IT DEPARTMENT'S SERVICE CLIMATE, TOP MANAGEMENT SUPPORT AND ORGANIZATIONAL IMPACT OF ENTERPRISE RESOURCE PLANNING SYSTEMS

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Master of Philosophy
The Hong Kong Polytechnic University
2012

The Hong Kong Polytechnic University
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A Thesis Submitted in Partial Fulfillment of the Requirements for
the Degree of Master of Philosophy
July 2012

CERTIFICATE OF ORIGINALITY

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_____ (Signed)

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ABSTRACT

The implementation of enterprise resources planning (ERP) systems helps organizations achieve both transactional and transformational benefits, such as increased operation efficiency and higher performance enabled by business process innovation. However, the outcome of ERP implementation could be very dynamic, hindering the assimilation of ERP by organization system in the post-implementation period. Drawing from research on service climate and top management support and following the general framework of information technology (IT) assimilation, this thesis examined the roles of IT department and top management in influencing organizational impact of ERP. In particular, IT department's service climate and top management support are theorized to enhance the contribution of ERP system to overall business performance. The hypotheses are tested using survey data from 62 organizations that have already implemented ERP system in China. Results of Structural Equation Modeling (SEM) show that IT director's service leadership positively affects IT department service climate, which in turn positively affects organizational impact of ERP. Results also indicate that top management support not only directly influences IT department

service climate and organizational impact of ERP, but also significantly moderates the relationship between IT director's service leadership and IT department's service climate. This thesis aims to contribute to information systems literature on ERP by highlighting the roles of IT department and top management support. It also contributes to organizational behavior literature by adapting the service climate theory to a new context—the post-implementation phase of ERP systems inside organizations. Implications of the study for research and practice are discussed.

ACKNOWLEDGEMENTS

I would like to take this opportunity to express my most sincere appreciation to the people who provided support and help to me in the past two years.

First of all, I wish to express my deepest gratitude to my chief supervisor, Dr. XU Xin. During my two years MPhil study, I obtained everlasting support and inspiration from him. His unconditional help and patient guidance made me grow a lot. I would like to acknowledge the great amount of time and effort he had spent in guiding me through these two years. I can never thank him enough for being such a wonderful supervisor and friend.

My most sincere gratitude also goes to my co-supervisor, Prof. Eric Ngai. I thank him for his on-going concern, assistant and guidance during the last two years. Without his guidance and valuable advice, the completion of this thesis would be impossible. I have learned much from him, his dedication and attitude to research will always enlighten me in my future career.

I would like to thank Dr. JJ Hsieh for his time and effort in organizing the whole procedure of my proposal confirmation and oral defense. I sincerely thank him for his concern and excellent arrangement. Thanks to his effort and help, the whole process went efficiently and smoothly.

My special thanks also go to Dr. FANG Yulin from City University of Hong Kong and Dr. Vincent CHOW from Hong Kong Baptist University. I thank them for their precious comments on my thesis as my external examiners and their kind help and understanding through the whole defense process.

I would like to thank Dr. HE Wei, who provided priceless help to my application for this program and the completion of my thesis. Her assistance during these two importance stages of my MPhil study helped me move forward along the way.

My gratitude also goes to Dr. Vincent Cho and Dr. Israr Qureshi for their valuable comments on my research proposal.

I would like to express my deepest thanks to my parents for their enduring support and endless love. Their love is always the driving force for me to go further.

Finally, I would like to express my special thanks to my boyfriend, Xinchao. I thank him for devoting so much in the past seven years. His love got me through all the difficulties in research and life. I thank him for standing beside me each and every moment as a lover, friend, teacher and sole mate.

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CHAPTER 1: INTRODUCTION

1.1 Research Motivation

As one typical example of enterprise information systems (EIS), enterprise resource planning (ERP) systems are large-scale, real-time, integrated software packages that utilize the power of modern information technology (IT) to support business processes, information flows and reporting, and business analytics within and between complex organizations (Seddon et al., 2010). Enterprise systems license revenue has growth with 19 percentage in 2007 (Jacobson et al. 2008), and the worldwide ERP market was estimated to be U.S. $24 in the year of 2008 (Hestermann et al. 2009). ERP systems produce positive impacts on the operation efficiency and productivity of organizations, such as reduction in inventory costs, raw material costs, and production costs, reduced production time, and reduced lead-time for customers (Ragowsky and Somers 2002). In addition to the transaction-level impacts, ERP systems also provide strategic and transformational benefits, such as enhanced managerial decision support (Holsapple and Sena 2005) and sustained business process innovation (Srivardhana and Pawlowski 2007). Both the transactional and the transformational benefits are the results of organizational transformations engendered by ERP systems, such as the automation and integration of cross-functional business processes (Gattiker

and Goodhue 2005), the real-time access to integrated data and information across the entire enterprise (Davenport 1998), and the process optimization and innovation through business process re-engineering (Scheer and Habermann 2000).

However, the same transformations can also bring challenges and risks to organizations that hinder the assimilation of ERP systems by the organizations in the post-implementation phase—i.e., the utilization of ERP systems to fully realize the potential business value (Seddon et al. 2010; Ke and Wei 2008). For instance, the challenge of business process re-engineering that aligns existing business processes with those "best practices" embedded in the ERP software puts ERP project at significant risk (Liang et al. 2007). Moreover, the outcome of ERP systems can be highly dynamic with an early implementation success becoming a later failure (Larsen and Myers 1999). This is because the facilitation of the transformations based on which ERP assimilation is achieved depends on a number of factors that are different from those influencing the completion of ERP projects (Seddon et al. 2010; Ke and Wei 2008). Practitioners thus have the pressing need to understand how to smooth the transformations discussed above to facilitate the assimilation of ERP systems by organizations so as to achieve the potential benefits, considering the significant investment of time, financial resources,

and human resources on ERP implementation.

Extensive research has been conducted to examine factors that affect the success of ERP adoption and implementation (e.g., Dong et al. 2002; Jabobs and Bendoly 2003). A number of factors have been identified, such as user involvement, change management approach, core team characteristics, project champion, relationships with consultants, and package choice and customization (e.g., Akkermans and Van Helden 2002; Gefen 2002; Robey et al. 2002). However, there is a lack of study on factors that influence the assimilation of ERP in the post-implementation stage to achieve the expected benefits (Liang et al. 2007).

1.2 Research Objectives and Research Questions

Following the general framework that IT assimilation is determined by IT infrastructure and senior leadership (e.g., Armstrong and Sambamurthy 1999), this thesis presents a study that examines the roles of IT department and top management support in influencing organizational impact of ERP. This study is different from Armstrong and Sambamurthy (1999) in the following aspects. Armstrong and Sambamurthy (1999) drew upon knowledge-based and resource-based views to study the effects of IT infrastructure and senior leadership on IT assimilation. They mainly focused on knowledge transfer and knowledge improvement in top management team

and CIO during IT assimilation. The current study integrates service climate theory and top management support theory to study ERP impact on organization. ERP assimilation is studied as the underlying mechanism through which IT service climate influences ERP impact. We focus on the service climate in IT department and the service they deliver to the whole organization.

IT (ERP) assimilation refers to the success achieved by firms in utilizing the capabilities of IT to enhance their business performance (Armstrong and Sambamurthy 1999). According to its definition, before ERP creates business values to the organization, the new system must infuse itself into the routinized business activities so as to achieve expected business goals. That is, ERP assimilation is a process in which the system is utilized by the whole organization that leads to ERP impact on organizational performance, i.e., organizational impact of ERP is the consequence of ERP assimilation.

The study aims to contribute to the IS literature by examining the impacts of IT department's service climate and top management support on the contribution of ERP to overall business performance. In the post-implementation stage, IT departments assume the major role of providing internal services that support the assimilation of ERP systems by

all other functional units and the management. Thus the functioning of IT departments affects the organizational impacts of ERP systems. According to Armstrong and Sambamurthy (1999), senior leadership is defined as organizational senior management team, including chief executive officer (CEO), chief information officer (CIO), chief financial officer (CFO) and other senior business executives. This is study focus on a more specific factor, i.e. top management support for ERP. With favorable attitudes and explicit support for ERP implementation, top management support serves as the critical senior level championship that smoothes the critical re-engineering engendered by ERP systems and facilitates a better functioning of IT departments and the realization of ERP benefits.

This thesis intends to answer following research questions:

(1) How does IT department contribute to the organizational impact of ERP in the post-implementation stage?

(2) What is the role of top management support in facilitating the ERP assimilation in the post-implementation stage? Does top management support directly influence ERP assimilation or through other mechanisms?

The thesis has two objectives:

(1) To develop a model of the impacts of IT department and top management support on organizational impact of ERP;

(2) To empirically test the proposed model in (1).

1.3 Structure of Thesis

The structure of the thesis is arranged as follows. First, Chapter 2 presents the literature and theoretical foundation of present study, which includes literature review on ERP research, service climate and top management support. Second, research model and the hypotheses are presented in Chapter 3. Chapter 4 describes the research methodology, i.e. construct operationalization and data collection. Then, Chapter 5 presents the data analysis procedure, common method bias issue and the results of the hypothesis testing. Finally, this thesis concludes with discussion of the results and findings, limitations and directions for future research.

CHAPTER 2: LITERATURE REVIEW AND THEORETICAL FOUNDATION

2.1. Information Systems Research on ERP

2.1.1 Stages of ERP Implementation

The stages that an organization goes through along with the enterprise system have been discussed by Markus and Tanis (2000). Those different phases start from the initial adoption idea to the final success of the new system. Although the experiences of different organizations vary considerably, the major phrases of adopting enterprise system include: the chartering phase, the project phrase, the shakedown phrase, the onward and upward phrase. In the chartering phase, adopters and vendors make decisions about enterprise system. The key players discuss about the idea of adopting system, select software, initiate the project plan, analyze current situation around system implementation and analyze budget and schedule. The outcome of this phase is approving or not approving the system adoption. The project phase comprises activities designed to get system up and running in one or more units. In this phase, activities include development of detailed plan, execution of parts of the system and change management, process integration. In the shakedown phase, enterprise system goes into normal operation. Key activities include bug solving, training and performance increasing. The system may also terminate in this phase because of disruption of business or

system's insufficient to address business goals. In the onward and upward phase, system operates routinely across the organization. Business benefits and organizational performance enhance because of adopting the system. However, if the organization is unwilling or unable to upgrade the system, the new system may also be impossible to continuously improve the organizational business impact and performance. IS research mainly focused on ERP implementation and its post-implementation impacts.

2.1.2 Research on ERP Success and ERP Impacts

ERP implementation and its post-implementation impacts have been extensively examined in the IS literature. My review of ERP studies in the leading IS journals[1] reveals that two broad streams or themes of research can be identified, namely research on ***ERP project success*** and research on ***ERP impacts*** (Robey et al. 2002; Seddon et al. 2010).

Research on ERP Project Success

Research on ERP project success mainly focuses on the outcome of ERP project management with such metrics as meeting project deadlines, working within budget, the successful configuration of ERP modules, and the system

[1] A comprehensive review of research articles in the eight journals in the AIS basket (http://home.aisnet.org/displaycommon.cfm?an=1&subarticlenbr=346) plus Decision Science, Decision Support Systems and Information & Management is presented in Appendix A.

quality perceived by project participants (e.g., Sarker and Lee 2003; Wang and Chen 2004; Wang et al. 2006). A number of factors have been identified that affect ERP project success, such as top management support, vendor selection, consultant quality, project team, communication, and user support (e.g., Sarker and Lee 2003; Wang and Chen 2004; Wang et al. 2006). For instance, Sarker and Lee (2003) studied the roles of top managers and the ERP implementation team in influencing the success of ERP system configuration. Wang et al. (2006) examined the effects of ERP package selection, consultancy, and manager and user support on ERP system quality. Overall, this stream of research mainly focuses on ERP project management issues with the completion of the ERP project as the major outcome. However, the outcomes of ERP implementation are dynamic with the possibility that an early implementation success turns into a post-implementation failure (Larsen and Myers 1999). Thus the majority of ERP studies examined factors influencing ERP impacts on organizations.

