
0.16	0.14	0.24	0.20	0.13	0.11	1.20	0.63	0.48	0.40	1.51	0.19	0.24	0.33	0.35	0.42	0.26	0.34
0.31	0.41	0.53	0.65	0.51	0.54	3.95	0.82	0.95	0.95	2.72	0.37	0.41	0.33	0.65	0.58	0.74	0.64
0.05	0.10	0.25	0.00	0.03	0.02	0.48	0.03	0.07	0.07	0.17	0.05	0.29	0.00	0.20	0.17	0.11	0.16
0.11	0.09	0.23	0.15	0.14	0.10	1.06	0.34	0.45	0.36	1.15	0.21	0.16	0.67	0.25	0.47	0.37	0.15
0.24	0.27	0.30	0.50	0.29	0.25	2.72	0.50	0.52	0.52	1.55	0.25	0.22	0.67	0.52	0.47	0.79	0.52
0.14	0.13	0.25	0.05	0.07	0.16	0.96	0.08	0.12	0.12	0.32	0.11	0.57	0.00	0.32	0.32	0.16	0.22
0.22	0.36	0.70	0.50	0.45	0.41	3.47	0.71	0.52	0.60	1.83	0.31	0.55	0.33	0.48	0.68	0.42	0.47
0.93	0.56	0.72	0.70	0.54	0.62	5.55	0.87	0.76	0.76	2.39	0.85	0.57	1.00	0.88	0.95	0.95	0.88
0.42	0.22	0.29	0.15	0.20	0.14	1.82	0.11	0.14	0.14	0.39	0.16	0.42	0.00	0.28	0.17	0.11	0.22
0.26	0.25	0.48	0.35	0.32	0.32	2.64	0.55	0.55	0.55	1.65	0.15	0.39	0.67	0.55	0.60	0.32	0.52
0.70	0.65	0.72	0.95	0.30	0.38	4.57	0.50	0.52	0.52	1.55	0.60	0.57	0.67	0.94	0.79	0.74	0.94
0.16	0.16	0.21	0.15	0.08	0.07	0.96	0.03	0.10	0.10	0.22	0.14	0.34	0.00	0.26	0.16	0.05	0.35
0.21	0.03	0.11	0.15	0.35	0.30	1.44	0.53	0.21	0.29	1.03	0.18	0.08	0.33	0.44	0.37	0.37	0.25
0.40	0.52	0.72	0.70	0.17	0.19	3.38	0.47	0.40	0.40	1.28	0.12	0.57	0.33	0.84	0.79	0.58	0.84
0.19	0.10	0.25	0.05	0.10	0.09	0.94	0.03	0.12	0.12	0.26	0.16	0.35	0.00	0.23	0.18	0.11	0.25
0.25	0.14	0.28	0.25	0.36	0.32	2.24	0.47	0.29	0.36	1.12	0.20	0.24	0.67	0.54	0.54	0.26	0.51
0.69	0.64	0.48	0.80	0.44	0.48	4.68	0.53	0.60	0.60	1.72	0.37	0.37	1.00	0.77	0.54	0.68	0.77
0.05	0.16	0.17	0.00	0.03	0.05	0.50	0.03	0.07	0.07	0.17	0.22	0.38	0.00	0.28	0.21	0.11	0.18
0.20	0.25	0.48	0.30	0.30	0.27	2.36	0.34	0.21	0.21	0.77	0.12	0.40	0.33	0.43	0.61	0.21	0.43
0.35	0.50	0.36	0.60	0.49	0.53	3.53	0.61	0.52	0.52	1.65	0.61	0.27	0.33	0.74	0.61	0.74	0.74
0.07	0.04	0.21	0.00	0.03	0.03	0.41	0.00	0.05	0.07	0.12	0.16	0.33	0.00	0.26	0.12	0.11	0.24
0.01	0.19	0.37	0.25	0.14	0.13	1.31	0.21	0.19	0.26	0.66	0.20	0.31	0.33	0.03	0.47	0.32	0.03
0.02	0.04	0.11	0.30	0.31	0.35	1.88	0.37	0.31	0.31	0.99	0.48	0.06	0.33	0.06	0.58	0.16	0.06
0.21	0.10	0.35	0.05	0.10	0.09	1.07	0.05	0.10	0.10	0.24	0.14	0.45	0.00	0.27	0.32	0.16	0.22
0.32	0.33	0.48	0.40	0.40	0.34	2.86	0.26	0.26	0.33	0.86	0.26	0.50	0.67	0.58	0.53	0.21	0.59
0.91	0.81	0.53	0.50	0.61	0.62	4.83	0.87	0.76	0.76	2.39	0.78	0.41	1.00	0.36	0.89	0.58	0.35
0.09	0.04	0.12	0.00	0.04	0.05	0.43	0.05	0.05	0.07	0.17	0.11	0.00	0.00	0.01	0.11	0.16	0.13
0.10	0.06	0.15	0.20	0.00	0.00	0.77	0.13	0.17	0.19	0.49	0.05	0.12	0.67	0.23	0.46	0.21	0.32
0.67	0.25	0.20	0.20	0.04	0.05	1.52	0.34	0.29	0.29	0.91	0.18	0.13	0.67	0.82	0.79	0.53	0.82
0.12	0.10	0.23	0.05	0.05	0.05	0.77	0.03	0.05	0.07	0.15	0.19	0.50	0.00	0.26	0.29	0.11	0.15
0.25	0.36	0.68	0.25	0.38	0.32	3.03	0.26	0.29	0.52	1.07	0.23	0.54	0.67	0.53	0.47	0.16	0.44
0.82	0.63	0.93	0.35	0.39	0.41	4.58	0.82	0.86	0.86	2.53	0.85	0.62	1.00	0.75	0.47	0.58	0.75
0.12	0.04	0.23	0.00	0.06	0.03	0.59	0.03	0.02	0.05	0.10	0.14	0.04	0.00	0.13	0.11	0.05	0.01
0.06	0.03	0.08	0.15	0.06	0.06	0.58	0.08	0.07	0.17	0.32	0.10	0.03	0.33	0.03	0.53	0.11	0.06
0.29	0.14	0.11	0.25	0.00	0.00	0.85	0.34	0.33	0.33	1.01	0.13	0.06	0.33	0.14	0.53	0.37	0.14
0.17	0.10	0.31	0.00	0.08	0.08	0.89	0.08	0.12	0.10	0.29	0.16	0.47	0.00	0.26	0.19	0.11	0.24
0.12	0.27	0.49	0.25	0.27	0.25	2.07	0.29	0.26	0.21	0.77	0.09	0.42	0.33	0.25	0.43	0.42	0.33
0.40	0.28	0.34	0.25	0.55	0.46	3.12	0.55	0.55	0.55	1.65	0.66	0.25	0.33	0.83	0.58	0.74	0.83
0.08	0.13	0.29	0.05	0.03	0.10	0.93	0.08	0.14	0.12	0.34	0.27	0.25	0.00	0.21	0.22	0.11	0.26
0.03	0.15	0.34	0.20	0.14	0.09	1.46	0.29	0.31	0.26	0.86	0.20	0.25	0.67	0.08	0.52	0.37	0.08
0.49	0.06	0.51	0.30	0.38	0.40	2.62	0.63	0.55	0.55	1.73	0.39	0.40	0.67	0.92	0.53	0.47	0.92
1	1	1	1	1	1		1	1	1		1	1	1	1	1	1	1
0	0	0	0	0	0		0	0	0		0	0	0	0	0	0	0

sq2.1.9	sq2.1.10	Q-input	sq2.2.1	sq2.2.3	sq2.2.4	Q-output	sq3.1.1	sq3.1.2	sq3.1.3	sq3.1.4	sq3.1.5	sq3.1.6	sq3.1.7	F-input	sq3.2.2	sq3.2.3	sq3.2.4
0.12	0.00	**1.15**	0.27	0.22	0.00	0.49	0.06	0.11	0.00	0.04	0.24	0.00	0.20	0.66	0.45	0.00	0.18
0.09	0.14	**2.96**	0.56	0.50	0.50	1.56	0.16	0.16	0.25	0.15	0.16	0.20	0.30	1.38	0.90	0.40	0.53
0.64	0.46	**5.37**	0.78	0.56	0.50	1.83	0.30	0.31	0.67	0.64	0.57	0.80	0.70	3.98	0.92	1.00	0.65
0.16	0.00	**1.41**	0.16	0.11	0.00	0.27	0.17	0.13	0.00	0.14	0.16	0.00	0.10	0.70	0.35	0.00	0.06
0.08	0.25	**2.42**	0.50	0.44	0.25	1.19	0.20	0.22	0.33	0.17	0.19	0.20	0.40	1.71	0.91	0.40	0.41
0.49	0.66	**5.47**	0.83	0.67	0.75	2.25	0.51	0.51	0.58	0.42	0.52	0.80	0.60	3.94	0.93	0.80	0.71
0.15	0.00	**1.55**	0.21	0.11	0.00	0.32	0.16	0.15	0.00	0.08	0.24	0.00	0.20	0.84	0.35	0.00	0.18
0.15	0.17	**3.60**	0.49	0.44	0.25	1.18	0.18	0.16	0.42	0.25	0.26	0.40	0.30	1.96	0.91	0.40	0.47
0.90	0.64	**7.14**	0.78	0.67	0.50	1.94	0.68	0.66	0.83	0.99	0.89	1.00	0.80	5.85	0.99	1.00	0.59
0.24	0.00	**2.18**	0.28	0.22	0.00	0.50	0.17	0.18	0.00	0.08	0.31	0.00	0.20	0.94	0.55	0.00	0.24
0.25	0.24	**4.10**	0.61	0.56	0.25	1.42	0.23	0.20	0.33	0.34	0.40	0.60	0.50	2.60	0.90	0.60	0.59
0.98	0.63	**7.45**	0.89	0.78	0.75	2.42	1.00	1.00	0.92	0.97	0.75	1.00	0.60	6.24	0.99	1.00	0.82
0.16	0.00	**2.33**	0.39	0.33	0.00	0.72	0.19	0.19	0.00	0.04	0.36	0.20	0.20	1.19	0.70	0.00	0.29
0.34	0.25	**4.25**	0.72	0.67	0.50	1.89	0.00	0.00	0.58	0.30	0.31	0.60	0.50	2.30	0.95	0.40	0.71
1.00	0.63	**8.47**	1.00	1.00	0.75	2.75	0.57	0.41	1.00	1.00	1.00	1.00	0.70	5.68	1.00	1.00	1.00
0.16	0.00	**1.60**	0.33	0.33	0.00	0.67	0.12	0.10	0.00	0.12	0.25	0.00	0.20	0.79	0.15	0.00	0.18
0.16	0.25	**3.18**	0.67	0.64	0.25	1.56	0.18	0.16	0.42	0.34	0.44	0.40	0.30	2.25	0.95	0.60	0.53
0.84	0.50	**6.18**	0.94	0.89	0.50	2.33	0.75	0.66	0.83	0.86	0.84	1.00	0.80	5.74	0.99	1.00	0.88
0.08	0.00	**1.38**	0.11	0.11	0.00	0.22	0.09	0.11	0.00	0.12	0.15	0.00	0.10	0.57	0.35	0.00	0.21
0.19	0.23	**3.19**	0.53	0.50	0.00	1.03	0.16	0.17	0.50	0.23	0.20	0.40	0.30	1.96	0.90	0.40	0.47
0.72	0.60	**5.96**	0.89	0.78	0.75	2.42	0.87	0.88	0.83	0.64	0.59	0.00	0.10	3.93	0.95	1.00	0.94
0.20	0.00	**1.98**	0.17	0.20	0.00	0.37	0.14	0.15	0.00	0.11	0.19	0.20	0.20	0.99	0.20	0.40	0.29
0.31	0.21	**3.58**	0.50	0.39	0.25	1.14	0.23	0.23	0.67	0.28	0.25	0.40	0.50	2.56	0.97	0.60	0.29
0.64	0.81	**6.72**	0.98	0.89	1.00	2.87	0.62	0.53	0.92	0.63	0.62	1.00	0.40	4.71	1.00	1.00	0.88
0.15	0.00	**1.12**	0.09	0.11	0.00	0.20	0.10	0.09	0.00	0.15	0.16	0.00	0.10	0.59	0.33	0.00	0.13
0.19	0.20	**3.31**	0.56	0.61	0.00	1.17	0.22	0.19	0.50	0.28	0.24	0.40	0.30	2.14	0.95	0.40	0.59
0.83	0.69	**6.56**	0.84	0.67	0.75	2.26	0.70	0.66	0.83	0.73	0.71	1.00	0.60	5.23	0.97	1.00	0.82
0.11	0.00	**1.19**	0.20	0.17	0.00	0.37	0.14	0.13	0.00	0.12	0.24	0.00	0.20	0.84	0.50	0.00	0.24
0.15	0.21	**3.37**	0.50	0.61	0.25	1.36	0.20	0.20	0.42	0.33	0.38	0.60	0.40	2.52	0.97	0.60	0.65
0.79	0.23	**6.48**	0.94	0.78	1.00	2.72	0.72	0.68	0.75	0.74	0.70	0.80	0.50	4.90	0.99	1.00	0.76
0.13	0.00	**1.12**	0.14	0.20	0.00	0.34	0.08	0.09	0.00	0.04	0.17	0.20	0.10	0.67	0.45	0.00	0.24
0.17	0.18	**2.06**	0.49	0.44	0.00	0.93	0.16	0.16	0.25	0.17	0.18	0.40	0.30	1.62	0.90	0.40	0.65
0.24	0.64	**4.98**	0.78	0.67	0.75	2.19	0.48	0.44	0.67	0.25	0.21	0.60	0.40	3.05	0.95	0.80	0.88
0.03	0.00	**0.42**	0.17	0.22	0.00	0.39	0.02	0.04	0.00	0.00	0.13	0.00	0.00	0.19	0.10	0.00	0.22
0.04	0.06	**2.13**	0.56	0.54	0.25	1.35	0.06	0.08	0.17	0.08	0.09	0.00	0.10	0.58	0.80	0.40	0.24
0.04	0.20	**2.73**	0.78	0.67	0.25	1.69	0.42	0.39	0.25	0.06	0.08	0.40	0.20	1.80	0.90	0.80	0.65
0.12	0.00	**0.88**	0.28	0.22	0.00	0.50	0.09	0.11	0.00	0.15	0.00	0.00	0.10	0.44	0.20	0.00	0.18
0.12	0.17	**2.68**	0.63	0.50	0.00	1.13	0.07	0.05	0.42	0.12	0.15	0.60	0.40	1.80	0.82	0.60	0.35
0.15	0.21	**3.22**	0.73	0.62	0.75	2.11	0.59	0.53	0.42	0.25	0.22	0.80	0.90	3.71	0.91	0.80	0.76
0.15	0.00	**1.63**	0.21	0.26	0.00	0.47	0.17	0.16	0.00	0.14	0.30	0.20	0.20	1.17	0.40	0.00	0.12
0.19	0.16	**3.60**	0.61	0.58	0.25	1.44	0.19	0.21	0.50	0.29	0.33	0.40	0.40	2.32	0.85	0.40	0.35
0.06	0.37	**6.30**	0.94	0.78	0.50	2.22	0.02	0.02	0.67	0.09	0.17	1.00	0.60	2.56	0.99	1.00	0.88
0.14	0.00	**0.75**	0.11	0.17	0.00	0.28	0.02	0.09	0.00	0.06	0.21	0.00	0.10	0.48	0.10	0.00	0.24
0.15	0.23	**1.81**	0.50	0.44	0.00	0.94	0.03	0.02	0.50	0.03	0.04	0.40	0.30	1.32	0.90	0.40	0.59
0.24	0.18	**2.34**	0.72	0.67	0.50	1.89	0.91	0.87	0.50	0.27	0.33	1.00	0.70	4.59	0.95	0.80	0.82
0.16	0.00	**2.22**	0.24	0.28	0.00	0.52	0.17	0.15	0.00	0.15	0.32	0.20	0.20	1.19	0.34	0.40	0.29
0.28	0.21	**3.70**	0.67	0.42	0.25	1.34	0.17	0.16	0.67	0.33	0.41	0.60	0.50	2.85	0.99	0.60	0.53
0.88	1.00	**7.74**	0.99	0.78	1.00	2.77	0.83	0.74	1.00	0.98	0.89	1.00	1.00	6.44	1.00	1.00	1.00
0.19	0.00	**1.40**	0.26	0.28	0.00	0.53	0.02	0.09	0.00	0.04	0.22	0.00	0.10	0.47	0.30	0.00	0.21
0.25	0.20	**2.59**	0.50	0.39	0.00	0.89	0.14	0.14	0.33	0.15	0.17	0.40	0.40	1.73	0.82	0.40	0.47
0.40	0.20	**4.32**	0.89	0.78	0.75	2.42	0.60	0.53	0.83	0.43	0.60	1.00	0.60	4.59	0.95	0.80	0.88
0.17	0.00	**1.14**	0.17	0.18	0.00	0.34	0.02	0.06	0.00	0.12	0.14	0.00	0.10	0.45	0.20	0.00	0.18
0.17	0.21	**2.66**	0.61	0.44	0.00	1.06	0.11	0.12	0.42	0.12	0.12	0.40	0.30	1.58	0.85	0.40	0.35
0.39	0.22	**4.05**	0.80	0.67	0.75	2.22	0.72	0.65	0.50	0.51	0.69	0.80	0.80	4.67	0.95	1.00	0.82
0.17	0.00	**1.87**	0.31	0.27	0.00	0.58	0.16	0.15	0.00	0.12	0.29	0.20	0.20	1.13	0.40	0.40	0.12
0.22	0.16	**3.63**	0.69	0.67	0.50	1.86	0.19	0.15	0.50	0.29	0.30	0.40	0.40	2.24	0.95	0.60	0.65
0.73	0.84	**7.65**	0.94	0.89	1.00	2.83	0.94	0.87	0.83	0.82	0.73	0.80	0.90	5.89	0.99	1.00	0.76
0.15	0.00	**1.51**	0.33	0.32	0.00	0.66	0.10	0.09	0.00	0.14	0.30	0.00	0.10	0.73	0.95	0.00	0.06
0.31	0.18	**3.68**	0.61	0.58	0.25	1.44	0.21	0.21	0.42	0.22	0.21	0.20	0.30	1.77	0.95	0.40	0.53
0.84	0.58	**6.66**	0.78	0.67	0.75	2.19	0.53	0.51	0.92	0.87	0.85	1.00	0.70	5.37	0.94	0.80	0.53
0.16	0.00	**1.45**	0.16	0.18	0.00	0.33	0.06	0.09	0.00	0.11	0.18	0.00	0.10	0.54	0.50	0.00	0.12
0.20	0.17	**2.39**	0.44	0.33	0.25	1.03	0.18	0.16	0.33	0.08	0.11	0.40	0.40	1.67	0.90	0.40	0.47
0.42	0.37	**4.85**	0.78	0.56	0.50	1.83	0.68	0.67	0.83	0.51	0.66	0.60	0.80	4.75	0.95	0.80	0.71
0.18	0.00	**1.45**	0.32	0.28	0.00	0.60	0.11	0.12	0.00	0.12	0.21	0.20	0.20	0.96	0.40	0.00	0.18
0.20	0.20	**3.34**	0.50	0.51	0.25	1.26	0.16	0.16	0.42	0.15	0.17	0.40	0.30	1.76	0.91	0.60	0.35
0.87	0.77	**6.14**	0.83	0.61	0.50	1.94	0.57	0.47	0.83	0.89	0.73	0.80	0.60	4.90	0.99	1.00	0.94
0.15	0.00	**1.53**	0.16	0.11	0.00	0.27	0.02	0.09	0.00	0.09	0.17	0.00	0.10	0.46	0.20	0.00	0.15
0.18	0.22	**2.93**	0.61	0.59	0.25	1.45	0.16	0.16	0.33	0.22	0.24	0.20	0.20	1.53	0.91	0.40	0.41
0.95	0.60	**5.60**	0.76	0.67	0.75	2.17	0.77	0.68	0.75	0.83	0.92	0.80	0.50	5.24	0.95	0.80	0.88
0.15	0.00	**1.36**	0.00	0.00	0.00	0.00	0.05	0.06	0.00	0.11	0.02	0.00	0.10	0.35	0.40	0.00	0.00
0.04	0.05	**1.78**	0.50	0.44	0.00	0.94	0.02	0.02	0.33	0.18	0.19	0.40	0.30	1.45	0.82	0.40	0.29
0.04	0.32	**2.09**	0.72	0.67	0.75	2.14	0.72	0.63	0.67	0.08	0.11	0.40	0.70	3.31	0.95	0.80	0.82
0.14	0.00	**1.69**	0.10	0.06	0.00	0.16	0.11	0.13	0.00	0.15	0.23	0.00	0.10	0.71	0.40	0.00	0.18
0.24	0.22	**3.78**	0.61	0.50	0.25	1.36	0.08	0.07	0.42	0.27	0.28	0.20	0.30	1.62	0.85	0.60	0.47
0.79	0.99	**6.15**	0.89	0.78	0.75	2.42	0.68	0.66	0.83	0.94	0.88	0.80	0.50	5.29	0.95	1.00	0.76
0.00	0.00	**0.52**	0.06	0.09	0.00	0.14	0.04	0.06	0.00	0.06	0.10	0.00	0.10	0.37	0.20	0.00	0.29
0.22	0.20	**2.48**	0.67	0.43	0.00	1.10	0.18	0.18	0.50	0.09	0.11	0.40	0.30	1.76	0.80	0.40	0.29
0.24	0.37	**4.54**	0.88	0.78	0.50	2.16	0.72	0.66	0.67	0.33	0.40	0.40	0.30	3.48	0.95	0.80	0.76
0.13	0.00	**1.63**	0.16	0.17	0.00	0.32	0.11	0.09	0.00	0.12	0.18	0.00	0.10	0.60	0.25	0.40	0.08
