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PARADIGM SHIFTS OF GLOBAL SOURCING STRATEGY: THE INVESTIGATION OF RESHORING PHENOMENON

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PhD

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Paradigm Shifts of Global Sourcing Strategy: The Investigation of Reshoring Phenomenon

CHENG PUI SZE

A thesis submitted in partial fulfillment of

the requirements for the degree of

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_____(Signed)

Cheng Pui Sze (Name of student)

Abstract

The global business environment has become unpredictable with a series of rapid trade policy alterations initiated by the United States (U.S.). Trade policies impact the host country's sourcing decisions in the home country or the trade dynamics between two countries. With protectionism, firms are facing the challenges of the existing offshoring tactic. The speedy growth of labor costs pushes the firms to revisit their sourcing plan to sustain. The firms are concerned about a paradigm shift from low-cost offshoring production to low total ownership cost (TCO) countries.

This thesis examines the reshoring phenomenon comprehensively in the following three studies. A Citation Network Analysis is the first study systematically reviewing 162 reshoring-related articles in economics, business, management, and operation management literature. Citation Network Analysis identifies five significant clusters, and the main path analysis offers the significant pieces in the clusters. This review provides insight and a research gap for further investigation with a better understanding.

In the first empirical study, we conducted a short-term event study to explore the market reaction to the impact of reshoring announcements. This study is based on 281 reshoring announcements by 132 U.S. firms between 2009 to 2022. Our empirical analysis reveals that the market reacts to a firm’s reshoring announcement more positively when the firm reshores under a high currency fluctuation environment and/or from countries with weak intellectual property (IP) protection. However, the market reacts more negatively when the firm’s reshoring announcement entails insourced reshoring (vs. in-house reshoring) operations and/or when the reshored location is a Democratic- rather than Republican-led state.

The second empirical study reviews the top management team's (TMT) likelihood of reshoring decisions. We collected TMT and financial data from the publicly listed U.S. firms

that announced a reshoring decision between 2010 and 2020. To compare the TMT diversity of firms with reshoring decisions to those without, we constructed a set of control firms that did not make reshoring announcements during this period. Our dataset contains 176 observations from 73 reshoring firms, with 8,424 observations across 1,146 listed manufacturing firms. We then applied a probit regression model to examine the direct effects of TMT characteristics and the potential differences in the role of TMTs with reshoring initiative likelihood. We found that TMT with higher nationality diversity, lower average age, and larger board sizes with fewer independent directors are more likely to reshore than older and smaller management boards. Although fewer independent directors cannot provide a diversified experience to TMT, without a clear picture of the global market, TMT will be more confident to reshore in the U.S..

Publications arising from the thesis

Working papers:

1. Cheng, M., Tang, C., Lo, C., Yeung, A., & Lam, H. (2020). Return to USA: Impact of Reshoring Announcements and Reshoring Risks on Market Valuation. (Submitted to Management Science- under Major revision)

2. Cheng, M., Lo, C.,(2021). Bibliometric analysis and systematic review of Reshoring literature

3. Cheng, M., Lo, C.,(2021). Top management team's influence on reshoring decision

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Contents

Chapter 1 Introduction

1.1 Research Background and Objectives

Multinational enterprises (MNEs) have adopted offshore sourcing for over two decades (Berry & Kaul, 2015). Low production costs, knowledge, raw material seeking, and tax refunds from the host country motivate the MNEs to go offshore (Bardhan, Whitaker, & Mithas, 2006; Cachon & Harker, 2002). However, the sourcing strategy changed due to protectionism and nationalism. According to the Reshoring Initiatives report, in 2020, over 1 million reshoring and foreign direct investment jobs have been created in the last ten years. Apparel & Textiles is one of the top 10 reshored industries, with 40,012 jobs created in 656 firms (Initiative, 2020). Researchers are interested in reshoring in fashion and textiles related industry (Ancarani & Di Mauro, 2018; Benstead, 2018; Cassia, 2020; Fratocchi & Stefano, 2019; Młody & Stępień, 2020; Rashid & Barnes, 2017; Robinson & Hsieh, 2016; Yu & Kim, 2018). The main topics for researchers to investigate are sustainability, industry 4.0, and quality control.

The stakeholders and firms must consider their profits by calculating the total cost of ownership (TCO) (Ferrin & Plank, 2002). The changing cost equation from emerging countries is one of the reshoring reasons. The imposing of the Chinese import tax and the dream of “Make America Great Again" motivate the firms to return home. Reshoring provides well-paid job opportunities, the need for skilled labor, and a tremendous investment and infrastructure that make the U.S. economy more robust.

With the rapid global political changes and the U.S. government's promotion, researchers began criticizing the global sourcing strategies and reviewing the possibilities of reshoring (Rafati & Poels, 2015). Production flexibility, quality, reputation, risk reduction, and the "Made in USA" label can offset the advantage of low production costs. The advancement of production technologies further facilitates these paradigm shifts. Researchers started the reshoring topic in

2006 and have drawn close attention since 2014. Most of the literature reviews the motivations and reasons for reshoring (Gray, Skowronski, Esenduran, & Rungtusanatham, 2013; Moore, Rothenberg, & Moser, 2018; Moradlou, Backhouse, & Ranganathan, 2017) which is better understand this phenomenon. They used traditional location theories such as Dunning's eclectic paradigm, transaction cost theory, and internalization theory (Ancarani, Di Mauro, Fratocchi, Orzes, & Sartor, 2015; Ellram, 2013; Foerstl, Kirchoff, & Bals, 2016) to explain reshoring. Gray, Skowronski, et al. (2013) developed different forms of reshoring: inhouse reshoring, outsourced reshoring, reshoring for outsourcing, and reshoring for insourcing which become the fundamental reshoring framework.

As sourcing strategies are vital for operation managers, the researchers discuss and review the reshoring process (Bals, Kirchoff, & Foerstl, 2016; Baraldi, Ciabuschi, Lindahl, & Fratocchi, 2018) and compare offshore and reshoring (Chen & Hu, 2017). Firm performance and market reaction are crucial to providing the direction and index for the operation managers. Brandon-Jones, Dutordoir, Neto, and Squire (2017) use a short-term event study to review firm performance. However, as the sample size is small, our analysis would like to expand further research with a larger sample size and moderate different sourcing risks.

Besides the firm performance and market reaction, the researchers criticized whether reshoring is appropriate for sourcing. Other sourcing strategies, such as right sourcing, might be another option for these operation managers. Thus, it is urgent to understand why the top management team makes such decisions, and operation managers recognize the reshoring performance and select the right sourcing strategy. The government can also furnish suitable policies or subsidies for boosting the reshoring activities.

1.2 Research Design

This dissertation explores the reshoring effect and performance in operation management to review the paradigm shifts in sourcing strategies for developed countries. The first study discovers global sourcing literature's current knowledge structure with citation network analysis (CNA). This review investigates the business and management-related literature and identifies five main research cluster domains: "**reshoring motivation**," "**offshore and reshore evaluation,**" "**knowledge transfer**," "**consumers perspective,**" and **"post-COVID-19 era"**. We further analyze the research gaps and knowledge using main path analysis. As the previous literature focuses on external motivations such as labor cost, quality, currency fluctuation, and delivery lead time, reshoring performance and internal motivation are underdeveloped. Therefore, we proposed an empirical investigation of the impacts of reshoring firms' announcements using a short-term event study. Four moderating risk factors are investigated in this study: offshore foreign currency risk and IP risk, onshore reshoring types (in-house vs. insourced reshoring), and reshoring location choice (Republican-vs Democratic-led states). The study works on 281 reshoring announcements by 132 U.S. firms between 2009 to 2022. The primary objective is to evaluate how the reshoring announcements influence the firm by measuring the abnormal stock return. This study confirms that insourced reshoring strategies and/or announcements involving Democratic-led states adversely affect the market reaction. However, the market reaction becomes positive when the firms reshored from higher foreign currency volatility relative to the U.S. dollar and offshore countries with lower IP protection scores than the US (i.e., higher foreign IP risk). The results provide insights into sourcing managers and developed and developing countries' governments. The firms can select the appropriate strategy and location to avoid reshoring failure.

The third study reviewed how the TMT influences the reshoring decision. As the decision-makers in the firm, TMT plays a vital role in strategic sourcing decisions (Melay & Kraus, 2012). However, TMT characteristics for reshoring are not investigated in the past. This study reviews TMT characteristics based on the upper echelons theory with the likelihood of reshoring. Our

results suggest that high nationality diversity, younger directors, and less board independence are more likely to reshore back to the U.S.. This study proves that TMT characteristics are associated with reshoring decisions and the results provide insights into potential reshoring firms.

The latest version of the first study, entitled "Bibliometric Analysis and Systematic Review of Reshoring Literature," is planned to be submitted to the International Journal of Production Research. The second study's latest version, " Return to the USA: Impact of Reshoring Announcements and Reshoring Risks on Market Valuation," has been submitted to Management Science under the major revision. Finally, the third study is planned to submit to the “International Journal of Production Economics."

Chapter 2 Bibliometric Analysis and Systematic Review of Reshoring Literature

This study comprehensively reviews the reshoring of business-related literature. With the rise of protectionism in the global economy in recent years, a growing number of firms have reversed their offshore sourcing to reshoring strategies to avoid perils (Ellram, Tate, & Feitzinger, 2013; Fratocchi, Di Mauro, Barbieri, Nassimbeni, & Zanoni, 2014; Gray, Skowronski, et al., 2013; Tate, 2014). In addition, the COVID-19 pandemic and supply chain disruption speed up decisions and actions (Ivanov, 2020), as reshoring may be the solution for this disruption. Reshoring is the sourcing strategy that reallocates the manufacturing and services from an offshore location to the home country (Gray, Skowronski, et al., 2013). In some studies, the terms "backshoring" (Kinkel, 2012) and "inshoring" (Fratocchi et al., 2014) refer to such relocation. This review uses "reshoring" for a more precise presentation.

Numerous authors review the reshoring drivers (Foerstl et al., 2016; Fratocchi et al., 2014; Gray, Skowronski, et al., 2013), including the increase in labor costs (Zhai, Sun, & Zhang, 2016) and environmental costs (Esfahbodi, Zhang, & Watson, 2016) in emerging markets. Meanwhile, exchange rate fluctuation, intellectual property theft of high-technology products and production processes, political instability, and regulatory changes (Holweg, Reichhart, & Hong, 2011; Stanczyk, Cataldo, Blome, & Busse, 2017) are external environmental threats that affect the firm cost performance (Esfahbodi et al., 2016; Hollos, Blome, & Foerstl, 2012). McIvor (2013) and Tate (2014) indicated that retaining firms' long-term capability should outweigh the simple manufacturing overhead cost control. Researchers evolved different management theories, such as transaction cost economics theory (Wacker, Yang, & Sheu, 2016), eclectic paradigm (Dunning, 2015), institutional theory (Glover, Champion, Daniels, & Dainty, 2014), and resource-based view (Safizadeh, Field, & Ritzman, 2008), to explain reshoring phenomenon.

Previous articles mainly focused on reshoring drivers and theories development. Compared to traditional systematic literature reviews (SLR), we use a citation network with a research domain, which provides a clear backbone of knowledge development (e.g., applying a theoretical perspective on an issue or using similar methodologies for new findings). Researchers from the same specialty tend to cite each other's research articles to position their work in the field based on previous knowledge (Calero-Medina & Noyons, 2008). Such a research domain demonstrates a clear momentum of future research development, yet the traditional literature review approach does not easily visualize such momentum. 162 articles from various leading business and management journals have been found and reviewed in this review from 2006 to 2023. Four systemic literature reviews focus on reshoring drivers (Dhiaf, Atayah, Nasrallah, & Frederico, 2021; Gadde & Jonsson, 2019; Tate & Bals, 2017). However, these literature reviews examine only 6 to 57 journals and mainly focus on the reshoring drivers.

To fill these research gaps, we endeavor to identify the critical reshoring studies that play an essential role in the economic, business, and management-related fields and use objective cluster and main path analysis to provide another perspective with a comprehensive study on reshoring literature. This review applies citation network analysis (CNA), a system of channels to identify specialties, the evolution of research traditions, and changing paradigms (De Nooy, Mrvar, & Batagelj, 2018). CNA allows a dynamic analysis to identify the articles that mainly contribute to theory-building (Colicchia & Strozzi, 2012) and enhance objectiveness while identifying the main research domains. We review the core articles and recalibrate the main focal issues of reshoring for upcoming trends and reshoring decisions through bibliographic coupling, co-citation, and citation analysis to provide additional information for researchers.

The following research questions are of interest:

1. To identify the top influential articles, journals, countries, and authors in the field between 2006 and 2023.

2. To classify the research domain, explore each domain's main path, and provide an important direction for future research.

2. Dataset and Methodology

2.1 Data collection

This review applies the five-phase process (Sarkar & Maiti, 2020). These five stages of procedures are discussed in detail below:

2.1.1 Phase 1 Bibliometric search

We searched through an advanced search in the Web of Science (WOS) database from Thomson Reuters (T.R.)[1] by using the related keywords (Appendix A1). Specifically, we select articles related to Business, Economics, Management, or Operations research management science according to WOS categories. We further limit the journal list to Quartile 1 in Scimago Journal & Country Rank (SJR)[2] . The timeframe is between 2006 and 2023. This study excludes textbooks, conference articles, doctoral dissertations, conference proceedings, letters, and notes to ensure vigorous samples. It results from 216 articles. To further improve the articles' relevance by reviewing their abstracts, we remove 54 articles unrelated to the topic. Consequently, there are 162 articles included (Appendix A2)

2.1.2 Phase 2 Descriptive analysis

With the dataset collected in phase 1, we can identify and answer research question 1. The descriptive analysis includes the distribution of the number of articles by cited times per year, the

[1] WOS is a multidisciplinary abstracting and indexing resource with 16,959 titles including 726 Open Access publications journal covers (Goodwin, 2014).

[2] Q1 in SJR is occupied by the top 25% of journals in the list. The most prestigious journals within a subject area are those occupying the first quartile, Q1.

top 5 journals listed with the most reshoring studies, distribution by article type, and research context in empirical studies.

2.1.3 Phase 3: Scientometric analysis

We apply VOS viewer (Van Eck & Waltman, 2010) to generate the co-authorship and co-occurrence network for keywords in our research domain. Thus, we can identify the potential keywords or concepts for future topics throughout the scientometric analysis.

2.1.4 Phase 4: Citation network analysis

CNA provides the research domain classification. The citation score we collect from the WoS database develops with different clusters and forms a citation network. (Van Eck & Waltman, 2014a). With the mapping and visualization of the network, we can identify the main research domain for reshoring topics.

2.1.5 Phase 5: Main Path Analysis

We identify each cluster's main path discovered by CitNetExplorer using Pajek (Hummon & Dereian, 1989; Lucio-Arias & Leydesdorff, 2008). Then, adopting the Search Path Count (SPC)[3] in the traversal citation weight extracts the main paths and identifies the literature's main streams (Wilding, Wagner, Colicchia, & Strozzi, 2012). Appendix A3 provides the process flow for our study.

2.2. Descriptive Statistics Results

2.2.1 Publication distribution and cited times per year

[3] Search Path Count is one of the traversals counts in main path analysis. Vladimir Batagelj proposes search path length considering all possible paths from all the sources to all the sink vertices (articles) and calculating the times the link is "traversed" after they run through all possible paths (Batagelj & Mrvar, 1998).

The articles' publication years show the development of reshoring literature in almost two decades (Figure 1). The researchers started the reshoring topic in 2006 and became interested in it in 2014. Some researchers argue that the economic downturn motivated firms to reshore in the late 2000s (Delis, Driffield, & Temouri, 2019). The article numbers increased continuously between 2016 and 2023, with 129 representing 79.63% of all articles captured. The number of publications rose from 2016 to 2019, reaching 28 articles in 2022. The sum of time cited is 5,304, the average citation per journal is 32.74, and H-index is 40 (Table 1). The citation started in 2006 and increased gradually from 2016 to 2019. After that, the reshoring of articles decreased due to the COVID-19 pandemic. The publication numbers are climbing steadily after 2019; the time cited reaches the highest in 2022. The increase in the citation indicates the researchers are more interested in this topic. The top 15 most cited reshoring articles are listed in Appendix A4. These top-cited articles ranged from 2015 to 2022 and 67% from cluster 1, further discussed in section 2.4.2.1.

Figure 1. Publication year of articles and the sum of times cited per year (till 2023 March).