Research on ERP Impacts

Research on ERP impacts examined factors influencing both direct impacts of ERP systems on business performance in the post-implementation stage and the associated intermediary outcomes. Some studies focus on the efficiency and productivity gains supported by ERP systems, such as reduced

inventory, decreased costs, customer order lead-time reduction, and improved business processes (e.g., Cotteleer and Bendoly 2006; Velcu 2010; Karimi et al. 2007a; 2007b). Strategic benefits included competitive edge, strategic goal achievement, enhanced decision support, and sustained business process innovation (e.g., Bernroider 2008; Srivardhana and Pawlowski 2007; Holsapple and Sena 2005). Intermediary outcomes, such as user satisfaction with ERP, ERP assimilation, and employee job satisfaction before and after ERP implementation have also been studied (e.g., Law and Ngai 2007; Liang et al. 2007; Morris and Venkatesh 2010). Most of the factors influencing ERP impacts identified in this stream of research are similar with those in the ERP project studies, such as top management support, project team, extent of ERP implementation, customization, and ERP selection (e.g., Karimi et al. 2007a; Tsai et al. 2012; Bernroider 2008). For instance, Stratman and Roth (2002) examined the effects of executive commitment, project management, ERP training, etc. on business performance after an ERP system is operationally and functionally stable. Also, Liang et al. (2007) studied the role of top management in affecting post-implementation assimilation of ERP.

Literature review reveals that there is a lack of study on factors that influence the assimilation of ERP to achieve the expected benefits (Liang et al. 2007). IT assimilation in general refers to the success achieved by firms in utilizing

the capabilities of IT to enhance their business performance (Armstrong and Sambamurthy 1999). Research suggested that in general IT infrastructure and senior leadership are the two main forces that drive on IT assimilation (e.g., Armstrong and Sambamurthy 1999). Following this framework, the current study examines the impacts of IT departments' service climate (as an IT infrastructure factor) and top management support (as a senior leadership factor) on ERP contribution to overall business performance.

Liang et al. (2007) mainly studied how top management support mediates the impacts of external institutional pressures on ERP assimilation. Integrating top management support theory and service climate theory, the current study addressed how top management support positively affects the organizational impact of ERP and the creation of IT department's service climate. In addition, Liang et al. (2007) studied two different stages of top management support, i.e. top management beliefs (TMB) and participation (TMP), while the current study use top management support (TMS) as a holist construct (Wang et al. 2006).

As the internal service provider that supports all other functional units and the management using the ERP system, IT department plays a role in supporting the assimilation of ERP systems by the organization. On the other hand, top

management support will enhance ERP assimilation by supporting both IT department's service climate and smoothing the transformations engendered by ERP systems.

2.2. Research on Service Climate

In general, organizational climate refers to the shared perceptions of employees concerning the practices, procedures, and kinds of behaviors that get rewarded and supported in a particular setting (Schneider 1990). The concept of climate first appeared in the domain of psychology (Lewin et al. 1939). Lewin et al. (1939) introduced the notion of social climate based on the Gestalt psychology and studied the behaviors of followers in different conditions—social climate and social atmosphere created by different leader styles in the boys' groups. Since then, climate received considerable attention from researchers in the organizational behavior field. Fleishman (1953) studied leadership climate when transferring a training program to a field setting. Argyris (1958) studied the organizational climate in a bank. McGregor (1960) discussed about the "managerial climate" in organizations. One concern among most researchers is the level of analysis of organizational climate, e.g. whether it is a psychological construct perceived by each individual employee, or a shared phenomenon in organization. Both James and Jones (1974) and Hellriegel and Slocum (1974) addressed this issue: 1) if

a climate describes individuals' feelings and measured at the individual level, it is a psychological climate; 2) if a climate is conceptualized and measured as a shared and combination perception of the organization environment, it is an organizational climate. The latter notion is widely accepted and applied since then. Moreover, Schneider (1975) argued that the concept of organizational climate should have a focus, and researchers should study climate with a reference i.e. a climate for something. Based on this rationale, different types of climate received academic attention, such as the climate for service (Schneider 1990), the climate for safety (Zohar 1980; 2000), the climate for sexual harassment (Fitzgerald et al. 1997), the climate for ethics (Victor and Cullen1988), the climate for innovation (Scott and Bruce 1994; Anderson and West 1998), etc. This study focuses on the climate for service (Schneider 1990; Schneider et al. 1998; 2005).

Service climate in particular refers to *employees' shared perceptions of the practices, procedures, and behaviors concerning quality customer service*, such as what will get rewarded, what will get supported, and what is expected of them in delivering customer service (Schneider et al. 1998). The early studies of service climate demonstrated a significant linkage between employees' shared perceptions of service climate and customers' feelings towards service quality. The first study about climate for service was

conducted by Schneider (1973). In this study, the relationship between customer loyalty and the climate for service in an organization was studied at bank branches. Service climate was measured mainly by employees' shared perception of practices and procedures. This line of the "linkage research" addressed the relationship between employees' perceptions and customers' experience. For instance, Parkington and Schneider (1979) studied the relationship between employees' behavior and customers' attitudes. Data collected from both employees and customers of 23 bank branches showed that there was a linkage between bank employees' behaviors and customers' feelings about the bank. In particular, the results showed that employees' shared feelings about their service orientation were significantly related to their experience about their work environment, which in turn significantly influenced the customers' view about the service quality. Schneider et al. (1980) studied the relationship between service climate of bank branches and service quality perceived by customers. The results of this study showed that the way in which employees described and felt about the service climate was positively related to what customers said about the service quality they received from the bank branch. The strong and significant relationship between employees' perceptions of service climate and customer satisfaction was also found in later studies (e.g., Schmit and Allscheid 1995; Johnson 1996).

As the conceptualization and measurement of service climate and the basic linkage between employees' perception and customers' attitude were established, service climate research began to study the antecedents, consequences, and moderators that extended the basic linkage model (see Table 1 and Table 2 for a comprehensive summary of the antecedents and consequences of service climate literature).

Antecedents of Service Climate can be classified into three different categories: organizational factors, employee factors, and leadership factors (Table 1). Organizational factors refer to fundamental rules, contexts, and supportive resources in the organization that are essential to form an effective service climate. For instance, Schneider et al. (1998) studied two kinds of organizational factors, namely work facilitation and inter-department service, as the foundation for service climate. Inter-department service was defined as the quality of the service received internally from other departments within the organization and work facilitation consisted of the efforts toward removing obstacles to work, supervisory behaviors, and human resource policies. Results showed that when there were adequate resources and supportive mechanisms from the organization, a positive global service climate tended to emerge, and employees tended to provide better service.

Similarly, Salanova et al. (2005) examined the impacts of different types of organizational resources/supports on service climate. The organizational resources consisted of those that remove obstacles, stimulate personal development, and enhance employee motivation in the work environment.

Table 1. Antecedents of Service Climate

Antecedents	Source	Level of Study
Coworker support	Susskind et al. (2003)	Organizational level
Work engagement	Salanova et al. (2005)	Department level
Service leadership	Schneider et al. (2005)	Department level
Transformational leadership	Liao and Chuang (2007)	Multi-level
Servant leadership	Walumbwa et al. (2010b)	Multi-level
Supervisor support	Susskind et al. (2003)	Organizational level
Manager's service quality orientation	Salvaggio et al., (2007)	Department level
Owner service value	Andrews and Rogelberg (2001)	Organizational level
Work facilitation	Schneider et al. (1998)	Organizational level
Inter-department service	Schneider et al. (1998)	Organizational level
Organizational resources	Salanova et al. (2005)	Department level

The roles of employee factors in influencing service climate also received attention from researchers. Susskind et al. (2003) defined coworker support as the extent to which employees believe their coworkers are willing to provide them with work-related assistance to aid in the execution of their service-based duties. Coworkers can provide formal or informal help at work. Service providers can discuss about problems and difficulties they meet at work with peers to have substantial help that leaders or customers cannot provide, which is beneficial to forming a good service climate. Susskind et al. (2003) found that the presence of supportive coworkers led to a positive service climate and helped to form a high commitment to customers.

Salanova et al. (2005) studied work engagement of employees when serving customers as the antecedent of service climate. Work engagement was defined as positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption. When employees feel energetic and happy in their work, they become more vigorous and absorbed in their job. This positive personal psychological state will influence people they interact, thus contributing to a collective service climate at work. Findings showed that if adequate organizational resources in the organizations assured fundamental needs and removed obstacles, employees were more engaged and vigorous in their work, which led to a better service climate.

Finally, different leadership styles—e.g., transformational leadership (Liao and Chuang 2007), servant leadership (Walumbwa et al. 2010b), and service leadership (Schneider et al. 1998)—have been found to foster a positive service climate. Liao and Chuang (2007) examined the impact of transformational leadership on influencing employees' performance and employee-customer relationship through creating service climate. Walumbwa et al. (2010b) proposed servant leadership as the antecedent of service climate. Servant leadership emphasizes moral influence on the followers. Servant leaders put more effort on the development of their followers, success of customers and stakeholders instead of themselves, thus creating an effective

service climate. Finally, Schneider et al. (2005) theorized service leadership as the antecedent of service climate. Service leadership was defined as *leadership that communicates a commitment to high levels of service quality*. If leaders emphasize the importance of service quality and encourage employees to provide high quality service, a good service climate will be created. Schneider et al. (2005) found that service leadership fostered and sustained a service climate.

The Consequences of Service Climate mainly include those related to customers and those related to service employees (Table 2). Customer perceived service quality and customer satisfaction are the two main consequences of service climate (e.g. Johnson 1996; Susskind et al. 2003; Dietz et al. 2004; Schneider et al. 2005; 2009; Mayer et al. 2009). The service climate created among front-line employees in an organization will influence their behavior toward customers—e.g., customer-orientation behaviors, which yield better service quality that in turn leads to customer satisfaction (Schneider et al. 1998; 2002). Employee-related consequences mainly include service performance, (e.g., Liao and Chuang 2004; 2007; Salanova et al. 2005) and organizational citizen behavior (OCB, Schneider et al. 2005; Walumbwa et al. 2010). Other consequences include employee commitment (Little and Dean 2006), willingness to report service complaint (Luria et al.

2009), positive emotion display (Lam et al. 2010), service worker's control (Yagil and Gal 2002), participation in decision making (Yagil and Gal 2002), and provision of information (Yagil and Gal 2002). For instance, under a positive service climate, employees understand that superior service is desired and rewarded. So they tend to have high motivation to deliver better service (Liao and Chuang 2007) and even OCB (Schneider et al. 2005).

Some studies examined the ***boundary conditions or moderators*** of the linkage relationship between employee perception and customer experience—the moderators that influence service climate's effect on the consequences. Schneider et al. (2002) proposed that "climate strength moderated the relationship between service climate and service quality". Climate strength determines the variability of employees' behavior. That is, no matter the service climate is positive or negative, service climate will have a bigger influence on service quality when climate strength is stronger. Dietz et al. (2004) and Mayer et al. (2009) tested the moderating effect of customer contact frequency on the relationship between service climate and customer satisfaction. High contact frequency gives customers opportunities to know more about the employees and gives employees opportunities to better know customers' needs, thus enhancing the impact of service climate on customer satisfaction (Dietz et al. 2004). Data collected from 160 US bank branches

showed that the relationship between service climate and customer satisfaction was significantly enhanced with a higher frequency of customer contact. Mayer et al. (2009) replicated Dietz et al. (2004) in the context of a US supermarket chain and showed a similar result. Mayer et al. (2009) also examined the moderating effect of service intangibility on the effect of service climate on customer satisfaction. The intangibility of service makes it difficult and ambiguous for customers to determine service quality. As customers' perceptions of service quality are based on the service delivery process or service providing atmosphere, service climate controls for the inconsistency and unreliability of customers' experience about the service. Thus when intangibility is high, service climate becomes more important in affecting customer satisfaction by ensuring the needed resources, standardizing service providing process, and increasing the cooperation among employees to serve customers. Data from 129 departments in a US supermarket chain supported their hypotheses.