0.22	0.19	**3.45**	0.61	0.44	0.25	1.31	0.17	0.12	0.58	0.29	0.31	0.60	0.40	2.48	0.90	0.60	0.53
0.76	0.58	**6.37**	0.72	0.72	0.75	2.19	0.14	0.13	0.83	0.79	0.93	0.60	0.40	3.82	0.99	1.00	0.94
0.16	0.00	**0.63**	0.18	0.21	0.00	0.39	0.00	0.00	0.00	0.11	0.03	0.00	0.00	0.15	0.00	0.00	0.12
0.02	0.18	**1.39**	0.50	0.50	0.25	1.25	0.03	0.03	0.25	0.02	0.02	0.20	0.20	0.75	0.80	0.40	0.18
0.01	0.11	**1.82**	0.83	0.44	0.50	1.78	0.46	0.44	0.17	0.05	0.05	0.40	0.10	1.67	0.90	1.00	0.53
0.19	0.00	**1.63**	0.21	0.22	0.00	0.43	0.09	0.04	0.00	0.12	0.16	0.00	0.10	0.51	0.40	0.00	0.18
0.17	0.17	**2.62**	0.44	0.40	0.25	1.09	0.18	0.18	0.42	0.24	0.24	0.40	0.40	2.05	0.90	0.40	0.47
0.34	0.37	**4.95**	0.78	0.56	0.75	2.08	0.92	0.88	0.92	0.42	0.49	0.80	0.80	5.22	0.95	1.00	0.76
0.16	0.00	**1.48**	0.24	0.28	0.00	0.52	0.07	0.04	0.00	0.12	0.14	0.00	0.10	0.47	0.14	0.00	0.24
0.23	0.14	**2.54**	0.56	0.49	0.25	1.29	0.27	0.22	0.50	0.16	0.20	0.40	0.50	2.24	0.91	0.40	0.53
0.38	0.46	**5.13**	0.89	0.78	1.00	2.67	0.72	0.67	0.83	0.46	0.64	1.00	0.60	4.92	0.92	0.80	0.82
1	1		1	1	1		1	1	1	1	1	1	1		1	1	1
0	0		0	0	0		0	0	0	0	0	0	0		0	0	0

sq3.2.5	F-output	sq4.1.4	sq4.1.5	S-input	sq4.2.1	sq4.2.2	sq4.2.4	sq4.2.6	sq4.2.7	S-output	sq5.1.1	sq5.1.2	sq5.1.3	sq5.1.4	sq5.1.5	sq5.1.6	sq5.1.7
0.50	**1.12**	0.34	0.54	**0.87**	0.09	0.28	0.00	0.00	0.00	**0.37**	0.05	0.22	0.25	0.13	0.23	0.00	0.25
0.25	**2.08**	0.24	0.84	**1.07**	0.27	0.50	0.33	0.29	0.43	**1.82**	0.13	0.27	0.25	0.35	0.39	0.00	0.25
0.01	**2.58**	0.39	0.84	**1.22**	0.73	0.61	0.56	1.00	0.86	**3.75**	0.70	0.82	0.70	0.75	0.69	0.51	0.50
0.90	**1.31**	0.32	0.43	**0.75**	0.11	0.22	0.11	0.14	0.14	**0.73**	0.05	0.36	0.27	0.12	0.22	0.00	0.00
0.30	**2.02**	0.22	0.84	**1.06**	0.18	0.44	0.44	0.57	0.57	**2.21**	0.14	0.21	0.27	0.45	0.36	0.00	0.25
0.01	**2.44**	0.42	0.84	**1.26**	0.60	0.72	0.78	0.86	0.86	**3.81**	0.68	0.65	0.68	0.80	0.36	0.47	0.75
1.00	**1.53**	0.41	0.64	**1.06**	0.13	0.28	0.00	0.00	0.00	**0.41**	0.09	0.29	0.37	0.16	0.36	0.00	0.00
0.25	**2.03**	0.41	0.56	**0.96**	0.55	0.44	0.44	0.29	0.29	**2.01**	0.16	0.42	0.61	0.45	0.55	0.00	0.25
0.03	**2.61**	0.99	0.56	**1.55**	0.73	0.67	0.67	0.86	0.71	**3.63**	0.69	0.93	0.69	0.90	0.83	0.72	0.75
0.75	**1.54**	0.49	0.71	**1.20**	0.13	0.33	0.22	0.29	0.14	**1.11**	0.10	0.29	0.46	0.20	0.37	0.00	0.25
0.30	**2.39**	0.56	0.76	**1.31**	0.60	0.56	0.33	0.43	0.43	**2.35**	0.17	0.61	0.46	0.50	0.72	0.00	0.50
0.02	**2.84**	0.75	0.76	**1.51**	0.82	0.89	0.44	1.00	1.00	**4.15**	1.00	1.00	1.00	0.95	0.67	1.00	0.75
0.40	**1.39**	0.51	0.71	**1.22**	0.18	0.28	0.00	0.00	0.00	**0.46**	0.10	0.24	0.54	0.18	0.36	0.00	0.25
0.25	**2.30**	0.61	0.85	**1.46**	0.64	0.78	0.44	0.57	0.57	**3.00**	0.20	0.51	0.63	0.40	0.63	0.00	0.50
0.00	**3.00**	1.00	1.00	**2.00**	1.00	1.00	0.56	1.00	1.00	**4.56**	0.89	0.84	0.89	1.00	1.00	0.83	1.00
0.50	**0.82**	0.47	0.36	**0.83**	0.18	0.24	0.11	0.14	0.14	**0.82**	0.06	0.36	0.38	0.17	0.36	0.00	0.25
0.30	**2.38**	0.46	0.80	**1.26**	0.45	0.64	0.33	0.43	0.43	**2.29**	0.13	0.30	0.49	0.46	0.41	0.00	0.25
0.02	**2.89**	0.80	0.80	**1.60**	0.78	0.89	0.67	0.86	0.71	**3.91**	0.84	0.72	0.84	0.70	0.84	0.53	0.75
0.50	**1.06**	0.40	0.54	**0.93**	0.13	0.33	0.22	0.29	0.14	**1.11**	0.06	0.36	0.25	0.18	0.39	0.00	0.00
0.35	**2.12**	0.60	0.80	**1.40**	0.27	0.50	0.33	0.29	0.29	**1.68**	0.10	0.28	0.25	0.49	0.36	0.00	0.25
0.04	**2.93**	0.38	0.80	**1.18**	0.73	0.56	0.78	1.00	1.00	**4.06**	0.81	0.71	0.81	0.75	0.39	0.47	0.50
0.75	**1.64**	0.41	0.71	**1.13**	0.18	0.31	0.22	0.29	0.14	**1.14**	0.11	0.22	0.32	0.13	0.46	0.00	0.25
0.25	**2.11**	0.54	0.77	**1.30**	0.55	0.39	0.44	0.57	0.57	**2.52**	0.20	0.49	0.32	0.38	0.60	0.00	0.50
0.02	**2.90**	0.53	0.77	**1.30**	0.55	0.89	0.44	0.71	0.71	**3.31**	0.96	0.85	0.96	0.80	0.59	0.79	0.50
0.75	**1.21**	0.36	0.50	**0.86**	0.09	0.28	0.11	0.14	0.00	**0.62**	0.09	0.14	0.27	0.16	0.29	0.00	0.00
0.40	**2.34**	0.50	0.76	**1.26**	0.53	0.61	0.44	0.57	0.57	**2.73**	0.09	0.35	0.27	0.38	0.45	0.00	0.25
0.03	**2.82**	0.50	0.76	**1.26**	0.73	0.89	0.56	0.86	0.71	**3.74**	0.74	0.74	0.74	0.65	0.53	0.59	0.75
0.50	**1.23**	0.32	0.54	**0.86**	0.11	0.21	0.22	0.29	0.29	**1.11**	0.08	0.29	0.43	0.14	0.33	0.00	0.25
0.40	**2.62**	0.57	0.74	**1.32**	0.55	0.61	0.33	0.29	0.29	**2.06**	0.15	0.36	0.43	0.40	0.44	0.00	0.25
0.04	**2.79**	0.69	0.74	**1.43**	0.55	0.78	0.67	0.71	0.71	**3.42**	0.71	0.89	0.71	0.80	0.74	0.57	0.50
0.75	**1.43**	0.13	0.43	**0.56**	0.02	0.28	0.22	0.29	0.14	**0.95**	0.06	0.11	0.30	0.12	0.23	0.00	0.00
0.35	**2.30**	0.60	0.40	**1.00**	0.18	0.44	0.22	0.29	0.29	**1.42**	0.06	0.32	0.30	0.25	0.39	0.00	0.25
0.10	**2.73**	0.49	0.40	**0.89**	0.64	0.50	0.56	0.86	0.71	**3.26**	0.48	0.55	0.48	0.60	0.44	0.51	0.50
1.00	**1.32**	0.09	0.00	**0.09**	0.00	0.06	0.00	0.00	0.00	**0.06**	0.02	0.00	0.16	0.10	0.22	0.00	0.00
0.50	**1.93**	0.38	0.20	**0.59**	0.02	0.54	0.11	0.14	0.14	**0.96**	0.15	0.16	0.16	0.05	0.23	0.00	0.00
0.25	**2.60**	0.23	0.20	**0.44**	0.73	0.66	0.44	0.57	0.57	**2.97**	0.10	0.07	0.10	0.40	0.13	0.00	0.00
1.00	**1.38**	0.17	0.18	**0.35**	0.02	0.10	0.11	0.14	0.14	**0.52**	0.05	0.22	0.00	0.12	0.22	0.00	0.00
0.50	**2.27**	0.33	0.56	**0.89**	0.09	0.50	0.33	0.00	0.00	**0.92**	0.16	0.09	0.03	0.19	0.05	0.00	0.25
0.04	**2.52**	0.01	0.56	**0.57**	0.73	0.67	0.89	1.00	1.00	**4.28**	0.23	0.24	0.23	0.45	0.06	0.07	0.75
0.50	**1.02**	0.38	0.36	**0.73**	0.02	0.32	0.22	0.29	0.14	**0.99**	0.08	0.36	0.45	0.10	0.29	0.00	0.25
0.45	**2.05**	0.48	0.51	**0.99**	0.55	0.58	0.44	0.43	0.43	**2.42**	0.18	0.52	0.45	0.45	0.63	0.00	0.25
0.04	**2.91**	0.74	0.51	**1.25**	0.64	0.88	1.00	1.00	1.00	**4.51**	0.61	0.74	0.61	0.75	0.86	0.83	0.25
1.00	**1.34**	0.06	0.36	**0.41**	0.07	0.10	0.11	0.14	0.14	**0.57**	0.07	0.14	0.03	0.13	0.00	0.00	0.00
0.50	**2.39**	0.01	0.43	**0.44**	0.11	0.44	0.44	0.29	0.29	**1.57**	0.07	0.24	0.33	0.10	0.13	0.00	0.00
0.03	**2.61**	0.07	0.43	**0.50**	0.73	0.56	0.44	0.57	0.57	**2.87**	0.39	0.09	0.39	0.30	0.49	0.17	0.50
0.75	**1.78**	0.51	0.57	**1.08**	0.18	0.32	0.22	0.29	0.29	**1.30**	0.10	0.29	0.46	0.16	0.39	0.00	0.25
0.25	**2.37**	0.57	0.44	**1.01**	0.55	0.42	0.44	0.43	0.43	**2.27**	0.19	0.56	0.56	0.49	0.66	0.00	0.50
0.02	**3.02**	0.94	0.44	**1.38**	0.78	0.78	0.67	0.71	0.86	**3.80**	0.92	0.90	0.92	0.85	0.83	0.86	1.00
1.00	**1.51**	0.28	0.43	**0.71**	0.09	0.31	0.11	0.14	0.14	**0.80**	0.04	0.14	0.34	0.19	0.26	0.00	0.00
0.45	**2.14**	0.50	0.45	**0.95**	0.38	0.39	0.33	0.29	0.29	**1.68**	0.07	0.28	0.34	0.20	0.36	0.00	0.25
0.15	**2.78**	0.55	0.45	**1.00**	0.64	0.50	0.56	0.71	0.71	**3.12**	0.48	0.58	0.48	0.60	0.51	0.48	0.50
0.50	**0.87**	0.11	0.36	**0.47**	0.07	0.32	0.00	0.00	0.00	**0.39**	0.05	0.22	0.24	0.17	0.24	0.00	0.00
0.40	**2.00**	0.49	0.48	**0.97**	0.18	0.44	0.22	0.29	0.29	**1.42**	0.08	0.01	0.24	0.10	0.08	0.00	0.25
0.15	**2.92**	0.38	0.48	**0.87**	0.69	0.64	0.56	0.57	0.57	**3.03**	0.34	0.42	0.34	0.45	0.39	0.11	0.75
1.00	**1.92**	0.22	0.68	**0.89**	0.16	0.28	0.00	0.00	0.00	**0.44**	0.09	0.22	0.44	0.15	0.41	0.00	0.25
0.25	**2.45**	0.59	0.52	**1.11**	0.55	0.67	0.44	0.43	0.43	**2.51**	0.18	0.54	0.44	0.43	0.63	0.00	0.50
0.04	**2.79**	0.72	0.52	**1.24**	0.71	0.72	0.78	1.00	1.00	**4.21**	0.63	0.76	0.63	0.90	0.64	0.83	0.50
1.00	**2.01**	0.32	0.43	**0.75**	0.11	0.29	0.00	0.00	0.00	**0.40**	0.07	0.36	0.45	0.16	0.36	0.00	0.00
0.30	**2.18**	0.59	0.60	**1.19**	0.36	0.58	0.44	0.43	0.43	**2.24**	0.17	0.42	0.56	0.25	0.49	0.00	0.25
0.03	**2.30**	0.91	0.60	**1.51**	0.55	0.94	0.89	0.71	1.00	**4.09**	0.73	0.86	0.73	0.80	0.65	0.64	0.50
0.75	**1.37**	0.23	0.29	**0.51**	0.00	0.28	0.00	0.00	0.00	**0.28**	0.03	0.29	0.30	0.18	0.28	0.00	0.00
0.50	**2.27**	0.42	0.40	**0.82**	0.31	0.33	0.22	0.29	0.29	**1.44**	0.18	0.11	0.30	0.18	0.10	0.00	0.25
0.10	**2.55**	0.48	0.40	**0.88**	0.27	0.50	0.67	0.86	0.86	**3.15**	0.60	0.71	0.60	0.55	0.65	0.13	0.75
1.00	**1.58**	0.32	0.43	**0.75**	0.13	0.20	0.11	0.14	0.14	**0.72**	0.10	0.22	0.33	0.16	0.44	0.00	0.25
0.25	**2.11**	0.56	0.56	**1.11**	0.38	0.51	0.33	0.43	0.43	**2.08**	0.19	0.28	0.33	0.25	0.36	0.00	0.50
0.03	**2.96**	0.53	0.56	**1.09**	0.64	0.56	0.78	1.00	1.00	**3.97**	0.70	0.85	0.70	0.40	0.48	0.47	0.25
1.00	**1.35**	0.13	0.32	**0.45**	0.09	0.32	0.11	0.14	0.14	**0.81**	0.05	0.14	0.27	0.19	0.26	0.00	0.00
0.30	**2.02**	0.46	0.73	**1.19**	0.18	0.59	0.22	0.29	0.29	**1.56**	0.16	0.42	0.27	0.15	0.50	0.00	0.25
0.15	**2.78**	0.42	0.73	**1.15**	0.80	0.71	0.56	0.86	0.71	**3.64**	0.56	0.68	0.56	0.60	0.39	0.65	0.25
1.00	**1.40**	0.06	0.54	**0.59**	0.11	0.09	0.00	0.00	0.00	**0.20**	0.04	0.04	0.09	0.00	0.24	0.00	0.00
0.50	**2.01**	0.52	0.17	**0.69**	0.18	0.44	0.11	0.14	0.14	**1.02**	0.08	0.34	0.14	0.15	0.42	0.00	0.25
0.10	**2.67**	0.23	0.20	**0.43**	0.78	0.56	0.22	0.29	0.29	**2.13**	0.04	0.10	0.04	0.50	0.22	0.55	0.75
1.00	**1.58**	0.23	0.57	**0.80**	0.04	0.28	0.00	0.00	0.00	**0.31**	0.08	0.22	0.36	0.15	0.46	0.00	0.25
0.30	**2.22**	0.59	0.95	**1.54**	0.35	0.50	0.33	0.43	0.43	**2.04**	0.17	0.50	0.36	0.20	0.59	0.00	0.25
0.03	**2.74**	0.57	0.95	**1.52**	0.67	0.61	0.67	0.86	0.86	**3.66**	0.84	0.91	0.84	0.85	0.51	0.77	0.50
0.75	**1.24**	0.04	0.18	**0.22**	0.09	0.00	0.00	0.00	0.00	**0.09**	0.05	0.13	0.19	0.12	0.33	0.00	0.00
0.50	**1.99**	0.56	0.52	**1.07**	0.18	0.43	0.33	0.43	0.43	**1.81**	0.03	0.47	0.19	0.10	0.56	0.00	0.00
0.15	**2.66**	0.29	0.52	**0.81**	0.78	0.64	0.44	0.57	0.57	**3.01**	0.37	0.10	0.37	0.50	0.29	0.73	0.75
0.50	**1.23**	0.17	0.64	**0.81**	0.09	0.32	0.11	0.14	0.14	**0.81**	0.10	0.22	0.30	0.15	0.41	0.00	0.25
0.40	**2.43**	0.60	0.64	**1.23**	0.42	0.44	0.22	0.29	0.29	**1.66**	0.20	0.52	0.62	0.25	0.63	0.00	0.50
0.04	**2.97**	0.95	0.64	**1.59**	0.64	0.56	0.44	0.57	0.57	**2.78**	0.69	0.84	0.69	0.65	0.97	0.82	0.25
1.00	**1.12**	0.00	0.07	**0.07**	0.00	0.11	0.00	0.00	0.00	**0.11**	0.00	0.02	0.06	0.11	0.26	0.00	0.00
0.50	**1.88**	0.09	0.77	**0.85**	0.18	0.50	0.11	0.00	0.00	**0.79**	0.04	0.10	0.06	0.10	0.04	0.00	0.00
0.20	**2.63**	0.12	0.30	**0.43**	0.55	0.56	0.44	0.14	0.14	**1.83**	0.27	0.10	0.27	0.10	0.09	0.05	0.25
0.75	**1.33**	0.17	0.36	**0.53**	0.07	0.26	0.00	0.00	0.00	**0.33**	0.06	0.22	0.26	0.13	0.37	0.00	0.00
0.30	**2.07**	0.36	0.56	**0.92**	0.27	0.40	0.33	0.43	0.43	**1.86**	0.13	0.40	0.26	0.25	0.52	0.00	0.25
0.03	**2.75**	0.38	0.56	**0.94**	0.64	0.67	0.78	0.71	0.71	**3.51**	0.37	0.43	0.37	0.70	0.41	0.68	0.50
1.00	**1.38**	0.23	0.21	**0.44**	0.09	0.18	0.00	0.00	0.00	**0.27**	0.06	0.26	0.23	0.14	0.35	0.00	0.00
0.35	**2.19**	0.39	0.54	**0.93**	0.33	0.49	0.44	0.57	0.57	**2.40**	0.08	0.13	0.35	0.30	0.11	0.00	0.25
0.04	**2.58**	0.36	0.54	**0.89**	0.73	0.50	0.89	0.86	0.86	**3.83**	0.20	0.16	0.20	0.65	0.50	0.15	0.25
1		1	1		1	1	1	1	1		1	1	1	1	1	1	1
0		0	0		0	0	0	0	0		0	0	0	0	0	0	0

sq5.1.8	sq5.1.9	I-input	sq5.2.2	sq5.2.4	sq5.2.5	sq5.2.6	sq5.2.7	sq5.2.8	sq5.2.9	sq5.2.10	I-output
0.40	0.30	1.83	0.21	0.29	0.11	0.00	0.16	0.00	0.00	0.04	0.82
0.42	0.50	2.55	0.57	0.43	0.33	0.00	0.30	0.00	0.67	0.36	2.66
0.63	0.70	6.00	0.64	0.86	0.67	1.00	0.70	1.00	0.67	0.78	6.31
0.48	0.20	1.70	0.14	0.14	0.22	0.00	0.18	0.00	0.00	0.07	0.75
0.39	0.60	2.68	0.50	0.57	0.56	0.00	0.34	0.00	0.33	0.38	2.68
0.69	0.60	5.68	0.57	0.86	0.56	0.50	0.78	0.00	0.33	0.89	4.49
0.37	0.20	1.84	0.07	0.14	0.11	0.00	0.20	0.00	0.00	0.02	0.55
0.58	0.60	3.61	0.64	0.29	0.44	0.00	0.38	0.00	0.67	0.44	2.86
0.95	0.80	7.26	0.79	0.71	0.78	1.00	0.92	1.00	0.67	0.76	6.62
0.43	0.30	2.39	0.21	0.29	0.22	0.00	0.22	0.00	0.00	0.11	1.05
0.60	0.80	4.36	0.71	0.43	0.67	0.00	0.40	0.00	0.67	0.56	3.43
1.00	0.60	7.97	0.86	0.71	0.56	1.00	0.68	1.00	0.67	0.96	6.43
0.51	0.30	2.48	0.21	0.29	0.22	0.00	0.24	0.00	0.00	0.02	0.98