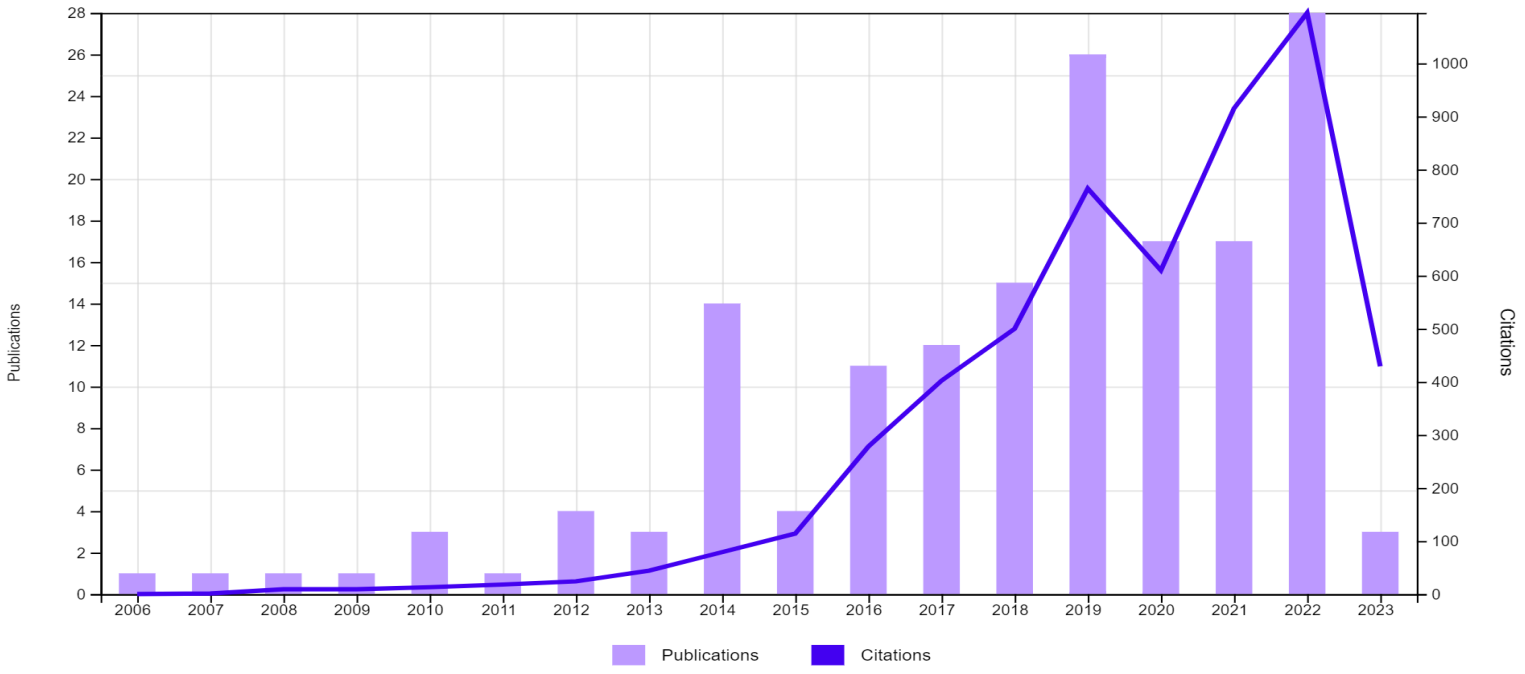


Table 1. Reshoring overview between 2006 and 2023

Descriptive statistics	
Number of articles	162
Times cited	5,304
Average citation per article[4]	32.74
Average citation per article per year	1.82
Average citation per year	294.67
H- Index[5]	40

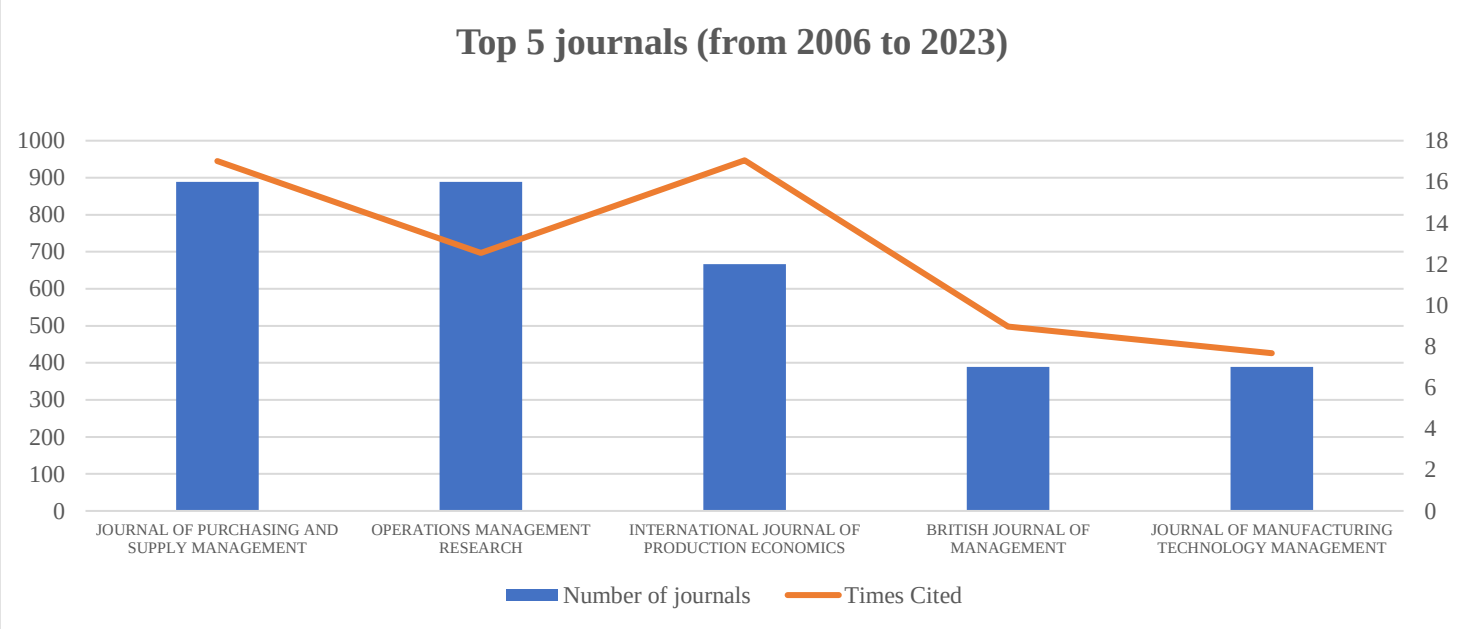
2.2.2 Top 5 journals list with most reshoring studies

There are 63 source journals (Appendix A5), and Figure 2 describes the top five journals publishing reshoring-related articles. These top five journals are *Journal of Purchasing and Supply Management, Operations Management Research, International Journal of Production Economics, British Journal of Management, and Journal of Manufacturing Technology Management.* These top five journals account for over one-third (33.95%) of reshoring-related articles. Furthermore, considering the total citation score (TCS), these top five journals account for 36.92% of all reshoring articles. Some top journals, such as the *Journal of Supply Chain Management, Business Horizon, International Journal of Operations & Production Management, and Management Science* are high in total citation scores per article, which means reshoring articles from these journals are also influential even if they do not have many publications as these top five journals.

[4] The calculation is the sum of the times cited count divided by the number of results.

[5] H-index value is based on a list of publications ranked in descending order by the Times Cited count.

Figure 2: Top 5 source journals (from 2006 to 2023)



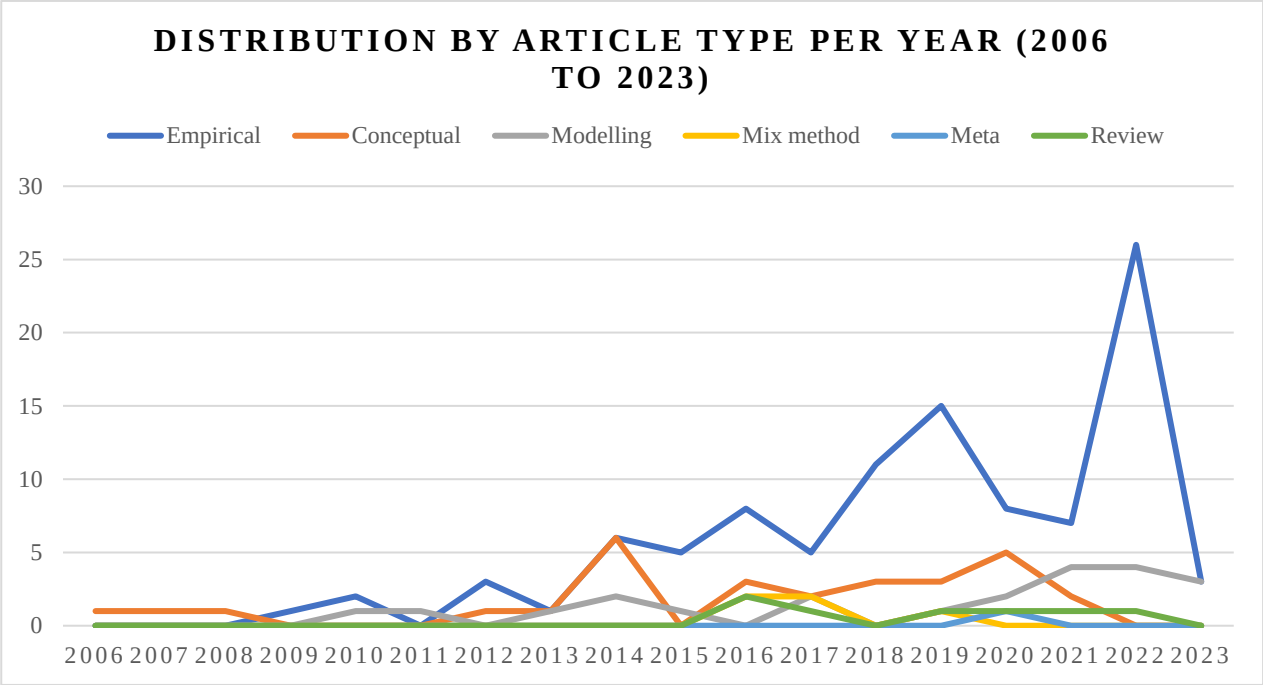
2.2.3 Distribution by article type and research context in empirical studies

Six article types, including empirical, modeling, review, mixed-method, meta-analysis, and conceptual, apply to the articles. Empirical studies (100 articles or 62.00%) are the most-shared article type, followed by conceptual type (31 articles or 19.13%) and modeling type (21 articles or 12.96%). The review paper conducted four articles (2.47%) while five articles (3.08%) were mixed method articles and meta-analysis with two articles (1.23%). The researchers primarily built the conceptual model started in 2007. The empirical studies research raises from 2009 while a sharp increase from 2014 to 2022 (Figure 3). The results indicate that research rarely covers reshoring topics in mixed-method and meta-analysis, which can be a promising avenue for future studies.

We review the countries' and industries' contexts in empirical studies (Appendix A6 and A7). Among 100 articles, almost 76% of the study concerns multiple industries (75 articles) and focuses on developed countries (76 articles), including the U.S. and the United Kingdom (UK). Developed countries remain dominant in world trade. However, emerging markets like China and India cannot be ignored. As such, researchers can further develop these emerging countries in the future. Various industries are selected in empirical research as the authors want to provide a

broader view of sourcing decisions. Some services-related sectors can be further developed since most manufacturing industries, like automobiles, are well discussed. The manufacturing industry is still leading in empirical research as reshoring manufacturing creates opportunities for communities. Concurrently, an in-depth investigation of a specific sector, such as the labor-intensive industry in a particular country, can fill the research gap as a potential trend.

Figure 3: Distribution by article type per year (2006 to 2023)



2.2.4 Co-authorship and Co-occurrence

VOSViewer counts the article keywords from abstracts and authors' co-occurrence frequency to analyze co-authorship and co-occurrence between articles (Gobster, 2014; Van Eck & Waltman, 2011). More researchers consider co-authorship a critical element when reviewing the literature, as researchers work as a team to bring skills and knowledge together. Collaboration networks and multidisciplinary approaches are compelling instruments for researchers. Co-authorship analysis can identify the key researchers and their connections in reshoring. (Acedo, Barroso, Casanueva, & Galán, 2006; Kumar, 2015; Morel, Serruya, Penna, & Guimarães, 2009).

VOSViewer provides full and fractional c2ounting methodologies to construct the coupling network (Van Eck & Waltman, 2014b). Van Eck and Waltman (2014b) prefer a fractional counting methodology for co-authorship as it reduces the journal's impact on many authors. The fractional counting method considers the co-authorship link by the total authors' number of co-authored documents. Full counting methodology weighs 1 to each author in an article, while each author weighs 1/n under fractional counting (Perianes-Rodriguez, Waltman, & Van Eck, 2016).

2.2.4.1 Co-Authorship

There is a total of 364 authors on the list for reshoring articles. VOSViewer calculates the total strength of the co-authorship links with other authors. Authors with the greatest total link strength are selected to form clusters. There is no connection between some authors in the network. Single authorship in this field, as over 76% (n = 278/364), only contributes to one publication. 24% of the authors contribute to two or more publications on the reshoring topic. Fratocchi Luciano (Cluster 2)and Barbieri Paolo (Cluster 3), Di Mauro Carmela (Cluster 5), Ancarani, Alessandro (Cluster 5), and Sartor, Marco (Cluster 5), with a sizeable total link strength (Appendix A8) in their clusters. Clusters 2, 3 5 are well-developed with more influential authors. At the same time, authors in clusters 1 and 4 are the potential clusters to be developed. Maloca, Spomenka, and Esenduran, Goekce, only with 1 article, have high citations, 194 and 197, respectively (Gray et al., 2013; Kinkel & Maloca, 2009)

The top 20 authors contributed approximately 63.58% (103/162 articles) of the entire publication. Fratocchi Luciano is among the top 20 most influential authors, with 700 citations and 53.84 average citations per journal. Di Mauro Carmela and Barbieri Paolo ranked the following positions with total citations of 608 and 425, respectively.

The academic collaboration between countries is keen on reshoring topics. U.S., Italy, Germany, and UK are involved in academic cooperation frequently. This finding is grounded because developed countries' universities play a decisive role in the reshoring topic. On the country level, the U.S. contributed the highest publication number and citation (59 journals, 2,074 citations), followed by Italy (38 journals, 1,090 citations), the UK (36 journals, 731 citations), Germany (22 journals, 1,039 citations) and Sweden (20 journals, 426 citations). China is the only emerging country in the top 15 countries (Appendix A9). The top 5 countries contributed to more than 76% of citations. More universities can collaborate to widen their scope and expand the discussion from different angles, especially in developed and developing countries.