In summary, service climate research has moved beyond the basic linkage of employees and customers to a broader area. First, service climate has been studied in many different contexts, such as service industries (Susskind et al. 2003; Andrews and Rogelberg 2001; Luria et al. 2009), banks (Schneider et al. 1998; Dietz et al. 2004; Johnson 1996), super markets (Schneider et al. 2005;

Mayer et al. 2009; Salvaggio et al. 2007), hotel and restaurants (Salanova et al. 2005; Liao and Chuang 2004), barber salon chain (Liao and Chuang 2007), multinational companies (Walumbwa et al. 2010b), etc. Second, the research has been conducted at different levels, such as individual level (Luria et al. 2009; Little and Dean 2006; Yagil and Gal 2002), organizational level (Susskind et al. 2003; Schneider et al. 1998; 2009), unit/branch level (Schneider et al. 2002; Dietz et al. 2004; Schneider et al. 2005; Mayer et al. 2009; Johnson 1996; Salanova et al. 2005; Salvaggio et al. 2007), and multi-level (Liao and Chuang 2007; Walumbwa et al. 2010b; Liao and Chuang 2004). Third, the nomological network of service climate has been more comprehensive with diverse antecedents, such as different leadership styles (Schneider et al. 2005; Liao and Chuang 2007), consequences, such as employee service performance (Salanova et al. 2005; Liao and Chuang 2007), and moderators, such as frequency of customer contact (Dietz et al. 2004; Mayer et al. 2009) and climate strength (Schneider et al. 2002).

Table 2. Consequences of Service Climate

Consequences	Reference	Level
Customer satisfaction	Susskind et al. (2003)	Organizational level
	Dietz et al. (2004)	Department level
	Schneider et al. (2005)	Department level
	Johnson (1996)	Department level
	Mayer et al. (2009)	Department level
	Schneider et al. (2009)	Individual level
Employee performance	Salanova et al. (2005)	Department level
	Liao and Chuang (2004)	Multi-level
	Liao and Chuang (2007)	Multi-level
OCB	Schneider et al. (2005)	Department level

	Walumbwa et al. (2010)	Multi-level
Service quality	Schneider et al. (1998)	Organizational level
	Schneider et al. (2002)	Department level
Willingness to report complaint	Luria et al. (2009)	Individual level
Service quality capability	Little and Dean (2006)	Individual level
Employee commitment	Little and Dean (2006)	Individual level
Positive emotion display	Lam et al. (2010)	Multi-level
Service worker's control	Yagil and Gal (2002)	Individual level
Customer's control	Yagil and Gal (2002)	Individual level
Participation in decision making	Yagil and Gal (2002)	Individual level
Provision of information	Yagil and Gal (2002)	Individual level

The current research adapts the notion of service climate to the context of IT departments inside organizations. The construct of overall service climate (Schneider et al. 2005) is adapted to the IT context and defined as *IT employees' shared perceptions of the practices, procedures, and behaviors concerning quality service for IS users*. The important role of IT departments and the service quality they deliver in enhancing IS effectiveness has attracted researchers' attention since the middle of 1990s (e.g., Pitt et al. 1995). Along with the development of IT for business, the role of IT departments has evolved from product developers and operations managers to service providers. A variety of services, such as hardware and software selection, installation, system maintenance, networking and web maintenance, and helpdesk and user training, are offered by IT departments. In addition to the routinized and scripted services, IT departments also offer knowledge-based and customized individual assistance to users such as providing advice about system utilization and data conversion and

presentation that ultimately lead to IS success (Jia et al. 2008; Pitt et al. 1995). While IS service quality has been extensively examined (e.g., Pitt et al. 1995; Pitt et al. 1997; Kettinger and Lee 1994), the role of IT department's service climate in facilitating the delivery of quality IS services received researchers' attention only recently (Jia et al. 2008). Jia et al. (2008) applied the notion of service climate into the IT domain and define IT service climate as IT professionals' shared perceptions of the practices and behaviors in their workplace that support the prevision of IT service to business customer. However, Jia et al. (2008) is a conceptual work without the operationalization and measurement of the key constructs or empirical support for their conceptual model.

In climate literature ever since Lewin et al. (1939), direct leader's leadership is the major and most influential antecedent to climate. In service climate literature, Schneider et al. (2005) found that unit service climate was mainly created by unit service leadership. IT director's service leadership conveys commitment to higher service quality to IT employees, which is the type of leadership in IT department for quality service delivery. IT director's responsibility includes ensuring IT department deliver service smoothly to the organization and even enabling the firm to derive strategic value from IT service at the strategic level (Chen et al. 2010). Because the direct

relationship between IT director and IT employees, IT director is the most influential manager on the IT employees' behavior. Therefore, following these lines of research, IT director's service leadership was examined as the main antecedent of IT service climate in this study.

The current study thus follows the established theoretical and empirical work in the organization behavior field and focuses on the overall service climate of IT departments with service leadership as the major determinant of this climate (Schneider et al. 2005).

2.3. Research on Top Management Support

Top management support for ERP refers to *the extent to which senior business executives provide the attention, resources and authority requires for ERP implementation* (Wang and Chen 2006). Also known as top management commitment and top management championship, top management support has been consistently identified as one of the most important success factors that influence information system adoption and effectiveness (Sharma and Yetton 2003; DeLone 1988), specifically the key factor of ERP system implementation (Davenport 1998). Ever since late 1960s, top management support has been identified important to IS studies in case studies and empirical studies (Dean 1968). The aggressive changes engendered by ERP systems often produce organizational wide effects that

contradict the existing norms and procedures. Previous research implies that top management support plays critical role in recognizing and directing the technical and organizational transforms (Leonard-Barton 1988). Top management support is regarded as agent that is responsible for changing the norms and values within organization, which in turn stimulates the employees adapt to the new technology (Purvis et al. 2001). Top management support usually includes managerial guidance in planning, design, development, and implementation activities (Bruwer 1984). Top managers also engage in supportive activities of ERP system, such as participating in regular project meetings, advocating new system through formal communication channels, setting up new practice and rules to specify the business requirements and to clarify issues related to the project, etc (Thong et al. 1996).

With senior level and broader perspectives, top managers are in a better position than IT staff to know the necessities and the development direction of the organization (Yap 1989). Top managers tend to act as generalists rather specialists (Thong et al., 1996). Therefore they can motivate employees by picturing an overarching visionary future of the organization. Top management support was found to have the authority influence low-level employees and help overcome organizational resistance to the new system (Markus 1983).

Top management support is found providing adequate resources for ERP implementation (Kwon and Zmud 1987; Lucas 1981). Successful IS implementation occurs when sufficient organizational resources are allocated. ERP implementation involves large scale of investment of time and resources, such as training, consultancy, etc. Sufficient implementation-related supporting resource motives and sustains the implementation process (Kwon and Zmud 1987). The future of the whole project may be jeopardized by insufficient investment and lead to a negative impact on the organizational performance (Yap 1989).

Massive literature research provided theoretical ground for top management support driving IS usage and ERP adoption within organizations (Yap 1989; Thong et al. 1996). Symbolic supportive activities of top managers have been found contributing to successful implementation (Sharma and Yetton 2003). Visible top management support encourages positive attitudes of employees towards the usage of ERP systems so that smooth the transition from existing work flow to a new procedure (Ginzberg 1981). Formal monitoring of progress (Garrity 1963) and proper incentives (Bhattacherjee 1996) lead to progressive usage of Information Technology. Prior studies also find that top management contributes to assimilation of CASE tools (Purvis et al. 2001),

IS effectiveness (Thong et al. 1996), ERP success (Bernoider 2008), increases the assimilation of web technologies (Chatterjee et al. 2002a), and can reverse failing implementations (Akkermans and van Helden 2002).

The current study examines the role of top management support for ERP in facilitating the realization of ERP benefits for organizations. While a number of IS studies have examined top management support in influencing ERP implementation (e.g., Liang et al, 2007; Wang and Chen 2006), they mainly examined the general impacts of top management support on the ultimate results of ERP implementation (Wang et al. 2006; Bernroider 2008) or as internal agent transferring external information and knowledge into the organization (Thong et al. 1996; Wang and Chen 2006). The current study conducted an empirical examination of the role of top management support in facilitating the realization of ERP benefits and also in forming the service climate of IT department.

Top management support is the favorable attitudes and behaviors of top executives to champion the new ERP system. Top managers tend to display their TMS across the organization, i.e. providing resources to all departments, advocate the new work flow engendered by ERP system. IT director's service leadership focuses on high service quality delivery in the IT department only.

IT director's service leadership influences IT employees inside the IT department, but TMS influence every employee inside the company--i.e. TMS not only facilitates service climate inside the IT department but also encourages employees across the whole organization to embrace the ERP system. Therefore, IT director's leadership and TMS are different leadership styles and have different focuses.

As discussed in previous sections, ERP systems not only produce transaction-level benefits, such as cost reduction and time saving based on automation, but also yield strategic benefits such as sustained business process innovation (Srivardhana and Pawlowski 2007) and enhanced decision making (Holsapple and Sena 2005). More importantly, ERP benefits are based on organizational transformations such as functional integration, process optimization, and data and information consolidation (Seddon et al. 2010). The senior level of top managers' support can play a significant role in the process of ERP benefits realization in addition to the contribution of IT department.

In summary, this study follows the general framework of IT assimilation (e.g., Armstrong and Sambamurthy 1999) and examines the impacts of IT department's service climate and top management support for ERP on the

organizational impact of ERP—i.e., the contribution of ERP to overall business performance. Further, IT director's service leadership and top management support are hypothesized to influence IT department's service climate. Figure 1 depicts the research model.

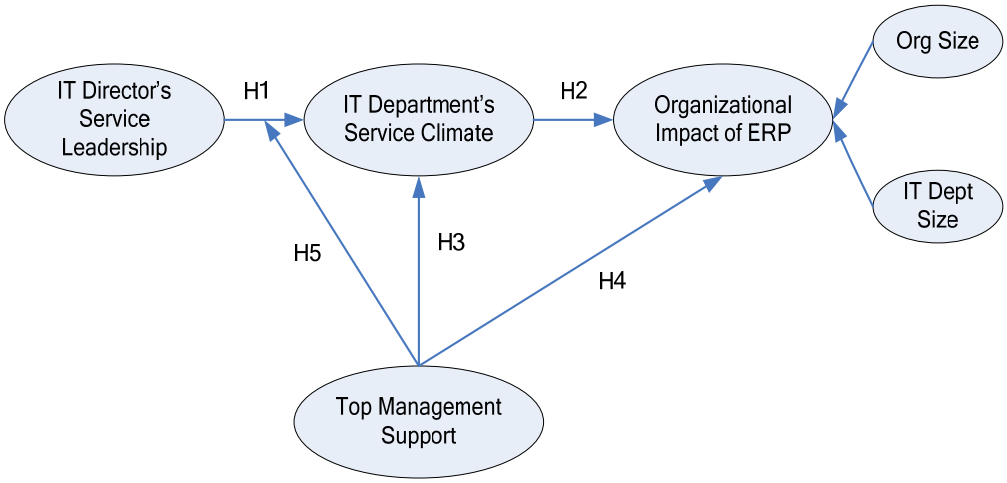

Figure 1. The Research Model

CHAPTER 3: HYPOTHESES DEVELOPMENT

3.1 IT director's Service Leadership and IT Department's Service Climate

Service leadership—i.e., the leadership that communicates a commitment to high levels of service quality—has been hypothesized and found to be the major antecedent to service climate (Schneider et al. 2005). By emphasizing service quality, managers convey behavioral signals to employees about the service-related practices, procedures, and behaviors that get supported and rewarded, thus creating and maintaining employees' shared understanding of what is important around—i.e., the climate for service. A manager's behavioral signals may include recognizing and appreciating high-quality service, removing obstacles to service delivery, setting clear standards for service quality and rewards, etc., all of which fosters and sustains a service climate for employees. Indeed, leadership factors related to service have been studied as the determinants of service climate. Schneider et al. (1998) found that unit leaders who emphasized the service quality created a better service climate in the unit because they serve as service climate "engineers" who shape employees' perception of organizational resources and work facilitation that support quality service. Supervisor support has been proposed and found to influence service climate (Susskind et al. 2003; Jia et al. 2008). Other service-specific leadership factors have also been found to

positively affect service climate, such as owner service value (Andrews and Rogelberg 2001) and manager's service quality orientation (Salvaggio et al. 2007). In the current research, IT director's service leadership is hypothesized as an antecedent of IT department's service climate. IT director is the immediate leader of IT department's employees, providing the specific directions and guidelines about how IT employees should conduct their work to provide services to employees in other departments. IT director also sets the standards for evaluating IT employees' job performance, based on which supports and rewards are provided. If these leadership behaviors emphasize quality service, a shared understanding of the importance of delivering high-quality service will be created among IT employees. Thus, IT director's service leadership fosters a positive work environment—i.e., a positive climate for service in the IT department.