0.63	0.70	4.21	0.64	0.43	0.78	0.00	0.30	0.00	0.67	0.53	3.35
0.84	0.70	7.99	1.00	0.86	0.67	1.00	1.00	1.00	0.67	1.00	7.19
0.35	0.20	2.13	0.14	0.29	0.11	0.00	0.20	0.00	0.00	0.02	0.76
0.52	0.60	3.16	0.57	0.29	0.56	0.00	0.32	0.00	0.33	0.42	2.49
0.84	0.80	6.86	0.79	0.86	0.78	0.50	0.80	1.00	0.67	0.89	6.28
0.49	0.40	2.13	0.21	0.29	0.22	0.00	0.18	0.00	0.00	0.07	0.97
0.53	0.50	2.75	0.64	0.29	0.44	0.00	0.30	0.00	0.33	0.40	2.41
0.82	0.50	5.76	0.64	0.57	0.44	0.50	0.70	1.00	0.33	0.78	4.97
0.44	0.30	2.22	0.29	0.14	0.33	0.00	0.24	0.00	0.00	0.02	1.02
0.56	0.70	3.75	0.71	0.14	0.67	0.00	0.36	0.00	0.67	0.42	2.97
0.77	0.40	6.61	0.79	0.43	0.33	1.00	0.66	1.00	0.67	0.84	5.72
0.36	0.30	1.61	0.21	0.14	0.22	0.00	0.16	0.00	0.00	0.04	0.78
0.53	0.40	2.73	0.50	0.29	0.78	0.00	0.30	0.00	0.33	0.29	2.49
0.80	0.60	6.14	0.64	0.71	0.56	0.50	0.60	1.00	0.33	0.56	4.90
0.38	0.40	2.29	0.21	0.14	0.33	0.00	0.18	0.00	0.00	0.02	0.89
0.49	0.50	3.02	0.57	0.43	0.67	0.00	0.28	0.00	0.67	0.47	3.08
0.80	0.50	6.22	0.71	0.57	0.44	1.00	0.70	1.00	1.00	0.78	6.21
0.47	0.30	1.60	0.14	0.00	0.22	0.00	0.16	0.00	0.00	0.00	0.53
0.39	0.40	2.36	0.36	0.29	0.56	0.00	0.26	0.00	0.33	0.31	2.10
0.88	0.40	4.85	0.57	0.43	0.33	0.50	0.60	0.00	0.33	0.67	3.43
0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.07
0.36	0.20	1.31	0.00	0.00	0.11	0.00	0.06	0.00	0.33	0.16	0.66
0.67	0.80	2.26	0.29	0.43	0.78	0.50	0.02	0.00	0.00	0.22	2.23
0.35	0.20	1.16	0.14	0.29	0.22	0.00	0.14	0.00	0.00	0.04	0.84
0.47	0.40	1.64	0.21	0.14	0.22	0.00	0.22	0.00	0.67	0.18	1.64
0.64	0.90	3.56	0.50	0.29	0.89	1.00	0.24	1.00	0.33	0.78	5.03
0.47	0.30	2.30	0.21	0.00	0.11	0.00	0.22	0.00	0.00	0.07	0.61
0.44	0.80	3.72	0.57	0.29	0.44	0.00	0.32	0.00	0.67	0.29	2.58
0.85	0.60	6.09	0.71	0.71	0.56	1.00	0.60	1.00	0.67	0.89	6.14
0.40	0.20	0.98	0.21	0.00	0.11	0.00	0.16	0.00	0.00	0.04	0.53
0.06	0.60	1.54	0.29	0.29	0.33	0.00	0.20	0.00	0.00	0.13	1.24
0.25	0.70	3.29	0.86	0.86	0.67	0.00	0.30	0.00	0.00	0.29	2.97
0.49	0.50	2.64	0.29	0.14	0.33	0.00	0.24	0.00	0.00	0.07	1.07
0.49	0.70	4.16	0.79	0.43	0.78	0.00	0.38	0.00	0.67	0.53	3.57
0.84	1.00	8.11	0.93	1.00	1.00	1.00	0.80	1.00	0.67	1.00	7.40
0.44	0.30	1.71	0.14	0.14	0.22	0.00	0.20	0.00	0.00	0.04	0.75
0.52	0.40	2.43	0.29	0.29	0.33	0.00	0.30	0.00	0.33	0.22	1.76
0.66	0.60	4.89	0.36	0.71	0.56	0.50	0.52	0.00	0.33	0.69	3.67
0.33	0.30	1.55	0.14	0.00	0.22	0.00	0.18	0.00	0.00	0.07	0.61
0.51	0.30	1.57	0.21	0.29	0.22	0.00	0.26	0.00	0.33	0.20	1.52
0.58	0.80	4.18	0.43	0.57	0.78	0.50	0.40	0.00	0.33	0.44	3.46
0.54	0.40	2.49	0.21	0.14	0.33	0.00	0.16	0.00	0.00	0.04	0.89
0.38	0.70	3.81	0.64	0.43	0.56	0.00	0.38	0.00	0.33	0.38	2.72
0.87	0.90	6.64	0.93	0.86	0.89	0.50	0.80	1.00	0.67	0.89	6.53
0.51	0.30	2.21	0.14	0.29	0.22	0.00	0.14	0.00	0.00	0.04	0.84
0.39	0.60	3.13	0.71	0.29	0.44	0.00	0.30	0.00	0.67	0.22	2.63
0.91	0.70	6.53	0.71	0.86	0.67	1.00	0.70	1.00	0.67	0.78	6.38
0.41	0.20	1.68	0.21	0.29	0.11	0.00	0.12	0.00	0.00	0.07	0.80
0.41	0.30	1.83	0.36	0.29	0.56	0.00	0.26	0.00	0.33	0.16	1.95
0.42	0.80	5.22	0.64	1.00	0.78	0.50	0.40	1.00	0.33	0.62	5.28
0.41	0.30	2.21	0.14	0.29	0.11	0.00	0.16	0.00	0.00	0.02	0.72
0.33	0.40	2.64	0.57	0.14	0.67	0.00	0.24	0.00	0.67	0.29	2.58
0.65	0.60	5.09	0.57	0.71	0.56	1.00	0.58	1.00	0.67	0.44	5.53
0.33	0.30	1.55	0.14	0.14	0.22	0.00	0.18	0.00	0.00	0.00	0.69
0.47	0.30	2.51	0.50	0.14	0.56	0.00	0.36	0.00	0.67	0.20	2.43
0.92	0.50	5.11	0.50	0.57	0.44	1.00	0.60	0.00	0.00	0.78	3.89
0.33	0.30	1.04	0.14	0.14	0.22	0.00	0.14	0.00	0.00	0.04	0.69
0.44	0.20	2.02	0.36	0.29	0.44	0.00	0.24	0.00	0.33	0.22	1.88
0.72	0.70	3.62	0.57	0.86	0.67	0.50	0.30	0.00	0.00	0.44	3.34
0.44	0.40	2.35	0.21	0.14	0.22	0.00	0.20	0.00	0.00	0.00	0.78
0.39	0.40	2.85	0.43	0.29	0.67	0.00	0.22	0.00	0.67	0.29	2.56
0.84	0.50	6.55	0.50	0.71	0.44	1.00	0.70	1.00	0.33	0.78	5.47
0.36	0.40	1.58	0.21	0.29	0.11	0.00	0.16	0.00	0.00	0.02	0.79
0.34	0.40	2.08	0.29	0.14	0.67	0.00	0.18	0.00	0.33	0.11	1.72
0.51	0.50	4.11	0.43	0.57	0.44	0.50	0.40	1.00	0.33	0.56	4.23
0.39	0.30	2.10	0.14	0.29	0.22	0.00	0.22	0.00	0.00	0.00	0.87
0.39	0.30	3.40	0.50	0.14	0.78	0.00	0.30	0.00	0.67	0.44	2.83
0.84	0.40	6.15	0.36	0.43	0.33	1.00	0.80	1.00	0.67	0.89	5.47
0.17	0.20	0.82	0.21	0.14	0.11	0.00	0.10	0.00	0.00	0.00	0.57
0.20	0.10	0.63	0.21	0.00	0.33	0.00	0.00	0.00	0.00	0.11	0.66
0.07	0.10	1.30	0.00	0.14	0.22	0.00	0.20	0.00	0.00	0.33	0.90
0.45	0.30	1.79	0.14	0.14	0.22	0.00	0.12	0.00	0.00	0.04	0.67
0.33	0.40	2.54	0.43	0.14	0.44	0.00	0.20	0.00	0.33	0.38	1.93
0.80	0.80	5.07	0.43	0.86	0.78	0.50	0.58	1.00	0.33	0.67	5.14
0.44	0.30	1.79	0.14	0.14	0.33	0.00	0.14	0.00	0.00	0.02	0.78
0.36	0.50	2.09	0.50	0.29	0.56	0.00	0.24	0.00	0.33	0.47	2.38
0.66	0.60	3.37	0.50	0.71	0.56	0.50	0.52	1.00	0.33	0.78	4.90
1	1		1	1	1	1	1	1	1	1	
0	0		0	0	0	0	0	0	0	0	

Variable labs:

Bus=Busines: 1=Textiles, 2= Clothing
1.1=Production: 1=yarn, 2=knitted fabric, 3=woven fabric, 4= BDPF, 5=cut & sewn garment, 6=sweater, 7=other garment
1.2=Years of establishment
1.3=Does company own any production facilities: 1=yes, 2=no
1.4=Does compay conduct any manufacturing process off-shore? 1=yes, 2=no
1.4.1=which area conduct any manufacturing process off-shore? 1=China,2=Asia,3=Africa,4=Others
1.5=Staff No: Including Hong Kong, the Mainland and overseas employees
1.6=Market: 1=USA, 2=Europe, 3=Asia, 4= China, 5=Hong Kong, 6=Others
Profile: Three Technometric Performance Attributes, i.e. 1=product, 2=process, 3=service
t=Period: 0= 1974-1983, 1=1984-1993, 2=1994-2003

Company	Bus	1.1	1.1.1	1.1.2	1.2	1.3	1.4	1.4.1	1.5	1.6.1	1.6.2	1.6.3	1.6.4	Profile	t	sq1.1.1	sq1.1.2	sq1.1.3	sq1.1.5
1	1	4	3	0	32	1	1	1	500	1	2	5	0	3	0	0.18	0.15	0.07	0.08
1	1	4	3	0	32	1	1	1	500	1	2	5	0	3	1	0.24	0.23	0.07	0.05
1	1	4	3	0	32	1	1	1	500	1	2	5	0	3	2	0.59	0.49	0.42	0.41
2	1	2	0	0	30	1	1	1	300	1	3	5	0	3	0	0.29	0.11	0.20	0.21
2	1	2	0	0	30	1	1	1	300	1	3	5	0	3	1	0.22	0.16	0.09	0.09
2	1	2	0	0	30	1	1	1	300	1	3	5	0	3	2	0.34	0.76	0.33	0.37
3	1	1	2	0	33	1	1	1	1500	1	4	5	0	3	0	0.23	0.17	0.09	0.09
3	1	1	2	0	33	1	1	1	1500	1	4	5	0	3	1	0.36	0.35	0.27	0.25
3	1	1	2	0	33	1	1	1	1500	1	4	5	0	3	2	0.68	0.47	0.83	0.67
4	1	1	2	4	40	1	1	1	3500	1	2	5	0	3	0	0.12	0.18	0.14	0.15
4	1	1	2	4	40	1	1	1	3500	1	2	5	0	3	1	0.49	0.38	0.19	0.18
4	1	1	2	4	40	1	1	1	3500	1	2	5	0	3	2	1.00	0.35	0.71	0.60
5	1	2	4	0	35	1	1	1	5000	3	5	0	0	3	0	0.01	0.15	0.03	0.03
5	1	2	4	0	35	1	1	1	5000	3	5	0	0	3	1	0.42	0.39	0.28	0.29
5	1	2	4	0	35	1	1	1	5000	3	5	0	0	3	2	0.90	0.80	0.97	1.00
6	1	1	0	0	30	1	1	1	2000	3	5	0	0	3	0	0.23	0.12	0.19	0.19
6	1	1	0	0	30	1	1	1	2000	3	5	0	0	3	1	0.25	0.31	0.20	0.18
6	1	1	0	0	30	1	1	1	2000	3	5	0	0	3	2	0.83	0.72	0.83	0.73
7	1	1	0	0	33	1	1	1	1500	3	5	0	0	3	0	0.23	0.14	0.23	0.23
7	1	1	0	0	33	1	1	1	1500	3	5	0	0	3	1	0.22	0.29	0.07	0.07
7	1	1	0	0	33	1	1	1	1500	3	5	0	0	3	2	0.80	0.90	0.83	0.67
8	1	2	4	0	32	1	1	1	3000	3	5	0	0	3	0	0.16	0.18	0.11	0.12
8	1	2	4	0	32	1	1	1	3000	3	5	0	0	3	1	0.40	0.35	0.11	0.09
8	1	2	4	0	32	1	1	1	3000	3	5	0	0	3	2	0.68	0.70	0.91	0.86
9	1	2	4	0	36	1	1	1	1000	3	5	0	0	3	0	0.00	0.15	0.00	0.00
9	1	2	4	0	36	1	1	1	1000	3	5	0	0	3	1	0.29	0.31	0.09	0.07
9	1	2	4	0	36	1	1	1	1000	3	5	0	0	3	2	0.70	0.60	0.71	0.60
10	1	3	4	0	40	1	1	1	2000	3	5	0	0	3	0	0.21	0.15	0.14	0.14
10	1	3	4	0	40	1	1	1	2000	3	5	0	0	3	1	0.28	0.27	0.17	0.15
10	1	3	4	0	40	1	1	1	2000	3	5	0	0	3	2	0.71	0.70	0.90	0.79
11	1	4	0	0	32	1	1	1	500	3	5	0	0	3	0	0.01	0.13	0.14	0.15
11	1	4	0	0	32	1	1	1	500	3	5	0	0	3	1	0.24	0.19	0.10	0.09
11	1	4	0	0	32	1	1	1	500	3	5	0	0	3	2	0.22	0.49	0.27	0.24
12	1	4	0	0	37	1	1	1	80	4	0	0	0	3	0	0.00	0.00	0.06	0.06
12	1	4	0	0	37	1	1	1	80	4	0	0	0	3	1	0.13	0.01	0.03	0.02
12	1	4	0	0	37	1	1	1	80	4	0	0	0	3	2	0.13	0.70	0.03	0.03
13	1	2	4	0	33	1	1	1	100	1	2	3	5	3	0	0.23	0.07	0.23	0.23
13	1	2	4	0	33	1	1	1	100	1	2	3	5	3	1	0.03	0.19	0.01	0.01
13	1	2	4	0	33	1	1	1	100	1	2	3	5	3	2	0.19	1.00	0.83	0.80
14	1	3	4	0	30	1	1	1	2000	3	5	0	0	3	0	0.29	0.19	0.20	0.21
14	1	3	4	0	30	1	1	1	2000	3	5	0	0	3	1	0.42	0.35	0.18	0.18
14	1	3	4	0	30	1	1	1	2000	3	5	0	0	3	2	0.59	1.00	0.82	0.72
15	1	4	0	0	31	1	1	1	100	4	0	0	0	3	0	0.16	0.06	0.06	0.06
15	1	4	0	0	31	1	1	1	100	4	0	0	0	3	1	0.05	0.11	0.12	0.11
15	1	4	0	0	31	1	1	1	100	4	0	0	0	3	2	0.34	1.00	0.18	0.26
16	2	6	0	0	40	1	1	1	5000	1	2	3	4	3	0	0.23	0.17	0.09	0.09
16	2	6	0	0	40	1	1	1	5000	1	2	3	4	3	1	0.44	0.38	0.24	0.24
16	2	6	0	0	40	1	1	1	5000	1	2	3	4	3	2	0.93	0.90	0.82	0.80
17	2	5	0	0	33	1	1	1	500	1	2	3	5	3	0	0.15	0.16	0.06	0.06
17	2	5	0	0	33	1	1	1	500	1	2	3	5	3	1	0.22	0.31	0.13	0.18
17	2	5	0	0	33	1	1	1	500	1	2	3	5	3	2	0.46	0.45	0.36	0.27
18	2	5	0	0	30	1	1	1	200	1	0	0	0	3	0	0.18	0.10	0.06	0.06
18	2	5	0	0	30	1	1	1	200	1	0	0	0	3	1	0.04	0.25	0.07	0.07
18	2	5	0	0	30	1	1	1	200	1	0	0	0	3	2	0.34	0.49	0.31	0.31
19	2	6	0	0	35	1	1	1	3000	1	2	3	5	3	0	0.21	0.18	0.17	0.18
19	2	6	0	0	35	1	1	1	3000	1	2	3	5	3	1	0.42	0.33	0.18	0.18
19	2	6	0	0	35	1	1	1	3000	1	2	3	5	3	2	0.60	0.72	0.90	0.85
20	2	6	0	0	36	1	1	1	1000	1	2	3	5	3	0	0.29	0.19	0.06	0.00
20	2	6	0	0	36	1	1	1	1000	1	2	3	5	3	1	0.31	0.25	0.24	0.23
20	2	6	0	0	36	1	1	1	1000	1	2	3	5	3	2	0.68	0.49	0.99	0.87
21	2	5	0	0	30	1	1	1	500	1	2	0	0	3	0	0.27	0.12	0.20	0.21
21	2	5	0	0	30	1	1	1	500	1	2	0	0	3	1	0.03	0.23	0.10	0.09
21	2	5	0	0	30	1	1	1	500	1	2	0	0	3	2	0.56	0.47	0.04	0.05
22	2	5	0	0	31	1	1	1	1000	1	2	3	0	3	0	0.25	0.18	0.23	0.23
22	2	5	0	0	31	1	1	1	1000	1	2	3	0	3	1	0.22	0.29	0.12	0.11
22	2	5	0	0	31	1	1	1	1000	1	2	3	0	3	2	0.67	0.60	0.04	0.04
23	2	5	0	0	30	1	1	1	800	1	2	0	0	3	0	0.12	0.11	0.06	0.06
23	2	5	0	0	30	1	1	1	800	1	2	0	0	3	1	0.32	0.19	0.09	0.07
23	2	5	0	0	30	1	1	1	800	1	2	0	0	3	2	0.54	0.29	1.00	0.91
24	2	6	0	0	38	1	1	1	150	1	0	0	0	3	0	0.02	0.09	0.09	0.09
24	2	6	0	0	38	1	1	1	150	1	0	0	0	3	1	0.26	0.25	0.02	0.01
24	2	6	0	0	38	1	1	1	150	1	0	0	0	3	2	0.01	0.35	0.25	0.24
25	2	6	0	0	30	1	1	1	1000	1	2	4	0	3	0	0.18	0.11	0.19	0.19
25	2	6	0	0	30	1	1	1	1000	1	2	4	0	3	1	0.39	0.33	0.13	0.11
25	2	6	0	0	30	1	1	1	1000	1	2	4	0	3	2	0.83	0.27	0.93	0.86
26	2	5	0	0	31	1	1	1	100	2	0	0	0	3	0	0.01	0.05	0.11	0.12
26	2	5	0	0	31	1	1	1	100	2	0	0	0	3	1	0.37	0.09	0.04	0.03
26	2	5	0	0	31	1	1	1	100	2	0	0	0	3	2	0.31	0.90	0.37	0.36
27	2	6	0	0	32	1	1	1	1000	1	2	3	4	3	0	0.02	0.17	0.14	0.15
27	2	6	0	0	32	1	1	1	1000	1	2	3	4	3	1	0.41	0.29	0.27	0.25
27	2	6	0	0	32	1	1	1	1000	1	2	3	4	3	2	0.66	0.84	0.85	0.73
28	2	5	0	0	30	1	1	1	90	1	0	0	0	3	0	0.01	0.03	0.00	0.00
28	2	5	0	0	30	1	1	1	90	1	0	0	0	3	1	0.02	0.09	0.02	0.01
28	2	5	0	0	30	1	1	1	90	1	0	0	0	3	2	0.22	0.01	0.26	0.25
29	2	6	0	0	33	1	1	1	300	1	2	0	0	3	0	0.18	0.07	0.21	0.21
29	2	6	0	0	33	1	1	1	300	1	2	0	0	3	1	0.34	0.21	0.08	0.19
29	2	6	0	0	33	1	1	1	300	1	2	0	0	3	2	0.35	0.27	0.70	0.60
30	2	7	0	0	30	1	1	1	200	1	2	3	0	3	0	0.17	0.09	0.10	0.11
30	2	7	0	0	30	1	1	1	200	1	2	3	0	3	1	0.04	0.15	0.07	0.13
30	2	7	0	0	30	1	1	1	200	1	2	3	0	3	2	0.14	0.80	0.76	0.78
															Max	1	1	1	1
															Min	0	0	0	0

sq1.1.6	P-input	sq1.2.2	sq1.2.3	P-output	sq2.1.1	sq2.1.2	sq2.1.3	sq2.1.4	sq2.1.5	sq2.1.6	sq2.1.7	sq2.1.8	sq2.1.9	sq2.1.10	Q-input	sq2.2.1	sq2.2.2	sq2.2.4	sq2.2.5
0.29	**0.77**	0.11	0.00	**0.11**	0.36	0.54	0.00	0.00	0.33	0.28	0.11	0.22	0.16	0.00	**2.00**	0.14	0.00	0.25	0.20
0.50	**1.10**	0.26	0.24	**0.51**	0.43	0.26	0.50	0.50	0.21	0.44	0.56	0.15	0.12	0.24	**3.41**	0.64	0.24	0.50	0.40
0.43	**2.35**	0.63	0.67	**1.30**	0.44	0.82	0.50	0.50	0.36	0.61	0.67	0.82	0.56	0.59	**5.87**	0.64	0.67	0.50	0.90
0.36	**1.16**	0.05	0.04	**0.10**	0.50	0.36	0.00	0.00	0.35	0.22	0.22	0.36	0.25	0.00	**2.27**	0.07	0.02	0.00	0.12
0.50	**1.06**	0.37	0.22	**0.59**	0.50	0.30	0.00	0.00	0.19	0.39	0.33	0.12	0.11	0.41	**2.35**	0.57	0.22	0.25	0.42
0.57	**2.37**	0.47	0.56	**1.03**	0.52	0.65	0.00	0.00	0.40	0.78	0.56	0.65	0.40	0.95	**4.91**	0.57	0.89	0.75	0.60