Figure 4 a: Network visualization for co-authorship

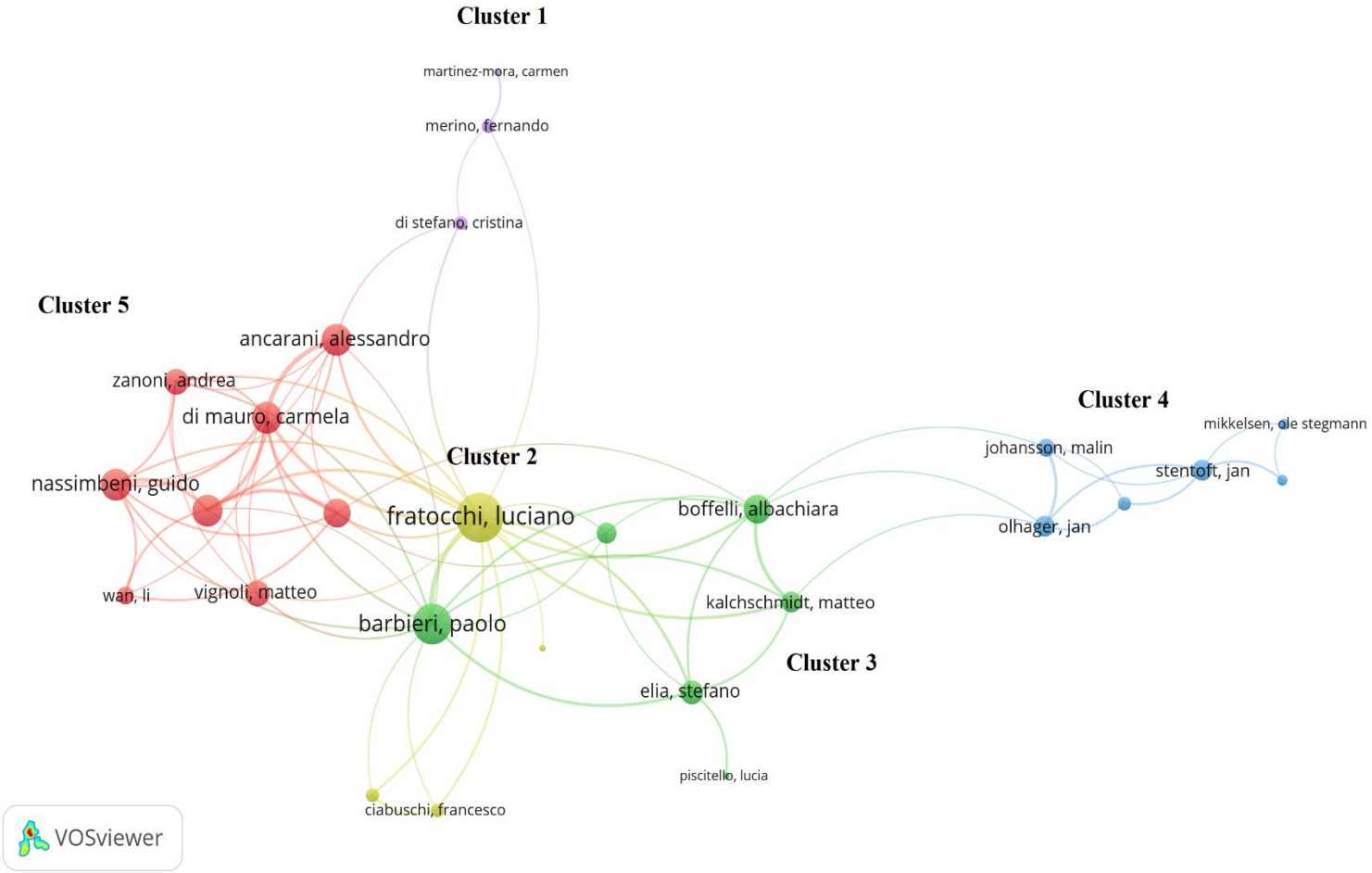
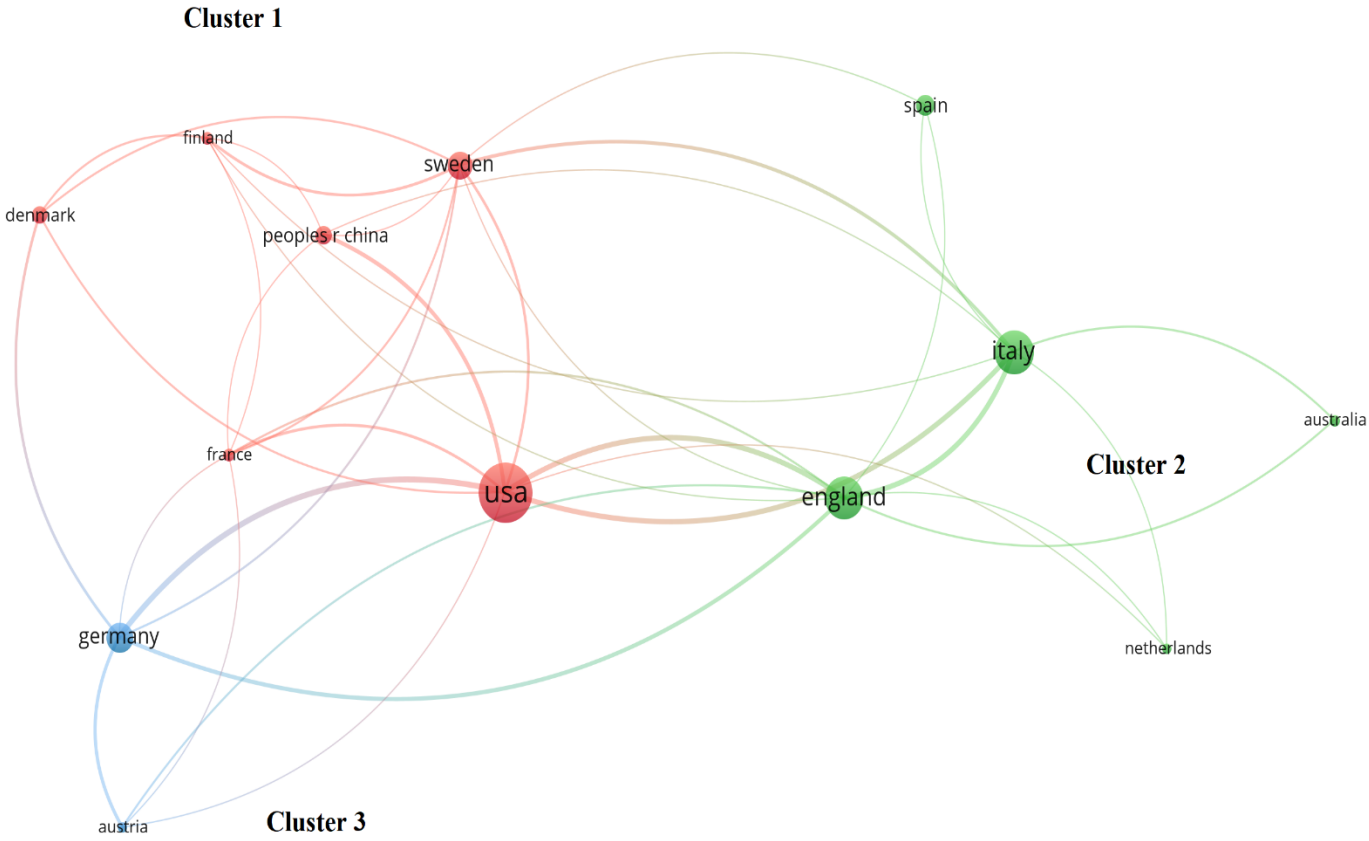


Figure 4b: Co-country network for co-authorship

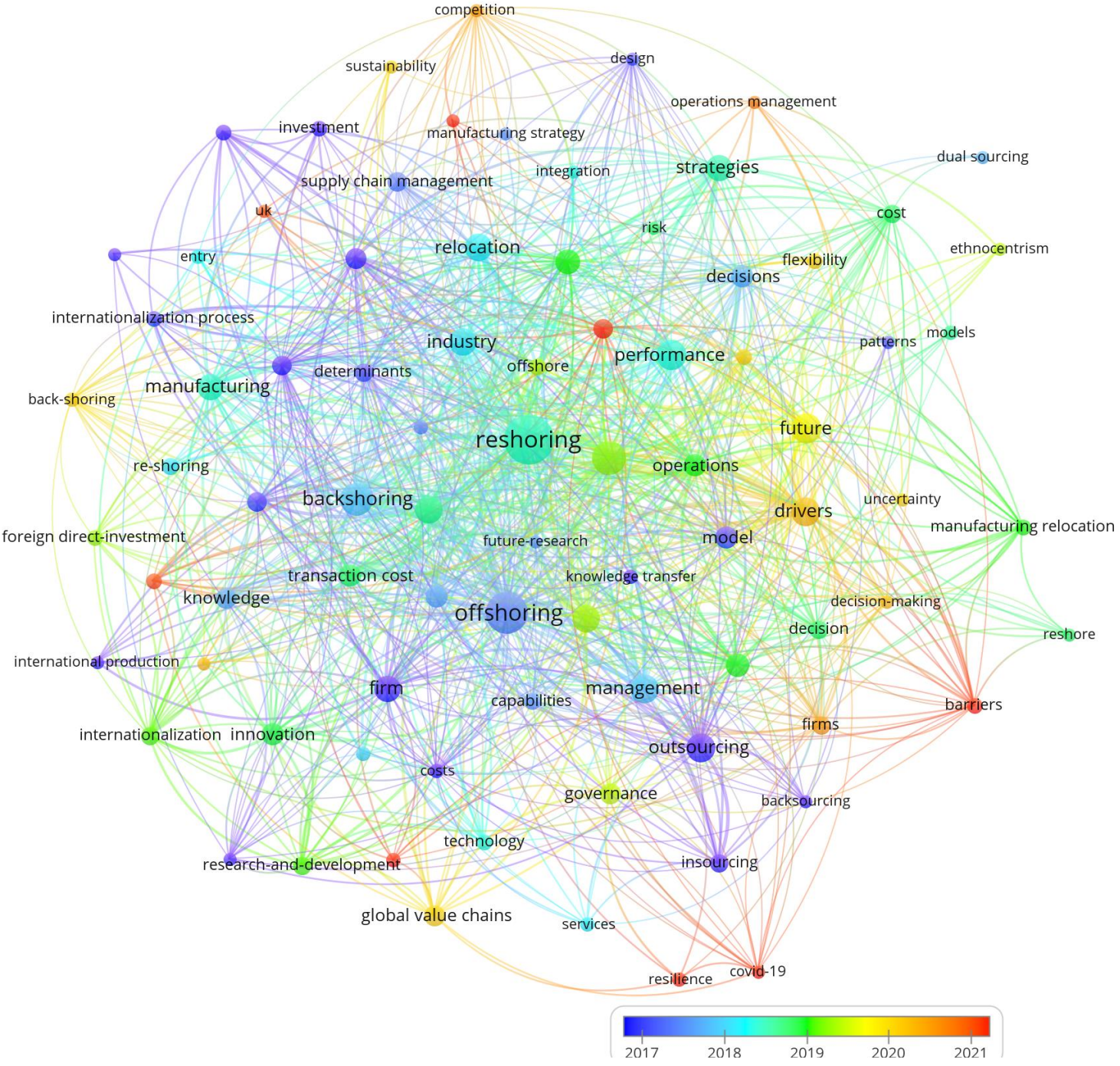


2.2.4.2 Co-occurrence

Keywords co-occurrence can effectively reflect the research hotspots and direction (Van Eck & Waltman, 2010). The VOSViewer occurrences attribute implies the number of documents where a keyword occurs. It analyzes the keywords and removes duplicate words or meaningless words in the dataset (for example, "isbok," "o53"). Six clusters with 1,564 links include 84 keywords (Figure 5) for reshoring topics. To capture deeper insights, we review the overlay visualization for different topics. Figure 5 demonstrates that the researchers discussed outsourcing, internationalization, and offshoring with backshoring before 2017. Then they moved to the topics: reshoring, reallocation, technology, and performance. Afterward, knowledge, sustainability, drivers, flexibility and global value chains are the main topics, and COVID-19 is the trend and

critical consideration for the reshoring research. These keywords also matched the research gap topic found in main path analysis.

Figures 5: Network visualization and overlay visualization for co-occurrence

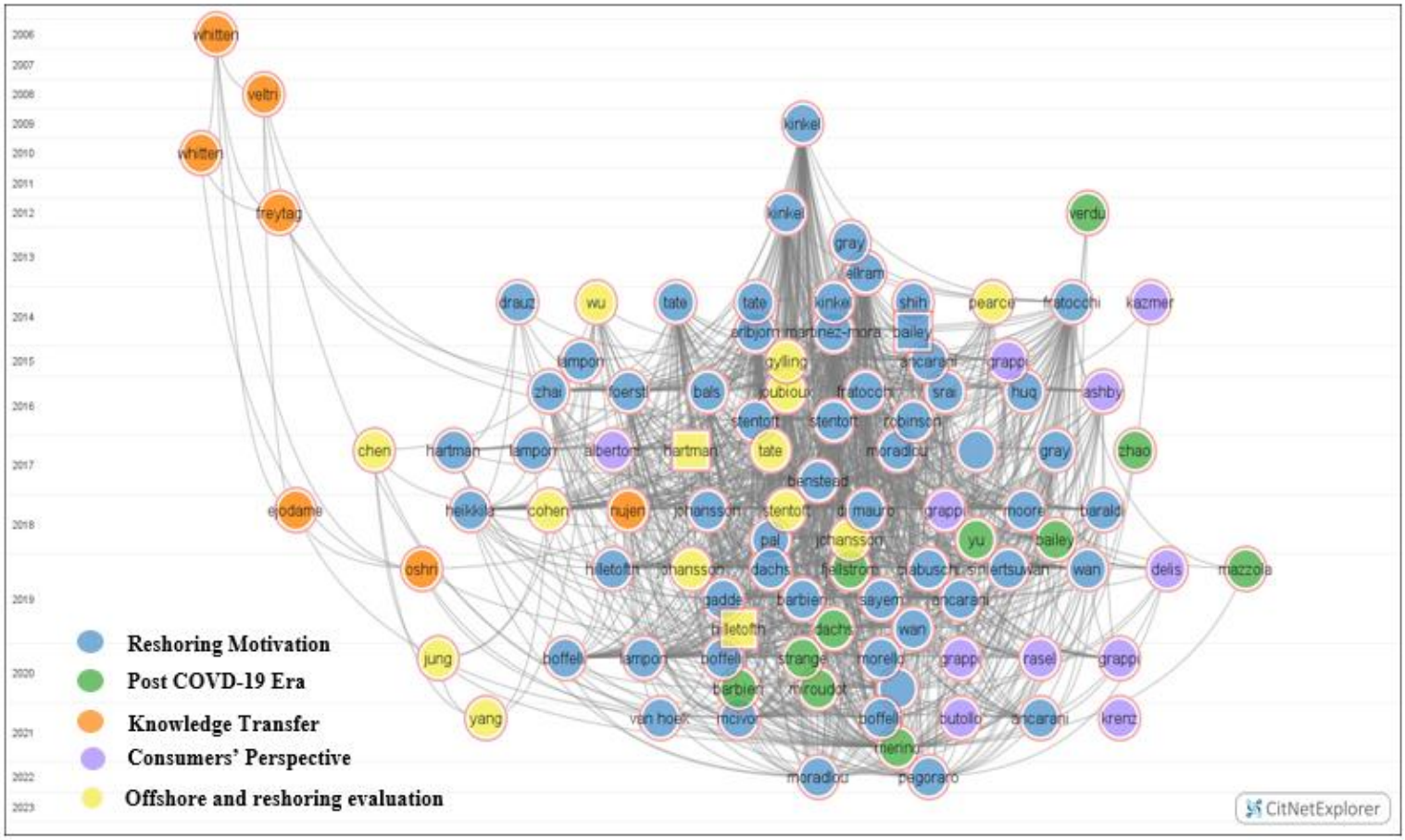


2.3 Citation Network Analysis

2.3.1 Clustering classification

As discussed in section 3.2.1.5, we run a small local moving clustering algorithm from CitNetExplorer for 162 articles in the network. The finding identifies five significant clusters that contain 149 articles (91.97% of the selected sample) with 1,821 citation links. The remaining 13 articles are "scatter clusters." We will focus on five significant domains for the main path analysis. First, we analyzed the articles to find the common topics and assigned labels to each cluster. Then, we labeled the clusters as "**reshoring motivation**," "**offshore and reshore evaluation,**" and "**knowledge transfer**", "**consumers perspective,**" and **"Post-COVID-19 era"** (Figure 6).

Figure 6 Five main clusters created by CitnetExplorer



2.3.2 Main path analysis for the main research domains

The main path analysis considers and reviews the citation relationship between articles. The well-developed field always provides a comprehensive network to study(Liang, Wang, Xue, & Cui, 2016). Exploring the main knowledge flow (as the backbone) in the citation domain is the main path analysis's main objective, which provides an accurate and objective estimation of an article's direct and indirect influences (Liu, Lu, Lu, & Lin, 2013). This research method can avoid any subjective interpretation from the writer. The main path analysis steps are as follows (Batagelj & Mrvar, 2001; De Nooy, Mrvar, & Batagelj, 2018). First, we selected the network's most significant connected component and shrank the most substantial components in the selected most significant component. Then, remove loops before creating the main path. According to De Nooy et al. (2018), the main path considers the highest traversal weight on its arcs and extracts the highest traversal count on the lines to determine the main paths. Finally, we select the acyclic network, create a search path count (SPC), and draw the main path. Appendix A10 to A14 shows the five main paths created by the main path analysis software - Pajek. We can understand the reshoring development route and propose possible research directions for each domain with these main paths.

2.3.2.1 Domain 1: Reshoring Motivation

In this domain, reshoring motivation and concept-building are the essential elements. The researchers focus on the "how" and "why" of reshoring. Reshoring drivers and motivation is the most significant domain, with the most cited articles (Appendix A10). Many authors (Gray, Esenduran, Rungtusanatham, & Skowronski, 2017; Shih, 2014) explain the reshoring reasons and build the framework in this domain.

Reshoring Drivers

Kinkel and Maloca (2009) defined and reviewed the reshoring phenomena in Germany. They used a multiple-case approach to investigate the reshoring decision. Offshoring is essential since lower prices and costs are still the priority for German companies. However, reshoring would be an option if the firms seek flexibility and better quality. Kinkel (2012) further developed the reshoring idea with different case studies before and after the European global recession crisis. Path dependency is critical for firms when considering reallocation as an adoption process. The probit regression results suggested the reshoring declined after the recession crisis. However, labor cost is still the most significant reason for offshoring and quality issues for reshoring. This article provided insight into how environmental factors affect reshoring activities. At this moment, the offshore sourcing strategy is significant compared to reshore.

Afterward, Ellram, Tate, and Petersen (2013) review the reshoring drivers using explanatory factor analysis. Government policies, including tax subsidies and support, affect the reshoring decision. The result matches Dunning's asset-seeking advantage. Supply interruption risk might be high, so firms should consider all costs when considering the manufacturing location.

Martínez-Mora and Merino (2014) offer a comprehensive suggestion for reshoring. Different volumes and product types will affect the reshoring decision. The authors examine the footwear industry, and the results contradict previous articles (Gray et al., 2013). While transportation, labor cost, and batch size affect the total cost, the authors believe reshoring can benefit Spain's footwear industry long-term. This finding delivers a new insight into the labor intensity industry since firms believe the labor cost would harm the total cost, especially for the labor intensity industry. Robinson and Hsieh (2016) reviewed the UK luxury brand Burberry. Like other fashion brands, they closed their factory in the UK and moved production to Asia. However, both sales and customers' responses suggested returning to “British heritage” is a better option for Burberry. The study provided another angle for luxury fashion brands since the customers’ expectations might differ from fast fashion brands since their business models are superior quality, brand heritage and

timeliness to market. Therefore reshoring their production would be a better choice for luxury brands.

Di Mauro, Fratocchi, Orzes, and Sartor (2018) selected the small and medium enterprises of the footwear industry in Italy, which required a lot of skilled labor during production. The article's authors identify offshoring and backshoring motivations, suggesting that backshoring is a strategic shift but not a managerial error. Maintaining the balance between offshore and backshore would be another step for the managers. The new concept of right-shoring is developed.