H1. IT director's service leadership has a positive effect on IT department's service climate.

3.2 IT Department's Service Climate and Organizational Impact of ERP

We propose that a positive service climate in the IT department will enhance the contribution of the ERP system to organizational performance by facilitating the assimilation of ERP. The relationship between service climate and service quality has been studied in service climate literature (Schneider and Bowen 1985; Schneider et al. 1998; 2002). Most of these studies found

that a positive service climate in the unit or organization yielded better service quality received by the customers. Jia et al. (2008) adapted this finding to the IT context, and proposed the positive relationship between IT service climate and service quality received by the internal customers—i.e., internal IT users. In the ERP context, a positive service climate in the IT department provides a favorable environment for IT employees to provide better internal service to ERP users—employees or managers—across the organization. In addition to the maintenance and helpdesk services to insure the smooth running of the ERP system, IT employees also provide knowledge-based services such as helping ERP users solve their job-related problems by suggesting additional or new features of the system for ERP users (Jia et al. 2008). When ERP users receive these high-quality services, they will encounter less difficulties when adapting to the ERP system, have less resistance against the system, and have better job satisfaction and performance. Thus a positive service climate of IT department will facilitate ERP users' adaptation, acceptance, and better utilization of the ERP system. The aggregation of the productivity gains at the individual user level will aggregate to the better utilization of the ERP system at the organization level—i.e., an enhanced contribution of ERP to the overall business performance. Therefore,

H2: IT department's service climate has a positive effect on organizational

impact of ERP.

3.3 Top Management Support and IT Department's Service Climate

Previous research suggested that top management support or top management commitment to service is critical determinant of employee behavior in excellent service providing (Hartline and Ferrell 1996). Moreover, past studies revealed that behaviors displayed by leaders at a higher organizational level tend to be found at lower levels (Avolio & Bass, 1988). Thus top management support for success ERP implementation is expected to have positive effect on IT department's service climate.

Top managers' leadership and vision is a prerequisite for positive environment of quality service and service delivery (Sureshchandar et al. 2002). Although top managers are far removed from IT staff, their commitment and support for ERP implementation can be perceived by IT employees and leads IT staff to accomplish such goal effectively (Boshoff and Allen 2000). Top management support for ERP is an overarching direction and incitement for IT employees, and top managers' advocacy for ERP system serves as dominant general management logic (Lyles and Schwenk 1992). IT employees act as service agents in the post-implementation period, when they perceive favorable support from top management, they tend to develop greater organizational commitment and

transfer it to quality service delivery (Chen et al. 2010). In addition, symbolic behaviors from top management such as removing barriers and providing adequate resources for IT department stimulates the capacity of the IT employees and facilitates a better environment for quality service delivery(Neufeld et al. 2007). Therefore,

H3. Top management support has a positive effect on IT department's service climate.

3.4 Top Management Support and Organizational Impact of ERP

The crucial role of top management support has been recognized widely in ERP implementation literature (Liang et al. 2007; Dong et al. 2009). Visible top management support encourages positive attitudes of ERP users to champion the new system and leads to smooth attitude transition of ERP users to the new work flow (Ginzberg 1981). Norburn and Birley (1988) found the positive relationship between favorable top management characteristics and corporate performance across industries. Wang et al. (2006) found top management support has a direct and positive effect on ERP system quality perceived by clients after implementation. Thong et al. (1996) found top management support positively and significantly influences user satisfaction, organizational impact and overall IS effectiveness in small businesses. By virtue of the senior level position in the company, top managers have the ability to ensure sufficient resources allocation, such as facilitating conditions,

and create a better environment for ERP users to familiarize with ERP system and new work routines (Sabherwal et al. 2006). When ERP system is implemented on a large scale, the critical change may bring about user resistance from employees (Kim and Kankanhalli 2009). Symbolic behavior of support from top managers enhances ERP users' willingness of participating in the ERP system, thus improving the user engagement in the system (Sabherwal et al. 2006). Top management involvement also helps define the goal of the system which serves as cognitive guides among ERP users, so that ERP users may devote more effort into familiarizing with the system and assimilate it into their own work flow. With the championship of top managers, the packages embedded in ERP system are assimilated into the business routines in the company. Therefore the expected benefits of ERP system can be realized, which lead to the overall visible and positive organizational impact. Therefore,

H4. Top management support has a positive effect on organizational impact of ERP.

3.5 Moderating Effect of Top Management Support

Keen (1991, p.55) said that "IT success generally reflect an effective relationship between business managers and information service managers and their staff". Because of their senior position, supportive top management team can provide valuable strategic advice to IT director and IT department

about the organization, such as the vision of their company, the problems and issues in the organization and probable resolving solutions via ERP system, how could ERP system help organization achieve expected goals, what is the expectation of the new ERP system from a strategic level, etc. IT director's clear understanding of the organization vision may facilitate his or her level of service leadership. IT director may make targeted rules, practices and rewarding system to evaluate IT employees, to encourage IT employees to deliver better customized individual assistance and knowledge based advice to ERP users, and to form a positive service delivering environment.

As a formal member of the top management team, rich interaction among top management ensures the chances for IT director and other top managers' knowledge sharing (Armstrong and Sambamurthy 1999). Rich interaction between technical and managerial personnel was found to enhance the level of IT innovation (Lind and Zmud 1991). Frequent interaction between IT director and other senior leaders enable IT director to better comprehend the strategic goal and business objective and blend them together to innovate and promote his or her service leadership (Armstrong and Sambamurthy 1999). In addition, past research suggests that the IT director simply cannot achieve performance goals without the necessary resources and support from the firm (Earl and Feeny 1994). If IT director perceives top management supporting

IT initiatives, he or she is more likely to develop greater organizational commitment and will thereby increase his or her productivity and facilitate his or her level of leadership (Fiorito et al. 2007).

When IT employees perceive top management support through different channels, i.e. emails and organizational briefings, they know better about the vision of their organization and the benefits of the ERP system. They are more willing to follow the leadership of IT director, i.e. providing high quality service to realize the expected benefits of ERP system, so that the service climate would be stronger. Combining top management support's effects on both IT director's service leadership and IT department's service climate, we expect that,

H5. Top management support moderates the relationship between IT director's service leadership and IT department's service climate. Specifically, the greater the top management support, the stronger the relationship between IT director's service leadership and IT department's service climate.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 Measurement

Questionnaire was developed by identifying appropriate measurements from a comprehensive literature review. All the measurement scales were adapted from exiting literature. Some modifications were made to the existing scale to make those more suitable in the context of ERP implementation. Since the target companies are the organizations that have implemented ERP systems in China, the questionnaire was translated into Chinese and then back to English to ensure translation equivalence (Brislin 1970). A few changes to the scales were made in order to match the Chinese context.

IT director's ***service leadership*** was assessed with a scale developed by Schneider et al. (2005). IT employees responded to a 7-point scale (scales are anchored from 1"strongly disagree" to 7 "strongly agree"). One sample item is "My IT director recognizes and appreciates high quality work and service". ***Service climate*** in IT department was measured with a scale developed by Schneider et al. (1998). IT employees answered responded to a 7-point scale (scales are anchored from 1"poor" to 7 "excellent"). A sample item is "How would you rate the recognition and rewards employees receive for the delivery of superior work and service?" ***The organizational impact of ERP*** was measured with a three-item scale developed by Gattiker and Goodhue

(2005). IT directors responded to a 7-point scale (scales are anchored from 1"strongly disagree" to 7 "strongly agree"). A sample item is "ERP system has improved this company's overall business performance." ***Top Management Support*** was rated with a three-item scale developed by Karimi et al. (2007a). IT employees evaluated top management support based on a 7-point scale (scales are anchored from 1"strongly disagree" to 7 "strongly agree"). A sample item is "Senior executives demonstrated a lot of enthusiasm and interest throughout the implementation of the ERP system".

Control Variables. To eliminate potential confounding effects and fully account for differences among organizations, two variables were included as controls in testing the hypotheses, i.e. organizational size and IT department size. Organizational size was measured with number of employees in organization. IT department size was measured with number of employee in IT department (Gattiker and Goodhue 2005). I select these two control variables because they may have potential effect on organizational impact of ERP and IT department's service climate. The two control variables were widely identified in the previous literature (Liang et al. 2007; Gattiker and Goodhue 2005). IT directors answered the questions about organization size and IT department size.

A pilot study was conducted to examine the validity and reliability of the

measurement instrument in the China context with data collected from four strategic business units in a large manufacturing company. Two items from the service climate scale and two from the service leadership scale were omitted from the final measurement because respondents reported these items either overlapped with the items in other scales or were not applicable in their work context. Factor analysis also suggested that these items had significant cross-loadings. All the scales are provided in Table 3. Please see Appendix B and Appendix C for full version of questionnaires in Chinese.

Table 3. Measurement Instrument

Construct	Respondent(s)	Items	Source
Organizational Impact of ERP	IT director	In terms of its business impacts on the company, the ERP system has been a success.	Gattiker and Goodhue (2005) MISQ.
		ERP system has seriously improved this company's overall business performance.	
		ERP system has had a significant positive effect on this company.	
IT director's Service Leadership	IT Employees	My IT director is very committed to improving the quality of my department's work and service.	Schneider et al. (1998) JAP.
		My IT director removes obstacles which prevent us from producing high quality work and service.	
		My IT director recognizes and appreciates high quality work and service.	
		We have established clear standards for the quality of work and service in my department.	

Construct	Respondent(s)	Items	Source
		*My IT director is responsive to my request for help and guidance.	
		My IT director takes the time to help new employees learn about our department and the company.	
		*Overall, my IT director is doing a really good job.	
IT Department's Service Climate	IT Employees	How would you rate the job knowledge and skills of employees in your department to deliver superior quality of work and service?	Schneider et al. (1998) JAP.
		How would you rate the efforts to measure and track the quality of the work and service in your department?	
		How would you rate the recognition and rewards employees receive for the delivery of superior work and service?	
		How would you rate the overall quality of service provided by your department?	
		*How would you rate the leadership you show in supporting the service quality efforts of the employees?	
		How would you rate the effectiveness of the communications between the employees in your department and those supported in other departments?	
		*How would you rate the tolls, technology, and other resources provided to employees in your department to support the delivery of superior quality work and service?	
Top Management Support	IT Employees	Senior executives demonstrated a lot of enthusiasm and interest throughout the implementation of the ERP system.	Karimi, et al. (2007a) JMIS.
		The overall level of management support was quite high.	
		Upper-level managers were personally involved in the implementation of the ERP system.	

Construct	Respondent(s)	Items	Source
Organizational Size	IT director	How many employees in total do you have in this organization?	
IT Department Size	IT director	How many employees in total do you have in IT department?	

Note: Items with * are deleted based on pilot study.

4.2 Data Collection

Survey data were collected from organizations which have already implemented ERP systems in China. The sample was drawn from a total number of 100 companies, who are the clients of a US-based ERP system vendor during an annual conference held by the vendor in 2010 in Shanghai. All of these companies are in the manufacturing sector and have already implemented the ERP system.

Of the 100 companies, 62 were returned and used for data analysis, with response rate of 62 percent. To assess the non-response bias, the company size and company ownership were compared between the respondents and non-respondents. The difference in company size was assessed using t-test and the difference in company ownership was assessed using Chi-square test. No significant differences were found ($p > .05$ for both tests). Table 4 and Table 5 present the ownership and demographics of the responding companies.

In total we had 62 IT directors and 186 IT employees that answered the questions. In the IT director sample, there were 87.5% male respondents and 12.5% female respondents. The average age was 37 and the average tenure was 6.5 years with the companies and 4.5 years in the current position. In the IT employee sample, there were 75% male respondents and 25% female respondents. The average age was 29 and the average tenure was 3.3 years.