0.21	**0.79**	0.11	0.09	**0.19**	0.48	0.43	0.00	0.00	0.37	0.28	0.11	0.29	0.22	0.00	**2.17**	0.21	0.00	0.00	0.16
0.57	**1.80**	0.32	0.22	**0.54**	0.70	0.44	0.50	0.50	0.38	0.50	0.44	0.21	0.23	0.28	**4.18**	0.57	0.22	0.25	0.50
0.79	**3.44**	0.58	0.89	**1.47**	0.71	0.93	1.00	1.00	0.60	0.72	0.78	0.93	0.73	0.64	**8.03**	0.79	0.67	0.50	0.70
0.29	**0.88**	0.11	0.00	**0.11**	0.24	0.57	0.00	0.00	0.25	0.33	0.22	0.29	0.19	0.00	**2.10**	0.26	0.02	0.25	0.12
0.43	**1.67**	0.21	0.29	**0.60**	0.67	0.78	0.00	0.00	0.54	0.56	0.44	0.38	0.30	0.40	**4.06**	0.64	0.29	0.25	0.56
0.64	**3.31**	0.79	1.00	**1.79**	0.92	1.00	0.00	0.00	0.96	0.89	0.89	1.00	0.97	0.58	**7.22**	0.93	1.00	0.75	0.90
0.21	**0.43**	0.16	0.04	**0.20**	0.00	0.59	0.00	0.00	0.20	0.28	0.22	0.39	0.23	0.00	**1.90**	0.29	0.04	0.25	0.06
0.50	**1.88**	0.26	0.33	**0.60**	0.73	0.53	0.50	0.50	0.83	0.44	0.56	0.61	0.47	0.85	**6.02**	0.71	0.33	0.50	0.60
0.43	**4.10**	0.89	0.84	**1.74**	1.00	0.84	1.00	0.50	0.73	1.00	0.78	0.84	1.00	1.00	**8.69**	1.00	0.98	0.75	1.00
0.29	**1.02**	0.05	0.07	**0.12**	0.48	0.47	0.00	0.00	0.35	0.24	0.11	0.36	0.19	0.00	**2.21**	0.26	0.07	0.25	0.26
0.57	**1.53**	0.32	0.24	**0.56**	0.73	0.45	0.00	0.00	0.44	0.53	0.44	0.24	0.26	0.42	**3.51**	0.69	0.24	0.25	0.56
0.57	**3.68**	0.84	0.60	**1.44**	0.76	0.72	0.00	0.00	1.00	0.94	0.89	0.72	0.79	0.77	**6.60**	0.83	0.89	0.50	0.80
0.29	**1.12**	0.05	0.11	**0.16**	0.48	0.36	0.00	0.00	0.37	0.33	0.22	0.36	0.26	0.00	**2.39**	0.13	0.02	0.00	0.12
0.64	**1.29**	0.37	0.18	**0.55**	0.43	0.41	0.50	0.50	0.60	0.50	0.44	0.38	0.35	0.38	**4.50**	0.64	0.18	0.00	0.38
0.57	**3.78**	0.89	0.78	**1.67**	0.68	0.71	0.50	1.00	0.56	0.61	0.78	0.71	0.55	0.73	**6.83**	0.64	0.67	0.75	1.00
0.21	**0.78**	0.11	0.02	**0.13**	0.31	0.34	0.00	0.00	0.49	0.31	0.33	0.22	0.27	0.00	**2.28**	0.14	0.02	0.25	0.10
0.43	**1.38**	0.47	0.22	**0.70**	0.59	0.49	0.50	0.50	0.71	0.56	0.33	0.50	0.42	0.35	**4.96**	0.63	0.22	0.25	0.46
0.86	**4.00**	1.00	0.89	**1.89**	0.76	0.85	0.50	0.00	0.67	0.83	0.89	0.85	0.67	0.71	**6.74**	0.50	0.78	1.00	0.80
0.14	**0.29**	0.11	0.00	**0.11**	0.02	0.56	0.00	0.00	0.22	0.28	0.22	0.14	0.14	0.00	**1.58**	0.09	0.00	0.00	0.28
0.36	**1.12**	0.42	0.13	**0.55**	0.49	0.50	0.00	0.00	0.49	0.50	0.44	0.30	0.29	0.33	**3.33**	0.57	0.13	0.00	0.52
0.64	**3.25**	0.89	0.67	**1.56**	0.92	0.74	0.00	0.00	0.68	0.72	0.67	0.74	0.58	0.69	**5.73**	0.79	0.89	0.75	0.86
0.29	**0.93**	0.11	0.00	**0.11**	0.43	0.44	0.00	0.00	0.39	0.21	0.33	0.29	0.23	0.00	**2.33**	0.11	0.02	0.25	0.12
0.43	**1.29**	0.32	0.18	**0.49**	0.59	0.34	0.50	0.50	0.56	0.39	0.44	0.39	0.41	0.34	**4.48**	0.56	0.18	0.50	0.38
0.50	**3.59**	0.79	0.53	**1.32**	0.57	0.89	1.00	1.00	0.91	0.89	0.56	0.89	0.70	0.70	**8.11**	0.79	0.67	1.00	0.70
0.21	**0.65**	0.05	0.02	**0.07**	0.00	0.57	0.00	0.00	0.20	0.28	0.22	0.11	0.10	0.00	**1.49**	0.07	0.02	0.00	0.10
0.36	**0.98**	0.26	0.11	**0.37**	0.55	0.29	0.00	0.00	0.58	0.39	0.22	0.39	0.30	0.29	**3.01**	0.50	0.11	0.00	0.32
0.64	**1.86**	0.84	0.67	**1.51**	0.56	0.55	0.00	0.50	0.40	0.61	0.33	0.55	0.20	0.29	**3.99**	0.57	0.56	0.75	0.60
0.14	**0.26**	0.00	0.00	**0.00**	0.07	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.03	0.00	**0.22**	0.01	0.04	0.00	0.18
0.43	**0.61**	0.21	0.02	**0.23**	0.47	0.15	0.50	0.50	0.36	0.48	0.78	0.24	0.22	0.10	**3.80**	0.57	0.02	0.25	0.20
0.29	**1.17**	0.26	0.22	**0.49**	0.24	0.07	0.50	0.50	0.20	0.50	0.00	0.07	0.11	0.10	**2.28**	0.70	0.31	0.25	0.40
0.29	**1.05**	0.11	0.09	**0.19**	0.48	0.50	0.00	0.00	0.39	0.10	0.22	0.22	0.18	0.00	**2.09**	0.03	0.02	0.00	0.12
0.57	**0.82**	0.05	0.09	**0.14**	0.38	0.21	0.50	0.50	0.30	0.50	0.56	0.21	0.24	0.28	**3.67**	0.64	0.09	0.00	0.40
0.14	**2.97**	0.53	0.31	**0.84**	0.35	0.24	0.50	0.50	0.28	0.42	0.44	0.24	0.18	0.28	**3.42**	0.64	0.67	0.75	0.50
0.36	**1.24**	0.11	0.11	**0.22**	0.60	0.65	0.00	0.00	0.45	0.32	0.11	0.36	0.26	0.00	**2.76**	0.13	0.11	0.25	0.30
0.71	**1.85**	0.47	0.27	**0.74**	0.66	0.52	0.50	0.50	0.46	0.53	0.56	0.73	0.26	0.26	**4.97**	0.57	0.27	0.25	0.38
1.00	**4.13**	0.79	0.76	**1.55**	0.87	0.74	1.00	1.00	0.71	0.84	0.78	0.74	0.58	0.26	**7.52**	0.74	0.56	0.50	0.60
0.29	**0.62**	0.05	0.02	**0.07**	0.31	0.53	0.00	0.00	0.39	0.10	0.11	0.14	0.11	0.00	**1.70**	0.00	0.00	0.00	0.08
0.50	**0.90**	0.26	0.13	**0.40**	0.63	0.05	0.00	0.00	0.02	0.39	0.44	0.01	0.04	0.38	**1.96**	0.47	0.13	0.00	0.26
0.50	**2.28**	0.37	0.31	**0.68**	0.33	0.01	0.00	0.00	0.07	0.39	0.44	0.01	0.32	0.38	**1.95**	0.57	0.60	0.50	0.40
0.36	**0.94**	0.16	0.04	**0.20**	0.48	0.43	0.00	0.00	0.41	0.32	0.33	0.29	0.23	0.00	**2.49**	0.27	0.02	0.25	0.10
0.57	**1.88**	0.32	0.31	**0.63**	0.66	0.55	0.50	0.50	0.75	0.39	0.78	0.53	0.42	0.35	**5.43**	0.69	0.31	0.25	0.58
0.64	**4.09**	0.89	0.76	**1.65**	0.92	0.90	0.50	1.00	1.00	0.89	1.00	0.90	0.93	0.35	**8.38**	0.57	0.38	1.00	0.80
0.29	**0.71**	0.05	0.02	**0.07**	0.29	0.44	0.00	0.00	0.37	0.31	0.22	0.14	0.14	0.00	**1.92**	0.23	0.04	0.00	0.10
0.43	**1.27**	0.26	0.11	**0.37**	0.65	0.27	0.00	0.00	0.68	0.33	0.44	0.40	0.32	0.33	**3.43**	0.50	0.11	0.00	0.52
0.43	**1.97**	1.00	0.84	**1.84**	0.45	0.58	0.00	0.00	0.37	0.56	0.56	0.58	0.45	0.33	**3.86**	0.64	0.44	0.75	0.80
0.21	**0.61**	0.11	0.02	**0.13**	0.36	0.26	0.00	0.00	0.33	0.32	0.22	0.22	0.17	0.00	**1.88**	0.07	0.02	0.00	0.08
0.43	**0.86**	0.26	0.09	**0.36**	0.42	0.21	0.50	0.50	0.47	0.50	0.56	0.36	0.29	0.35	**4.14**	0.50	0.09	0.00	0.30
0.43	**1.89**	0.89	0.98	**1.87**	0.34	0.42	0.50	0.50	0.28	0.50	0.67	0.42	0.32	0.35	**4.30**	0.57	0.33	0.75	1.00
0.29	**1.03**	0.05	0.07	**0.12**	0.43	0.27	0.00	0.00	0.39	0.28	0.33	0.22	0.19	0.00	**2.12**	0.27	0.07	0.25	0.16
0.57	**1.68**	0.37	0.22	**0.59**	0.63	0.52	0.00	0.00	0.57	0.56	0.67	0.38	0.33	0.26	**3.92**	0.64	0.22	0.50	0.58
0.57	**3.64**	0.89	0.67	**1.56**	0.87	0.76	1.00	1.00	0.71	0.89	0.78	0.76	0.59	0.26	**7.62**	0.86	0.56	1.00	0.80
0.29	**0.83**	0.05	0.09	**0.14**	0.53	0.47	0.00	0.00	0.37	0.29	0.22	0.36	0.24	0.00	**2.48**	0.19	0.04	0.00	0.14
0.64	**1.68**	0.42	0.11	**0.53**	0.65	0.39	0.50	0.50	0.77	0.54	0.67	0.52	0.40	0.30	**5.25**	0.57	0.11	0.25	0.48
0.64	**3.68**	0.95	0.91	**1.86**	0.65	0.86	0.50	0.50	0.53	0.78	0.56	0.86	0.68	0.30	**6.21**	0.74	0.84	0.75	0.90
0.21	**1.01**	0.11	0.04	**0.15**	0.55	0.29	0.00	0.00	0.35	0.28	0.11	0.29	0.22	0.00	**2.08**	0.17	0.00	0.00	0.10
0.64	**1.09**	0.32	0.07	**0.38**	0.54	0.14	0.00	0.00	0.40	0.22	0.56	0.25	0.22	0.28	**2.61**	0.43	0.07	0.25	0.48
0.50	**1.63**	0.74	0.67	**1.40**	0.23	0.71	0.00	0.00	0.19	0.83	0.67	0.71	0.55	0.28	**4.17**	0.57	0.78	0.50	0.20
0.21	**1.10**	0.00	0.07	**0.07**	0.48	0.30	0.00	0.00	0.47	0.20	0.11	0.22	0.19	0.00	**1.97**	0.14	0.02	0.25	0.10
0.50	**1.24**	0.37	0.31	**0.68**	0.63	0.27	0.50	0.50	0.54	0.39	0.56	0.39	0.30	0.33	**4.39**	0.64	0.31	0.25	0.42
0.57	**1.92**	1.00	0.51	**1.51**	0.44	0.85	1.00	1.00	0.36	0.61	0.44	0.85	0.66	0.33	**6.55**	0.66	0.73	0.50	0.92
0.21	**0.56**	0.00	0.02	**0.02**	0.24	0.14	0.00	0.00	0.16	0.32	0.22	0.14	0.11	0.00	**1.34**	0.07	0.02	0.00	0.08
0.43	**1.10**	0.26	0.24	**0.51**	0.49	0.40	0.00	0.00	0.44	0.48	0.33	0.26	0.21	0.36	**2.97**	0.57	0.24	0.25	0.34
0.43	**3.18**	0.58	0.76	**1.33**	0.66	0.68	0.00	0.00	0.54	0.64	0.44	0.68	0.53	0.36	**4.55**	0.76	0.82	0.75	1.00
0.14	**0.43**	0.11	0.02	**0.13**	0.02	0.14	0.00	0.00	0.08	0.09	0.22	0.14	0.15	0.00	**0.85**	0.00	0.04	0.00	0.08
0.43	**0.98**	0.21	0.00	**0.21**	0.20	0.32	0.00	0.00	0.62	0.43	0.56	0.40	0.33	0.08	**2.94**	0.50	0.00	0.00	0.24
0.36	**1.21**	0.21	0.29	**0.50**	0.54	0.10	0.00	0.00	0.44	0.67	0.33	0.10	0.05	0.09	**2.31**	0.57	0.67	0.75	0.90
0.29	**0.96**	0.05	0.04	**0.10**	0.36	0.22	0.00	0.00	0.33	0.28	0.22	0.22	0.19	0.00	**1.82**	0.03	0.07	0.25	0.10
0.43	**1.39**	0.32	0.29	**0.60**	0.68	0.48	0.50	0.50	0.58	0.47	0.33	0.38	0.20	0.36	**4.48**	0.50	0.29	0.25	0.30
0.50	**3.39**	0.84	0.67	**1.51**	0.28	0.10	0.50	0.50	0.23	0.83	0.44	0.10	0.30	0.33	**3.63**	0.70	0.44	0.50	0.80
0.29	**0.58**	0.11	0.02	**0.13**	0.05	0.13	0.00	0.00	0.00	0.00	0.11	0.13	0.13	0.00	**0.54**	0.01	0.00	0.00	0.00
0.36	**0.89**	0.21	0.13	**0.34**	0.30	0.17	0.50	0.50	0.54	0.33	0.00	0.38	0.38	0.33	**3.44**	0.47	0.13	0.00	0.22
0.21	**2.16**	0.53	0.22	**0.75**	0.81	0.91	1.00	0.50	0.66	0.78	0.44	0.91	0.83	0.36	**7.18**	0.64	0.56	0.75	0.72
0.21	**0.70**	0.05	0.02	**0.07**	0.07	0.22	0.00	0.00	0.02	0.32	0.22	0.22	0.16	0.00	**1.23**	0.03	0.00	0.25	0.10
0.43	**1.66**	0.21	0.20	**0.41**	0.54	0.52	0.50	0.50	0.58	0.39	0.33	0.38	0.41	0.31	**4.46**	0.57	0.20	0.25	0.24
0.36	**3.44**	0.89	0.76	**1.65**	0.86	0.84	1.00	0.50	0.71	0.61	0.33	0.84	0.66	0.31	**6.66**	0.57	0.51	0.75	0.80
0.00	**0.04**	0.00	0.00	**0.00**	0.00	0.06	0.00	0.00	0.20	0.11	0.11	0.02	0.00	0.00	**0.50**	0.04	0.00	0.00	0.08
0.07	**0.22**	0.21	0.09	**0.30**	0.20	0.01	0.00	0.00	0.05	0.44	0.22	0.04	0.05	0.30	**1.31**	0.46	0.09	0.25	0.20
0.07	**0.81**	0.05	0.33	**0.39**	0.33	0.10	0.00	0.00	0.01	0.50	0.22	0.10	0.20	0.30	**1.76**	0.64	0.22	0.50	0.36
0.29	**0.95**	0.05	0.04	**0.10**	0.36	0.22	0.00	0.00	0.39	0.26	0.22	0.22	0.18	0.00	**1.84**	0.07	0.04	0.00	0.14
0.50	**1.32**	0.37	0.16	**0.52**	0.47	0.42	0.00	0.00	0.34	0.41	0.56	0.24	0.22	0.28	**2.93**	0.50	0.16	0.25	0.26
0.57	**2.49**	0.58	0.62	**1.20**	0.70	0.43	0.00	0.00	0.57	0.61	0.56	0.43	0.33	0.28	**3.90**	0.64	0.64	0.75	0.60
0.21	**0.68**	0.05	0.07	**0.12**	0.34	0.40	0.00	0.00	0.27	0.18	0.33	0.26	0.22	0.00	**2.00**	0.14	0.07	0.00	0.10
0.57	**0.96**	0.42	0.24	**0.67**	0.41	0.28	0.50	0.50	0.75	0.47	0.44	0.53	0.45	0.24	**4.57**	0.47	0.24	0.25	0.30
0.50	**2.98**	0.68	0.47	**1.15**	0.47	0.16	0.50	0.00	0.38	0.84	0.44	0.16	0.12	0.24	**3.33**	0.63	0.76	1.00	0.50
1		1	1		1	1	1	1	1	1	1	1	1	1		1	1	1	1
0		0	0		0	0	0	0	0	0	0	0	0	0		0	0	0	0

sq2.2.6	Q-output	sq3.1.3	sq3.1.4	sq3.1.5	sq3.1.6	F-input	sq3.2.4	sq3.2.5	F-output	sq4.1.1	sq4.1.2	sq4.1.3	sq4.1.4	sq4.1.5	S-input	sq4.2.1	sq4.2.2	sq4.2.3
0.11	**0.70**	0.17	0.04	0.11	0.11	**0.43**	0.18	0.50	**0.68**	0.24	0.30	0.08	0.25	0.36	**1.23**	0.20	0.22	0.00
0.40	**2.19**	0.33	0.15	0.21	0.56	**1.26**	0.53	0.75	**1.28**	0.19	0.40	0.08	0.25	0.84	**1.76**	0.40	0.56	0.38
0.89	**3.60**	0.83	0.64	0.56	0.67	**2.70**	0.65	0.99	**1.64**	0.83	0.60	0.75	0.40	0.84	**3.41**	0.60	0.67	0.88
0.02	**0.24**	0.00	0.14	0.14	0.22	**0.50**	0.06	0.10	**0.16**	0.19	0.20	0.00	0.24	0.71	**1.35**	0.20	0.17	0.13
0.38	**1.84**	0.50	0.17	0.25	0.44	**1.36**	0.41	0.70	**1.12**	0.17	0.70	0.17	0.24	0.84	**2.12**	0.70	0.50	0.50
0.67	**3.48**	0.67	0.42	0.40	0.56	**2.04**	0.71	0.99	**1.70**	0.67	0.80	0.83	0.43	0.84	**3.58**	0.80	0.78	0.75
0.04	**0.42**	0.17	0.08	0.12	0.11	**0.48**	0.18	0.00	**0.18**	0.19	0.30	0.08	0.22	0.54	**1.33**	0.20	0.22	0.00
0.40	**1.94**	0.33	0.25	0.33	0.67	**1.58**	0.47	0.75	**1.22**	0.31	0.50	0.08	0.42	0.56	**1.87**	0.50	0.50	0.50
0.69	**3.34**	1.00	0.99	0.73	0.78	**3.50**	0.59	0.97	**1.56**	0.93	0.70	0.58	0.99	0.56	**3.76**	0.70	0.72	0.75
0.02	**0.67**	0.17	0.08	0.15	0.22	**0.62**	0.24	0.25	**0.49**	0.22	0.40	0.08	0.00	0.64	**1.35**	0.30	0.28	0.25
0.56	**2.30**	0.67	0.32	0.48	0.56	**2.02**	0.59	0.70	**1.29**	0.42	0.70	0.25	0.56	0.76	**2.69**	0.60	0.61	0.38
0.96	**4.63**	0.83	0.97	0.97	0.56	**3.33**	0.82	0.98	**1.80**	1.00	0.50	1.00	0.75	0.76	**4.01**	0.50	0.94	1.00
0.04	**0.68**	0.17	0.04	0.12	0.22	**0.65**	0.29	0.60	**0.90**	0.25	0.40	0.08	0.33	0.36	**1.42**	0.20	0.17	0.00
0.53	**2.68**	0.67	0.30	0.39	0.67	**2.03**	0.71	0.75	**1.46**	0.62	0.70	0.08	0.62	0.85	**2.87**	0.60	0.61	0.50
1.00	**4.73**	1.00	1.00	1.00	0.67	**3.67**	1.00	1.00	**2.00**	0.85	0.60	0.92	1.00	1.00	**4.36**	0.60	0.94	0.63