Henkel, Boffelli, Olhager, and Kalchschmidt (2022) continue to investigate the reshoring motivation for backshoring decision processes. The survey results show that firm size, industry type, and offshore country can act as contingencies for reshoring decisions. Firms that are quality, efficient, and resource-seeking would lead to reshoring. Reshoring readiness, including the firms' skills, knowledge, and capability level, would also positively affect the reshoring decision.

Conceptual framework development

Gray et al. (2013)first define reshoring types: in-house reshoring, outsourcing reshoring for insourcing, and outsourced reshoring. This article is the second-highest cited article, and the typology of the reshoring phenomenon becomes the researcher's fundamental to determining reshoring types. Next, Fratocchi et al. (2014) examined the reshoring concepts by reviewing the definition, the companies' motivations, the advantages of home & foreign locations, and the entry and exit modes. As more firms consider to reshore, the entry mode for reshoring becomes more critical (Wan, Orzes, Sartor, Di Mauro, & Nassimbeni, 2019). Wan et al. (2019) first developed the conceptual framework based on Gray et al. (2013) entry mode framework. They reviewed the reshoring entry mode regarding country, industry, firm, and project factors. The result suggests that if the firm implements the offshore insourcing entry mode, it will apply the same insourcing entry mode when they reshore. Wan et al. (2019) further investigate the relationship between entry mode with cultural/cognitive in the firms, together with industrial characteristics using resource-

based views. With more complex environments, the reshoring can be successfully implemented based on the proper pairing between the home country's institutional, cultural, and industrial factors, specificities, and firms' history.

Ancarani et al. (2015) visited the reshoring motivations and categorized them based on Dunning's Eclectic theory. The results were consistent with the eclectic theory and suggested a linkage between duration and motivation of reshoring (especially for the quality and made-in effect). Benstead, Stevenson, and Hendry (2017) continued the reshoring motivation conversations using the contingency theory and a single case from the textile industry. The authors investigated the previous motivation factors and categorized eleven contingency factors. They reviewed the reshoring process and contingency factors with the U.K.'s case study and refined the new conceptual framework for reshoring. Although some conceptual frameworks are developed to explain the reshoring phenomenon using traditional sourcing theories, they are still insufficient for researchers to explain it satisfactorily.

McIvor and Bals (2021) developed a conceptual framework to understand reshoring decisions. The study reviews management theories, including transaction cost economics, eclectic paradigm, and resource-based theory, in three different stages when considering reshoring. Both resource-based theory and transaction cost economics provide support to make the reshoring inhouse/outsourcing decision.

New external factors

The researchers started to review how technology can alter the reshoring phenomenon. Ancarani, Di Mauro, and Mascali (2019) investigated whether backshoring is workable under Industry 4.0. Empirical results show Industry 4.0 is vital for backshoring. The hidden cost, like customers' return and quality performance, affects customer proximity, supporting backshoring. Product innovation and relocation support are also positively significant with backshoring.

Boffelli, Golini, Orzes, and Dotti (2020) started to change the direction for reshoring and reconsider whether reshoring is the best sourcing solution. Using the grounded theory approach, Boffelli et al. (2020) offered four cases from the textile-related industry. The authors suggested reshoring decision-making and implementation of process review with the cases. In addition, they provided another significant motivation that disappeared in the past: emotions and experience-based factors. The emotions and top management's experience will affect the reshoring decision regarding the made-in effect, and belonging emotion explains why the CEO or top management returns home especially the medium and small firms.

This domain's literature focuses on discussing different sourcing theories and reshoring reasons. Comparatively, the researchers focus more on the external factors affecting the reshoring decisions, including labor cost, lead time, and quality issues. However, researchers branch out the internal factors like organizational culture or TMT preference since TMT is the firm's essential player and decision-maker. The TMT's working experience, management capabilities, political consideration, and background might be significant internal factors for the researchers to investigate. These factors directly affect the risk-taking possibilities and sourcing decision-making process, leading to reshoring decisions. Simultaneously, the existing sourcing theories cannot comprehensively explain the reshoring phenomenon. Due to the complexity of the reshoring decision, the researchers can continue to improve the current theories and framework in future research.

2.3.2.2 Domain 2: Offshore and reshore evaluation

While offshore has been the sourcing strategy for over two decades (Jaymin Lee, 1986), this cluster's articles compare offshore and reshoring activities using different angles and methods (Appendix 11).

Wu and Zhang (2014) reviewed offshore sourcing (efficient sourcing) with reshoring (responsive sourcing). The authors developed the sourcing game model and found that the information in firms affects the sourcing decision. The firms might still choose to outsource even if the decision is not cost-effective. Besides the volatile demand, shrinking market size, and rising global commodity prices, the labor and logistic cost increase also contributes to the reshoring decision that matches the drivers discussed in previous literature.

Afterward, more articles further investigated reshoring and offshoring (Chen & Hu, 2017; Cohen et al., 2016; Jung, 2020; Yu & Kim, 2018). Chen and Hu (2017) suggested offshore supply dependence obstructs the market response, affecting the offshoring-reshoring comparison for the reshoring firms. The authors used the mathematics model to demonstrate and identify standard component designs that make reshoring more appealing under offshore supply dependence circumstances. Cohen et al. (2016) suggested a different point of view. Reshoring is not the corrective action managers take, and offshoring is still dominant as the primary sourcing strategy. Although firms consider complex factors when considering manufacturing locations, China is still the favored location for production. Jung (2020) further reviews the effectiveness of offshore and combining dual sourcing. The mathematics model provides that firms prefer offshore production if they consider a single sourcing strategy. They prefer offshore and reshoring (dual sourcing) for risk pooling purposes. As President Donald Trump imposed tariffs on different industries in 2018, the firms must reconsider their sourcing strategies, whether maintaining the outsource production with heavy tariffs in offshore countries like India and China or returning to their home country with different reshoring incentives. Yang, Ou, and Chen (2021) investigated the tariff effect on the production cost of MNEs. With the mathematical model, they suggest that if the tariff rate is low, offshore production brings more long-term benefits, especially when competition exists. The government should impose a higher tariff to bring the MNEs home. Besides tariffs, Xie, Liu, Han, and Qiu (2023) reviewed the government subsidy with different types of manufacturers. The brand

premium is high with high government subsidies; firms will choose to reshore. But the government still wants to subsidize the firms with low brand premiums (intend to outsource) to raise their competitiveness. Kim and Chung (2022) formulated a model to analyze the production cost and profit. The reverse logistics, environment from host and home countries, and reshoring policy should consider together with reshoring drivers on MNEs. Therefore, firms should apply right-shoring strategies after considering all factors.

Besides comparing offshore and reshore, Merino, Di Stefano, and Fratocchi (2021) compare reshoring with near-shoring for the footwear industry. The government prefers to reshore to the home country instead of the nearby country. Although the government is not the primary driver for reshoring, aid from the government and labor availability will boost the reshoring process.

Overall, as more articles review offshore together with reshoring and provide some directions for firms to make the sourcing decision, comparing near-shore and reshore would be a new trend for the researchers to study. Near-shore can tackle some disadvantages of offshore sourcing, e.g., poor communication and control because of distance, while maintaining the offshore advantage, e.g., cheap labor. Therefore, firms might select near-shoring instead of reshoring. Furthermore, the changes in government policies, for example, tariffs and incentives provided by home and host countries, can provide different scenarios for firms to make decisions. Thus, more investigation should compare different sourcing strategies and provide appropriate solutions (right-shoring) for the firms, especially from an OM perspective.

2.3.2.3 Domain 3: Knowledge Transfer

Research Domain 3 primarily discusses knowledge transfer from offshoring to reshoring the information technology(IT) and service industry (Appendix 12). The IT industry involves different switching costs than the other industry, especially knowledge and technology transfer. Whitten and Leidner (2006) examined the switching cost for the information system industry when

switching production back through large-scale surveys. Unless the firms suffer from inferior products and service quality, they prefer to reshore. Otherwise, they will continue to outsource and switch vendors. This article provided a new direction to consider the switching cost between vendors and reshoring. Whitten, Chakrabarty, and Wakefield (2010) extended their earlier work and focused on switching costs, including IT operations, personnel-replacement costs, and in-house learning. The results showed that firms would continue to process outsourcing if switching costs were high and not reshoring.

Freytag, Clarke, and Evald (2012) suggested that reshoring is one solution to problematic outsourcing and argued that firms could maintain the original vendor, switch vendors, or establish a new organization apart from the reshoring. They proposed some reconsideration process elements for managerial consideration and suggested re-learning, and the setup cost is high for reshoring. The I.T. industry's call center and help desk services are always offshore, involving high labor costs. Benaroch, Dai, and Kauffman (2010) use mathematic modeling to review whether the client should be outsourced or insourced. The demand volatility, especially demands uncertainty, increases the trend to insource. Contract flexibility is the main reason for outsourcing decisions in the technological industry.

Oshri, Sidhu, and Kotlarsky (2019) provided another angle by using the behavioral theory of the firm to explain the reshoring reason. The authors considered the financial, managerial, and reshoring policies to explain why the company reshore back to its home country. As expected, the bad experience from offshoring profoundly drives the company to return home. The top management's decision is subject to quality, financial risk, and policy backing. These moderating factors provide different insights for the researchers to review and explain the reshoring phenomenon. Law (2018) uses the path dependence and path creation theory to compare

outsourcing and reshoring IT activities. When the firm has successful past experiences, internal and control activities can accelerate the reshoring decision.

This domain mainly focuses on the technological and knowledge transfer when the firms reshore, which is difficult for many IT firms. Most articles discussed whether firms would select the reshoring if the switching cost were high in this domain. However, the traditional knowledge management process might not be able to explain the reshoring phenomenon (Raudeliūnienė, Davidavičienė, Jakubavičius, & Issues, 2018). In the conventional sourcing knowledge transfer process, the home country firms are the source of knowledge distributors. Therefore, when reshoring transpires, knowledge transfer within firms might not be the problem as these technicians might already be familiar with the learning process.

Nevertheless, these reshoring firms might need to face knowledge transfer problems between firms, especially when the IT firms need to outsource their jobs. Some firms might also face re-integrating knowledge when returning home (Ejodame & Oshri, 2018). Some topics would be the new topics for this domain, such as transferring tacit, implicit knowledge, building trust, and motivation to the reshoring firms during the knowledge transfer. The call center and help desk reshoring are less popular than manufacturing reshoring. Are there any incentives the government can provide to these firms? What is the reshoring performance for these reshoring firms?

2.3.2.4 Domain 4: Consumers' Perspective

Grappi, Romani, and Bagozzi (2015) provide a new perspective on customers' reactions (Anger, gratitude, sadness, and happiness). The consumer attributions and ethnocentrism about the firm's reshoring motives and the effect of company communication strategies, the first paper provides a new angle for the company to reconsider the reshoring. Grappi, Romani, and Bagozzi (2018) continue the topic with consumer reshoring sentiment (CRS) as they believe the demand-side perspective is also critical for reshoring. The result from two countries: U.S. and Italy,

confirms that the customers are complimentary to the reshoring related to "superior quality production, "made-in effect," "competency availability," "government support," "greater ability to fulfill needs," and "ethical issues in host countries" which motivate for the companies to consider. Grappi (2020) further develops the relationship between consumer animosity (CA) and reshoring. After conducting two experiments and one survey, the results indicate that CA moderates CRS's positive effect on market responses. Both low and high CA have a positive market response. Customers' gratitude and relief mediate CRS's effects on market response to reshoring, which strongly supports the companies to reshore.

Dey, Alwi, Babu, Roy, and Muhammad (2022) investigate consumer purchase intention with reshored brands and Brexit. The authors found that corporate social responsibility (CSR) and consumer reshoring sentiment (CRS) are positively associated with reshored brands. Although CRS is favorable to Brexit, Brexit does not significantly affect the intention to purchase the reshored brand. Therefore, the study proposes that firms should put more effort into improving brand image and CSR. Gillani, Kutaula, and Budhwar (2022) discuss consumers' perspectives on CSR and reshoring in the UK. Brand sustainability connectedness is a positive significant effect on consumer perceptions. However, if they consider a more comprehensive view of sustainability's economic, social, and environmental dimensions, the consumer responses to reshoring changed. The data suggest that not all participants shared positive perceptions about reshoring. Sena, Kanungo, Ozdemir, Yannopoulou, and Patel (2022)further discuss whether the host country's regulation affects the reshoring. If the foreign directors have experience in civil law countries, the firms will not likely do the reshoring. The results suggest external stakeholders (foreign directors) will moderate by country-level institutions and regulatory requirements.

In this domain, the researchers consider consumer sentiment about the reshored firms, and the results provide a positive association between sentiment with the reshored firms. Afterward,

researchers added more topics, especially Brexit and sustainability, with consumer sentiment and reshored firms. The research in this domain focuses more on the UK than other countries such as the U.S. or Germany. Therefore, more investigation on different countries is needed. Besides sustainability, brand image to consumers can also be discussed.

2.3.2.5 Domain 5: Post-COVID-19 Era

The COVID-19 pandemic has disrupted the supply chain globally. The disruption reshapes the firm's global value chains while firms reconsider their sourcing strategies. Responsiveness to the market becomes the consideration of the firms, especially when the countries are lock-down during COVID-19. Therefore, reshoring becomes one of the solutions for firms. Strange (2020) discusses the global value chain (GVC) with reshoring after COVID-19. The author believes that to reduce risk, firms would like to do reshoring to achieve customer responsiveness. At the same time, firms should consider alternatives such as preparing extra domestic capacity and stockpiling for better risk management. When firms, especially MNEs, have domestic and international sales, how to balance reshoring and offshore would be based on whether the firms are market-seeking, resource-seeking, or strategic asset-seeking firms. COVID-19 also alert firms to reconsider their risk assessment activities for future pandemics. Finally, the U.S., Australian and Japanese governments are also looking explicitly to decouple independence from China, which might also affect the policies of governments.

Pla-Barber, Villar, and Narula (2021) further elaborate on the global supply chain with COVID-19. As firms consider GVC regionalization as a risk reduction strategy, authors believe reshoring should implement new technology, such as automation, robotics, and 3D printing, to reduce transaction and governance costs. This technology can upgrade the trajectories and reduce the cost. Chen, Hsu, Shih, and Caskey (2022) also propose that technology and intelligent

manufacturing would be the key to success, especially after the post-COVID era. Miroudot (2020) provides another point of view. The author suggests that producing in the home country does not mean it is safer since natural disasters, strikes, or social unrest exist. Therefore, the firms should reconsider all the risks and rethink risk management. The firms should consider other risk factors and opportunities such as digit transformation, climate, environmental issues, and protectionism with COVID-19.

In this domain, the researchers focus on supply chain management post-COVID-19 era (Appendix 14). The unexpected lockdown during COVID-19, and insufficient resources and products, including surgical masks and medicines, push the firms and government to rethink the sourcing strategies and risk management for the subsequent pandemics. Reshoring might not be the only solution for the firms, but they must prepare well for the following disruptions. Similar to domain 4, this domain is also under development, and the researchers can develop different mathematical modeling for different scenarios and calculate the equilibrium point. The sourcing strategies can be more complicated with government policies.