Table 4. Ownership of Companies

		N	Percentage (%)
Ownership	Foreign venture	29	46.7
	Joint venture (exclude Hong Kong and Taiwan)	18	29.0
	Hong Kong owned	7	11.3
	Hong Kong or Taiwan Joint venture	4	6.5
	Private owned	4	6.5

Table 5. Company Demographics

	Mean	Std. Dev
Employee Number in Organization	661.29	325.45
Employee Number in IT Department	11.97	6.25
Revenues (millions RMB)	43.41	1465.82

4.3 Data Aggregation

The thesis is a single-level study at the organizational level. Because service climate and service leadership were evaluated by IT employees, to achieve the organizational-level scores, aggregation was statistically justified by examining within-department agreement of data. We calculated interrater agreement (rwg) and reliability, i.e. intraclass correlation coefficient (ICC[1] and ICC[2]) values for service leadership and service climate using the data

from IT employees. For service leadership, the average rwg was .72 and the median of rwg was 0.79, which were above the rule-of-thumb value of 0.70. The ICC(1) was .17 and the ICC(2) was .56. For service climate, the average rwg was .78 and the median of rwg was 0.86, which were also above the rule-of-thumb value of 0.70. The ICC(1) was .23 and the ICC(2) was .58. There are no strict cut-off criteria for ICC(1) and ICC(2), ICC(1) have a range of 0.0 – 0.5 with a median of 0.12 (James 1982) and the cut-off value for ICC(2) is recommended as 0.6 (Glick 1985). Overall, the results from these analyses were comparable to existing literature (Schneider et al. 1998; Schneider et al. 2005) and provided support for aggregation.

CHAPTER 5: DATA ANALYSIS AND RESULTS

Structural equation modeling (SEM) was employed to test the research model. SEM is chosen because it provides the researcher with the flexibility to: (a) model relationships among multiple predictors and criterion variables, (b) construct unobservable latent variables, (c) model errors in measurements for observed variables, and (d) statistically test a priori substantive/theoretical and measurement assumptions against empirical data (i.e., confirmatory analysis). SEM is considered as a powerful second generation multivariate analysis technique for studying causal models (Fornell and Bookstein 1982). Partial least squares (PLS) is the most widely known implementation of SEM. PLS was developed by Wold (1982). PLS has less restrictive assumptions. It does not depend on having multivariate normal distributions (distribution-free), interval scales, or large sample size. PLS is also considered more appropriate in earlier stages of theory development. PLS has been used successfully in marketing (Fomell and Bookstein 1982), organizational behavior (Howell and Higgins 1990), and IS (Thompson et al. 1991).

Given the early stage of theory development of service climate in IS discipline, especially ERP implementation and the relatively small sample size of this study, PLS was the preferred technique for data analysis in this

study. PLS was used to assess the overall reliability and validity of the research model. Particularly, SmartPLS is used to analyze the data.

5.1 Measurement Model

Item reliability, convergent validity and discriminant validity are used to test the measurement model in PLS. Factor loadings measure the strength of the correlation between each item and the corresponding construct. A high loading implies that the shared variance between constructs and its measurement is higher than error variance (Hulland 1999). A factor loading higher than 0.7 can be viewed as high reliability and a factor loading less than 0.5 should be dropped. As seen in Table 6, the factor loading values (highlighted) showed that there was a strong correlation between each of the items and their corresponding construct after dropping one item in the service climate scale that was found to have high cross-loadings on other factors.

Convergent validity detects if the measures for a construct are more correlated with one another than with the measures of another construct. Convergent validity can be examined by reliability of constructs, composite reliability of constructs, and average variance extracted (AVE) by constructs. Construct reliability can be assessed with Cronbach's alpha. Convergent validity was further tested by examining the composite reliability (CR) and AVE for the measures. AVE reflects the ratio of the construct variance to the

total variance among indicators (Hair et al. 1998). If the AVE is less than 0.5, it means that the variance captured by the construct is less than the measurement error and the validity of a single indicator and construct is questionable. The composite reliability, AVE, and Cronbach's alpha values in Table 7 indicate high internal consistency. All the internal composite reliability range from 0.81 to 0.88, all are above 0.7 (Chin 1998); all the Cronbach's alpha are above 0.83, and each AVE is above 0.50 (Fornell and Larcker 1981). Therefore the measurements are reliable and have high internal consistency.

Table 6. Item Loadings and Cross Loadings

Construct	Items	Factor 1	Factor 2	Factor 3	Factor 4
Organizational Impact of ERP	ERP1	-0.24331	0.17628	0.33026	**0.56651**
	ERP2	-0.03969	0.02089	-0.14257	**0.99079**
	ERP3	0.15381	-0.04253	0.04486	**0.81666**
Service Climate	SC1	-0.17113	**0.90565**	0.11171	0.04176
	SC2	0.19989	**0.84181**	-0.26490	0.00437
	SC3	0.25977	**0.70543**	0.01523	-0.05878
	SC4	-0.18961	**0.93129**	0.13023	0.06685
	SC6	0.19337	**0.76548**	-0.04216	-0.04202
Service Leadership	SL1	**0.95053**	-0.05100	0.06392	0.04108
	SL2	**0.96106**	0.01815	-0.01053	-0.04696
	SL3	**0.81627**	0.05991	0.09328	-0.04442
	SL4	**0.94403**	0.02865	-0.08840	-0.05140
	SL6	**0.86402**	-0.04090	0.03440	0.13939
Top Management Support	TMS1	-0.01863	-0.03403	**0.89652**	0.05414
	TMS2	0.29176	-0.30492	**0.82946**	0.10017
	TMS3	-0.14097	0.27628	**0.91923**	-0.25619

Discriminant validity focuses on testing whether the measures of constructs are different from each other. Discriminant validity can be verified by examining the cross-loading of items on other constructs (Chin 1998). To obtain high discriminant validity, items should have relatively low cross-loading on other constructs (Gefen et al. 2000). From Table 6 we note that each item loading on other constructs is much lower than the assigned constructs, indicating high discriminant validity. Discriminant validity is also assessed by examining the correlation between each pair of constructs, and comparing the square root of AVE and inter-construct correlation (Chin 1998). As in Table 8, all the inter-construct correlations are below 0.9, specifically range from 0.240 to 0.702. Each square root of AVE is larger than the correlation between constructs. Therefore, the results in Table 6 and Table 8 indicate that our measurement model has sufficient discriminant validity.

Table 7. Reliability and Variance Extracted

Variables	**Composite Reliability**	**Cronbach's alpha**	**AVE**
Organizational Impact of ERP	0.87	.84	0.70
Service Climate	0.88	.91	0.61
Service Leadership	0.81	.95	0.50
Top Management Support	0.86	.83	0.69

Table 8. Means, Standard Deviations, Correlations, and AVEs

	Mean	Std. Dev	1	2	3	4
1. Organizational Impact of ERP	5.68	.836	**0.837**			
2. Service Climate	5.35	.785	.434*	**0.781**		
3. Service Leadership	5.53	.684	.240	.650**	**0.707**	
4. Top Management Support	5.52	.822	.702**	.455**	.309*	**0.831**

*** p < .001; ** p < .01; * p < .05; The diagonal elements are the square root of the AVEs.

5.2 Common Method Bias

To avoid the common method bias, *ad hoc* statistical analysis was used to assess the significance of common method variance. First, we conducted Harmon one-factor test (Podsakoff and Organ 1986) on the four variables in the model, including service leadership, service climate, organizational impact of ERP, and top management support. The screen plot test and eigenvalues clearly revealed the presence of four factors among the measures. The most covariance explained by one factor is 29.071 percent, and no general factor was apparent in the unrotated factor structure, indicating that common method bias is not a likely contaminant of our results. Second, following Liang et al. (2007)'s approach, we used PLS to assess common method bias (Figure 2). This approach is recommended to be used if the independent and dependent variables were not obtained from different sources and not measured in different contexts and the sources of the method bias cannot be identified, because it controls for any systematic variance among the items that is independent of the covariance due to the

constructs of interest (Podsakoff et al. 2003). We included a common method factor in the PLS model which links to all the single-indicator constructs that were converted from observed indicators. For each single-indicator construct in Figure 2, we examined the coefficients of its two incoming paths from its substantive construct and the method factor. These two path coefficients are equivalent to the observed indicator's loadings on its substantive construct and the method factor and can be used to assess the presence of common method bias.

According to Williams et al. (2003), evidence of common method bias can be obtained by examining the statistical significance of factor loadings of the method factor and comparing the variances of each observed indicator explained by its substantive construct and the method factor. The squared values of the method factor loadings were interpreted as the percent of indicator variance caused by method, whereas the squared loadings of substantive constructs were interpreted as the percent of indicator variance caused by substantive constructs. If the method factor loadings are insignificant and the indicators' substantive variances are substantially greater than their method variances, we can conclude that common method bias is unlikely to be a serious concern.

As shown in Table 9, the results showed that the average substantively explained variance of the indicators is 0.771, while the average method-based variance is 0.016. Given the small magnitude and insignificance of method variance, we contend that the method is unlikely to be a serious concern for this study.

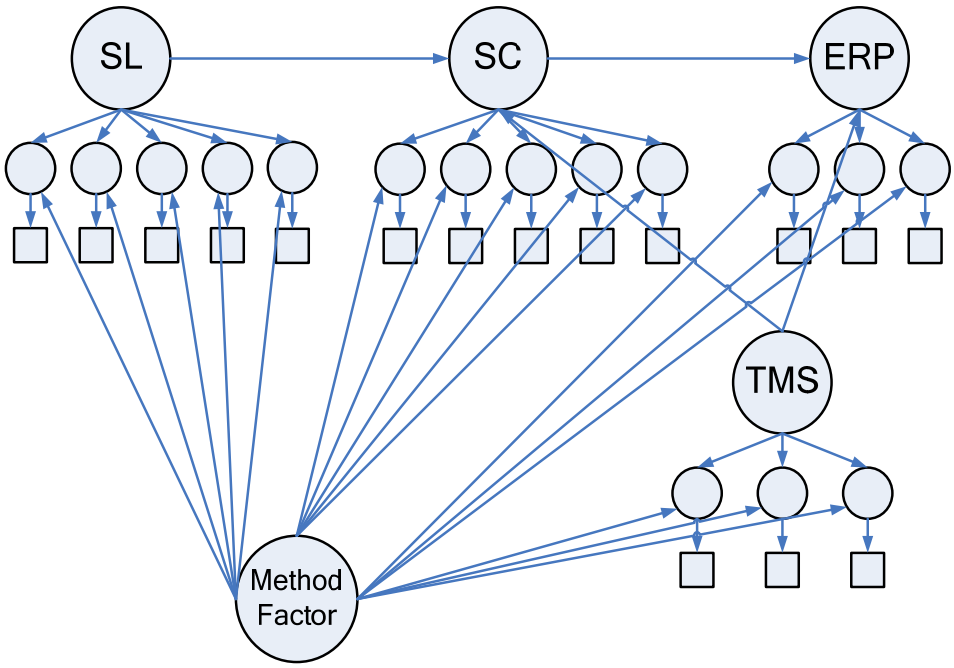

Figure 2. The PLS Model for Assessing Common Method Bias

Table 9 Common Method Bias Analysis

Construct	Indicator	Substantive Factor Loading (R1)	$R1^2$	Method Factor Loading (R2)	$R2^2$
Service Leadership	SL1	0.928	0.861	0.017	0.000
	SL2	1.009	1.018	-0.059	0.003
	SL3	0.802	0.643	0.082	0.007
	SL4	1.036	1.073	-0.141	0.020
	SL6	0.739	0.546	0.142	0.020
Service Climate	SC1	0.637	0.406	0.189	0.036

	SC2	1.142	1.304	-0.294	0.086
	SC3	0.961	0.924	-0.054	0.003
	SC4	0.695	0.483	0.155	0.024
	SC6	0.802	0.643	0.072	0.005
Organizational Impact of ERP	ERP1	0.839	0.704	0.017	0.000
	ERP2	1.004	1.008	-0.127	0.016
	ERP3	0.722	0.521	0.169	0.029
Top Management Support	TMS1	0.881	0.776	0.017	0.000
	TMS2	0.792	0.627	-0.024	0.001
	TMS3	0.894	0.799	0.002	0.000
Average		**0.868**	**0.771**	**0.010**	**0.016**

5.3 Structural Model

5.3.1 Direct Model

To test the structural model, path coefficients and R-square are estimated using SmartPLS. Path coefficients indicate the strengths of the relationship between predictors and outcomes, and R-square represents the amount of variance explained by the predictors. Bootstrapping was employed to test the significance of the path coefficient. Table 10 presents the hypothesis testing result. As expected, service leadership has a direct and very significant effect on service climate ($b = 0.563$, $p < 0.01$), thus supporting H1. Service climate is a positively significant determinant of organizational impact of ERP ($b = 0.146$, $p < 0.05$), thus supporting H2. Top management support has significant direct effect on both service climate and organizational impact of ERP ($b = 0.294$, $p < 0.01$; $b = 0.598$, $p < 0.01$), thus supporting H3, H4.