0.09	**0.92**	0.17	0.12	0.16	0.11	**0.66**	0.18	0.50	**0.68**	0.25	0.30	0.08	0.33	0.46	**1.43**	0.20	0.19	0.13
0.49	**2.23**	0.33	0.34	0.48	0.78	**1.93**	0.53	0.70	**1.23**	0.35	0.40	0.17	0.47	0.80	**2.19**	0.50	0.59	0.63
0.89	**3.91**	1.00	0.86	0.79	0.78	**3.43**	0.88	0.98	**1.86**	0.73	0.70	0.92	0.81	0.80	**3.95**	0.70	0.94	0.75
0.02	**0.29**	0.00	0.12	0.12	0.22	**0.47**	0.21	0.50	**0.71**	0.22	0.30	0.08	0.30	0.18	**1.08**	0.40	0.33	0.25
0.29	**1.49**	0.33	0.23	0.32	0.00	**0.89**	0.59	0.65	**1.24**	0.46	0.70	0.25	0.61	0.80	**2.82**	0.40	0.56	0.38
0.89	**3.95**	0.00	0.64	0.56	0.11	**1.31**	0.94	0.96	**1.91**	0.72	0.80	0.83	0.39	0.80	**3.54**	0.80	0.61	0.63
0.02	**0.64**	0.17	0.11	0.11	0.44	**0.83**	0.29	0.25	**0.55**	0.18	0.40	0.08	0.26	0.71	**1.64**	0.30	0.26	0.25
0.40	**1.96**	0.67	0.28	0.36	0.67	**1.97**	0.29	0.75	**1.05**	0.54	0.60	0.25	0.55	0.77	**2.71**	0.60	0.44	0.50
0.84	**3.92**	1.00	0.63	0.67	0.33	**2.63**	0.88	0.98	**1.86**	0.86	0.50	0.83	0.54	0.77	**3.50**	0.50	0.94	0.75
0.00	**0.37**	0.00	0.15	0.15	0.22	**0.52**	0.13	0.25	**0.38**	0.23	0.30	0.08	0.22	0.36	**1.20**	0.30	0.27	0.13
0.33	**1.56**	0.33	0.28	0.44	0.56	**1.61**	0.59	0.60	**1.19**	0.38	0.50	0.17	0.51	0.76	**2.32**	0.30	0.67	0.50
0.89	**4.17**	0.83	0.73	0.58	0.56	**2.70**	0.82	0.97	**1.80**	0.75	0.40	1.00	0.51	0.76	**3.41**	0.40	0.94	0.50
0.02	**0.53**	0.17	0.12	0.11	0.33	**0.73**	0.24	0.50	**0.74**	0.25	0.30	0.08	0.26	0.61	**1.50**	0.40	0.28	0.25
0.22	**1.84**	0.50	0.30	0.27	0.44	**1.51**	0.65	0.60	**1.25**	0.43	0.40	0.25	0.58	0.74	**2.41**	0.50	0.56	0.38
0.78	**3.93**	0.67	0.74	0.70	0.44	**2.56**	0.76	0.96	**1.73**	0.89	0.70	0.83	0.70	0.74	**3.87**	0.70	0.83	1.00
0.02	**0.22**	0.00	0.04	0.06	0.22	**0.32**	0.24	0.25	**0.49**	0.11	0.20	0.00	0.19	0.54	**1.03**	0.30	0.22	0.25
0.18	**1.11**	0.33	0.17	0.26	0.33	**1.10**	0.65	0.65	**1.30**	0.45	0.30	0.25	0.60	0.40	**2.00**	0.30	0.50	0.25
0.67	**3.14**	0.50	0.25	0.21	0.33	**1.29**	0.88	0.90	**1.79**	0.10	0.50	0.67	0.50	0.40	**2.17**	0.50	0.56	0.88
0.00	**0.24**	0.00	0.01	0.01	0.00	**0.02**	0.22	0.00	**0.22**	0.08	0.10	0.00	0.00	0.18	**0.36**	0.10	0.00	0.00
0.13	**1.18**	0.00	0.08	0.11	0.22	**0.42**	0.24	0.50	**0.74**	0.05	0.20	0.08	0.40	0.20	**0.93**	0.30	0.44	0.13
0.44	**2.11**	0.33	0.06	0.12	0.11	**0.63**	0.65	0.75	**1.40**	0.10	0.30	0.08	0.25	0.20	**0.94**	0.30	0.71	0.50
0.02	**0.19**	0.00	0.15	0.16	0.22	**0.53**	0.18	0.00	**0.18**	0.16	0.20	0.00	0.06	0.39	**0.81**	0.20	0.16	0.13
0.36	**1.49**	0.50	0.12	0.16	0.67	**1.45**	0.35	0.50	**0.86**	0.25	0.40	0.17	0.34	0.56	**1.72**	0.40	0.56	0.38
0.56	**3.12**	1.00	0.25	0.19	0.89	**2.32**	0.76	0.96	**1.72**	0.27	0.40	0.75	0.03	0.56	**2.01**	0.40	0.72	0.63
0.11	**0.90**	0.17	0.14	0.15	0.11	**0.56**	0.12	0.50	**0.62**	0.19	0.40	0.08	0.22	0.43	**1.33**	0.30	0.11	0.25
0.11	**1.58**	0.50	0.29	0.41	0.56	**1.76**	0.35	0.55	**0.91**	0.36	0.60	0.25	0.49	0.51	**2.21**	0.60	0.39	0.50
0.67	**3.07**	0.83	0.09	0.58	0.56	**2.06**	0.88	0.96	**1.85**	0.75	1.00	0.83	0.75	0.51	**3.84**	1.00	0.93	0.75
0.00	**0.08**	0.00	0.06	0.08	0.11	**0.25**	0.24	0.00	**0.24**	0.14	0.20	0.00	0.15	0.50	**0.99**	0.20	0.06	0.13
0.18	**1.04**	0.33	0.03	0.15	0.67	**1.18**	0.59	0.50	**1.09**	0.09	0.50	0.17	0.01	0.43	**1.20**	0.50	0.50	0.50
0.47	**2.54**	1.00	0.27	0.33	0.67	**2.27**	0.82	0.97	**1.79**	0.01	0.30	0.50	0.09	0.43	**1.33**	0.30	0.61	0.50
0.02	**0.67**	0.17	0.15	0.17	0.44	**0.93**	0.29	0.25	**0.55**	0.18	0.40	0.08	0.33	0.54	**1.53**	0.50	0.22	0.25
0.40	**2.23**	0.67	0.33	0.43	0.78	**2.21**	0.53	0.75	**1.28**	0.57	0.50	0.25	0.58	0.44	**2.34**	0.60	0.48	0.50
0.84	**3.59**	1.00	0.98	0.93	1.00	**3.91**	1.00	0.98	**1.98**	0.90	0.70	1.00	0.94	0.44	**3.98**	0.70	0.83	1.00
0.04	**0.42**	0.00	0.04	0.07	0.22	**0.33**	0.21	0.00	**0.21**	0.11	0.30	0.00	0.11	0.36	**0.88**	0.30	0.10	0.13
0.38	**1.51**	0.50	0.15	0.21	0.56	**1.42**	0.47	0.55	**1.02**	0.52	0.40	0.17	0.51	0.45	**2.04**	0.40	0.44	0.38
0.82	**3.46**	0.83	0.43	0.45	0.56	**2.27**	0.88	0.85	**1.74**	0.59	0.60	0.50	0.56	0.45	**2.70**	0.60	0.56	0.63
0.07	**0.24**	0.00	0.12	0.12	0.22	**0.47**	0.18	0.50	**0.68**	0.25	0.30	0.00	0.13	0.64	**1.32**	0.30	0.06	0.00
0.24	**1.13**	0.33	0.12	0.16	0.44	**1.06**	0.35	0.60	**0.96**	0.37	0.30	0.08	0.50	0.48	**1.74**	0.30	0.50	0.25
0.84	**3.50**	0.67	0.51	0.33	0.78	**2.29**	0.82	0.85	**1.68**	0.44	0.40	0.42	0.40	0.48	**2.14**	0.40	0.70	0.75
0.07	**0.81**	0.17	0.12	0.15	0.33	**0.77**	0.12	0.00	**0.12**	0.23	0.40	0.08	0.32	0.64	**1.67**	0.40	0.26	0.00
0.44	**2.39**	0.50	0.29	0.41	0.67	**1.87**	0.65	0.75	**1.40**	0.44	0.60	0.08	0.60	0.52	**2.24**	0.60	0.72	0.50
0.82	**4.03**	1.00	0.82	0.60	0.89	**3.30**	0.76	0.96	**1.73**	0.77	0.80	0.83	0.73	0.52	**3.64**	0.80	0.78	0.88
0.04	**0.41**	0.00	0.14	0.14	0.22	**0.50**	0.06	0.00	**0.06**	0.27	0.30	0.08	0.24	0.57	**1.47**	0.30	0.08	0.00
0.33	**1.75**	0.33	0.22	0.31	0.56	**1.42**	0.53	0.70	**1.23**	0.58	0.50	0.08	0.60	0.60	**2.37**	0.60	0.54	0.50
0.78	**4.02**	0.83	0.87	0.68	0.67	**3.05**	0.53	0.97	**1.50**	0.87	0.90	0.83	0.91	0.60	**4.11**	0.90	1.00	0.75
0.00	**0.27**	0.00	0.11	0.15	0.11	**0.36**	0.12	0.25	**0.37**	0.22	0.20	0.00	0.30	0.36	**1.07**	0.20	0.06	0.00
0.40	**1.63**	0.50	0.08	0.11	0.33	**1.02**	0.47	0.50	**0.97**	0.32	0.30	0.08	0.43	0.40	**1.54**	0.30	0.28	0.25
0.22	**2.27**	0.50	0.51	0.56	0.78	**2.35**	0.71	0.90	**1.61**	0.72	0.70	1.00	0.49	0.40	**3.31**	0.70	0.50	0.25
0.02	**0.54**	0.17	0.12	0.16	0.11	**0.56**	0.18	0.00	**0.18**	0.25	0.30	0.08	0.32	0.71	**1.66**	0.30	0.11	0.13
0.33	**1.96**	0.33	0.15	0.21	0.44	**1.14**	0.35	0.75	**1.11**	0.42	0.40	0.17	0.56	0.56	**2.11**	0.40	0.50	0.38
0.78	**3.59**	0.67	0.89	0.67	0.56	**2.78**	0.94	0.97	**1.92**	0.85	0.80	0.83	0.54	0.56	**3.58**	0.80	0.61	0.75
0.09	**0.26**	0.00	0.09	0.15	0.22	**0.46**	0.15	0.00	**0.16**	0.19	0.20	0.00	0.26	0.29	**0.94**	0.30	0.03	0.13
0.31	**1.72**	0.17	0.22	0.31	0.44	**1.16**	0.41	0.70	**1.12**	0.35	0.30	0.17	0.47	0.73	**2.02**	0.30	0.60	0.25
0.89	**4.22**	0.67	0.83	0.54	0.44	**2.48**	0.88	0.85	**1.74**	0.70	0.60	0.50	0.43	0.73	**2.96**	0.60	0.77	0.50
0.04	**0.17**	0.00	0.11	0.11	0.22	**0.44**	0.00	0.00	**0.00**	0.22	0.30	0.00	0.20	0.21	**0.94**	0.30	0.02	0.00
0.22	**0.96**	0.33	0.18	0.26	0.22	**1.00**	0.29	0.50	**0.80**	0.09	0.20	0.08	0.53	0.17	**1.07**	0.30	0.50	0.13
0.87	**3.75**	0.33	0.08	0.01	0.67	**1.09**	0.82	0.90	**1.73**	0.10	0.30	0.42	0.25	0.20	**1.27**	0.30	0.61	0.50
0.07	**0.51**	0.00	0.15	0.16	0.22	**0.53**	0.18	0.00	**0.18**	0.22	0.20	0.08	0.24	0.54	**1.28**	0.40	0.08	0.00
0.24	**1.58**	0.33	0.27	0.38	0.44	**1.43**	0.47	0.70	**1.17**	0.45	0.40	0.08	0.60	0.95	**2.48**	0.50	0.50	0.38
0.89	**3.33**	0.67	0.94	0.83	0.44	**2.88**	0.76	0.97	**1.74**	0.91	0.70	0.83	0.58	0.95	**3.97**	0.70	0.67	0.50
0.00	**0.01**	0.00	0.06	0.09	0.11	**0.27**	0.29	0.25	**0.55**	0.16	0.20	0.00	0.22	0.25	**0.84**	0.40	0.01	0.00
0.16	**0.98**	0.33	0.09	0.13	0.22	**0.78**	0.29	0.50	**0.80**	0.42	0.40	0.08	0.57	0.52	**1.99**	0.40	0.49	0.38
0.67	**3.34**	0.33	0.33	0.31	0.22	**1.19**	0.76	0.85	**1.62**	0.14	0.30	0.58	0.30	0.52	**1.84**	0.30	0.70	0.63
0.00	**0.38**	0.00	0.12	0.16	0.22	**0.60**	0.08	0.50	**0.58**	0.23	0.30	0.08	0.24	0.57	**1.43**	0.30	0.08	0.13
0.24	**1.51**	0.50	0.29	0.41	0.33	**1.53**	0.53	0.60	**1.13**	0.45	0.30	0.17	0.60	0.64	**2.16**	0.50	0.44	0.25
0.89	**3.52**	0.50	0.79	0.66	0.33	**2.28**	0.94	0.96	**1.90**	0.84	0.50	0.83	0.95	0.64	**3.77**	0.50	0.61	0.75
0.00	**0.12**	0.00	0.00	0.00	0.11	**0.11**	0.12	0.00	**0.12**	0.00	0.00	0.00	0.06	0.00	**0.06**	0.20	0.06	0.00
0.13	**1.13**	0.17	0.02	0.01	0.22	**0.42**	0.18	0.50	**0.68**	0.01	0.10	0.08	0.10	0.77	**1.06**	0.10	0.33	0.13
0.29	**2.01**	0.33	0.05	0.21	0.00	**0.59**	0.53	0.80	**1.33**	0.05	0.10	0.58	0.14	0.30	**1.17**	0.00	0.61	0.50
0.18	**0.43**	0.00	0.12	0.14	0.22	**0.48**	0.18	0.25	**0.43**	0.18	0.20	0.08	0.24	0.43	**1.13**	0.30	0.20	0.00
0.22	**1.39**	0.50	0.24	0.33	0.44	**1.51**	0.47	0.70	**1.17**	0.28	0.40	0.08	0.38	0.56	**1.70**	0.50	0.44	0.38
0.62	**3.26**	0.67	0.42	0.34	0.78	**2.20**	0.76	0.97	**1.73**	0.45	0.80	0.67	0.40	0.56	**2.87**	0.80	0.72	0.63
0.16	**0.47**	0.00	0.12	0.16	0.33	**0.61**	0.24	0.00	**0.24**	0.16	0.20	0.08	0.22	0.29	**0.96**	0.30	0.17	0.00
0.33	**1.60**	0.67	0.16	0.22	0.56	**1.60**	0.53	0.65	**1.18**	0.57	0.50	0.08	0.40	0.54	**2.09**	0.50	0.50	0.50
0.56	**3.44**	0.83	0.46	0.13	0.56	**1.98**	0.82	0.96	**1.79**	0.20	0.90	0.83	0.37	0.54	**2.84**	0.90	0.56	0.75
1		1	1	1	1		1	1		1	1	1	1	1		1	1	1
0		0	0	0	0		0	0		0	0	0	0	0		0	0	0

sq4.2.4	sq4.2.5	sq4.2.7	S-output	sq5.1.1	sq5.1.6	q5.1.9	I-input	sq5.2.3	sq5.2.4	sq5.2.5	sq5.2.6	sq5.2.8	sq5.2.11	I-output	sq1.1.1	sq1.1.2	sq1.1.3	sq1.1.5	sq1.1.6
0.13	0.00	0.00	**0.66**	0.09	0.00	0.10	**0.44**	0.25	0.29	0.14	0.00	0.00	0.18	**0.85**	0.18	0.15	0.07	0.08	0.29
0.38	0.17	0.43	**2.30**	0.22	0.00	0.30	**1.02**	0.50	0.43	0.43	0.00	0.00	0.40	**1.76**	0.24	0.23	0.07	0.05	0.50
0.75	0.50	0.43	**3.82**	0.42	0.51	0.70	**2.38**	0.75	0.86	0.86	1.00	1.00	0.80	**5.26**	0.59	0.49	0.42	0.41	0.43
0.13	0.00	0.14	**0.76**	0.08	0.00	0.10	**0.18**	0.00	0.14	0.29	0.00	0.00	0.20	**0.63**	0.29	0.11	0.20	0.21	0.36
0.50	0.17	0.57	**2.94**	0.24	0.00	0.40	**1.14**	0.50	0.57	0.57	0.00	0.00	0.38	**2.02**	0.22	0.16	0.09	0.09	0.50
0.50	0.83	0.71	**4.38**	0.46	0.47	0.60	**2.03**	0.50	0.86	0.86	0.00	0.00	0.83	**3.04**	0.34	0.76	0.33	0.37	0.57
0.13	0.17	0.00	**0.71**	0.15	0.00	0.10	**0.25**	0.00	0.14	0.14	0.00	0.00	0.15	**0.44**	0.23	0.17	0.09	0.09	0.21
0.50	0.00	0.57	**2.67**	0.26	0.00	0.40	**0.66**	0.50	0.29	0.29	0.00	0.00	0.38	**1.46**	0.36	0.35	0.27	0.25	0.57
0.63	0.33	0.86	**3.99**	0.63	0.72	0.80	**2.15**	0.75	0.71	0.71	1.00	1.00	0.75	**4.93**	0.68	0.47	0.83	0.67	0.79
0.25	0.17	0.29	**1.63**	0.16	0.00	0.20	**0.36**	0.25	0.29	0.29	0.00	0.00	0.25	**1.07**	0.12	0.18	0.14	0.15	0.29
0.38	0.33	0.43	**2.72**	0.28	0.00	0.30	**0.58**	0.50	0.43	0.43	0.00	0.00	0.45	**1.81**	0.49	0.38	0.19	0.18	0.43
0.88	0.50	0.57	**4.39**	1.00	1.00	0.60	**2.60**	0.75	0.71	0.71	1.00	1.00	1.00	**5.18**	1.00	0.35	0.71	0.60	0.64
0.13	0.17	0.00	**0.66**	0.17	0.00	0.20	**0.37**	0.25	0.29	0.14	0.00	0.00	0.15	**0.83**	0.01	0.15	0.03	0.03	0.21
0.50	0.00	0.57	**2.78**	0.34	0.00	0.30	**0.64**	0.50	0.43	0.43	0.00	0.00	0.50	**1.86**	0.42	0.39	0.28	0.29	0.50
0.88	0.33	0.71	**4.09**	0.75	0.83	0.70	**2.28**	1.00	0.86	0.86	1.00	1.00	0.95	**5.66**	0.90	0.80	0.97	1.00	0.43
0.25	0.17	0.14	**1.07**	0.10	0.00	0.10	**0.20**	0.25	0.29	0.29	0.00	0.00	0.15	**0.97**	0.23	0.12	0.19	0.19	0.29
0.63	0.17	0.43	**2.93**	0.22	0.00	0.40	**0.62**	0.50	0.29	0.29	0.00	0.00	0.40	**1.47**	0.25	0.31	0.20	0.18	0.57
0.63	0.67	0.57	**4.26**	0.65	0.53	0.80	**1.99**	0.50	0.86	0.86	1.00	1.00	0.75	**4.96**	0.83	0.72	0.83	0.73	0.57
0.25	0.17	0.29	**1.69**	0.10	0.00	0.10	**0.20**	0.00	0.29	0.29	0.00	0.00	0.20	**0.77**	0.23	0.14	0.23	0.23	0.29
0.38	0.33	0.43	**2.47**	0.16	0.00	0.40	**0.56**	0.50	0.29	0.29	0.00	0.00	0.33	**1.40**	0.22	0.29	0.07	0.07	0.64
0.75	0.50	0.86	**4.14**	0.60	0.47	0.50	**1.56**	0.50	0.57	0.57	1.00	1.00	0.70	**4.34**	0.80	0.90	0.83	0.67	0.57
0.25	0.17	0.29	**1.51**	0.18	0.00	0.20	**0.38**	0.25	0.14	0.14	0.00	0.00	0.15	**0.69**	0.16	0.18	0.11	0.12	0.21
0.50	0.50	0.57	**3.12**	0.33	0.00	0.30	**0.63**	0.50	0.14	0.14	0.00	0.00	0.38	**1.16**	0.40	0.35	0.11	0.09	0.43
0.88	0.33	0.71	**4.12**	0.70	0.79	0.40	**1.89**	0.75	0.43	0.43	1.00	1.00	0.88	**4.48**	0.68	0.70	0.91	0.86	0.86
0.13	0.00	0.14	**0.96**	0.15	0.00	0.10	**0.25**	0.00	0.14	0.14	0.00	0.00	0.18	**0.46**	0.00	0.15	0.00	0.00	0.14