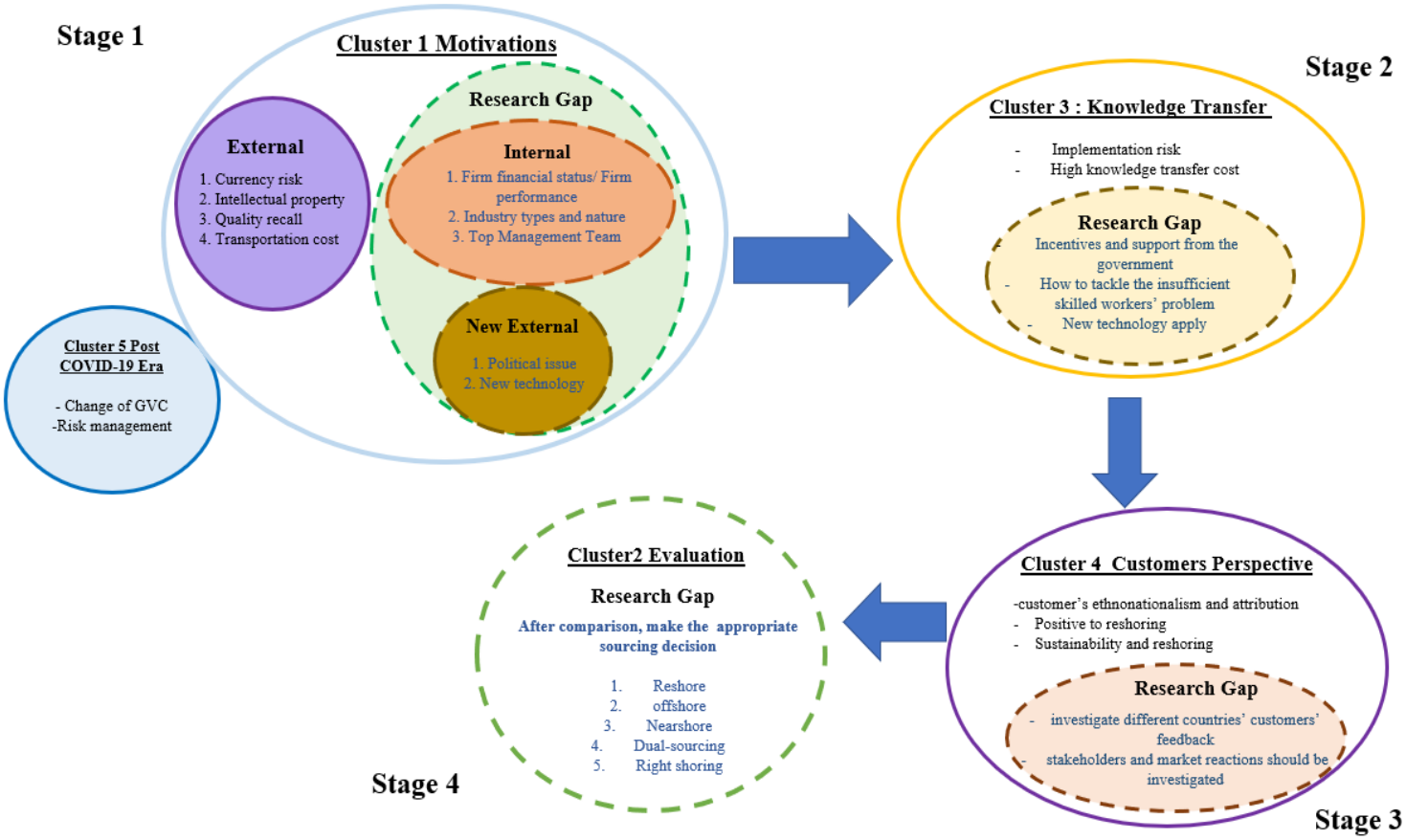
2.4 Framework of the reshoring decision process

After reviewing five main paths of reshoring, we would like to propose the framework for the study. The firms might go through these four stages before implementing the reshoring strategy. When the firm considers to reshore, they need to consider reshoring motivations (cluster 1), including external and internal factors. As stated, external motivations are well-discussed in different literature (Dachs, Kinkel, & Jager, 2019; Delis et al., 2019; Dhiaf, Atayah, Nasrallah, & Frederico, 2021). Researchers should explore new external factors like tariffs and Industry 4.0 and internal motivation like top management teams. As an external motivation, COVID-19 is the latest topic for researchers to explore (cluster 5) since it allows them to review their supply chain management, especially the association between reshoring and the risk management level.

When the firms decide to reshore the production or development center to the home country, they might face implementation risk, especially for high technology industries. The high knowledge transfer cost might outweigh the incentives from the government (cluster 3). It might also take long periods to transfer the knowledge. Therefore, the researchers can propose some solutions to the government, including incentives and skilled labor support to the reshore firms. At the same time, the firms can implement new technologies like robotics and automation production.

Besides the government and its supply chain, the firms might look at the customers, stakeholders, and market reaction (cluster 4) for the new reshoring strategy. Firms and researchers need to pay attention to new government policies, such as Brexit and new environmental policies, that might lead to a different reaction. After contemplating the motivation, customer reaction, and implementation risks, the firms might also compare different sourcing strategies for the total cost (cluster 2), as reshoring might not be the only solution for firms. They can maintain their offshore production or change to nearshore, dual sourcing, or a combination of sourcing methods. This framework (Figure 7) provides guidelines and flows for the firms when they deliberate the reshoring process.

Figure 7 Framework for the reshoring decision process



2.5 Limitations and Suggestions for future research

2.5.1 Practical Insight and Discussion for future research

This study offers the first extensive bibliometric reshoring literature review. The previous studies mainly discuss the reshoring drivers (Wiesmann, Snoei, Hilletofth, & Eriksson, 2017) while examining the development of reshoring literature from an objective perspective. CNA offers five main domains, and the main path analysis provides a comprehensive picture of each reshoring domain's knowledge flow. 162 articles were captured from leading economic, marketing, and management-related journals between 2006 and 2023. Most articles published in the *Journal of Purchasing and Supply Management* and empirical research are widely used. Most of the studies focus on multiple industries in developed countries. The researchers widely discussed country-

specific reshoring (Bailey & De Propris, 2014; Gadde & Jonsson, 2019; Martinez-Mora & Merino, 2014; Tate, 2014). However, there is no comparison between different countries and industries. For example, the reshoring situation differs between manufacturing, service provider, and IT firms. The external factors might vary and provide additional insights to managers and local governments. A suitable reshoring policy will help the firms tackle the challenge and motivate them to reshore.

Generally, the scale of reshoring research has made good progress over the past ten years. However, some reshoring research domains still need further discussion as a fast and newly developed topic. The motivation and drivers for the reshoring are the focal issues with comprehensive discussion. In addition, researchers can further explore prominent sourcing topics, such as quality, flexibility, lead time, sustainability, and reshoring performance. These topics are always crucial to sourcing, and the reshoring evaluation needs to be further discussed in future research. For example, is the reshoring improving the product and service quality and the lead time of the firms? Is the firm performance improved or worsened after reshoring under various market contexts? These discussions would allow firms, especially the senior sourcing managers, to decide.

Reshoring literature should also expand to the policy research realm. Policymakers' understanding of firms' reshoring barriers and drivers should help formulate better government guidelines. Research questions like “How to improve the effectiveness of government incentives of the reshoring movement?” “Besides financial incentives, what kind of incentives can the government offer the reshored firms?” “What are the priorities of developing infrastructure and labor market to attract firms to reshore?” With these questions' help, the local government can work with pertinent regulations and plan for reshoring firms. Although maintaining investment for local job employment is essential for offshore countries, what strategy might foreign countries take to slow down or reverse the reshoring phenomena?

On the other hand, an in-depth discussion on some internal factors, such as the TMT and organizational culture, especially TMT's political view or personal background, can be interesting for the researchers to review. As TMT plays an influential role in sourcing decisions, it is worthy to reveal the decision-making process. Researchers recently examined how top management perception affected the reshoring decision (Gharleghi, Jahanshahi, & Thoene, 2020; Moretto, Patrucco, & Harland, 2020). As there is a lack of a consolidative framework, researchers can further develop the framework and review the rationale behind the decision-making process.

We have identified the emerging research domain about the sourcing strategies in Domain 1. This research area interests operation managers as it delivers practical implications when sourcing. We believe this new research domain would be the uptrend for the reshoring. More researchers would criticize the reshoring strategies, compare them with offshore or near-shore strategies, and finally turn out a new sourcing strategy. A new concept: right-shoring, involves reviewing the existing sourcing decision and selecting the "right sourcing" to maximize the benefit and efficiency and lower the sourcing location cost (Joubioux & Vanpoucke, 2016). There are no specific sourcing strategies for the firms. The firms can either choose offshore or reshoring or combine offshore and reshoring to achieve the target. To make the "right-shoring," firms must manage all supply chain costs to get the lowest cost and maximize the benefit. Therefore, different mathematical models for cost calculation and further empirical analysis can help understand the decision.

Recently, COVID-19 has disrupted the supply chain, and the government is inviting firms to return to their home countries. There is a discussion in domain 5 for the post-COVID-19 era. This new normal from COVID-19 changed the global value chain, and firms are preparing for the next pandemic. But is reshoring can help to reduce the risk in the post-COVID-19 era?

Furthermore, reshoring was primarily discussed from the Western perspective, i.e., reshoring factories from China. While the researchers focus on developed countries, future research might also bring perspectives from developing countries. When US former President Donald Trump was trying to decouple from China, China was counteracted by "domestic circulation and "dual circulation" by President Xi Jinping in 2020. This action would trigger the Chinese manufacturers to return to China's mainland to meet the domestic circulation and get close to customers.[6] Will Chinese manufacturers reshore their production from Cambodia and Vietnam? It will be the next question for researchers. The reshoring effect bought on by the COVID-19 pandemic will be another topic, especially since no one can predict when the supply chain disruption will end and how the "new normal" will be affected by COVID-19. Should the firms consider revamping the supply chain and reshore to the home country as risk management? We summarized the future directions and provided suggestions in Appendices A15.

This chapter systematically reviews 162 articles for reshoring issues. We identified five significant domains, including "**reshoring motivation**," "**offshore and reshore evaluation,**" "**knowledge transfer**", "**consumers perspective,"** and **"Post-COVID-19 era".** Some limitations, as well as research opportunities, have been discussed in the chapter.

In a nutshell, most of these five domains focus on reshoring motivations. Other scholars have widely discussed the theories, models, and performance for reshoring. As a result, the reshoring phenomenon is gaining attention from academia. Besides, researchers have started to critique the reshoring performance. Furthermore, after COVID-19, the global supply chain was primarily disrupted, and the priorities changed from cost-driven to strategic importance. How to weigh the balance between cost and strategic importance?

[6] https://www.forbes.com/sites/princeghosh/2020/09/18/the-exodus-of-chinese-manufacturing-shutting-down-the-worlds-factory/?sh=6bf43ac3c2f2

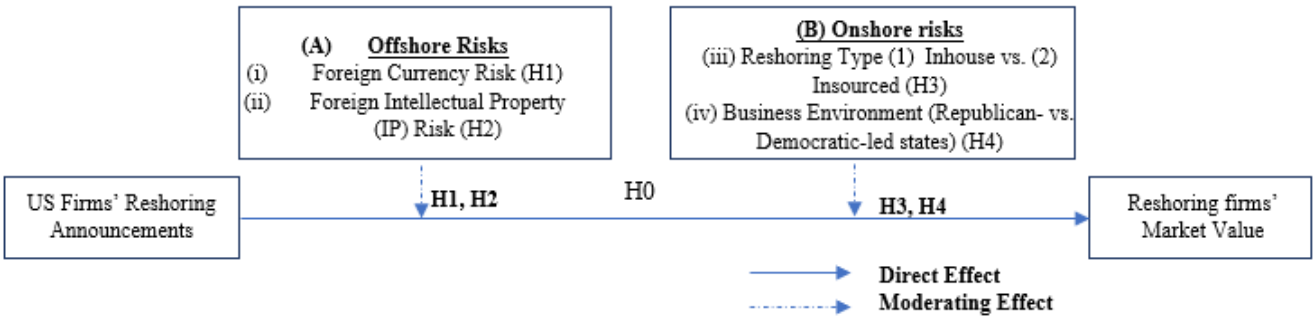
There are several limitations to this chapter. Firstly, it is partially subjective when we proceed with the journal selection. Although we review the whole data set, some related articles may be excluded yet published in journals with lower impact factors. Moreover, there are different clustering algorithms, and we only applied the commonly adopted algorithms in similar review studies. A better clustering algorithm could lead to different clustering results.

Chapter 3: Return to the United States: Impact of Reshoring Announcements and Reshoring Risks on Market Valuation

3.1 Introduction

The previous section provides shreds of evidence on the increasing interest in reshoring phenomena, especially the effectiveness of reshoring and new external and internal drivers, such as how the new technology and top management team affect the likelihood of reshoring. In chapters 3 and 4, we would like to investigate the short-term effect of reshoring activities on firm performance and how the top management team affects the reshoring likelihood separately. This chapter identifies four essential types of reshoring risks inherent to (1) foreign currency fluctuation, (2) IP protection, (3) reshoring types (in-house vs. insourced reshoring), and (4) reshoring location choice (Republican- vs. Democratic-led states). After identifying risk factors, it helps explain the variation in reshoring's market valuation based on 281 reshoring initiatives 132 publicly traded US firms announced between 2009 and 2022. Figure 8 shows the research framework for our study with hypotheses.

Figure 8: A research framework and hypotheses.



We first formulate a primary hypothesis (H0) concerning the general relationship between US firms' reshoring announcements and market valuation. We then develop four hypotheses (H1 to H4), focusing on how the abovementioned risk factors affect the relationship between reshoring announcements and market valuation. The following section will review the literature and discuss

risk factors identification. Afterward, we intricate each hypothesis in section 3.3.

3.2 Literature review

3.2.1 Supply chain risks and transaction cost economics

Reshoring is a strategy for reducing supply chain risks (Ciabuschi, Lindahl, Barbieri, & Fratocchi, 2019), including political, operations, resource, security, macroeconomics, and competitive risks (Manuj & Mentzer, 2008). Reshoring decisions often aim to reduce supply chain-related and cross-border transactional uncertainties. Firms with offshore operations frequently encounter political risks, IP protection risks, regulatory stability, legal enforcement, infrastructure and property protection, and the financial and operational risks of overseas countries (Blackhurst, Scheibe, & Johnson, 2008; Tang & Tomlin, 2008; Wagner & Bode, 2008). At the same time, reshoring risk factors include domestic operations-related uncertainty (e.g., new plant setup/expansion, change of make-or-buy decisions) (Ciabuschi et al., 2019), local government support, and the availability of technical and skilled laborers (Hartman, Ogden, & Hazen, 2017).

Reshoring enables firms to build resources and capabilities closer to home (McIvor & Lydia Bals, 2021). Reshoring decisions often involve a strategy for upgrading manufacturing capabilities and reconfiguration of operational systems (Ancarani & Di Mauro, 2018), bringing research capability close to home through colocation of research and development (R&D), production, and other headquarters functions (e.g., product development, strategic plans) (McIvor & Bals, 2021). In recent decades, the gap between emerging and advanced economies regarding labor costs has narrowed, motivating firms from developed countries to reshore. For example, in the past two decades, the average annual wage of Chinese workers increased more than 14 times from US$1,127 in 2000 to US$16,153 in 2021 (Ezrati, 2022). Firms that rely highly on offshore operations face significant uncertainties in logistics costs and transportation lead time because of

geographical distance and complex cross-border transactions. A fast-paced and efficient production and supply chain system entails the need for close coordination, joint problem-solving, and rapid market adjustment (Gray, Siemsen, & Vasudeva, 2015), increasing the costs of offshore operations and favoring reshoring (McIvor & Bals, 2021).

Transaction cost economics (TCE) explains how firms seek to reduce the cost of economic transactions and how governance structures help reduce transaction costs (Williamson, 1991). The TCE framework guides executives in outsourcing, offshoring, and reshoring decisions. From the TCE perspective, supply chain risk monitoring and mitigation help firms lower overall transaction costs (Blome & Schoenherr, 2011). Reshoring may improve geographical proximity between the headquarters and production facilities, reducing uncertainty related to foreign operations (e.g., political and regulatory uncertainties) and mitigating risks in multiple supply chain processes. However, it may trade off labor costs and other advantages in offshore locations (e.g., low-cost facilities and lax environmental regulations overseas). As global supply risks and uncertainty from offshore operations increase, firms prefer reshoring to reduce transaction costs (Foerstl et al., 2016).

Supply chain disruption risks, regulatory environments, and currency fluctuation i*ncrease complexity and coordination costs* (McIvor & Bals, 2021). Global political and economic uncertainties, trade conflicts, and IP infringement further increase the need for closer governance and monitoring, making reshoring a feasible risk-reduction strategy to bring down transaction costs and increase operational efficiency. In particular, complex, multidimensional, and recurring cross-border transactions can be expensive to manage under high global political and economic uncertainties (Ketokivi & Mahoney, 2017; Ketokivi & Mahoney, 2020). In a high-risk context, offshore operations of complex supply chains become less attractive. Reshoring decisions are thus more likely to reduce governance costs and enhance transactional efficiency (Chiles & McMackin, 1996; Ketokivi & Mahoney, 2017). According to the TCE perspective, reshoring benefits increase

with the global risk level in the supply chain, sourcing, and purchasing.

3.2.2 Identification of risk factors

To identify the most critical risk concerns that affect different firms' offshore operations and reshoring decisions, we conduct a text mining analysis by examining the annual reports of reshoring firms.[7] We first searched the Reshoring Initiative database[8] (reshorenow.org) and identified 149 publicly listed firms with reshoring announcements from 2009–2022. We then download these 149 firms' annual reports published in the year before their first reshoring announcements to investigate these firms' decision contexts before their reshoring announcements.[9]

We first use the text mining software Orange Data Mining Tool[10] to analyze the text extracted from these 149 annual reports.[11] We then visualize the result with a word cloud and highlight critical risk factors for reshoring that appear most often (Appendix A18). Finally, we identify the top risk factors (i.e., word phrases) with the highest weight (i.e., frequency of appearance). Words and phrases with similar meanings, such as *exchange fluctuation* and *fluctuation [of] currency*, are grouped together.[12] One limitation based on word cloud frequencies is that it requires researchers to group similar word phases into a few categories or topics. We supplement the word cloud analysis with Latent Dirichlet Allocation (LDA) to avoid researchers' interpretation and bias. LDA is a natural language processing technique that uses an unsupervised

[7] Researchers have used text mining on firms' annual reports to identify potential predictors and variables (Jihwan Lee & Hong, 2014; Jihwan Lee & Hong, 2016 ; Shirata, Takeuchi, Ogino, & Watanabe, 2011).
[8] The Reshoring Initiative was founded in 2010.
[9] Our text mining analysis focuses on the "Risk Factors" sections of the annual reports (with 69,418 words) because our objective is to understand firms' risk concerns. The text mining process includes document retrieval, data preprocessing, data analysis, and critical risk factors identification (Aggarwal & Zhai, 2012; Agrawal & Batra, 2013; Gaikwad, Chaugule, & Patil, 2014).
[10] Orange is a data-mining, open-source machine learning and data visualization tool kit (Ciabuschi et al., 2019a; Demšar et al., 2013).
[11] Text preprocessing, including transformation, tokenization, normalization, and filtering functions, is used to analyze the dataset (Vijayarani, Ilamathi, & Nithya, 2015).
[12] To reflect the actual weight of the word cloud for risk factors, we review the top 100 phrases with the highest frequencies (a total frequency of 2,652 for the top 100 phrases) and consolidate similar phrases based on the risk factors in the annual report. After grouping similar phrases, we identify the top four risk factors with the highest weights. A list of keywords identified under these four topics is shown in the first column of Table 2. These keywords are associated with business environment (weight = 479), currency exchange (weight = 412), IP (weight = 397), and manufacturing- and sourcing-related topics (weight = 311), which account for 60% of the total frequency.