5.3.2 Moderating Effect

Moderating effects can be examined by comparing the difference between the

direct model and interaction effect model. Variables were mean-centered before multiplication when creating the interaction effect term. As in Table 10, the moderating effect of top management support on the relationship between service leadership and service climate was significant ($p < 0.01$). R-squares are also examined. In direct effect model, R-squares for ERP impact and service climate are 0.494, 0.505 respectively. In Model 2, R-squares for ERP impact and service climate are 0.493, 0.528 respectively. The differenced R-square for service climate is 0.023. Based on the results, the moderating effect of top management support is supported. With regard to all the control variables included in the model, all are not significant related to organizational impact of ERP. Figure 3 and Figure 4 present the PLS analysis results.

Table 10. Hypothesis Testing

Relationship	Model 1	Hypothesis	Model 2	Hypothesis
SL → SC (H1)	0.563** (10.067)	**H1 √**	0.490** (7.195)	
SC→ ERP Impact(H2)	0.146* (2.320)	**H2 √**	0.141* (2.205)	
TMS → SC (H3)	0.294** (6.957)	**H3 √**	0.318** (7.152)	
TMS → ERP Impact (H4)	0.598** (9.376)	**H4 √**	0.602** (9.863)	
Org Size → ERP Impact	0.037 (0.605)		0.037 (0.586)	
IT Size →ERP Impact	0.057 (0.981)		0.057 (1.011)	
SL×TMS → SC (H5)			0.168** (2.832)	**H5 √**
R^2 (ERP Impact)	0.494		0.493	
R^2 (SC)	0.505		0.528	
ΔR^2 (SC)			0.023	

Note: 1. SL = Service Leadership; SC = Service Climate; TMS = Top Management Support; ERP Impact = Organizational Impact of ERP.

2. Model 1 = Direct Effect Only; Model 2 = Direct Effect and Interaction Effect.

3. ** $p < 0.01$; * $p < 0.05$

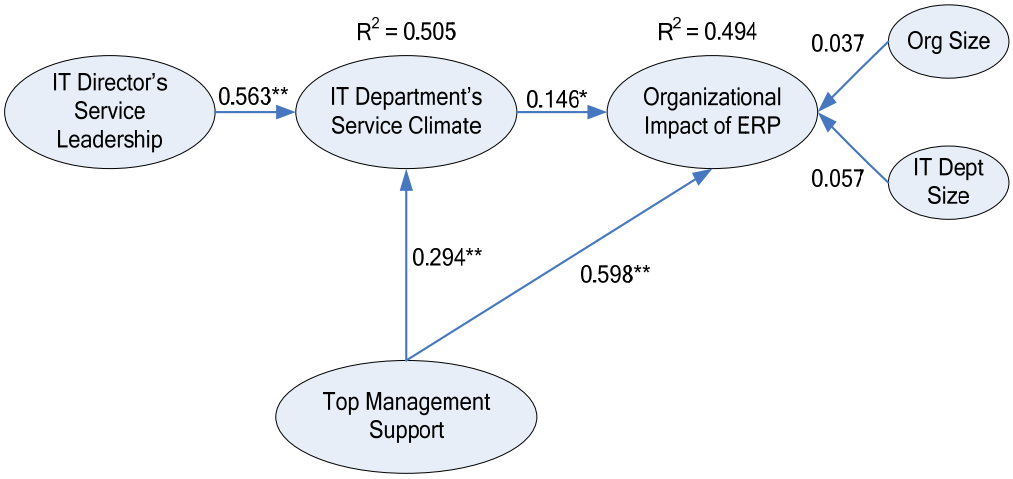

Figure 3. The Direct Effect Model

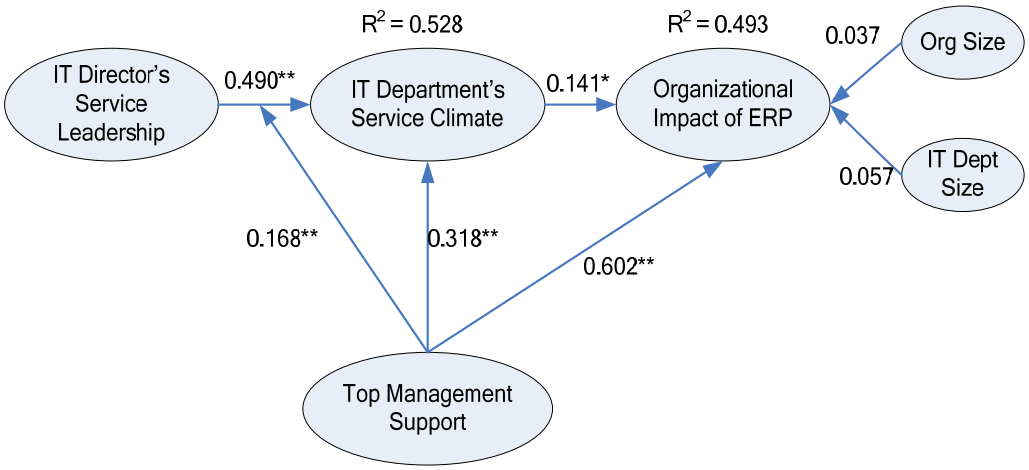

Figure 4. The Direct Effect and Interaction Effect Model

CHAPTER 6: DISCUSSION

One of the most pervasive organizational change happened in the last decade is the implementation of large scale organizational wide information systems, e.g. enterprise resource planning (ERP) systems (Jarvenpaa and Stoddard 1998). Extensive studies have focus on ERP outcomes and ERP impact on diverse metrics in organization (Sarker and Lee 2003; Robey et al. 2002; Seddon et al. 2010). This thesis of investigating the organizational impact of ERP implementation was triggered by two main contributors in the post-implementation period: first, the inevitable role of IT department which providing technical assistant and advice to ERP users, theorizing from service climate perspective (Schneider et al. 2005); second, the senior level top management support for ERP enables employees in the organization to adapt to the new system (Liang et al. 2007). The model examined how IT department service climate contributing to the organizational impact of ERP, and IT director's service leadership was theorized as antecedent of IT department service climate. Top management support was theorized as determinant of and IT department service climate and ERP impact and as the moderator of the relationship between IT director service leadership and IT department service climate.

We find that IT department contributes to ERP implementation. IT director Service leadership is found to have significant effect on IT department service climate. This supports service climate literature that service climate mainly driven by leadership styles, and in current study of ERP context. The positive relationship between service climate and organizational impact of ERP support my conceptualization of IT department's service provider role and their crucial status in the post-implementation period of ERP system. Top management support, on the other hand, is found to directly influencing the final success of ERP implementation and moderating the relationship between IT director and IT staff as well. From the results of alternative models, IT department service climate was found to fully mediate the relationship between IT director's service leadership and organizational impact of ERP. The reasons for this mediating effect may be IT director's ability and knowledge on IT can better advise the organization on a strategic level through the usability of ERP system (Armstrong and Sambamurthy 1999). As the top executive who is responsible for the organization's ERP deployment and operation, IT director could contribute to the impact of ERP on organization when he or she envisions the organization though ERP assimilation.

Therefore, these findings are consistent with my expectation of highlighting

the role of IT department in facilitating ERP assimilation and combining service climate and top management support theories to uncover the mechanisms inside IT department.

6.1 Theoretical Contribution

Drawing upon IS research and OB research, this study examines the role of IT department and top management support in influencing organizational impact of ERP. This research aims to make the following contributions.

First, the current study contributes to the IS literature by examining IT department's service climate as facilitator for positive ERP impact on organizations. In particular, the role of IT department in affecting ERP benefits is highlighted. The current study proposes that as a service provider, the IT department provides internal services for ERP users—employees and managers—across the organization. The service climate in the IT department contributes to ERP system's overall effects on business performance through facilitating ERP utilization by the users. This study first empirically examined service climate in IT department, providing sufficient theoretical and empirical foundation on service climate research in IS discipline. IT director's service leadership was examined as predictor. This study reinforced the important role of IT department director in the post-implementation stage and theorized IT director leadership from a

service providing perspective, i.e. service leadership.

Second, the study contributes to OB literature on service climate by adapting the service climate model to a new context—the implementation of enterprise information systems inside organizations. Previous research on service climate mainly focuses on the linkage between the internal service climate in the unit/organization and the desirable external outcomes, e.g., customer satisfaction and sales. The current study adapts the linkage to inside organization. Service climate in the IT department is theorized as leading to the organizational outcome—i.e., ERP impacts. In addition, the effect of top management support on service climate is proposed in addition to that of service leadership exhibited by the immediate leader—i.e., IT director, which in turn enhances the organizational impact of ERP.

Moreover, this study also contributes to top management support theory. Top management support was theorized as direct predictor of service climate and ERP impact. Top management support enhances ERP benefits directly through motivating organization members to embrace and better utilize the ERP system. Moreover, top management support affects the creation and maintenance of service climate in the IT department. This study first examined the effect of top management support on service climate,

which not only contributes to the literature on top management support, but also proposed possible predictor of service climate in the IS setting.

This study also contributes to top management support literature by theorizing it as moderator in the relationship between service leadership and service climate. Because of the senior position in organization, top management support enhanced IT director's service leadership through sufficient contact frequency and resource allocation, and enhanced IT department service climate through visionary and motivating encouragement. On the one hand, with high level top management support, IT manager tends to have a strategic level understanding of the organization and makes corresponding rules for IT staff. On other hand, IT employees tend to embrace the work flow changes brought by ERP system under the leadership of their IT director. Therefore, combining IS literature and OB literature, top management support was theorized to have moderating effect inside IT department.

6.2 Implications for Practice

This study also offers practical implications for organizations that implement new information technology, especially enterprise information systems.

First, this study highlights the important role of IT department's service

climate in facilitating ERP assimilation to achieve ERP benefits. IT department's service climate is proposed to positively affect the enterprise system's contribution to organizational performance. Therefore, more management attention should be directed toward creating an effective service climate in the IT department. Organizations should emphasize the role of IT department, provide sufficient resources supporting IT department, put more efforts on selecting and training IT employees to have the required knowledge and skills to deliver quality service, and measure and track service quality to create a positive climate for service.

Second, the study also demonstrates the important role of IT director and top management team in creating service climate. IT directors should make the right rules and practices for high quality service, such as rewarding employees for excellent service performance and providing employees with the necessary technology and resources to deliver high-quality service, so as to foster and sustain a positive service climate in IT department. Top management team can also contribute to a positive service climate by motivating IT employees and providing sufficient resources and support.

Third, the current study also suggests that top management team should display more supportive attitudes and behaviors to facilitate the utilization of

new IT after its implementation. Practices such as articulating a clear and vivid vision about IT innovation, championing the new system, and displaying a role model of supporting the system will smooth IT implementation and enhance organizational impacts.

6.3 Limitation and Future Research

First, the variable ERP assimilation is not included in the current model, though the development of hypotheses is based on the rationale of IT assimilation. Future research can incorporate this variable directly in the research model to provide more concrete support. Existing literature addressed the difficulties and obstacles hindering ERP assimilation in the post-implementation stage (Liang et al. 2007). For instances, users persistently maintain the legacy system, system users extensively rely on consultants or technical staff to overcome problems (Hirt and Swanson 2001), or top managers aim to satisfying expectations or following trend instead of be fully committed to promoting organizational benefits (Chatterjee et al. 2002). Thus, other factors influencing ERP assimilation may be further explored in future study.

Second, the present study used cross-sectional data with sample size. Given the unavoidable pitfalls of cross-sectional data, future research with longitudinal data (e.g., Koys, 2001) may be particularly useful for examining

ERP assimilation. Especially in different stages of ERP implementation (Markus and Tanis 2000), ERP assimilation can be examined respectively to test the effect of ERP stages.