0.50	0.17	0.57	**2.70**	0.15	0.00	0.30	**0.45**	0.50	0.29	0.29	0.00	0.00	0.28	**1.35**	0.29	0.31	0.09	0.07	0.36
1.00	0.17	0.57	**3.68**	0.71	0.59	0.60	**1.90**	0.75	0.71	0.71	1.00	1.00	0.63	**4.80**	0.70	0.60	0.71	0.60	0.64
0.13	0.00	0.29	**1.34**	0.13	0.00	0.10	**0.23**	0.25	0.14	0.14	0.00	0.00	0.15	**0.69**	0.21	0.15	0.14	0.14	0.29
0.38	0.33	0.43	**2.67**	0.26	0.00	0.20	**0.46**	0.50	0.43	0.43	0.00	0.00	0.33	**1.68**	0.28	0.27	0.17	0.15	0.43
1.00	0.50	0.71	**4.75**	0.51	0.57	0.50	**1.58**	0.75	0.57	0.57	1.00	1.00	0.60	**4.49**	0.71	0.70	0.90	0.79	0.50
0.25	0.00	0.29	**1.31**	0.11	0.00	0.10	**0.21**	0.00	0.00	0.00	0.00	0.00	0.13	**0.13**	0.01	0.13	0.14	0.15	0.21
0.25	0.33	0.29	**1.92**	0.10	0.00	0.20	**0.30**	0.25	0.29	0.29	0.00	0.00	0.25	**1.07**	0.24	0.19	0.10	0.09	0.36
1.00	0.33	0.43	**3.69**	0.45	0.51	0.40	**1.36**	0.50	0.43	0.43	0.00	0.00	0.38	**1.73**	0.22	0.49	0.27	0.24	0.64
0.00	0.00	0.00	**0.10**	0.04	0.00	0.00	**0.04**	0.00	0.00	0.00	0.00	0.00	0.20	**0.20**	0.00	0.00	0.06	0.06	0.14
0.13	0.00	0.14	**1.14**	0.25	0.00	0.10	**0.35**	0.25	0.00	0.00	0.00	0.00	0.15	**0.40**	0.13	0.01	0.03	0.02	0.43
0.88	0.17	0.29	**2.84**	0.27	0.00	0.80	**1.07**	0.00	0.43	0.43	0.00	0.00	0.25	**1.11**	0.13	0.70	0.03	0.03	0.29
0.13	0.17	0.14	**0.92**	0.09	0.00	0.10	**0.19**	0.00	0.29	0.29	0.00	0.00	0.18	**0.76**	0.23	0.07	0.23	0.23	0.29
0.38	0.17	0.43	**2.30**	0.27	0.00	0.30	**0.57**	0.75	0.14	0.14	0.00	0.00	0.23	**1.26**	0.03	0.19	0.01	0.01	0.57
0.75	0.50	0.43	**3.43**	0.35	0.07	0.90	**1.32**	0.75	0.29	0.29	1.00	1.00	0.30	**3.62**	0.19	1.00	0.83	0.80	0.14
0.13	0.00	0.29	**1.07**	0.13	0.00	0.10	**0.23**	0.25	0.00	0.00	0.00	0.00	0.20	**0.45**	0.29	0.19	0.20	0.21	0.36
0.50	0.33	0.57	**2.89**	0.30	0.00	0.40	**0.70**	0.25	0.29	0.29	0.00	0.00	0.43	**1.26**	0.42	0.35	0.18	0.18	0.71
0.88	0.83	0.71	**5.11**	0.74	0.83	0.60	**2.16**	0.75	0.71	0.71	1.00	1.00	0.75	**4.93**	0.59	1.00	0.82	0.72	1.00
0.13	0.17	0.14	**0.82**	0.12	0.00	0.00	**0.12**	0.00	0.00	0.00	0.00	0.00	0.18	**0.18**	0.16	0.06	0.06	0.06	0.29
0.50	0.17	0.57	**2.74**	0.12	0.00	0.20	**0.32**	0.25	0.29	0.29	0.00	0.00	0.28	**1.10**	0.05	0.11	0.12	0.11	0.50
0.38	0.67	0.57	**3.02**	0.15	0.17	0.70	**1.03**	0.50	0.86	0.86	0.00	0.00	0.30	**2.61**	0.34	1.00	0.18	0.26	0.50
0.25	0.17	0.29	**1.67**	0.17	0.00	0.20	**0.37**	0.25	0.14	0.14	0.00	0.00	0.20	**0.74**	0.23	0.17	0.09	0.09	0.36
0.50	0.33	0.57	**2.98**	0.31	0.00	0.30	**0.61**	0.50	0.43	0.43	0.00	0.00	0.48	**1.83**	0.44	0.38	0.24	0.24	0.57
1.00	0.67	0.57	**4.77**	0.77	0.86	1.00	**2.64**	1.00	1.00	1.00	1.00	1.00	0.88	**5.88**	0.93	0.90	0.82	0.80	0.64
0.13	0.00	0.14	**0.79**	0.06	0.00	0.10	**0.16**	0.00	0.14	0.14	0.00	0.00	0.18	**0.46**	0.15	0.16	0.06	0.06	0.29
0.38	0.17	0.43	**2.19**	0.12	0.00	0.40	**0.52**	0.50	0.29	0.29	0.00	0.00	0.25	**1.32**	0.22	0.31	0.13	0.18	0.43
0.63	0.50	0.43	**3.33**	0.42	0.48	0.60	**1.60**	0.50	0.71	0.71	0.00	0.00	0.75	**2.68**	0.46	0.45	0.36	0.27	0.43
0.00	0.00	0.00	**0.36**	0.08	0.00	0.10	**0.18**	0.00	0.00	0.00	0.00	0.00	0.20	**0.20**	0.18	0.10	0.06	0.06	0.21
0.25	0.00	0.29	**1.59**	0.13	0.00	0.30	**0.43**	0.25	0.29	0.29	0.00	0.00	0.23	**1.05**	0.04	0.25	0.07	0.07	0.43
0.75	0.33	0.29	**3.22**	0.34	0.11	0.80	**1.25**	0.75	0.57	0.57	0.00	0.00	0.38	**2.27**	0.34	0.49	0.31	0.31	0.43
0.00	0.17	0.00	**0.82**	0.15	0.00	0.20	**0.35**	0.25	0.14	0.14	0.00	0.00	0.18	**0.71**	0.21	0.18	0.17	0.18	0.29
0.50	0.00	0.57	**2.89**	0.29	0.00	0.30	**0.59**	0.50	0.43	0.43	0.00	0.00	0.38	**1.73**	0.42	0.33	0.18	0.18	0.57
0.88	0.67	0.57	**4.57**	0.74	0.83	0.90	**2.47**	0.50	0.86	0.86	1.00	1.00	0.83	**5.04**	0.60	0.72	0.90	0.85	0.57
0.13	0.00	0.00	**0.50**	0.12	0.00	0.10	**0.22**	0.00	0.29	0.29	0.00	0.00	0.18	**0.75**	0.29	0.19	0.06	0.00	0.29
0.50	0.00	0.57	**2.72**	0.28	0.00	0.20	**0.48**	0.50	0.29	0.29	0.00	0.00	0.25	**1.32**	0.31	0.25	0.24	0.23	0.64
0.75	1.00	1.00	**5.40**	0.57	0.64	0.70	**1.92**	0.50	0.86	0.86	1.00	1.00	0.50	**4.71**	0.68	0.49	0.99	0.87	0.64
0.00	0.00	0.00	**0.26**	0.05	0.00	0.10	**0.15**	0.00	0.43	0.29	0.00	0.00	0.20	**0.91**	0.27	0.12	0.20	0.21	0.21
0.25	0.00	0.29	**1.36**	0.30	0.00	0.20	**0.50**	0.25	0.29	0.29	0.00	0.00	0.20	**1.02**	0.03	0.23	0.10	0.09	0.64
0.25	0.33	0.29	**2.32**	0.26	0.13	0.80	**1.19**	0.75	1.00	1.00	1.00	1.00	0.60	**5.35**	0.56	0.47	0.04	0.05	0.50
0.13	0.17	0.14	**0.97**	0.17	0.00	0.20	**0.37**	0.25	0.14	0.14	0.00	0.00	0.15	**0.69**	0.25	0.18	0.23	0.23	0.21
0.38	0.17	0.43	**2.25**	0.31	0.00	0.30	**0.61**	0.50	0.14	0.14	0.00	0.00	0.48	**1.26**	0.22	0.29	0.12	0.11	0.50
0.75	0.33	0.29	**3.53**	0.42	0.47	0.60	**1.49**	0.25	0.71	0.71	1.00	1.00	0.63	**4.30**	0.67	0.60	0.04	0.04	0.57
0.13	0.17	0.14	**0.89**	0.09	0.00	0.10	**0.19**	0.00	0.14	0.14	0.00	0.00	0.13	**0.41**	0.12	0.11	0.06	0.06	0.21
0.25	0.17	0.29	**1.85**	0.26	0.00	0.30	**0.56**	0.50	0.14	0.14	0.00	0.00	0.40	**1.19**	0.32	0.19	0.09	0.07	0.43
0.50	0.33	0.29	**2.99**	0.58	0.65	0.50	**1.73**	0.25	0.57	0.57	0.00	0.00	0.65	**2.04**	0.54	0.29	1.00	0.91	0.43
0.00	0.00	0.00	**0.32**	0.06	0.00	0.10	**0.16**	0.00	0.14	0.14	0.00	0.00	0.18	**0.46**	0.02	0.09	0.09	0.09	0.14
0.13	0.00	0.14	**1.19**	0.13	0.00	0.20	**0.33**	0.25	0.29	0.29	0.00	0.00	0.13	**0.95**	0.26	0.25	0.02	0.01	0.43
0.50	0.17	0.14	**2.22**	0.49	0.55	0.70	**1.75**	0.75	0.86	0.86	0.00	0.00	0.45	**2.91**	0.01	0.35	0.25	0.24	0.36
0.13	0.17	0.00	**0.77**	0.13	0.00	0.10	**0.23**	0.25	0.14	0.14	0.00	0.00	0.13	**0.66**	0.18	0.11	0.19	0.19	0.29
0.38	0.00	0.43	**2.18**	0.28	0.00	0.40	**0.68**	0.50	0.29	0.29	0.00	0.00	0.45	**1.52**	0.39	0.33	0.13	0.11	0.43
0.25	0.50	0.43	**3.05**	0.69	0.77	0.50	**1.96**	0.50	0.71	0.71	1.00	1.00	0.75	**4.68**	0.83	0.27	0.93	0.86	0.50
0.00	0.00	0.00	**0.41**	0.09	0.00	0.00	**0.09**	0.00	0.29	0.29	0.00	0.00	0.15	**0.72**	0.01	0.05	0.11	0.12	0.29
0.38	0.00	0.43	**2.07**	0.04	0.00	0.40	**0.44**	0.25	0.14	0.14	0.00	0.00	0.28	**0.81**	0.37	0.09	0.04	0.03	0.36
0.63	0.50	0.43	**3.18**	0.30	0.73	0.50	**1.53**	0.75	0.57	0.57	1.00	1.00	0.50	**4.39**	0.31	0.90	0.37	0.36	0.21
0.13	0.17	0.14	**0.94**	0.16	0.00	0.20	**0.36**	0.25	0.14	0.14	0.00	0.00	0.13	**0.66**	0.02	0.17	0.14	0.15	0.21
0.25	0.17	0.29	**1.80**	0.33	0.00	0.30	**0.63**	0.50	0.14	0.14	0.00	0.00	0.35	**1.14**	0.41	0.29	0.27	0.25	0.43
0.75	0.33	0.29	**3.23**	0.73	0.82	0.40	**1.95**	0.50	0.43	0.43	1.00	1.00	0.88	**4.23**	0.66	0.84	0.85	0.73	0.36
0.00	0.00	0.00	**0.26**	0.00	0.00	0.00	**0.00**	0.00	0.14	0.14	0.00	0.00	0.00	**0.29**	0.01	0.03	0.00	0.00	0.00
0.13	0.00	0.00	**0.68**	0.06	0.00	0.10	**0.16**	0.25	0.00	0.00	0.00	0.00	0.23	**0.48**	0.02	0.09	0.02	0.01	0.07
0.50	0.00	0.14	**1.76**	0.07	0.05	0.10	**0.21**	0.25	0.14	0.14	0.00	0.00	0.33	**0.86**	0.22	0.01	0.26	0.25	0.07
0.13	0.00	0.00	**0.63**	0.10	0.00	0.10	**0.20**	0.00	0.14	0.14	0.00	0.00	0.18	**0.46**	0.18	0.07	0.21	0.21	0.29
0.38	0.00	0.43	**2.12**	0.22	0.00	0.20	**0.42**	0.50	0.14	0.14	0.00	0.00	0.30	**1.09**	0.34	0.21	0.08	0.19	0.50
0.63	0.67	0.57	**4.01**	0.61	0.68	0.80	**2.09**	0.50	0.86	0.86	1.00	1.00	0.63	**4.84**	0.35	0.27	0.70	0.60	0.57
0.00	0.00	0.00	**0.47**	0.11	0.00	0.10	**0.21**	0.00	0.14	0.14	0.00	0.00	0.15	**0.44**	0.17	0.09	0.10	0.11	0.21
0.50	0.00	0.57	**2.67**	0.13	0.00	0.30	**0.43**	0.50	0.29	0.29	0.00	0.00	0.40	**1.47**	0.04	0.15	0.07	0.13	0.57
0.88	0.67	0.43	**4.18**	0.44	0.15	0.60	**1.19**	0.50	0.71	0.71	1.00	1.00	0.73	**4.65**	0.14	0.80	0.76	0.78	0.50
1	1	1		1	1	1		1	1	1	1	1	1		1	1	1	1	1
0	0	0		0	0	0		0	0	0	0	0	0		0	0	0	0	0

P-input	sq1.2.2	sq1.2.3	P-output	sq2.1.1	sq2.1.2	sq2.1.3	sq2.1.4	sq2.1.5	sq2.1.6	sq2.1.7	sq2.1.8	sq2.1.9	sq2.1.10	Q-input	sq2.2.1	sq2.2.2	sq2.2.4	sq2.2.5	sq2.2.6
0.77	0.11	0.00	0.11	0.36	0.54	0.00	0.00	0.33	0.28	0.11	0.22	0.16	0.00	2.00	0.14	0.00	0.25	0.20	0.11
1.10	0.26	0.24	0.51	0.43	0.26	0.50	0.50	0.21	0.44	0.56	0.15	0.12	0.24	3.41	0.64	0.24	0.50	0.40	0.40
2.35	0.63	0.67	1.30	0.44	0.82	0.50	0.50	0.36	0.61	0.67	0.82	0.56	0.59	5.87	0.64	0.67	0.50	0.90	0.89
1.16	0.05	0.04	0.10	0.50	0.36	0.00	0.00	0.35	0.22	0.22	0.36	0.25	0.00	2.27	0.07	0.02	0.00	0.12	0.02
1.06	0.37	0.22	0.59	0.50	0.30	0.00	0.00	0.19	0.39	0.33	0.12	0.11	0.41	2.35	0.57	0.22	0.25	0.42	0.38
2.37	0.47	0.56	1.03	0.52	0.65	0.00	0.00	0.40	0.78	0.56	0.65	0.40	0.95	4.91	0.57	0.89	0.75	0.60	0.67
0.79	0.11	0.09	0.19	0.48	0.43	0.00	0.00	0.37	0.28	0.11	0.29	0.22	0.00	2.17	0.21	0.00	0.00	0.16	0.04
1.80	0.32	0.22	0.54	0.70	0.44	0.50	0.50	0.38	0.50	0.44	0.21	0.23	0.28	4.18	0.57	0.22	0.25	0.50	0.40
3.44	0.58	0.89	1.47	0.71	0.93	1.00	1.00	0.60	0.72	0.78	0.93	0.73	0.64	8.03	0.79	0.67	0.50	0.70	0.69
0.88	0.11	0.00	0.11	0.24	0.57	0.00	0.00	0.25	0.33	0.22	0.29	0.19	0.00	2.10	0.26	0.02	0.25	0.12	0.02
1.67	0.21	0.29	0.50	0.67	0.78	0.00	0.00	0.54	0.56	0.44	0.38	0.30	0.40	4.06	0.64	0.29	0.25	0.56	0.56
3.31	0.79	1.00	1.79	0.92	1.00	0.00	0.00	0.96	0.89	0.89	1.00	0.97	0.58	7.22	0.93	1.00	0.75	0.90	0.96
0.43	0.16	0.04	0.20	0.00	0.59	0.00	0.00	0.20	0.28	0.22	0.39	0.23	0.00	1.90	0.29	0.04	0.25	0.06	0.04
1.88	0.26	0.33	0.60	0.73	0.53	0.50	0.50	0.83	0.44	0.56	0.61	0.47	0.85	6.02	0.71	0.33	0.50	0.60	0.53
4.10	0.89	0.84	1.74	1.00	0.84	1.00	0.50	0.73	1.00	0.78	0.84	1.00	1.00	8.69	1.00	0.98	0.75	1.00	1.00
1.02	0.05	0.07	0.12	0.48	0.47	0.00	0.00	0.35	0.24	0.11	0.36	0.19	0.00	2.21	0.26	0.07	0.25	0.26	0.09
1.53	0.32	0.24	0.56	0.73	0.45	0.00	0.00	0.44	0.53	0.44	0.24	0.26	0.42	3.51	0.69	0.24	0.25	0.56	0.49
3.68	0.84	0.60	1.44	0.76	0.72	0.00	0.00	1.00	0.94	0.89	0.72	0.79	0.77	6.60	0.83	0.89	0.50	0.80	0.89
1.12	0.05	0.11	0.16	0.48	0.36	0.00	0.00	0.37	0.33	0.22	0.36	0.26	0.00	2.39	0.13	0.02	0.00	0.12	0.02
1.29	0.37	0.18	0.55	0.43	0.41	0.50	0.50	0.60	0.50	0.44	0.38	0.35	0.38	4.50	0.64	0.18	0.00	0.38	0.29
3.78	0.89	0.78	1.67	0.68	0.71	0.50	1.00	0.56	0.61	0.78	0.71	0.55	0.73	6.83	0.64	0.67	0.75	1.00	0.89
0.78	0.11	0.02	0.13	0.31	0.34	0.00	0.00	0.49	0.31	0.33	0.22	0.27	0.00	2.28	0.14	0.02	0.25	0.10	0.02
1.38	0.47	0.22	0.70	0.59	0.49	0.50	0.50	0.71	0.56	0.33	0.50	0.42	0.35	4.96	0.63	0.22	0.25	0.46	0.40
4.00	1.00	0.89	1.89	0.76	0.85	0.50	0.00	0.67	0.83	0.89	0.85	0.67	0.71	6.74	0.50	0.78	1.00	0.80	0.84
0.29	0.11	0.00	0.11	0.02	0.56	0.00	0.00	0.22	0.28	0.22	0.14	0.14	0.00	1.58	0.09	0.00	0.00	0.28	0.00
1.12	0.42	0.13	0.55	0.49	0.50	0.00	0.00	0.49	0.50	0.44	0.30	0.29	0.33	3.33	0.57	0.13	0.00	0.52	0.33
3.25	0.89	0.67	1.56	0.92	0.74	0.00	0.00	0.68	0.72	0.67	0.74	0.58	0.69	5.73	0.79	0.89	0.75	0.86	0.89
0.93	0.11	0.00	0.11	0.43	0.44	0.00	0.00	0.39	0.21	0.33	0.29	0.23	0.00	2.33	0.11	0.02	0.25	0.12	0.02
1.29	0.32	0.18	0.49	0.59	0.34	0.50	0.50	0.56	0.39	0.44	0.39	0.41	0.34	4.48	0.56	0.18	0.50	0.38	0.22
3.59	0.79	0.53	1.32	0.57	0.89	1.00	1.00	0.91	0.89	0.56	0.89	0.70	0.70	8.11	0.79	0.67	1.00	0.70	0.78
0.66	0.05	0.02	0.07	0.00	0.57	0.00	0.00	0.20	0.28	0.22	0.11	0.10	0.00	1.49	0.07	0.02	0.00	0.10	0.02
0.98	0.26	0.11	0.37	0.55	0.29	0.00	0.00	0.58	0.39	0.22	0.39	0.30	0.29	3.01	0.50	0.11	0.00	0.32	0.18
1.86	0.84	0.67	1.51	0.56	0.55	0.00	0.50	0.40	0.61	0.33	0.55	0.20	0.29	3.99	0.57	0.56	0.75	0.60	0.67
0.26	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.03	0.00	0.22	0.01	0.04	0.00	0.18	0.00
0.61	0.21	0.02	0.23	0.47	0.15	0.50	0.50	0.36	0.48	0.78	0.24	0.22	0.10	3.80	0.57	0.02	0.25	0.20	0.13
1.17	0.26	0.22	0.49	0.24	0.07	0.50	0.50	0.20	0.50	0.00	0.07	0.11	0.10	2.28	0.70	0.31	0.25	0.40	0.44
1.05	0.11	0.09	0.19	0.48	0.50	0.00	0.00	0.39	0.10	0.22	0.22	0.18	0.00	2.09	0.03	0.02	0.00	0.12	0.02
0.82	0.05	0.09	0.14	0.38	0.21	0.50	0.50	0.30	0.50	0.56	0.21	0.24	0.28	3.67	0.64	0.09	0.00	0.40	0.36