Bayesian machine-learning algorithm to classify related topics in texts without requiring researchers' judgments in classifying word phases (Huang, Wang, Yang, & Xu, 2018). Instead, the words co-occurring probabilities under a theme are modeled for identifying a potential topic. We adopt Mallet, an open-source LDA tool kit for topic modeling (Dyer, Lang, & Stice-Lawrence, 2017; Kaplan & Vakili, 2015). As shown in Table 1, the keywords of the top four major topics generated from LDA are highly similar to those of the word cloud, supporting the importance of these four risk factors for reshoring firms.

Table 2. Top Four Risk Factors Generated from Word Cloud Analysis and LDA Topic Modeling

Topics	Keywords generated from word cloud analysis	Keywords generated from LDA topic modeling	Examples from reshoring companies' annual reports
Currency exchange-related topics	**currency exchange**, **fluctuation exchange, fluctuation currency**, foreign **currency**, **exchange** control	**currency exchange fluctuations** rates currencies costs dollars businesses expenses financial	"**Foreign currency exchange** rates and **fluctuations** in those rates may affect the Company's ability to realize projected growth rates… Company's results of operations could be adversely affected if the U.S. dollar strengthens significantly against **foreign currencies**" (*3M 2011*)
Business environment-related topics	**economic political**, **international regulations,** government contract, **political regulatory**, compliance regulation	**international regulations political tax** operations laws risks U.S. trade financial	**"**…**regulatory**, **tax** or **government incentive** policies impacting the timing of customers' investment in new or expanded fabrication plants" (*Applied Material Inc. 2021*)
Intellectual property-related topics	**Intellectual property, protect intellectual property**, difficulty intellectual property	**intellectual rights property** patents infringement trademarks patent protect third-party parties	"…defend against **intellectual property** infringement claims or misappropriation claims, which may be time-consuming and expensive… business may be adversely affected if we are unable to **protect our intellectual property** rights from unauthorized use by **third parties**" (*Canoo Inc, 2020)*
Manufacturing and sourcing-related topics	**manufacturing product**, **material** business, manufacturing **facility**, customer **supplier**, staff manage, difficulty staff	**manufacturing products facilities suppliers materials** costs labor delays transportation sourcing	"Several of our key **raw materials** and components are either single-sourced or sourced from a limited number of **suppliers**, and their failure to perform could cause **manufacturing delays**" (*First solar 2018*)

3.2.3 Contextualization of Risk Factors

We contextualize the top four risk factors shown in Table 2 in our research in Table 3, as follows. First, note that currency exchange-related topics receive one of the highest weights. Because the fluctuation in currency exchange rates increases the uncertainties of doing business across national borders,[13] we contextualize this risk factor as foreign currency fluctuation and

[13] Indeed, a survey of 300 executives on the motivation behind reshoring decisions shows that currency fluctuation is "the factor considered to provide the greatest risk" (White & Borchers, 2016, p. 208).

measure it according to the volatility of the currency of offshore countries against the U.S. dollar. High foreign currency fluctuation makes offshore operations more uncertain and less favorable, so we expect that investors would be more welcoming to a reshoring announcement under such a circumstance.

Second, we observe that IP risk is of particular concern to many U.S. manufacturers who offshored their manufacturing activities to developing countries with weak IP protection, which motivated them to reshore these activities back to the US (Locke, Rissing, & Pal, 2013; Skowronski & Benton Jr, 2018). For instance 2013, General Electric (GE) shifted its production back to the United States because of IP rights disputes and ease of design collaboration (Vanchan, Mulhall, & Bryson, 2018). We thus capture this risk factor as foreign IP protection risk and measure it based on the strength of IP protection in a foreign country relative to that of the United States. If a U.S. firm reshores from a foreign country with relatively weak IP protection, investors will support this move because it helps protect the firm's valuable IP assets.

Third, when making reshoring decisions, firms may need to consider moving their overseas in-house or outsourced manufacturing activities back to the U.S. as in-house operations. Alternatively, firms may simply move their outsourced or in-house operations overseas to local suppliers through OTO or *in-house-to-outsourcing* reshoring. In this research, we first focus on in-house reshoring (i.e., in-house-to-in-house reshoring) and insourced reshoring (i.e., outsourcing-to-in-house reshoring) and compare their operations and risk implications. An important difference between these two types of reshoring is that firms adopt "make" strategies in foreign countries and the U.S. for in-house reshoring, but insourced reshoring involves a change from "buy" in foreign countries to "make" in the U.S., which may pose more uncertainties and be perceived as a riskier move.[14] Therefore, we expect investors to react less positively to the more

[14] For example, GE's insourced reshoring strategies that moved its outsourced production activities in China and Mexico back to in-house production in the United States cost the firm $1 billion. Jeff Immelt, GE's CEO, described the move as "as risky an investment as it has ever made" (Crooks, 2012).

uncertain and riskier insourced reshoring (compared with in-house reshoring). In addition, because a significant portion of firms also adopts OTO reshoring, we further examine investors' reactions to this reshoring type in both our event study and regression analyses. Section 5.3 provides the details. However, we do not find any in-house-to-outsourcing reshoring announcements in our sample.

Fourth, business environment-related topics appear to be a factor associated with reshoring. Because practitioners and researchers recognized the different impacts of Republican- and Democratic-led states on the business environment (Dye, 1984; Grossmann, Mahmood, & Isaac, 2021; Reed, 2006),[15] we expect that a firm may receive less support and face higher regulatory and policy risks if it chooses to reshore to a Democratic-led state, which may create a negative market reaction.

Table 3. Risk Factors and Potential Investor Reaction

	(A) Offshore Risks		**(B) Onshore Risks**	
Risk Factors	(i) Foreign currency fluctuation	(ii) Foreign IP protection	(iii) Reshoring types (in-house vs. insourced reshoring)[16]	(iv) Business environment (Republican- vs. Democratic-led states)
Potential Investor Reaction	If the currency of offshore countries is more volatile relative to the U.S. dollar, investors will react to reshoring more positively.	If IP protection is weak in offshore countries relative to the United States, investors will react to reshoring more positively.	If a firm adopts insourced reshoring that involves a change from outsourcing to in-house production, investors will react less positively (relative to in-house reshoring).	If a firm reshores to a Democratic-led state that is relatively less business-friendly than a Republican-led one, investors will react less positively.

3.3 Hypothesis Development

3.3.1 Reshoring Announcement and Market Valuation

There are certain risks and hurdles involved in reshoring. First, despite reduced wage gaps between the United States and certain countries, most offshore manufacturing locations, including

[15] For example, Republican-led states generally provide more state-level support and a more business-friendly environment (e.g., taxes, business incentives, investment benefits) than Democratic-led states.

[16] We provide further analyses on the impact of OTO reshoring in Section 5.3, whereas we do not find any cases for in-house-to-outsourcing reshoring in our sample.

India, Mexico, and Vietnam, still have significantly lower labor costs (Fromm et al., 2020). Moving production to the United States requires reshoring firms to rehire employees in the United States to operate the new or expanded facilities, which can be substantially more expensive. Reshoring firms need to ensure the availability of skilled laborers and experienced professionals and appropriately restructured and localized supply chain networks (Engström, Sollander, Hilletofth, & Eriksson, 2018; Shih, 2014). Transitioning production back to the United States involves various upfront expenses (e.g., setup and exit costs) that pose significant hurdles to reshoring firms.

Despite the potentially higher labor and production costs, reshoring often involves strategic repositioning and enhancement of firms in their supply chain functions, manufacturing capabilities, and product images that investors will likely anticipate positively. There are several potential advantages of reshoring. Most notably, reshoring may enable firms to achieve greater control over their supply chains, allowing them to manage their production capacities and inventories more effectively (Brandon-Jones et al., 2017). Additionally, reshoring may reduce supply chain disruptions due to international transportation, transactions, and cross-border regulatory issues (e.g., custom clearance and tariff problems) (Krenz, Prettner, & Strulik, 2021; Moradlou, Reefke, Skipworth, & Roscoe, 2021). Because of the geographical proximity of headquarters to production facilities, bringing back operations from offshore locations may spur innovation through reduced physical and cultural distances between product design, R&D, and production units (Albertoni, Elia, Massini, & Piscitello, 2017; Ancarani et al., 2015; Ashby, 2016). Finally, reshoring to the United States may improve brand image, particularly when production was initially located in developing countries that convey an impression of low quality. These potential benefits of reshoring suggest that investors will react positively to a reshoring announcement, motivating the first hypothesis as the following:

H0: The stock market reacts positively to a firm's reshoring announcement.

3.3.2. Offshore Risk (i): Foreign Currency Risk

In the outsourcing literature, currency exchange volatility has always been an essential risk factor for offshoring decisions (Chen, Li, & Wang, 2014; Tang & Musa, 2011). Currency fluctuations[17] have direct economic implications (Chen et al., 2014; Hu & Motwani, 2014; Viaene & De Vries, 1992) that can affect offshoring (Katada & Henning, 2014) and reshoring decisions (Chen et al., 2014; Hu & Motwani, 2014; Viaene & De Vries, 1992). Specifically, foreign currency risk, including transactional and operating exposures, is a severe concern for MNEs (Chow, Lee, & Solt, 1997; Pantzalis, Simkins, & Laux, 2001). Transactional currency risk refers to potential financial loss when firms' foreign assets and investments are translated to domestic currency. Operating currency exposure is related to the risk of varying production costs and incomes as firms operating in a foreign country with fluctuating exchange rates. Firms prefer stable foreign exchange rates because fluctuating offshore currency values make long-term investments, production costs, and business plans unpredictable (White and Borchers 2016). For example, Sherrill Manufacturing, Inc., moved its production from Mexico to New York because of the cost uncertainty associated with the fluctuations of the Mexican peso (Commerce, 2019). The appreciation of China's currency from 2005–2014 increased the cost of labor and other expenses associated with manufacturing operations, such as the costs of land, utilities, and logistics. This observation motivates the following hypothesis:

H1: The stock market reaction to a firm's reshoring announcements is more positive when the firm reshores under high foreign currency risk.

3.3.3 Offshore Risk (ii): Foreign IP Risk

Many U.S. firms relocated their R&D centers (Hemphill, 2005; Liu & Chen, 2012;

[17] Geopolitical stability and foreign countries' monetary policy affect currency volatility. China, the top supplier of U.S. goods imports, has a fluctuating exchange rate. The exchange rate changed from 6.90 on May 12, 2017, to 6.48 on September 11, 2017, with a 6.09% decrease. It increased sharply to 6.67 in 26 days with 2.93%. Afterward, it dropped another 5.4% within three months. A continued short period of currency fluctuation can severely disrupt offshore production plans.

Motohashi, 2010; Nieto & Rodríguez, 2011) to offshore production locations for cheaper intellectual capital from foreign countries such as China, India, and Mexico in last two decades (Fifarek, Veloso, & Davidson, 2008; Lewin, Massini, & Peeters, 2009; Nieto & Rodríguez, 2011). Doing so increases the risk of IP infringement due to weak patent enforcement in offshore countries (Locke et al., 2013). Offshore suppliers who gained tacit knowledge of product innovation, design, and production techniques may eventually become competitors. For example, IP infringement severely threatens plastic tooling, molding, and manufacturing. The original tooling design is expensive, but offshore suppliers can duplicate it easily. Some firms register their patents and brand trademarks in offshore countries, but IP law enforcement is weak (Tate, 2014b). According to the Commission on the Theft of American Intellectual Property,[18] annual costs from IP losses range from $225 billion to $600 billion. Indeed, foreign IP risk motivates many reshoring decisions.[19] Several studies suggest IP protection is a key driver for reshoring (Ellram, Tate, & Petersen, 2013; Gray et al., 2013). The U.S. Chamber International IP Index 2021[20] indicates that the U.S. legal system provides better protection than most developing countries. IP protection in offshore countries is costly (Glass & Saggi, 2002) and risky if counterfeit products exist. Therefore, some firms are considering moving production back to the U.S. to reduce foreign IP risk. These observations motivate us to propose the following hypothesis:

H2: The stock market reaction to a firm's reshoring announcement is more positive when the firm reshores from a foreign country with high IP risk.

3.3.4 Onshore Risk (iii): In-house vs. Insourced Reshoring

Recall from Section 2.2 and Table 3 that insourced reshoring (i.e., outsourcing-to-in-house reshoring) is likely to be a riskier strategy compared to in-house reshoring (i.e., in-house-to-in-

[18] https://www.nbr.org/wp-content/uploads/pdfs/publications/ip_commission_2021_recommendations_mar2021.pdf.
[19] For instance, X-Cell Tool & Mold, LLC, could not produce whole molding components with overseas suppliers to protect customers' IP (Goldsberry, 2010). Another steel mold manufacturer, Marlin Steel, suffered enormous losses from IP disputes with overseas suppliers (Dhue, 2018; Manufacturing, 2018). In short, the shortfall of IP protection contributes to supply chain risks in offshore operations.
[20] https://www.theglobalipcenter.com/report/ipindex2021.

house reshoring) because in-house reshoring enables a firm to retain its tacit production knowledge. For example, a firm can close its foreign factory and establish a factory in the United States by transferring its offshore management team back to the United States. The latest production-related knowledge and experience acquired from offshore plants would bring valuable experience in establishing new production processes in the home country (Thomas, Pedersen, & Volberda, 2007; Wan et al., 2019). Furthermore, returning managerial staff and technicians via in-house reshoring could help train more skilled laborers faster than insourced reshoring, which is a critical success factor for reshoring. Also, "insourced reshoring" strategies require additional expertise in setting up and running a new plant, which incurs higher production setup costs (Whitten et al., 2010), including the costs for candidate search, personnel replacement, in-house learning, and information transfer, leading to higher uncertainty (Van den, Hector, & Aakash, 2014; Whitten et al., 2010).[21] These observations motivate the following hypothesis:

H3: The stock market reaction to a firm's reshoring announcements is less positive when the firm adopts insourced (rather than in-house) reshoring.

3.3.5. Onshore Risk (iv): Reshoring to Democratic- vs. Republican-led States

Reshoring is a capital-intensive decision, and the reshoring firm faces a higher risk if the political-economic environment is unfavorable. Business environments, including government subsidies, tax benefits, and labor supplies, influence a firm's reshoring decision (Rasel, Abdulhak, Kalfadellis, & Heyden, 2020; Sarder, Miller, & Adnan, 2014; Tan & Chintakananda, 2016; Weng & Peng, 2018). In the U.S., the Republican and Democratic parties have different beliefs about economic policy and regulations, corporate taxes, and the role of government, translating them into different policy preferences and platforms (Belo, Gala, & Li, 2013; Besley & Case, 1995;

[21] Studies show that additional costs from the disruption of previous routines outweigh the benefits of restructuring (Girod & Whittington, 2017; Karim & Mitchell, 2004).

Pástor & Veronesi, 2020).[22] Political scientists (Halvorsen & Jakobsen, 2013; Quinn & Shapiro, 1991) believe that Republicans generally prefer an investment-driven (supply-side) growth model through direct business-friendly measures such as low general corporate and capital taxations, whereas Democrats favor a consumption-driven (demand-side) growth model. Under such an investment-driven model, the key is to address production costs for business and attract and retain firms, especially in manufacturing industries (Reed, 2006). Relevant measures include direct grants or subsidies for businesses, state incentives to promote R&D, low-interest loans, subsidized training of employees, and discounted land cost. Recent research shows that the election of a Republican as governor significantly positively impacts net investment inflows in the manufacturing industries (Wang & Heyes, 2022). By contrast, some studies find that state taxes, including corporate taxes, tend to increase significantly during the tenure of Democratic governors (Besley & Case, 1995). Therefore, the incentives (taxes and subsidies) for reshoring vary across U.S. states depending on which political party is controlling the state.[23] These observations motivate the following hypothesis:

H4: The stock market reaction to a firm's reshoring announcement is less positive when the firm reshores to a Democratic-led (rather than Republican-led) state.

3.4 Data Sources and Variables

This section presents data collected on reshoring announcements and the four reshoring risks and the control variables.

[22] States' corporate tax rates varied from 0% to 11.5% in 2022. South Dakota and Wyoming are Republican states without a corporate income tax. In contrast, the Democratic states of New Jersey and Pennsylvania levy the highest corporate tax rate, creating a less business-friendly environment for reshoring.