Third, we randomly chose three IT employees from each IT department as respondents. While random sampling tackles the representativeness issue by probability, "3 out 12" still raises the concern of the sample representativeness of all the IT employees within each department.

The current study can be extended to a multi-level research that investigates how factors at different levels of the organization—i.e., organizational factors, work unit factors, and individual employee factors—influence the success of a firm-wide implementation of ERP systems. As ERP system implementation is a top-down strategic initiative that affects employees at all levels and across different units in the organization, a number of strategic and managerial factors that contribute to ERP success can be examined, such as organizational culture and IT governance mode. Moreover, in addition to factors like IT service climate and IT service leadership that focus on the IT department in the organization, unit level factors such as unit leadership and LMX in functional departments can be included in the research model. Finally, at the employee level, employee work engagement, IT employee

service performance, and ERP users' job performance and job satisfaction can also be examined to fully reflect the impacts of ERP on the whole organization.

CHAPTER 7: CONCLUSION

Drawing on service climate and top management support theory, I developed and tested a model of ERP implementation in the post-implementation period. The research model examined the role of IT department as service providers to facilitate ERP assimilation. Top management support was found to directly impact ERP implementation and moderate the relationship between IT director's service leadership and IT department's service climate. Data from 62 organizations in China supported all the hypotheses in the model. This research contributed to the IS research by highlighting the service climate in IT department and top management support as facilitators to ERP implementation. It also advanced OB research by introducing the notion of service climate into ERP context.

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Appendix A: IS Literature on ERP

In this appendix we provide a detailed review of the ERP literature. We summarize the literature into three categories—critical success factors of ERP, factors of ERP failure, and ERP benefits.

1. Critical Success Factors of ERP

Over the past few years, a considerable amount of research has been conducted into critical success factors for ERP implementations (Holland and Light, 1999; Sumner, 1999; Willcocks and Sykes, 2000) and IT implementations in general (Marble, 2000). Such factors typically include top management support, user training, vendor relations, project champions, interdepartmental collaboration and communication. Somers and Nelson (2001) list the factors that may affect the ERP implementation process and the probability of ERP success. They studied the impact of critical success factors across the stages of ERP implementations using the responses from 86 organizations that completed or are in the process of completing an ERP implementation. Among the more important factors are top management support and involvement, the need for a project champion, user training, technological competence, process delineation, project planning, change management, and project management (Somers and Nelson, 2001).

Al-Mudimigh et al. (2001) also list the dominant critical success factor for ERP project implementation. They provide an integrated framework of the critical factors related ERP project implementation. They listed the top

critical success factors that ongoing throughout all implementation levels. These factors are top management commitment, business case, change management, project management, training, and communication.

Based on my literature review and integrating previous literature, I list some dominant critical success factors that impact the ERP implementation among all stages.

(1) Top management support.

Top management support has been consistently identified as the most important and crucial success factor in ERP system implementation projects (Davenport, 1998; Bingi et al, 1999; Sumner, 1999; Somers and Nelson, 2001). Slevin and Pinto (1987) define top management support as the willingness of top management to provide the necessary resources and authority or power for project success. Top management tend to provide enough resources, fast decisions, and support for the employees acceptance of new system in the organization (Welti, 1999). Top management is also found to mediate the impact of external institutional pressures on the degree of usage of ERP systems. (Liang et al., 2007)

(2) Project management.

ERP implementation is challenging and complex, because of its combination of hardware, software and organisational business process (Ryan, 1999). In order to successfully manage project, project managers must be capable both in strategic and tactical project management activities (Slevin and Pinto, 1987). A good project management should control the project's scope. It

considers project objective, needs, and benefits. Project management is not only to govern a project but also to deliver quality products (Peak, 2000). Project management activities span the life of the project from initiating the project to closing it.

(3) Change management.

Change management is a common concern of ERP implementation in many organisations (Somers and Nelson, 2001). In the process of ERP implementation, change management is identified as activities, processes, and methodologies that support organizational wide employees to understand and accept the organisational shifts (Cooke and Peterson, 1998). Suitable change management help employees champion the change and enhance their commitment to it. In organization, the need for change will help employees focus on the expected business value to be achieved from the ERP project and associated business changes.

(4) Training

ERP systems are extremely complex systems and demand rigorous training. Installing an ERP software package without adequate user preparation and training could lead to unexpected consequences. Inadequate or lack of training has been one of the most significant reasons for failure of many ERP systems (Gupta, 2000). Clearly, training and updating employees on ERP systems is a major challenge. It has been estimated that by lack of training, about 30– 40% of front-line workers will not be able to handle the demands of a new ERP system (Bingi et al, 1999). In addition, Every level in the project

class and the various users require different training. According to Al-Mudimigh et al. (2001), top management teams need to have a project overview and general idea of the new system. IT department, especially the CIO should have in-depth understanding of the functionality and project management of the system. Systems users need to learn more about the functions and background of the new system, especially which related to their own business process. Overall, training provides the whole organization an opportunity to meet the changing needs brought by new systems.

(5) Communication.

The importance of communication across different business functions and departments is well known in the IT implementation literature. (Somers and Nelson, 2001) Communication is defined as "the provision of an appropriate network and necessary data to all key factors in the project implementation" (Slevin and Pinto, 1987). Schwalbe (2000) mentioned that 'communication is the oil that keeps everything working properly'. Therefore, communication across functional and departmental boundaries is another important part in an ERP context since the primary objective of ERP systems is to integrate business functions (Davenport 1998).

(6) Consultant

ERP success is dependent not only on the internal employees who actively participate in the whole reengineering process but also on the outside consultants who bridge the technical knowledge and situation in the implementing organization (Brown and Vessey, 2003). According to Simon

(1990), consultants are even more important for small companies, because they often lack of internal IT staff or professional training. The need for consultant support increases exponentially with the extent of ERP implementation because of the difficulties associated with configuring a large number of modules, the scope of the system, and coordination of operations (Karimi et al., 2007). Consultants are so important that it cost two to ten times than the cost of ERP implementation at the starting stage, and up to 80 percent of the total cost (Scheer and Habermann, 2000).

2. Factors of ERP Failure

Although successfully implemented ERP bring much benefits to organization, such as revitalizing information technology infrastructures and integrated business process, difficulties in implementation lead to significant numbers of ERPs being late or over budget (Umble and Uinble 2002). Given the complexity of ERP implementation and its high requirement of the investment of time, money, and internal resources, understanding the factors that lead to ERP failures is both practically important and theoretically significant. The reasons have been identified, i.e. pervasiveness of the changes associated with ERP, the need for simultaneous work flow redesign, and the need for adapting to the system (Hitt, Wu and Zhou, 2002). In the following, I am going to name two top reasons for ERP failure.

One reason for the high failure is the user resistance among employees (Kim and Kankanhalli, 2009). The implementation and adoption of ERP system require significant change in work practices, procedures (Sharif et al., 2005). For the employees, their entire work flow may change according to the

system software, so that their commitment to the change is relatively important. During and after the implementation, employees may resist the new system which causes delay or over budget to the entire project (Beaudry and Pinsonneault 2005). A survey of 375 organizations from around the world indicated that user resistance is the first-ranked challenge for the implementation of large-scale information systems, such as enterprise resource planning (ERP) systems (ITtoolbox 2004).

Another critical factor leading to ERP failure is misfit between ERP system and organization. Fit between the implementing organization and ERP system is regarded as mutual adaption (Hong and Kim, 2002). Although ERP systems claim to support a broad range of business processes (Scott and Kaindl, 2000), the misfits between the functionality offered by the system and that required by the adopting firm are common (Soh et al., 2000). Basically, there are two kinds of misfits between ERP system and the adopting organization. First, implemented ERP systems did not fit organizational requirement. Although most ERP vendors claim that the systems can suit most organizations, not all information systems operate so smoothly and not all information systems have the same package and embedded modules. Therefore, not all companies will gain the same benefit from using the same ERP applications, and different ERP software packages will better suit different organizations (Ragowsky and Somers, 2002). Second, misfit also occurs when systems developers and systems adopters have different culture. These issues of misfit can be particularly pronounced in Asia when firms adopt a Western ERP system and business practices have been shaped by one

culture while the imposed solution has been shaped by another (Liang et al.,2004; Martinsons, 2004). Wang, Klein and Jiang (2006) found that the initial misfit between the country of origin of the client and the system has persistent adverse effect on the system quality even after implementation. The result indicate that the misfit is usually lower when adopting a local ERP package.

3. ERP Benefits

I summarize the main benefits of ERP systems on organization below.

(1) Improve organizational performance. Studies of operational performance suggest that ERP positively influences performance over time. McAfee (2002) studied the impact of ERP systems on self-reported company performance based on a survey of 101 U.S. implementers of SAP R/3 packages. Participating companies reported substantial performance improvement in several areas as a result of their ERP implementation, including their ability to provide information to customers, cycle times, and on-time completion rates. ERP may improve the firm operational performance by shifts in organizational learning dynamics (CoReleer and Bendoly, 2006). Hitt et al. (2002) found find that firms that invest in ERP tend to show higher performance across a wide variety of financial metrics. Even though there is a slowdown in business performance and productivity shortly after the implementation, financial markets consistently reward the adopters with higher market valuation (as measured by Tobin's q).

(2) Improve Business values of organization. Gattiker and Goodhue (2005)

found that greater business value is associated with ERP deployments that integrate plants with higher interdependence. These empirical findings on ERP impacts due to module selection and multiple sites are also consistent with prior conceptual studies. The study of Hayes et al. (2001) also provides some evidence that market-value increases are higher for ERP purchases from leading vendors.

(3) Increase shareholder returns. Hayes et al. (2001) found ERP announcements generated mean standardized abnormal returns of 0.19%. Small healthy firms had more positive returns than large firms and small unhealthy firms. Ranganathan and Brown (2006) found support for their hypotheses that ERP projects with greater functional scope (two or more value-chain modules) or greater physical scope (multiple sites) result in positive, higher shareholder returns. Furthermore, the highest increases in returns (3.29%) are found for ERP purchases with greater functional scope and greater physical scope; negative returns are found for projects with lesser functional scope and lesser physical scope.

Other studies also find benefits of ERP implementation, such as an ERP might help a firm survive because it leads to higher profits (Gattiker and Goodhue, 2005). Seddon, Calvert and Yang (2010) develop a long-term, multi-project model of factors affecting organizational benefits from enterprise systems (ES). This project-oriented view of ES benefits are increased functional fit (e.g., as the result of minor projects) and success in overcoming organizational inertia.

Source	Outcome	Predictors	Implementation Stage	Level of Analysis	Theoretical Foundation
Al-Mudimigh et al. (2001), EJIS	ERP Implementation Success	• Top management commitment/support • Business case • Project management • Change management • Training • Communication	Implementation	Organization	N/A
Bernroider (2008), I&M	ERP success (• A. Competitive edge • B. Efficiency of IT/IS supported processes • C. IT/IS impacts on goal achievement, and • D. IT/IS reliability)	IT Governance Practices: • IT/IS strategy, • Strategic alignment • Strategic concept based Evaluation • Top management commitment • Participative decision-making • Project team	post-implementation	Organization	IS Success Model (DeLone and McLean 2003)
Chou and Chang (2008), DSS	Overall ERP benefits (ERP's contribution to Organizational Performance)	• Customization • Organizational Mechanism	Post-Implementation	Organization	Gattiker and Goodhue (2005)
Cotteleer and Bendoly (2006), MISQ	Operational Performance (Order lead-time reduction)	• ERP automational capabilities • ERP informational capabilities • ERP transformational effects	Post-implementation	Organization	Business Value of IT (Mooney et al. 1995)
Gattiker and Goodhue (2005), MISQ	Overall Benefits (ERP Contribution to Organizational Performance)	• Interdependence • Differentiation • Customization • Time elapsed since implementation	Post-implementation	Organization	Organizational information processing theory (e.g., Galbraith 1973)