2.97	0.53	0.31	0.84	0.35	0.24	0.50	0.50	0.28	0.42	0.44	0.24	0.18	0.28	3.42	0.64	0.67	0.75	0.50	0.56
1.24	0.11	0.11	0.22	0.60	0.65	0.00	0.00	0.45	0.32	0.11	0.36	0.26	0.00	2.75	0.13	0.11	0.25	0.30	0.11
1.85	0.47	0.27	0.74	0.66	0.52	0.50	0.50	0.46	0.53	0.56	0.73	0.26	0.26	4.97	0.57	0.27	0.25	0.38	0.11
4.13	0.79	0.76	1.55	0.87	0.74	1.00	1.00	0.71	0.84	0.78	0.74	0.58	0.26	7.52	0.74	0.56	0.50	0.60	0.67
0.62	0.05	0.02	0.07	0.31	0.53	0.00	0.00	0.39	0.10	0.11	0.14	0.11	0.00	1.70	0.00	0.00	0.00	0.08	0.00
0.90	0.26	0.13	0.40	0.63	0.05	0.00	0.00	0.02	0.39	0.44	0.01	0.04	0.38	1.96	0.47	0.13	0.00	0.26	0.18
2.28	0.37	0.31	0.68	0.33	0.01	0.00	0.00	0.07	0.39	0.44	0.01	0.32	0.38	1.95	0.57	0.60	0.50	0.40	0.47
0.94	0.16	0.04	0.20	0.48	0.43	0.00	0.00	0.41	0.32	0.33	0.29	0.23	0.00	2.49	0.27	0.02	0.25	0.10	0.02
1.88	0.32	0.31	0.63	0.66	0.55	0.50	0.50	0.75	0.39	0.78	0.53	0.42	0.35	5.43	0.69	0.31	0.25	0.58	0.40
4.09	0.89	0.76	1.65	0.92	0.90	0.50	1.00	1.00	0.89	1.00	0.90	0.93	0.35	8.38	0.57	0.38	1.00	0.80	0.84
0.71	0.05	0.02	0.07	0.29	0.44	0.00	0.00	0.37	0.31	0.22	0.14	0.14	0.00	1.92	0.23	0.04	0.00	0.10	0.04
1.27	0.26	0.11	0.37	0.65	0.27	0.00	0.00	0.68	0.33	0.44	0.40	0.32	0.33	3.43	0.50	0.11	0.00	0.52	0.38
1.97	1.00	0.84	1.84	0.45	0.58	0.00	0.00	0.37	0.56	0.56	0.58	0.45	0.33	3.86	0.64	0.44	0.75	0.80	0.82
0.61	0.11	0.02	0.13	0.36	0.26	0.00	0.00	0.33	0.32	0.22	0.22	0.17	0.00	1.88	0.07	0.02	0.00	0.08	0.07
0.86	0.26	0.09	0.35	0.42	0.21	0.50	0.50	0.47	0.50	0.56	0.36	0.29	0.35	4.14	0.50	0.09	0.00	0.30	0.24
1.89	0.89	0.98	1.87	0.34	0.42	0.50	0.50	0.28	0.50	0.67	0.42	0.32	0.35	4.30	0.57	0.33	0.75	1.00	0.84
1.03	0.05	0.07	0.12	0.43	0.27	0.00	0.00	0.39	0.28	0.33	0.22	0.19	0.00	2.12	0.27	0.07	0.25	0.16	0.07
1.68	0.37	0.22	0.59	0.63	0.52	0.00	0.00	0.57	0.56	0.67	0.38	0.33	0.26	3.92	0.64	0.22	0.50	0.58	0.44
3.64	0.89	0.67	1.56	0.87	0.76	1.00	1.00	0.71	0.89	0.78	0.76	0.59	0.26	7.62	0.86	0.56	1.00	0.80	0.82
0.83	0.05	0.09	0.14	0.53	0.47	0.00	0.00	0.37	0.29	0.22	0.36	0.24	0.00	2.48	0.19	0.04	0.00	0.14	0.04
1.68	0.42	0.11	0.53	0.65	0.39	0.50	0.50	0.77	0.54	0.67	0.52	0.40	0.30	5.25	0.57	0.11	0.25	0.48	0.33
3.68	0.95	0.91	1.86	0.65	0.86	0.50	0.50	0.53	0.78	0.56	0.86	0.68	0.30	6.21	0.74	0.84	0.75	0.90	0.78
1.01	0.11	0.04	0.15	0.55	0.29	0.00	0.00	0.35	0.28	0.11	0.29	0.22	0.00	2.08	0.17	0.00	0.00	0.10	0.00
1.09	0.32	0.07	0.38	0.54	0.14	0.00	0.00	0.40	0.22	0.56	0.25	0.22	0.28	2.61	0.43	0.07	0.25	0.48	0.40
1.63	0.74	0.67	1.40	0.23	0.71	0.00	0.00	0.19	0.83	0.67	0.71	0.55	0.28	4.17	0.57	0.78	0.50	0.20	0.22
1.10	0.00	0.07	0.07	0.48	0.30	0.00	0.00	0.47	0.20	0.11	0.22	0.19	0.00	1.97	0.14	0.02	0.25	0.10	0.02
1.24	0.37	0.31	0.68	0.63	0.27	0.50	0.50	0.54	0.39	0.56	0.39	0.30	0.33	4.39	0.64	0.31	0.25	0.42	0.33
1.92	1.00	0.51	1.51	0.44	0.85	1.00	1.00	0.36	0.61	0.44	0.85	0.66	0.33	6.65	0.66	0.73	0.50	0.92	0.78
0.56	0.00	0.02	0.02	0.24	0.14	0.00	0.00	0.16	0.32	0.22	0.14	0.11	0.00	1.34	0.07	0.02	0.00	0.08	0.09
1.10	0.26	0.24	0.51	0.49	0.40	0.00	0.00	0.44	0.48	0.33	0.26	0.21	0.36	2.97	0.57	0.24	0.25	0.34	0.31
3.18	0.58	0.76	1.33	0.66	0.68	0.00	0.00	0.54	0.64	0.44	0.68	0.53	0.36	4.55	0.76	0.82	0.75	1.00	0.89
0.43	0.11	0.02	0.13	0.02	0.14	0.00	0.00	0.08	0.09	0.22	0.14	0.15	0.00	0.85	0.00	0.04	0.00	0.08	0.04
0.98	0.21	0.00	0.21	0.20	0.32	0.00	0.00	0.62	0.43	0.56	0.40	0.33	0.08	2.94	0.50	0.00	0.00	0.24	0.22
1.21	0.21	0.29	0.50	0.54	0.10	0.00	0.00	0.44	0.67	0.33	0.10	0.05	0.09	2.31	0.57	0.67	0.75	0.90	0.87
0.96	0.05	0.04	0.10	0.36	0.22	0.00	0.00	0.33	0.28	0.22	0.22	0.19	0.00	1.82	0.03	0.07	0.25	0.10	0.07
1.39	0.32	0.29	0.60	0.68	0.48	0.50	0.50	0.58	0.47	0.33	0.38	0.20	0.36	4.48	0.50	0.29	0.25	0.30	0.24
3.39	0.84	0.67	1.51	0.28	0.10	0.50	0.50	0.23	0.83	0.44	0.10	0.30	0.33	3.63	0.70	0.44	0.50	0.80	0.89
0.58	0.11	0.02	0.13	0.05	0.13	0.00	0.00	0.00	0.00	0.11	0.13	0.13	0.00	0.54	0.01	0.00	0.00	0.00	0.00
0.89	0.21	0.13	0.34	0.30	0.17	0.50	0.50	0.54	0.33	0.00	0.38	0.38	0.33	3.44	0.47	0.13	0.00	0.22	0.16
2.16	0.53	0.22	0.75	0.81	0.91	1.00	0.50	0.66	0.78	0.44	0.91	0.83	0.36	7.18	0.64	0.56	0.75	0.72	0.67
0.70	0.05	0.02	0.07	0.07	0.22	0.00	0.00	0.02	0.32	0.22	0.22	0.16	0.00	1.23	0.03	0.00	0.25	0.10	0.00
1.66	0.21	0.20	0.41	0.54	0.52	0.50	0.50	0.58	0.39	0.33	0.38	0.41	0.31	4.46	0.57	0.20	0.25	0.24	0.24
3.44	0.89	0.76	1.65	0.86	0.84	1.00	0.50	0.71	0.61	0.33	0.84	0.66	0.31	6.66	0.57	0.51	0.75	0.80	0.89
0.04	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.20	0.11	0.11	0.02	0.00	0.00	0.50	0.04	0.00	0.00	0.08	0.00
0.22	0.21	0.09	0.30	0.20	0.01	0.00	0.00	0.05	0.44	0.22	0.04	0.05	0.30	1.31	0.46	0.09	0.25	0.20	0.13
0.81	0.05	0.33	0.39	0.33	0.10	0.00	0.00	0.01	0.50	0.22	0.10	0.20	0.30	1.76	0.64	0.22	0.50	0.36	0.29
0.95	0.05	0.04	0.10	0.36	0.22	0.00	0.00	0.39	0.26	0.22	0.22	0.18	0.00	1.84	0.07	0.04	0.00	0.14	0.18
1.32	0.37	0.16	0.52	0.47	0.42	0.00	0.00	0.34	0.41	0.56	0.24	0.22	0.28	2.93	0.50	0.16	0.25	0.26	0.22
2.49	0.58	0.62	1.20	0.70	0.43	0.00	0.00	0.57	0.61	0.56	0.43	0.33	0.28	3.90	0.64	0.64	0.75	0.60	0.62
0.68	0.05	0.07	0.12	0.34	0.40	0.00	0.00	0.27	0.18	0.33	0.26	0.22	0.00	2.00	0.14	0.07	0.00	0.10	0.16
0.96	0.42	0.24	0.67	0.41	0.28	0.50	0.50	0.75	0.47	0.44	0.53	0.45	0.24	4.57	0.47	0.24	0.25	0.30	0.33
2.98	0.68	0.47	1.15	0.47	0.16	0.50	0.00	0.38	0.84	0.44	0.16	0.12	0.24	3.33	0.63	0.76	1.00	0.50	0.56
	1	1		1	1	1	1	1	1	1	1	1	1		1	1	1	1	1
	0	0		0	0	0	0	0	0	0	0	0	0		0	0	0	0	0

Q-output	sq3.1.3	sq3.1.4	sq3.1.5	sq3.1.6	F-input	sq3.2.4	sq3.2.5	F-output	sq4.1.1	sq4.1.2	sq4.1.3	sq4.1.4	sq4.1.5	S-input	sq4.2.1	sq4.2.2	sq4.2.3	sq4.2.4	sq4.2.5
0.70	0.17	0.04	0.11	0.11	**0.43**	0.18	0.50	**0.68**	0.24	0.30	0.08	0.25	0.36	**1.23**	0.20	0.22	0.00	0.13	0.00
2.19	0.33	0.15	0.21	0.56	**1.26**	0.53	0.75	**1.28**	0.19	0.40	0.08	0.25	0.84	**1.76**	0.40	0.56	0.38	0.38	0.17
3.60	0.83	0.64	0.56	0.67	**2.70**	0.65	0.99	**1.64**	0.83	0.60	0.75	0.40	0.84	**3.41**	0.60	0.67	0.88	0.75	0.50
0.24	0.00	0.14	0.14	0.22	**0.60**	0.06	0.10	**0.16**	0.19	0.20	0.00	0.24	0.71	**1.35**	0.20	0.17	0.13	0.13	0.00
1.84	0.50	0.17	0.25	0.44	**1.36**	0.41	0.70	**1.12**	0.17	0.70	0.17	0.24	0.84	**2.12**	0.70	0.50	0.50	0.50	0.17
3.48	0.67	0.42	0.40	0.56	**2.04**	0.71	0.99	**1.70**	0.67	0.80	0.83	0.43	0.84	**3.68**	0.80	0.78	0.75	0.50	0.83
0.42	0.17	0.08	0.12	0.11	**0.48**	0.18	0.00	**0.18**	0.19	0.30	0.08	0.22	0.54	**1.33**	0.20	0.22	0.00	0.13	0.17
1.94	0.33	0.25	0.33	0.67	**1.68**	0.47	0.75	**1.22**	0.31	0.50	0.08	0.42	0.56	**1.87**	0.50	0.50	0.50	0.50	0.00
3.34	1.00	0.99	0.73	0.78	**3.60**	0.59	0.97	**1.66**	0.93	0.70	0.58	0.99	0.56	**3.76**	0.70	0.72	0.75	0.63	0.33
0.67	0.17	0.08	0.15	0.22	**0.62**	0.24	0.25	**0.49**	0.22	0.40	0.08	0.00	0.64	**1.36**	0.30	0.28	0.25	0.25	0.17
2.30	0.67	0.32	0.48	0.56	**2.02**	0.59	0.70	**1.29**	0.42	0.70	0.25	0.56	0.76	**2.69**	0.60	0.61	0.38	0.38	0.33
4.53	0.83	0.97	0.97	0.56	**3.33**	0.82	0.98	**1.80**	1.00	0.50	1.00	0.75	0.76	**4.01**	0.50	0.94	1.00	0.88	0.50
0.68	0.17	0.04	0.12	0.22	**0.65**	0.29	0.60	**0.90**	0.25	0.40	0.08	0.33	0.36	**1.42**	0.20	0.17	0.00	0.13	0.17
2.68	0.67	0.30	0.39	0.67	**2.03**	0.71	0.75	**1.46**	0.62	0.70	0.08	0.62	0.85	**2.87**	0.60	0.61	0.50	0.50	0.00
4.73	1.00	1.00	1.00	0.67	**3.67**	1.00	1.00	**2.00**	0.85	0.60	0.92	1.00	1.00	**4.36**	0.60	0.94	0.63	0.88	0.33
0.92	0.17	0.12	0.16	0.11	**0.66**	0.18	0.50	**0.68**	0.25	0.30	0.08	0.33	0.46	**1.43**	0.20	0.19	0.13	0.25	0.17
2.23	0.33	0.34	0.48	0.78	**1.93**	0.53	0.70	**1.23**	0.35	0.40	0.17	0.47	0.80	**2.19**	0.50	0.59	0.63	0.63	0.17
3.91	1.00	0.86	0.79	0.78	**3.43**	0.88	0.98	**1.86**	0.73	0.70	0.92	0.81	0.80	**3.96**	0.70	0.94	0.75	0.63	0.67
0.29	0.00	0.12	0.12	0.22	**0.47**	0.21	0.50	**0.71**	0.22	0.30	0.08	0.30	0.18	**1.08**	0.40	0.33	0.25	0.25	0.17
1.49	0.33	0.23	0.32	0.00	**0.89**	0.59	0.65	**1.24**	0.46	0.70	0.25	0.61	0.80	**2.82**	0.40	0.56	0.38	0.38	0.33
3.95	0.00	0.64	0.56	0.11	**1.31**	0.94	0.96	**1.91**	0.72	0.80	0.83	0.39	0.80	**3.64**	0.80	0.61	0.63	0.75	0.50
0.64	0.17	0.11	0.11	0.44	**0.83**	0.29	0.25	**0.66**	0.18	0.40	0.08	0.26	0.71	**1.64**	0.30	0.26	0.25	0.25	0.17
1.96	0.67	0.28	0.36	0.67	**1.97**	0.29	0.75	**1.06**	0.54	0.60	0.25	0.55	0.77	**2.71**	0.60	0.44	0.50	0.50	0.50
3.92	1.00	0.63	0.67	0.33	**2.63**	0.88	0.98	**1.86**	0.86	0.50	0.83	0.54	0.77	**3.60**	0.50	0.94	0.75	0.88	0.33
0.37	0.00	0.15	0.15	0.22	**0.62**	0.13	0.25	**0.38**	0.23	0.30	0.08	0.22	0.36	**1.20**	0.30	0.27	0.13	0.13	0.00
1.66	0.33	0.28	0.44	0.56	**1.61**	0.59	0.60	**1.19**	0.38	0.50	0.17	0.51	0.76	**2.32**	0.30	0.67	0.50	0.50	0.17
4.17	0.83	0.73	0.58	0.56	**2.70**	0.82	0.97	**1.80**	0.75	0.40	1.00	0.51	0.76	**3.41**	0.40	0.94	0.50	1.00	0.17
0.63	0.17	0.12	0.11	0.33	**0.73**	0.24	0.50	**0.74**	0.25	0.30	0.08	0.26	0.61	**1.60**	0.40	0.28	0.25	0.13	0.00
1.84	0.50	0.30	0.27	0.44	**1.61**	0.65	0.60	**1.26**	0.43	0.40	0.25	0.58	0.74	**2.41**	0.50	0.56	0.38	0.38	0.33
3.93	0.67	0.74	0.70	0.44	**2.66**	0.76	0.96	**1.73**	0.89	0.70	0.83	0.70	0.74	**3.87**	0.70	0.83	1.00	1.00	0.50
0.22	0.00	0.04	0.06	0.22	**0.32**	0.24	0.25	**0.49**	0.11	0.20	0.00	0.19	0.54	**1.03**	0.30	0.22	0.25	0.25	0.00
1.11	0.33	0.17	0.26	0.33	**1.10**	0.65	0.65	**1.30**	0.45	0.30	0.25	0.60	0.40	**2.00**	0.30	0.50	0.25	0.25	0.33
3.14	0.50	0.25	0.21	0.33	**1.29**	0.88	0.90	**1.79**	0.10	0.50	0.67	0.50	0.40	**2.17**	0.50	0.56	0.88	1.00	0.33
0.24	0.00	0.01	0.01	0.00	**0.02**	0.22	0.00	**0.22**	0.08	0.10	0.00	0.00	0.18	**0.36**	0.10	0.00	0.00	0.00	0.00
1.18	0.00	0.08	0.11	0.22	**0.42**	0.24	0.50	**0.74**	0.05	0.20	0.08	0.40	0.20	**0.93**	0.30	0.44	0.13	0.13	0.00
2.11	0.33	0.06	0.12	0.11	**0.63**	0.65	0.75	**1.40**	0.10	0.30	0.08	0.25	0.20	**0.94**	0.30	0.71	0.50	0.88	0.17
0.19	0.00	0.15	0.16	0.22	**0.53**	0.18	0.00	**0.18**	0.16	0.20	0.00	0.06	0.39	**0.81**	0.20	0.16	0.13	0.13	0.17
1.49	0.50	0.12	0.16	0.67	**1.45**	0.35	0.50	**0.86**	0.25	0.40	0.17	0.34	0.56	**1.72**	0.40	0.56	0.38	0.38	0.17
3.12	1.00	0.25	0.19	0.89	**2.32**	0.76	0.96	**1.72**	0.27	0.40	0.75	0.03	0.56	**2.01**	0.40	0.72	0.63	0.75	0.50
0.90	0.17	0.14	0.15	0.11	**0.56**	0.12	0.50	**0.62**	0.19	0.40	0.08	0.22	0.43	**1.33**	0.30	0.11	0.25	0.13	0.00
1.68	0.50	0.29	0.41	0.56	**1.76**	0.35	0.55	**0.91**	0.36	0.60	0.25	0.49	0.51	**2.21**	0.60	0.39	0.50	0.50	0.33
3.07	0.83	0.09	0.58	0.56	**2.06**	0.88	0.96	**1.86**	0.75	1.00	0.83	0.75	0.51	**3.84**	1.00	0.93	0.75	0.88	0.83
0.08	0.00	0.06	0.08	0.11	**0.25**	0.24	0.00	**0.24**	0.14	0.20	0.00	0.15	0.50	**0.99**	0.20	0.06	0.13	0.13	0.17
1.04	0.33	0.03	0.15	0.67	**1.18**	0.59	0.50	**1.09**	0.09	0.50	0.17	0.01	0.43	**1.20**	0.50	0.50	0.50	0.50	0.17
2.64	1.00	0.27	0.33	0.67	**2.27**	0.82	0.97	**1.79**	0.01	0.30	0.50	0.09	0.43	**1.33**	0.30	0.61	0.50	0.38	0.67
0.67	0.17	0.15	0.17	0.44	**0.93**	0.29	0.25	**0.66**	0.18	0.40	0.08	0.33	0.54	**1.53**	0.50	0.22	0.25	0.25	0.17
2.23	0.67	0.33	0.43	0.78	**2.21**	0.53	0.75	**1.28**	0.57	0.50	0.25	0.58	0.44	**2.34**	0.60	0.48	0.50	0.50	0.33
3.69	1.00	0.98	0.93	1.00	**3.91**	1.00	0.98	**1.98**	0.90	0.70	1.00	0.94	0.44	**3.98**	0.70	0.83	1.00	1.00	0.67
0.42	0.00	0.04	0.07	0.22	**0.33**	0.21	0.00	**0.21**	0.11	0.30	0.00	0.11	0.36	**0.88**	0.30	0.10	0.13	0.13	0.00
1.61	0.50	0.15	0.21	0.56	**1.42**	0.47	0.55	**1.02**	0.52	0.40	0.17	0.51	0.45	**2.04**	0.40	0.44	0.38	0.38	0.17
3.46	0.83	0.43	0.45	0.56	**2.27**	0.88	0.85	**1.74**	0.59	0.60	0.50	0.56	0.45	**2.70**	0.60	0.56	0.63	0.63	0.50
0.24	0.00	0.12	0.12	0.22	**0.47**	0.18	0.50	**0.68**	0.25	0.30	0.00	0.13	0.64	**1.32**	0.30	0.06	0.00	0.00	0.00
1.13	0.33	0.12	0.16	0.44	**1.06**	0.35	0.60	**0.96**	0.37	0.30	0.08	0.50	0.48	**1.74**	0.30	0.50	0.25	0.25	0.00