[23] Republican states generally provide more favorable conditions for reshoring in different ways. For example, the Mississippi Development Authority helped vehicle parts supplier Grammer move from Germany to the United States, and the Tennessee Valley Authority subsidized Hago Automotive for its relocation and equipment costs. AirGuide, an aluminum grilles manufacturer, received support from the Mississippi Development Authority for their reshoring from Mexico to Clarksdale. Home textile firm Louis Hornick moved facilities to South Carolina because of the state's business-friendly environment, support for skilled labor, and extensive infrastructure network (Souza, 2020). To avoid a deficit of skilled labor, the state university partnered with reshored firms to provide skilled laborers (Lammers, 2019). These examples become strong reference points for other firms to choose reshoring locations in the future.

3.4.1 Reshoring Announcements

We collected reshoring announcements made by publicly listed U.S. firms, focusing on firms headquartered in the United States that initially manufactured in that country before they offshored their production. These reshoring announcements were compiled through the Reshoring Initiative.[24]

3.4.2. Data Cleaning and Checking

Of the 1,483 reshoring announcements identified, we removed 1,076 announcements involving 260 duplications (i.e., same news reported by several sources), 390 instances of insufficient information (e.g., lacking specific date or location of reshoring), and 426 non-U.S.-headquartered firms (e.g., Toyota), resulting in a sample of 407 reshoring announcements. We further identified and removed reshoring announcements with confounding events because these events might affect firms' market value and confuse the interpretation of the test results (Ramasubbu, Shang, May, Tjader, & Vargas, 2019). Specifically, we searched Factiva for each of the 407 reshoring announcements to check if any confounding events occurred from 10 days before to 10 days after the reshoring announcement (i.e., Day −10 to Day 10). The confounding events included lawsuits, mergers, dividend declarations, changes to key executives, unexpected earnings, product recalls, and acquisitions announcements (McWilliams & Siegel, 1997). Our Factiva search identified and removed 124 reshoring announcements with confounding events, and we further deleted two outliers,[25] leaving 281 (i.e., 407 − 124 − 2) reshoring announcements from 132 publicly listed U.S. firms for further analysis. The detailed step-by-step data cleaning process is presented in Appendix Figure A16.[26]

[24] The Reshoring Initiative database covered 1,483 reshoring announcements made by 258 publicly listed firms with major operations in the United States from 2009–2022. To ensure announcement accuracy for the date and reshore locations, we cross-checked each announcement using Google News and Factiva. We marked the announcement date as "Day 0" for short-term event study analysis (Lo, Tang, Zhou, Yeung, & Fan, 2018; McGuire & Dilts, 2008).

[25] Based on extreme cumulative abnormal return (CAR) values outside +/− 3* interquartile ranges (Schwertman et al. 2004).

[26] A major concern arising from our data-cleaning process is that the reshoring firms remaining in the test sample could be quite different from those removed due to insufficient information and confounding events, which might hurt the generalizability of the

3.4.3. Classification of Reshoring Announcements

Following Gray et al. (2013), we classified the 281 announcements into four different types: (1) in-house reshoring, (2) insourced reshoring, (3) in-house-to-outsourcing reshoring, and (4) OTO reshoring.[27] The classification results suggest that among the 281 reshoring announcements, 216 are in-house reshoring (type 1), 36 are insourced reshoring (type 2), 29 are OTO reshoring (type 4), and no reshoring announcement involves in-house-to-outsourcing reshoring (type 3). The distribution of these 281 reshoring announcements across years is shown in Appendix Table 17.

3.4.4. Financial Data

For those sample firms making the 281 reshoring announcements, we collected their financial, stock price, and market index data from S&P's COMPUSTAT and Bloomberg databases. The firms' annual reports provided information on the headquarters and affiliate office locations. Table 4 provides descriptive statistics of their financial performance in the year prior to the reshoring announcements

test results. To address this concern, we conducted several independent sample *t*-tests to compare the remaining and removed reshoring firms. Our comparison covered a comprehensive set of firm-level measures, including the number of employees, total assets, sales, operating expenses, total liabilities, and total inventories. The independent sample *t*-test results suggest no significant difference between the remaining and removed reshoring firms across all six firm-level measures ($p > 0.1$; not tabulated), providing no evidence of sampling bias and improving confidence in the generalizability of our test results.

[27] The detailed classification procedures can be found in Appendix A.19. and are further explained below. First, we recruited two external coders to code the 281 reshoring announcements independently. They were provided with the study purpose, classification definitions with coding training, detailed examples and guidelines, and a codebook, as shown in Appendix A.19. There were two rounds of coding. In round 1, the coders were asked to independently code all the reshoring announcements. There was about 72.24% agreement (i.e., 203 out of 281 cases) on the coding results in the first round. There were two parts in round 2. In part 1, the coders were required to review the 78 (281−203) disagreement cases independently, following the same procedures as round 1, leading to agreement on 31 cases. In part 2, for the remaining 47 (78−31) cases, each coder was allowed to review the information (e.g., location, ownership) collected by their counterpart and discuss the remaining cases in detail. The main reason for disagreement was a lack of clear information or different interpretations of the announcements. After the second part of round 2, the coders achieved 100% agreement on the classification of the 281 reshoring announcements.

Table 4. Descriptive Statistics of Sample Firms

Variables	Mean	Median	Std. Deviation	Minimum	Maximum
Total Assets (USD, in Millions)	105,804.02	19,351.00	177,550.44	13.41	781,818.00
Number of Employees in Thousands	144.83	50.70	371.07	0.08	2,300.00
Net Income (USD, in Millions)	5,056.87	1,115.00	9,172.69	−22,355.00	57,411.00
Sales (USD, in Millions)	62,671.68	18,143.00	97,516.48	21.19	511,729.00
Debt/Equity Ratio	1.73	0.77	13.65	−139.75	173.43
Market Value (USD, in Millions)	90,335.40	30,435.92	178,527.42	3.85	1,966,078.92
Return on Assets	0.13	0.11	0.09	−0.26	0.60

3.4.5. Stock Market Reaction

We adopt the short-term event study methodology to quantify the stock market reaction to a firm's reshoring announcement in terms of abnormal returns (Hendricks & Singhal, 2003; Lo et al., 2018). We use the daily stock data to calculate abnormal returns, which estimate the percentage change in stock prices associated with an event after adjusting them with market-wide movements (Sorescu, Warren, & Ertekin, 2017). Following the general approach to conducting short-term event studies (Jacobs, Singhal, & Subramanian, 2010), we use calendar days as event days and Day 0 as the date when the reshoring announcement was made (before market closing time). Then we present a three-day event period and examine the daily effects of all reshoring announcements on abnormal returns from Day −1 to Day 1.[28] Following previous studies (McWilliams & Siegel, 1997; Wood, Wang, Olesen, & Reiners, 2017), we use a two-day event period that includes both the announcement day (day 0), and the trading day after the announcement (day 1) to ensure sufficient time for market response, particularly when the announcements were made near market closure. Because the measurement window is more than one day, we add up the daily abnormal

[28] The three-day time window is a widely adopted standard in various short-term event studies of abnormal stock returns in different events-related research (Ba, Lisic, Liu, & Stallaert, 2013; Hendricks, Singhal, & Wiedman, 1995; Klassen & McLaughlin, 1996; Lam, Yeung, Cheng, & Humphreys, 2016; Lo et al., 2018; Paulraj & de Jong, 2011).

returns in the event window to obtain a cumulative abnormal return (CAR). In the next section, we further work with CAR's cross-sectional analysis. Specifically, the CAR is the sum of the daily mean abnormal stock return (AR) over the measurement window (t0, t1):

$$CAR_{i_{(t0,t1)}} = \sum_{t=t_0}^{t_1} AR_{it}. \quad (1)$$

To compute the daily mean abnormal stock return (AR_t), we use Fama and French's three-factor model to estimate abnormal returns by considering three factors, including market risk, market capitalization, and book-to-market ratio, and by assuming a linear relationship between the return of any stock and these three factors over time (Fama and French 2021).[29] We also use a 200-day estimation period (from Day −210 to Day −11) to compute the expected return for each firm. We eliminate firms with less than 40 days of stock price data to ensure accuracy (Jacobs et al., 2010). To protect the estimate against the effects of the announcement and ensure nonstationarity, we end the estimation period 11 trading days before the event day (Jacobs et al., 2010). The difference between the expected and actual return is the abnormal return for firm *I* on day *t*. The following formula shows how it is estimated using the Fama–French three-factor model:

$$AR_{it} = R_{it} - (\alpha_i + R_{ft} + \beta_{i1}[R_{Mt} - R_{ft}] + \beta_{i2}SMB_t + \beta_{i3}HML_t + \varepsilon_{it}) , \quad (2)$$

where R_{it} is the actual return for firm *I* on day *t*, the formula in the parenthesis is the expected return based on the three-factor model, and R_{ft} and R_{Mt} are the risk-free rate and market return on day *t*. SMB stands for small minus big (market capitalization), and HML stands for high minus low (book-to-market ratio) return on day *t*. β is the factor's coefficient, and ε_{it} is the error term.

To test the presence of abnormal returns, both parametric (*t*-test) and nonparametric tests are conducted. Nonparametric tests, such as the Wilcoxon signed rank (WSR) test and binomial sign test, are used to compare the abnormal median return and determine whether positive or negative

[29] For robustness checks, we also consider the market model and the four-factor model. The market model is built on the actual returns of a reference market and the correlation of the firm's stock with the reference market. Similar to the three-factor model, the market model assumes a linear relationship between any stock return and that of the market index over a given time period (Scholes & Williams, 1977). The four-factor model extends the three-factor model by adding monthly momentum to the regression (Carhart, 1997). The calculations for the mean abnormal return and cumulative abnormal return over a given time period are the same as in Equations (1) and (2). The details are provided in Appendix Tables A.5 and A.6.

abnormal returns occurred during the event periods.

3.4.6. Measuring the Four Risk Factors

We conduct a cross-sectional regression with the CAR as the dependent variable to estimate the impact of various risk factors. We measure those four reshoring risk factors as stated in Table 2: (i) foreign currency risk, (ii) foreign IP risk, (iii) reshoring type (i.e., in-house vs. insourced reshoring), and (iv) business environment (i.e., reshoring to Democratic- vs. Republican-led states).

3.4.6.1. Offshore Risk (i): Foreign Currency Risk

To measure **foreign currency risk**, we use the Bloomberg Dollar Spot Index (BBDXY) to measure foreign countries' currency volatility against the U.S. dollar. Unlike the U.S. Dollar Index, which focuses on leading global currencies, BBDXY provides developed and "emerging 10" trading foreign market currencies (e.g., Indian rupee, Mexican peso, Chinese renminbi) against the U.S. dollar. These emerging markets are involved in our reshoring announcement event study and affect reshoring decisions. For this reason, we use BBDXY to calculate the past 12 months' volatility (coefficient of variation) using the ratio of the monthly standard deviation of foreign currency exchange rate to the monthly average foreign currency rate against the U.S. dollar in the previous 12 months (Benita & Lauterbach, 2007; De Santis & Gerard, 1998). Hence, the foreign currency risk is higher when the foreign currency volatility is higher, which favors reshoring.

3.4.6.2. Offshore Risk (ii): Foreign IP Risk

Firms may lower foreign IP risk by reshoring to the United States from low-IP protection countries (Anand & Goyal, 2019; Skowronski & Benton Jr, 2018).[30] To measure foreign IP risk,

[30] IP risk covers the high-tech production process and trade secrets such as recipes for food manufacturing or plastic molding design.

we use the International Property Rights Index's (IPRI) IP rights score developed by Property Right Alliance[31] (Dombrovsky, Doguchaeva, & Bratanovsky, 2019).[32] This index consists of three indicators related to the level of IP protection in a country: (1) protection of IP rights, (2) patent protection, and (3) copyright piracy under the IP rights subindex.[33] The higher a country's IPRI's IP index, the stronger the IP protection. For our analysis, the variable foreign IP risk is calculated based on a three-year average of the IPRI IP right score between the United States and offshore countries the years before the announcement date (i.e., U.S. average score minus offshore country average score over three years). Because the IPRI index is higher when a country has more vital IP protection, this measure is positive when foreign IP risk is higher (i.e., when the U.S. has stronger IP protection than its offshore location). Hence, when the foreign IP risk is higher, reshoring can reduce IP risk. In this case, firms might favor reshoring.

3.4.6.3. Onshore Risk (iii): Reshoring Type (1) In-house versus Type (2) Insourced Reshoring

As discussed in Section 3, a Type (2) **insourced reshoring** strategy has a higher risk because it involves a significant change of strategy from outsourcing from a foreign supplier to in-house production in the United States. Therefore, we create an insourced reshoring dummy variable to measure this inshore risk. This dummy variable equals 1 if the corresponding announcement is based on **insourced reshoring** (higher risk). Conversely, if the announcement is based on in-house reshoring, the dummy variable equals 0.

[31] Property Rights Alliance is an affiliate of Americans for Tax Reform Foundation. They have partners from 125 international organizations from 73 countries for conducting the IPRI index.
[32] This index has been commonly used to measure intellectual protection rights in the operations management literature (Skowronski & Benton Jr, 2018; Skowronski, Benton Jr, & Hill, 2020).
[33] There are three areas under IPRI: **IP rights, legal and political rights**, **and physical property rights** (Levy-Carciente & Montanari, 2021). We focus on the **IP rights index**.

3.4.6.4. Onshore Risk (iv): Business Environment (Democratic- versus Republican-led States)

We measure Democratic- vs. Republican-led states associated with reshoring announcements based on the controlling party of the reshoring location (state).[34] To capture the inshore risk of a less business-friendly environment caused in Democratic-led states, we create a variable Democratic-led states that equals 1 if the state is under a Democrat governor and the Democratic party also controls the state legislature during the year of the reshoring announcement. If the state has a Democratic governor but Democrats do not control the legislature, or vice-versa (i.e., Democrats control the state legislature, but the state is not under a Democratic governor), we take this variable as 0. By contrast, if a state is under a Republican governor and Republicans also control the state legislature, we code the variable as -1. This variable reflects the change from Republican control (-1) to divided government (0) and Democratic control (+1). This operationalization of partisan control is consistent with leading publications in the political and economic sciences (Alt & Lowry, 1994; Halvorsen & Jakobsen, 2013; Poterba, 1994).

3.4.7. Control Factors

We incorporate the following control factors obtained from S&P's COMPUSTAT database, Bloomberg, and company annual reports to control other factors influencing abnormal stock returns associated with a firm's reshoring announcement. The control factors, including firm size, return on assets (ROA), and leverage, are computed based on the fiscal year ending prior to the announcement date, unless specified differently.

Firm size: We measure firm size according to the number of employees. Larger firms would have more resources (e.g., financial resources, human capital) to return to the United States than smaller firms.

ROA: ROA is the ratio of a firm's operating income over its total assets adjusted by industry.

[34] The controlling party of each state during each year is available at Ballotpedia ("Ballotpedia," 2020).

Firms with higher profitability may have more resources to reshore.

Leverage: We measure leverage as a firm's debit-to-equity ratio. High leverage means a significant percentage of firm assets are in debt, indicating high operating risk (Johnson, Wu, & Varnon, 2017). High-leverage firms' reshoring initiatives thus may be perceived as riskier and lead to less favorable investor reactions.

Oil price volatility: High oil price volatility may lead to more uncertain shipping and logistics costs and motivate firms to reshore (Chen & Hu, 2017; Ellram, Tate, & Petersen, 2013). We use the WTI Spot Price FOB (dollars per barrel) from Thomson Reuters.[35] Oil price volatility is the ratio of the oil price's daily standard deviation to the mean daily oil price in the month before the reshoring announcement.

Labor intensity: We measure labor intensity as a firm's number of employees divided by total assets (Lo, Wiengarten, Humphreys, Yeung, & Cheng, 2013). It may be less favorable for labor-intensive firms to reshore due to high U.S. labor costs.

Offshore sales proportion: If a firm has a large proportion of its sales from an offshore country, it may be riskier and more costly for the firm to reshore from this offshore country. To measure offshore sales proportion, we obtain the ratio of a firm's annual sales in an offshore country or region to its total annual sales and average the ratios over two years including the year of and the year before its reshoring announcement.

Offshore sales growth: A firm's sales growth in an offshore country may be affected when it moves from the offshore country back to the United States. Obtaining firm sales data from annual reports, we measure offshore sales growth as the average of a firm's annual sales growth in an offshore country or region over two years including the year of and the year before its reshoring announcement.

Offshore GDP growth: An offshore country's GDP growth indicates its market potential,

[35] WTI spot price FOB source: https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=rwtc&f=m.

which may affect the attractiveness of reshoring as perceived by investors. For example, moving from an offshore country with high GDP growth back to the United States may increase reshoring firms' risks and costs to capture the offshore country's market potential, leading to less favorable investor reactions. With GDP data obtained from the World Bank, we measure offshore GDP growth as an offshore country's average percentage of GDP changes including the year before and the year of reshoring.