Source	Outcome	Predictors	Implementation Stage	Level of Analysis	Theoretical Foundation
Gattikera and Goodhue (2004), I&M	ERP Net Impacts (• ERP Benefits • ERP Costs)	• Interdependence • Differentiation	post-implementation	Organization	Organizational Information Processing Theory (Galbraith 1977)
Häkkinen and Hilmola (2008), ISJ	Net Benefits (• Productivity • Quality of work • Time to make decisions • Decision quality • Service to external interest groups • Service to internal interest groups)	• Information Quality • System Quality • Service Quality	post-implementation	Organization	IS Success Model (DeLone and McLean 2003)
Hitt, Wu, and Zhou (2002), JMIS	Financial Performance (• Profitability • Productivity • Market Value)	• ERP Adoption • Extent of Adoption	Post-implementation	Organization	Business Value of IT ERP Impact
Holsapple and Sena (2005), DSS	Decision-Support Benefits (• Better Coordination • Better Communication • Greater Satisfaction)	• ERP Planning	Post-implementation	Organization	N/A
Hong and Kim (2002), I&M	ERP Implementation Success	• Organizational fit of ERP	Implementation	Organization	N/A
Karimi, Somers and Bhattacherjee (2007a), JMIS	Business Process Outcomes (• efficiency • effectiveness • flexibility)	• Extent of ERP implementation • ERP delivery system support • ERP radicalness	Post-implementation	Organization	Technology Diffusion (Fichman and Kemerer 1999)
Karimi, Somers and Bhattacherjee (2007b), JMIS	Business Process Outcomes (• efficiency • effectiveness • flexibility)	• IS resources • ERP capabilities	Post-implementation	Organization	Resource-based view (Wade et al. 2004)
Ke and Wei (2007), DSS	ERP implementation success	• Organizational Culture	Post-implement	Organization	Transformational and

Source	Outcome	Predictors	Implementation Stage	Level of Analysis	Theoretical Foundation
	(the effectiveness of ERP assimilation and application)	• Top Management's Leadership	ation		Transactional Leadership (Bass 1985) Organizational Culture (Hurley and Hult 1998)
Kositanurit et al. (2006), EJIS	Individual Performance (ERP impact on individual Job Performance)	• System Quality • Ease of Use • Documentation • System reliability • Authorization • Utilization (Mediator)	Post implementation	Individual	Task–technology Fit (Goodhue and Thompson 1995)
Law and Ngai (2007), I&M	• ERP Success (User Satisfaction) • Organizational Performance (Profitability, Sales Growth, Market Share, and Customer Satisfaction)	• Senior management support • CEO—IT distance • strategic intent • business process improvement	post-implement ation	Organization	Ein-Dor and Segev (1978) Kumar et al. (2002)
Liang et al. (2007), MISQ	ES Assimilation (• Volume • Diversity • Depth)	• Top management belief and participation (Mediator) • Institutional Pressure	Post-implement ation	Organization	Institutional Theory
Lim et al. (2005), EJIS	User Acceptance	• Expectancy • Instrumentality • Valence	Post-implement ation	Individual	Motivation Theory (Scholl 1981)
Morris and Venkatesh (2010), MISQ	Job Satisfaction	• Job characteristics	Post-implementation (Shakedown)	Individual	Job Characteristics Model (Hackman and Oldham 1980)
Osei-Bryson et al. (2008), ISJ	Implementation Effectiveness	• Implementation Climate • Innovation-values Fit	Post-Implement ation	Organization	The Klein-Sorra model (Klein and Sorra 1996)
Rajagopal (2002), I&M	Performance (• Operational Benefits • Functional Benefits	• Motives • Facilitators • Inhibitors	Post-implement ation	Organization	The Stage Model of Information Systems Implementation (Kwon and

Source	Outcome	Predictors	Implementation Stage	Level of Analysis	Theoretical Foundation
	• Customer Benefits)				Zmud 1987)
Ranganathan and Brown (2006), ISR	ERP Business Value (Abnormal stock market return)	• Functional scope • Physical Scope • Vendor Status	Pre-implementation	Organization	Organizational Integration Option Value of IT Platform
Robey et al. (2002), JMIS	Outcomes of ERP (Performance Improvement)	• Core team • Consulting Relationship • User Training • Implementation Approach	Post-implementation	Organization	Organization Development and Change (Van de Ven and Poole 1995)
Saeed et al. (2010), DS	• Shared Understanding • Task Efficiency	• Task Productivity • Task Innovation • User Acceptance • Actual Use	Pre- & Post-Implementation	Individual	TAM (Davis 1989) Technology Sense-making (Griffith 1999)
Sarker and Lee 2003, I&M	ERP Implementation Success (• Implementation and Configuration of System Modules • Structure and Culture Change)	• Leadership • Communication • Implementation Team	Implementation	Organization	Process Theory (Markus and Robey 1988)
Seddon, Calvert and Yang (2010), MISQ	Organizational Benefits from Enterprise Systems (Organizational benefits from system use, from the perspective of senior management) • Long-term Benefits • Short-term Benefits	For short-term benefits • Functional fit • Overcoming organizational inertia For long-term benefits • Integration • Process optimization • Improved access to information • On-going major ES business improvement projects	Post-implementation	Organization	Hong and Kim (2002) Davenport et al. (2004), Gattiker and Goodhue (2005)
Srivardhana and Pawlowski (2007), JSIS	Sustained Business Process Innovation	• Knowledge Sources • Organizational Knowledge	Post-implementation	Organization	Model of absorptive capacity (Zahra and George

Source	Outcome	Predictors	Implementation Stage	Level of Analysis	Theoretical Foundation
		• Absorptive Capacity			2002)
Staehr (2010), ISJ	Business Benefits (Operational, Managerial, Strategic, IT Infrastructure and Organizational benefits)	• Managerial Agency	Post-implement ation	Organization	Structuration Theory (Gidderns 1984)
Stratman and Roth (2002), DS	Business Performance (• Internal Integration • External Integration • Organizational Agility • Customer Responsiveness)	• Strategic IT Planning • Executive Commitment • Project Management • IT Skills • Business Process Skills • ERP Training • Learning • Change Readiness	Post-Implement ation	Organization	N/A
Tsai et al. (2011), DSS	ERP Project Success (• System Quality • Information Quality • System Use • User satisfaction • Individual Impact • Organizational Impact)	• System Providers' Service Quality • Consultants' Service Quality • Project Management	Post-implementation	Organization	IS Service Quality (Pitt et al. 1995)
Tsai et al. (2012), I&M	Net Benefits (Financial, Customer Service, Internal Business, and Innovation & Learning)	• ERP Selection Criteria	post-implement ation	Organization	IS Success Model (DeLone and McLean 2003)
Velcu (2010), I&M	ERP Benefits • internal efficiency benefits • financial benefits • customer benefits	• Strategic alignment • Motivation for ERP • Management of ERP project	post-implement ation	Organization	N/A
Wagner and Newell (2007), JAIS	ES Success (User Acceptance)	• User Participation in the Post-implementation Period	Post-implement ation	Organization	Situated Learning (Lave and Wenger 1991)
Wang and Chen (2004),	ERP Project Success (	• Governance Equilibrium	Implementation	Organization	Transaction Cost Theory

Source	Outcome	Predictors	Implementation Stage	Level of Analysis	Theoretical Foundation
DSS	• completed on schedule • within budget • user training, etc.)				
Wang and Chen (2006), DSS	ERP System Quality (• Functionality • Reliability • Security • efficiency)	• Top Management Support • User Support • Consultant Quality • Communication Effectiveness • Conflict Resolution	Implementation	Organization	N/A
Wang, Klein, and Jiang (2006), JMIS	ERP System Quality (• Functionality • Reliability • Security • efficiency)	• Country of origin of the ERP package • Consultant quality • Top management support • User support	Implementation	Organizational	social shaping of technology (Williams 1996)
Ward, Hemingway and Daniel (2005), JSIS	ES implementation Success	• ES project team's stakeholder management approach • Information systems rationalities and behaviors	Implementation	Organization	Information System Rationalities (Kling 1980; Kumar 1998)

Appendix B. Questionnaire for IT director

1. 您领导的IT部门共有多少职员？

☐ 10 以下
☐ 10-15
☐ 16-20
☐ 21-25
☐ 26-30
☐ 30以上

2. 您公司大约有多少职员？

☐ 100 以下
☐ 100－399
☐ 400－699
☐ 700－999
☐ 1000或以上

3. 请评估[ERP]对您部门效益的影响。

		非常不同意	不同意		中立	同意		非常同意
1.	【ERP】成功提升了IT部门的整体业务表现	1	2	3	4	5	6	7
2.	【ERP】显著提高了IT部门的效率	1	2	3	4	5	6	7
3.	【ERP】对IT部门有明显的积极作用	1	2	3	4	5	6	7

4、请填写您的个人资料（你的答案和个人资料不会被披露给公司或其他任何人）

1）年龄： ☐ 20～30 ☐ 30～40 ☐ 40～50
☐ 50～60 ☐ 60 以上

2）性别： ☐ 男 ☐ 女

3）教育: ☐ 初中或以下 ☐ 高中或中专 ☐ 大专
☐ 本科 ☐ 研究生以上 ☐ 其他 _____

4）您所在的部门 _____; 您在现任职位任职的时间 _____ 年

5）您在本公司任职的时间 _____ 年

6）您公司大约有多少职员？

☐ 100 以下
☐ 100－399
☐ 400－699
☐ 700－999
☐ 1000或以上

7）您部门大约有多少员工？

☐ 10 以下
☐ 10－15
☐ 16－20
☐ 21－25
☐ 26－30
☐ 30以上

8）您公司的年销售额（人民币）：

☐ 500万以下
☐ 500万-1000万
☐ 1000万-2000万
☐ 2000万-3000万
☐ 4000万-5000万
☐ 5000万以上

9） 您公司主要是从事:

☐ 制造业　　☐ 服务业　　☐ 其他 _____

10）您公司的资本构成：

☐ 国外独资　　☐ 国有独资　　☐ 民营独资
☐ 台资　　☐ 港资　　☐ 中港或中台合资
☐ 中外合资（不包括与港、台和资）
☐ 其他 _____

感谢您的帮助！

Appendix C. Questionnaire for IT Employees

1. 您作为IT部门员工，为企业内部其他员工提供IT支援服务。

请对下面各项给出您的评价：

	【ERP】实施后	差	较差		中等	优秀		很优秀
1.	IT部门员工所具备的专业知识和技能	1	2	3	4	5	6	7
2.	对IT部门员工的服务质量所进行的跟踪评价	1	2	3	4	5	6	7
3.	对IT部门员工高质量服务的认可和嘉奖	1	2	3	4	5	6	7
4.	IT部门员工的整体服务水平	1	2	3	4	5	6	7
5.	IT部门经理在提升IT部门员工服务质量方面的领导力	1	2	3	4	5	6	7
6.	IT部门员工与所服务的其他部门员工之间的沟通	1	2	3	4	5	6	7
7.	为确保高质量的服务，IT部门员工获得的资源和支持	1	2	3	4	5	6	7

2. 请对 IT 部门经理的领导风格作出评价。

	我的上司：	非常不同意	不同意		中立	同意		非常同意
1.	专注于提升IT部门的服务质量	1	2	3	4	5	6	7
2.	消除了我们提升服务质量的阻碍	1	2	3	4	5	6	7
3.	关注并赞赏IT部门员工的优质服务	1	2	3	4	5	6	7
4.	制定了有关IT部门员工服务的清晰标准	1	2	3	4	5	6	7
5.	很快回应我在工作方面的请教	1	2	3	4	5	6	7
6.	会抽出时间协助新同事熟悉我们部门和我们公司	1	2	3	4	5	6	7
7.	总而言之，我的上司确实做得很好	1	2	3	4	5	6	7

3. 评估 ERP 系统实施时管理层的支持程度。

		非常不同意	不同意		中立	同意		非常同意
1.	公司管理层在系统实施过程中表现出很高的热情和兴趣	1	2	3	4	5	6	7
2.	管理层对ERP系统的支持度很高	1	2	3	4	5	6	7
3.	高层管理人员亲自参与到ERP系统项目之中	1	2	3	4	5	6	7

4、请填写您的个人资料（你的答案和个人资料不会被披露给公司或其他任何人）

1）年龄： ☐ 20～30 ☐ 30～40 ☐ 40～50
☐ 50～60 ☐ 60 以上

2）性别： ☐ 男 ☐ 女

3）教育: ☐ 初中或以下 ☐ 高中或中专 ☐ 大专
☐ 本科 ☐ 研究生以上 ☐ 其他 _____

4）您在现任职位任职的时间 _____ 年

5）您在本公司任职的时间 _____ 年

感谢您的帮助！