3.60	0.67	0.51	0.33	0.78	**2.29**	0.82	0.85	**1.68**	0.44	0.40	0.42	0.40	0.48	**2.14**	0.40	0.70	0.75	0.75	0.33
0.81	0.17	0.12	0.15	0.33	**0.77**	0.12	0.00	**0.12**	0.23	0.40	0.08	0.32	0.64	**1.67**	0.40	0.26	0.00	0.00	0.17
2.39	0.50	0.29	0.41	0.67	**1.87**	0.65	0.75	**1.40**	0.44	0.60	0.08	0.60	0.52	**2.24**	0.60	0.72	0.50	0.50	0.00
4.03	1.00	0.82	0.60	0.89	**3.30**	0.76	0.96	**1.73**	0.77	0.80	0.83	0.73	0.52	**3.64**	0.80	0.78	0.88	0.88	0.67
0.41	0.00	0.14	0.14	0.22	**0.50**	0.06	0.00	**0.06**	0.27	0.30	0.08	0.24	0.57	**1.47**	0.30	0.08	0.00	0.13	0.00
1.76	0.33	0.22	0.31	0.56	**1.42**	0.53	0.70	**1.23**	0.58	0.50	0.08	0.60	0.60	**2.37**	0.60	0.54	0.50	0.50	0.00
4.02	0.83	0.87	0.68	0.67	**3.05**	0.53	0.97	**1.60**	0.87	0.90	0.83	0.91	0.60	**4.11**	0.90	1.00	0.75	0.75	1.00
0.27	0.00	0.11	0.15	0.11	**0.36**	0.12	0.25	**0.37**	0.22	0.20	0.00	0.30	0.36	**1.07**	0.20	0.06	0.00	0.00	0.00
1.63	0.50	0.08	0.11	0.33	**1.02**	0.47	0.50	**0.97**	0.32	0.30	0.08	0.43	0.40	**1.54**	0.30	0.28	0.25	0.25	0.00
2.27	0.50	0.51	0.56	0.78	**2.35**	0.71	0.90	**1.61**	0.72	0.70	1.00	0.49	0.40	**3.31**	0.70	0.50	0.25	0.25	0.33
0.64	0.17	0.12	0.16	0.11	**0.66**	0.18	0.00	**0.18**	0.25	0.30	0.08	0.32	0.71	**1.66**	0.30	0.11	0.13	0.13	0.17
1.96	0.33	0.15	0.21	0.44	**1.14**	0.35	0.75	**1.11**	0.42	0.40	0.17	0.56	0.56	**2.11**	0.40	0.50	0.38	0.38	0.17
3.69	0.67	0.89	0.67	0.56	**2.78**	0.94	0.97	**1.92**	0.85	0.80	0.83	0.54	0.56	**3.68**	0.80	0.61	0.75	0.75	0.33
0.26	0.00	0.09	0.15	0.22	**0.46**	0.15	0.00	**0.15**	0.19	0.20	0.00	0.26	0.29	**0.94**	0.30	0.03	0.13	0.13	0.17
1.72	0.17	0.22	0.31	0.44	**1.16**	0.41	0.70	**1.12**	0.35	0.30	0.17	0.47	0.73	**2.02**	0.30	0.60	0.25	0.25	0.17
4.22	0.67	0.83	0.54	0.44	**2.48**	0.88	0.85	**1.74**	0.70	0.60	0.50	0.43	0.73	**2.96**	0.60	0.77	0.50	0.50	0.33
0.17	0.00	0.11	0.11	0.22	**0.44**	0.00	0.00	**0.00**	0.22	0.30	0.00	0.20	0.21	**0.94**	0.30	0.02	0.00	0.00	0.00
0.96	0.33	0.18	0.26	0.22	**1.00**	0.29	0.50	**0.80**	0.09	0.20	0.08	0.53	0.17	**1.07**	0.30	0.50	0.13	0.13	0.00
3.75	0.33	0.08	0.01	0.67	**1.09**	0.82	0.90	**1.73**	0.10	0.30	0.42	0.25	0.20	**1.27**	0.30	0.61	0.50	0.50	0.17
0.61	0.00	0.15	0.16	0.22	**0.63**	0.18	0.00	**0.18**	0.22	0.20	0.08	0.24	0.54	**1.28**	0.40	0.08	0.00	0.13	0.17
1.68	0.33	0.27	0.38	0.44	**1.43**	0.47	0.70	**1.17**	0.45	0.40	0.08	0.60	0.95	**2.48**	0.50	0.50	0.38	0.38	0.00
3.33	0.67	0.94	0.83	0.44	**2.88**	0.76	0.97	**1.74**	0.91	0.70	0.83	0.58	0.95	**3.97**	0.70	0.67	0.50	0.25	0.50
0.01	0.00	0.06	0.09	0.11	**0.27**	0.29	0.25	**0.55**	0.16	0.20	0.00	0.22	0.25	**0.84**	0.40	0.01	0.00	0.00	0.00
0.98	0.33	0.09	0.13	0.22	**0.78**	0.29	0.50	**0.80**	0.42	0.40	0.08	0.57	0.52	**1.99**	0.40	0.49	0.38	0.38	0.00
3.34	0.33	0.33	0.31	0.22	**1.19**	0.76	0.85	**1.62**	0.14	0.30	0.58	0.30	0.52	**1.84**	0.30	0.70	0.63	0.63	0.50
0.38	0.00	0.12	0.16	0.22	**0.60**	0.08	0.50	**0.58**	0.23	0.30	0.08	0.24	0.57	**1.43**	0.30	0.08	0.13	0.13	0.17
1.61	0.50	0.29	0.41	0.33	**1.63**	0.53	0.60	**1.13**	0.45	0.30	0.17	0.60	0.64	**2.16**	0.50	0.44	0.25	0.25	0.17
3.62	0.50	0.79	0.66	0.33	**2.28**	0.94	0.96	**1.90**	0.84	0.50	0.83	0.95	0.64	**3.77**	0.50	0.61	0.75	0.75	0.33
0.12	0.00	0.00	0.00	0.11	**0.11**	0.12	0.00	**0.12**	0.00	0.00	0.00	0.06	0.00	**0.06**	0.20	0.06	0.00	0.00	0.00
1.13	0.17	0.02	0.01	0.22	**0.42**	0.18	0.50	**0.68**	0.01	0.10	0.08	0.10	0.77	**1.06**	0.10	0.33	0.13	0.13	0.00
2.01	0.33	0.05	0.21	0.00	**0.69**	0.53	0.80	**1.33**	0.05	0.10	0.58	0.14	0.30	**1.17**	0.00	0.61	0.50	0.50	0.00
0.43	0.00	0.12	0.14	0.22	**0.48**	0.18	0.25	**0.43**	0.18	0.20	0.08	0.24	0.43	**1.13**	0.30	0.20	0.00	0.13	0.00
1.39	0.50	0.24	0.33	0.44	**1.61**	0.47	0.70	**1.17**	0.28	0.40	0.08	0.38	0.56	**1.70**	0.50	0.44	0.38	0.38	0.00
3.26	0.67	0.42	0.34	0.78	**2.20**	0.76	0.97	**1.73**	0.45	0.80	0.67	0.40	0.56	**2.87**	0.80	0.72	0.63	0.63	0.67
0.47	0.00	0.12	0.16	0.33	**0.61**	0.24	0.00	**0.24**	0.16	0.20	0.08	0.22	0.29	**0.96**	0.30	0.17	0.00	0.00	0.00
1.60	0.67	0.16	0.22	0.56	**1.60**	0.53	0.65	**1.18**	0.57	0.50	0.08	0.40	0.54	**2.09**	0.50	0.50	0.50	0.50	0.00
3.44	0.83	0.46	0.13	0.56	**1.98**	0.82	0.96	**1.79**	0.20	0.90	0.83	0.37	0.54	**2.84**	0.90	0.56	0.75	0.88	0.67
	1	1	1	1		1	1		1	1	1	1	1		1	1	1	1	1
	0	0	0	0		0	0		0	0	0	0	0		0	0	0	0	0

sq4.2.7	S-output	sq5.1.1	sq5.1.6	q5.1.9	I-input	sq5.2.3	sq5.2.4	sq5.2.5	sq5.2.6	sq5.2.8	sq5.2.11	I-output
0.00	**0.55**	0.09	0.00	0.10	**0.44**	0.25	0.29	0.14	0.00	0.00	0.18	**0.85**
0.43	**2.30**	0.22	0.00	0.30	**1.02**	0.50	0.43	0.43	0.00	0.00	0.40	**1.76**
0.43	**3.82**	0.42	0.51	0.70	**2.38**	0.75	0.86	0.86	1.00	1.00	0.80	**5.26**
0.14	**0.76**	0.08	0.00	0.10	**0.18**	0.00	0.14	0.29	0.00	0.00	0.20	**0.63**
0.57	**2.94**	0.24	0.00	0.40	**1.14**	0.50	0.57	0.57	0.00	0.00	0.38	**2.02**
0.71	**4.38**	0.46	0.47	0.60	**2.03**	0.50	0.86	0.86	0.00	0.00	0.83	**3.04**
0.00	**0.71**	0.15	0.00	0.10	**0.25**	0.00	0.14	0.14	0.00	0.00	0.15	**0.44**
0.57	**2.57**	0.26	0.00	0.40	**0.66**	0.50	0.29	0.29	0.00	0.00	0.38	**1.45**
0.86	**3.99**	0.63	0.72	0.80	**2.15**	0.75	0.71	0.71	1.00	1.00	0.75	**4.93**
0.29	**1.53**	0.16	0.00	0.20	**0.36**	0.25	0.29	0.29	0.00	0.00	0.25	**1.07**
0.43	**2.72**	0.28	0.00	0.30	**0.58**	0.50	0.43	0.43	0.00	0.00	0.45	**1.81**
0.57	**4.39**	1.00	1.00	0.60	**2.60**	0.75	0.71	0.71	1.00	1.00	1.00	**5.18**
0.00	**0.66**	0.17	0.00	0.20	**0.37**	0.25	0.29	0.14	0.00	0.00	0.15	**0.83**
0.57	**2.78**	0.34	0.00	0.30	**0.64**	0.50	0.43	0.43	0.00	0.00	0.50	**1.86**
0.71	**4.09**	0.75	0.83	0.70	**2.28**	1.00	0.86	0.86	1.00	1.00	0.95	**5.66**
0.14	**1.07**	0.10	0.00	0.10	**0.20**	0.25	0.29	0.29	0.00	0.00	0.15	**0.97**
0.43	**2.93**	0.22	0.00	0.40	**0.62**	0.50	0.29	0.29	0.00	0.00	0.40	**1.47**
0.57	**4.26**	0.65	0.53	0.80	**1.99**	0.50	0.86	0.86	1.00	1.00	0.75	**4.96**
0.29	**1.69**	0.10	0.00	0.10	**0.20**	0.00	0.29	0.29	0.00	0.00	0.20	**0.77**
0.43	**2.47**	0.16	0.00	0.40	**0.56**	0.50	0.29	0.29	0.00	0.00	0.33	**1.40**
0.86	**4.14**	0.60	0.47	0.50	**1.56**	0.50	0.57	0.57	1.00	1.00	0.70	**4.34**
0.29	**1.51**	0.18	0.00	0.20	**0.38**	0.25	0.14	0.14	0.00	0.00	0.15	**0.69**
0.57	**3.12**	0.33	0.00	0.30	**0.63**	0.50	0.14	0.14	0.00	0.00	0.38	**1.16**
0.71	**4.12**	0.70	0.79	0.40	**1.89**	0.75	0.43	0.43	1.00	1.00	0.88	**4.48**
0.14	**0.96**	0.15	0.00	0.10	**0.25**	0.00	0.14	0.14	0.00	0.00	0.18	**0.46**
0.57	**2.70**	0.15	0.00	0.30	**0.45**	0.50	0.29	0.29	0.00	0.00	0.28	**1.35**
0.57	**3.58**	0.71	0.59	0.60	**1.90**	0.75	0.71	0.71	1.00	1.00	0.63	**4.80**
0.29	**1.34**	0.13	0.00	0.10	**0.23**	0.25	0.14	0.14	0.00	0.00	0.15	**0.69**
0.43	**2.57**	0.26	0.00	0.20	**0.46**	0.50	0.43	0.43	0.00	0.00	0.33	**1.68**
0.71	**4.75**	0.51	0.57	0.50	**1.58**	0.75	0.57	0.57	1.00	1.00	0.60	**4.49**
0.29	**1.31**	0.11	0.00	0.10	**0.21**	0.00	0.00	0.00	0.00	0.00	0.13	**0.13**
0.29	**1.92**	0.10	0.00	0.20	**0.30**	0.25	0.29	0.29	0.00	0.00	0.25	**1.07**
0.43	**3.69**	0.45	0.51	0.40	**1.36**	0.50	0.43	0.43	0.00	0.00	0.38	**1.73**
0.00	**0.10**	0.04	0.00	0.00	**0.04**	0.00	0.00	0.00	0.00	0.00	0.20	**0.20**
0.14	**1.14**	0.25	0.00	0.10	**0.35**	0.25	0.00	0.00	0.00	0.00	0.15	**0.40**
0.29	**2.84**	0.27	0.00	0.80	**1.07**	0.00	0.43	0.43	0.00	0.00	0.25	**1.11**
0.14	**0.92**	0.09	0.00	0.10	**0.19**	0.00	0.29	0.29	0.00	0.00	0.18	**0.75**
0.43	**2.30**	0.27	0.00	0.30	**0.57**	0.75	0.14	0.14	0.00	0.00	0.23	**1.26**
0.43	**3.43**	0.35	0.07	0.90	**1.32**	0.75	0.29	0.29	1.00	1.00	0.30	**3.62**
0.29	**1.07**	0.13	0.00	0.10	**0.23**	0.25	0.00	0.00	0.00	0.00	0.20	**0.45**
0.57	**2.89**	0.30	0.00	0.40	**0.70**	0.25	0.29	0.29	0.00	0.00	0.43	**1.25**
0.71	**5.11**	0.74	0.83	0.60	**2.16**	0.75	0.71	0.71	1.00	1.00	0.75	**4.93**
0.14	**0.82**	0.12	0.00	0.00	**0.12**	0.00	0.00	0.00	0.00	0.00	0.18	**0.18**
0.57	**2.74**	0.12	0.00	0.20	**0.32**	0.25	0.29	0.29	0.00	0.00	0.28	**1.10**
0.57	**3.02**	0.15	0.17	0.70	**1.03**	0.50	0.86	0.86	0.00	0.00	0.30	**2.51**
0.29	**1.67**	0.17	0.00	0.20	**0.37**	0.25	0.14	0.14	0.00	0.00	0.20	**0.74**
0.57	**2.98**	0.31	0.00	0.30	**0.61**	0.50	0.43	0.43	0.00	0.00	0.48	**1.83**
0.57	**4.77**	0.77	0.86	1.00	**2.64**	1.00	1.00	1.00	1.00	1.00	0.88	**5.88**
0.14	**0.79**	0.06	0.00	0.10	**0.16**	0.00	0.14	0.14	0.00	0.00	0.18	**0.46**
0.43	**2.19**	0.12	0.00	0.40	**0.52**	0.50	0.29	0.29	0.00	0.00	0.25	**1.32**
0.43	**3.33**	0.42	0.48	0.60	**1.50**	0.50	0.71	0.71	0.00	0.00	0.75	**2.68**
0.00	**0.36**	0.08	0.00	0.10	**0.18**	0.00	0.00	0.00	0.00	0.00	0.20	**0.20**
0.29	**1.59**	0.13	0.00	0.30	**0.43**	0.25	0.29	0.29	0.00	0.00	0.23	**1.05**
0.29	**3.22**	0.34	0.11	0.80	**1.25**	0.75	0.57	0.57	0.00	0.00	0.38	**2.27**
0.00	**0.82**	0.15	0.00	0.20	**0.35**	0.25	0.14	0.14	0.00	0.00	0.18	**0.71**
0.57	**2.89**	0.29	0.00	0.30	**0.59**	0.50	0.43	0.43	0.00	0.00	0.38	**1.73**
0.57	**4.57**	0.74	0.83	0.90	**2.47**	0.50	0.86	0.86	1.00	1.00	0.83	**5.04**
0.00	**0.50**	0.12	0.00	0.10	**0.22**	0.00	0.29	0.29	0.00	0.00	0.18	**0.75**
0.57	**2.72**	0.28	0.00	0.20	**0.48**	0.50	0.29	0.29	0.00	0.00	0.25	**1.32**
1.00	**5.40**	0.57	0.64	0.70	**1.92**	0.50	0.86	0.86	1.00	1.00	0.50	**4.71**
0.00	**0.26**	0.05	0.00	0.10	**0.15**	0.00	0.43	0.29	0.00	0.00	0.20	**0.91**
0.29	**1.36**	0.30	0.00	0.20	**0.50**	0.25	0.29	0.29	0.00	0.00	0.20	**1.02**
0.29	**2.32**	0.26	0.13	0.80	**1.19**	0.75	1.00	1.00	1.00	1.00	0.60	**5.35**
0.14	**0.97**	0.17	0.00	0.20	**0.37**	0.25	0.14	0.14	0.00	0.00	0.15	**0.69**
0.43	**2.25**	0.31	0.00	0.30	**0.61**	0.50	0.14	0.14	0.00	0.00	0.48	**1.26**
0.29	**3.53**	0.42	0.47	0.60	**1.49**	0.25	0.71	0.71	1.00	1.00	0.63	**4.30**
0.14	**0.89**	0.09	0.00	0.10	**0.19**	0.00	0.14	0.14	0.00	0.00	0.13	**0.41**
0.29	**1.85**	0.26	0.00	0.30	**0.56**	0.50	0.14	0.14	0.00	0.00	0.40	**1.19**
0.29	**2.99**	0.58	0.65	0.50	**1.73**	0.25	0.57	0.57	0.00	0.00	0.65	**2.04**
0.00	**0.32**	0.06	0.00	0.10	**0.16**	0.00	0.14	0.14	0.00	0.00	0.18	**0.46**
0.14	**1.19**	0.13	0.00	0.20	**0.33**	0.25	0.29	0.29	0.00	0.00	0.13	**0.95**
0.14	**2.22**	0.49	0.55	0.70	**1.75**	0.75	0.86	0.86	0.00	0.00	0.45	**2.91**
0.00	**0.77**	0.13	0.00	0.10	**0.23**	0.25	0.14	0.14	0.00	0.00	0.13	**0.66**
0.43	**2.18**	0.28	0.00	0.40	**0.68**	0.50	0.29	0.29	0.00	0.00	0.45	**1.52**
0.43	**3.05**	0.69	0.77	0.50	**1.96**	0.50	0.71	0.71	1.00	1.00	0.75	**4.68**
0.00	**0.41**	0.09	0.00	0.00	**0.09**	0.00	0.29	0.29	0.00	0.00	0.15	**0.72**
0.43	**2.07**	0.04	0.00	0.40	**0.44**	0.25	0.14	0.14	0.00	0.00	0.28	**0.81**
0.43	**3.18**	0.30	0.73	0.50	**1.53**	0.75	0.57	0.57	1.00	1.00	0.50	**4.39**
0.14	**0.94**	0.16	0.00	0.20	**0.36**	0.25	0.14	0.14	0.00	0.00	0.13	**0.66**
0.29	**1.90**	0.33	0.00	0.30	**0.63**	0.50	0.14	0.14	0.00	0.00	0.35	**1.14**
0.29	**3.23**	0.73	0.82	0.40	**1.95**	0.50	0.43	0.43	1.00	1.00	0.88	**4.23**
0.00	**0.26**	0.00	0.00	0.00	**0.00**	0.00	0.14	0.14	0.00	0.00	0.00	**0.29**
0.00	**0.68**	0.06	0.00	0.10	**0.16**	0.25	0.00	0.00	0.00	0.00	0.23	**0.48**
0.14	**1.75**	0.07	0.05	0.10	**0.21**	0.25	0.14	0.14	0.00	0.00	0.33	**0.86**
0.00	**0.63**	0.10	0.00	0.10	**0.20**	0.00	0.14	0.14	0.00	0.00	0.18	**0.46**
0.43	**2.12**	0.22	0.00	0.20	**0.42**	0.50	0.14	0.14	0.00	0.00	0.30	**1.09**
0.57	**4.01**	0.61	0.68	0.80	**2.09**	0.50	0.86	0.86	1.00	1.00	0.63	**4.84**
0.00	**0.47**	0.11	0.00	0.10	**0.21**	0.00	0.14	0.14	0.00	0.00	0.15	**0.44**
0.57	**2.57**	0.13	0.00	0.30	**0.43**	0.50	0.29	0.29	0.00	0.00	0.40	**1.47**
0.43	**4.18**	0.44	0.15	0.60	**1.19**	0.50	0.71	0.71	1.00	1.00	0.73	**4.65**
1		1	1	1		1	1	1	1	1	1	
0		0	0	0		0	0	0	0	0	0	

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