Nearshore 45 days announcements: Firms' nearshoring their production and manufacturing to countries close to the United States, such as Canada and Mexico, may also lead to stock market reactions. To control for this effect, we identify firms' nearshoring announcements from Factiva and code nearshore 45 days announcements as 1 for firms having announcements of nearshoring to Canada and Mexico from 45 days before to 45 days after the firms' reshoring announcements and 0 otherwise.

Offshore 45 days announcements: We account for firms that offshored their manufacturing to countries beyond Canada and Mexico because these offshoring initiatives may also affect the firms' market value. We identify firms' offshoring announcements from Factiva and code offshore 45 days announcements as 1 for firms having announcements of offshoring to countries beyond Canada and Mexico from 45 days before to 45 days after the firms' reshoring announcements and 0 otherwise.

Manufacturing process: Investors may react differently to reshoring different manufacturing processes. For example, investors might react more positively when final assembly rather than raw material procedures are reshored to the United States. Based on the information provided in firms' reshoring announcements and annual reports, we code the manufacturing process being reshored into raw material, assembly, and final manufacturing and then create two corresponding dummy variables: manufacturing process: raw material dummy and manufacturing process: final manufacturing dummy).

Product recall: Product quality risk is a substantial concern when firms offshore their production (Steven, Dong, & Corsi, 2014). Therefore, firms with more product recalls may benefit more from reshoring. We searched the product recall databases maintained by the U.S. Consumer Product Safety Commission, U.S. Food and Drug Administration, and National Highway Traffic Safety Administration[36] to identify reshoring firms' product recalls. We measure product recall as a firm's total number of product recalls in three years before its reshoring announcement.

Top 10 states for business: As the business competitiveness of a state may affect a reshoring firm's location decision, we create a dummy variable based on CNBC's Top 10 States for Business,[37] which reflects a state's overall competitiveness in various factors such as the economy, education, workforce, infrastructure, and quality of life. We code the variable as 1 if the reshoring state is among the top 10 states for business in the announcement year and 0 otherwise.

Building new plant: Firms may decide to build new plants in the United States when reshoring, showing their commitment to and confidence in their reshoring decisions, which may lead to more favorable investor reactions. After reading firms' reshoring announcements, we code building new plant as 1 for firms setting up new plants/offices in the United States and 0 otherwise.

Closed facility: Firms may also show their commitment to and confidence in their reshoring decisions by closing the production facilities or plants in the offshore locations after reshoring. To measure this variable, we look at the facility of the specific country and location involved and determine whether the facility still existed (or if the number of facilities in this location was reduced) in the year after the year of reshoring.[38] We look into annual reports of the reshoring firm in the year subsequent to the reshoring year for related information. We take this variable as 1 if a firm closed its offshore facility subsequent to reshoring, and 0 otherwise.

Reshoring proportion: The extent of reshoring may also affect how investors react to a

[36] https://www.cpsc.gov/Recalls; https://www.fda.gov; https://www.nhtsa.gov

[37] https://www.cnbc.com/americas-top-states-for-business/

[38] For example, if a firm had a facility in Portugal in the year of reshoring, and this facility no longer existed in their annual reports (or the number of facilities in this location reduced) in the subsequent year, we assume that the firm closed this facility.

firm's reshoring announcement. Reshoring proportion is the ratio of the reshoring facility to the total number of offshore production facilities. From the annual report and the company website, we identify the total number of offshore plants in offshore countries and calculate the reshoring proportion variable by dividing the reshoring activity (taken as 1) by the number of offshore plants. A higher reshoring proportion means that the reshoring activity is a more significant action by the firm.[39]

Offshore locations: Investors may react differently when firms reshore from different offshore countries. To account for this potential heterogeneity, we created two offshore location dummies. One is offshore China, indicating whether a firm reshores from China, the world's factory. The other is Offshore G7, indicating whether a firm reshores from G7 countries (apart from the United States) that comprise the world's largest advanced economies.

Operational capability: Firms with better operational capabilities may be more capable of handling complex reshoring processes, leading to more favorable investor reactions. Following the literature (Dutta, Narasimhan, & Rajiv, 2005; Lam, Yeung, & Cheng, 2016; Yiu, Yeung, & Jong, 2020), we employ stochastic frontier estimation methodology to quantify a firm's operational capability as its ability to transform operational resources (i.e., number of employees, cost of goods sold, capital expenditure) into operational output (i.e., operating income).

3.4.8 Endogeneity

Our research investigates how a firm's reshoring announcement relates to its market value. However, a firm's reshoring decision is not random and may depend on other internal and external factors, leading to possible selection bias (Ketokivi & McIntosh, 2017). Two examples, labor intensity (an internal factor) and oil price volatility (an external factor), illustrate this point. For example, labor-intensive firms may be less likely to reshore because they rely more on a significant

[39] For example, a firm could have dozens of offshore production facilities in different countries, and the reshoring activity in the news would cover just a small portion of the firm's offshore locations. We expect that the impact of the reshoring activity will be weaker for firms with many offshore locations.

number of workers from developing countries that are more widely available and cheaper (Ellram, Tate, & Feitzinger, 2013). By contrast, firms may be more likely to reshore when oil prices become more volatile because high oil price volatility induces more uncertainties in transportation and supply chain management, motivating firms to move their production and manufacturing back to their home countries to reduce such uncertainties (Chen & Hu, 2017).

We thus follow the literature (Shaver, 1998; Wolfolds & Siegel, 2019) by employing the Heckman model to address selection bias because the Heckman model adopts a two-stage approach (Heckman, 1979), explicitly modeling the probability of an observation to be selected for the treatment group (i.e., the first-stage selection model) and the conditional expectation of the outcome resulting from the treatment (i.e., the second-stage outcome model). In our research context, the first-stage selection model concerns a firm's probability of reshoring, whereas the second-stage outcome model focuses on a firm's market-value change because of reshoring. However, as Wolfolds and Siegel (2019) emphasize, if the variables determining the selection in the first-stage model are also related to the outcome in the second-stage model, the exclusion restriction condition cannot be met, and the results based on the estimation approach become less reliable. For example, although labor intensity may determine a firm's reshoring decision, as discussed above, it may also affect the extent to which a firm's market value will change because of reshoring. In particular, reshoring may negatively impact the market value of a labor-intensive firm because of the expected increased labor costs after reshoring. Similarly, oil price volatility may not only motivate a firm to reshore but also enable the firm to benefit more from the reshoring in terms of increased market value because reshoring helps reduce the uncertainties arising from oil price volatility and leads to more stable future cash flows for the firm.

Accordingly, Wolfolds and Siegel (2019) suggest it is essential to identify and include one or more variables or instruments that "affect selection but not the outcome" in the first-stage model to satisfy the exclusion restriction conditions and yield more reliable results. We use two such

instruments in this research, one indicating the annual number of reshoring announcements in the industry and the other representing the Trump administration (2017–2020). A firm should be more likely to reshore if many of its industry peers reshore (Boffelli & Johansson, 2020), but it is unlikely to affect its market value directly. Similarly, whereas the Trump administration motivated firms to return to the United States (Pegoraro, De Propris, & Chidlow, 2022), firms' market value did not need to be higher during the Trump administration. We also further confirm that these two instruments are not significantly correlated with firms' market value ($p > 0.1$), satisfying the exclusion restriction condition.

As a result, our first-stage selection model includes the two instruments (industry's reshoring number and Trump administration), labor intensity, oil price volatility, and three firm-level variables (firm size, ROA, and leverage) that may be related to firms' reshoring decisions. In particular, whereas large and profitable firms may have more resources and capacities to support their reshoring activities (Zhang, Shui, Smart, Wang, & Chen, 2022), high leverage may increase the risk of firms' strategic changes or initiatives such as reshoring (Mishra & Modi, 2013).

We rely on a probit regression to estimate the first-stage selection model. Firms included in the estimation consist of reshoring firms (i.e., the event study sample firms) and their industry peers (with the same GIC codes as the reshoring firms) that have offshore production but do not make any reshoring announcements. As shown in Table 4, the probit regression results confirm our prediction: a firm was more likely to reshore when many of its industry peers reshored during the Trump administration period and when oil prices were volatile in the external environment. Internally, less labor-intensive and larger firms are more likely to reshore.

Table 5. First-Stage Probit Regression Results

	Coef.	Standard Err.
Industry's reshoring number	0.0739**	0.0066
Trump administration	0.1871**	0.0583
Oil price volatility	0.9571*	0.4270
Firm size	0.0018**	0.0001
ROA	0.0001	0.0008
Leverage	0.0000	0.0017
Labor intensity	−34.7172**	8.4923

Notes: * $p < 0.05$; ** $p < 0.01$

Number of observations	27,618
Log-likelihood	−1098.560
LR chi2(7) = 309.4100	
Prob > chi2 = 0.0000	

After running the probit regression, we obtain an inverse Mills ratio (IMR) for each firm to account for its probability to reshore (King & Soule, 2007). The IMR is added as an additional independent variable in the second-stage outcome model, as shown below. Consistent with Wolfolds and Siegel's (2019) practice, all variables from the first-stage selection model, except the two instrumental variables, are also included in the second-stage outcome model. We exclude the two instrumental variables because they are not expected to be related to market value. We confirmed this by the correlation check. Finally, we display the test results based on the traditional OLS model without IMR in Table 7 for direct comparison.

Second-stage outcome model: $CAR_i = \beta0 + \beta1$ firm size + β2 ROA + β3 leverage + β4 oil price volatility + β5 labor intensity + β6 offshore GDP growth + β7 offshore sales growth + β8 offshore sales proportion + β9 product recall + β10 offshore 45 days announcements + β11 nearshore 45 days announcements + β12 manufacturing process: raw material dummy + β13 manufacturing process: final manufacturing dummy + β14 top 10 states for business + β15 build new plant + β16 close facility + β17 reshoring proportion + β18 offshore China +β19 offshore G7 + β20 operational capability + β21 foreign currency risk + β22 foreign IP risk + β23 insourced reshoring + β24 Democratic-led states + β25 IMR + $residual_i$ (3).

Table 6 presents the descriptive statistics and correlation of the variables.

Table 6: The Descriptive Statistics and Correlations of the Variables

		Mean	Std. Deviation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	CAR	0.00	0.02																									
2	Firm size	144.83	371.07	0.05																								
3	ROA	1.55	1.49	0.14*	−0.02																							
4	Leverage	1.73	13.65	−0.02	−0.02	0.03																						
5	Oil price volatility	0.03	0.03	0.22**	−0.06	0.19**	−0.03																					
6	Labor intensity	0.00	0.00	−0.11	0.36**	−0.18**	0.00	−0.04																				
7	Offshore GDP growth	0.04	0.05	−0.02	0.08	−0.03	−0.03	−0.03	0.10																			
8	Offshore sales growth	0.15	0.79	0.06	−0.03	0.00	0.00	0.02	−0.09	−0.04																		
9	Offshore sales proportion	0.24	0.16	0.01	−0.04	0.01	−0.05	0.03	−0.06	−0.15*	−0.15*																	
10	Product recall	0.00	3.25	0.07	0.05	0.00	−0.02	0.00	−0.13*	0.04	0.08	−0.08																
11	Offshore 45 days announcements	0.10	0.30	−0.02	0.01	0.02	0.04	−0.06	−0.17**	−0.04	0.22**	−0.10	0.18**															
12	Nearshore 45 days announcement	0.02	0.14	0.01	0.00	0.01	0.00	−0.02	−0.05	−0.05	−0.02	0.01	0.13*	−0.05														
13	Manufacturing process: raw material	0.10	0.30	0.12*	−0.11	−0.06	−0.02	0.22**	−0.04	−0.08	−0.05	0.12*	−0.04	−0.11	−0.05													
14	Manufacturing process: final manufacturing	0.58	0.49	−0.01	0.22**	0.07	−0.08	−0.04	0.16**	.151*	−0.10	−0.06	0.08	0.10	0.07	−0.39**												
15	Top 10 states for business	0.32	0.47	−0.03	−0.09	−0.07	0.00	−0.02	0.06	0.02	−0.08	0.17**	0.03	−0.16**	−0.05	0.10	0.03											
16	Build new plant	0.27	0.45	−0.01	−0.13*	−0.07	0.01	−0.06	0.05	−0.10	0.00	−0.04	−0.02	−0.13*	−0.09	0.06	−0.17**	0.13*										
17	Close Facility	0.10	0.30	0.04	−0.08	−0.02	−0.01	−0.01	−0.08	−0.14*	−0.03	0.13*	−0.15*	0.00	0.03	0.05	−0.10	0.05	−0.02									
18	Reshoring proportion	0.17	0.24	0.10	−0.08	0.04	−0.01	0.07	0.32**	0.04	−0.02	0.05	−0.15*	−0.14*	−0.05	0.07	−0.03	0.01	0.09	0.09								
19	Offshore China	0.50	0.50	−0.04	0.07	0.02	−0.12	−0.06	0.10	.438**	−0.05	0.09	0.02	−0.05	0.00	−0.04	0.10	0.06	−0.01	−0.04	0.02							
20	Offshore G7	0.19	0.34	0.06	−0.01	0.18**	0.12*	0.13*	−0.09	−0.33**	−0.02	0.02	−0.05	−0.08	0.00	0.11	−0.12*	−0.04	0.07	0.02	−0.09	−0.35**						
21	Operational capability	0.66	0.14	0.00	0.01	0.14*	−0.01	0.02	−0.27**	−0.01	0.02	−0.17**	−0.04	0.11	0.00	−0.06	0.00	−0.22**	−0.04	−0.09	−0.16**	−0.05	0.03					
22	IMR	2.42	0.50	−0.03	−0.81**	0.02	−0.05	0.06	−0.10	0.10	−0.03	0.04	−0.09	−0.03	−0.03	0.15*	−0.20**	0.14*	0.07	0.05	0.18**	−0.02	−0.05	−0.11				
23	Currency risk	0.02	0.01	0.10	0.04	−0.04	0.00	0.01	0.11	−0.27**	−0.08	−0.04	0.00	−0.04	0.04	−0.05	0.06	0.14*	0.09	0.11	−0.01	0.02	0.03	−0.20**	−0.04			
24	IP risk	2.04	1.12	−0.01	0.01	−0.24**	−0.09	−0.13*	0.16**	0.33**	0.00	−0.05	0.04	0.00	0.05	−0.08	0.14*	−0.02	−0.16**	−0.14*	−0.04	0.33**	−0.63**	−0.14*	0.04	0.07		
25	insourced reshoring	0.13	0.34	−0.20**	−0.06	−0.11	−0.01	−0.04	0.24**	0.04	−0.03	−0.12	−0.05	−0.06	−0.06	−0.09	0.11	−0.04	0.17**	−0.09	0.14*	0.03	−0.11	0.04	0.09	0.04	0.07	
26	Democratic-led states	−0.45	0.73	−0.04	−0.15*	0.24**	−0.05	0.15**	−0.09	−0.06	−0.05	−0.07	0.07	0.02	−0.01	−0.04	−0.09	−0.23**	0.03	−0.04	0.05	0.00	0.06	.133*	0.13*	0.06	−0.06	0.03

3.5 Analysis and Results

3.5.1. Market Reaction toward Reshoring Announcements

We present three statistical tests commonly applied in short-term event studies, including *t*-test, Wilcoxon signed-rank test, and binomial sign test, to investigate whether the abnormal returns are associated with the 281 reshoring announcements. First, we examine the effects of the reshoring announcement on abnormal returns from Day −1 to Day 1. Table 6 shows abnormal returns for all announcements under the three-factor model. We cannot find significant results for day −1, day 0, and day 1, and from day 0 to day 1. Therefore, our event study result based on the 281 reshoring announcements **does not support H0**. Our result differs from Brandon-Jones et al. (2017), who find significant positive results from 37 announcements,[40] whereas we cannot find significant results based on a much larger sample. We will provide further analyses and discussion in Section 5.3.

Table 7. Abnormal Returns Associated with All Reshoring Announcements

Day	Day −1	Day 0	Day 1	Day 0 to 1
N	280	281	281	281
Mean abnormal returns	0.0006	0.0010	0.0000	0.0010
t-statistic	0.5910	1.1370	−0.0490	1.0130
Median abnormal return	−0.0010	0.0004	0.0002	−0.0003
Wilcoxon signed-rank *Z*-statistic	−0.0440	1.0630	0.0790	−0.9440
% positive abnormal returns	47.86%	52.67%	50.53%	49.47%
Binomial sign test *Z*-statistic	−0.6570	0.8350	0.1190	−0.1190

Notes: +$p < 0.10$; * $p < 0.05$; ** $p < 0.01$; Based on the Fama–French three-factor model.
^ Sample size on Day −1 equals 280 instead of 281 due to missing data on that day only.

[40] We obtained the sample of Jones et al.'s (2017) study and found they have a higher proportion of in-house reshoring (Type 1).

3.5.2. Analysis of Four Risk Factors

We conduct hierarchical linear regression analysis to test hypotheses H1–H4. We examine the impact of different reshoring risks on the market reaction associated with a firm's reshoring announcement. First, we develop a model to determine whether the four risk factors of (i) foreign currency risk, (ii) foreign IP risk, (iii) reshoring type (1) in-house vs. type (2) insourced reshoring, and (iv) business environment (reshoring to Democratic vs. Republican-led States) moderate the abnormal stock market reaction toward reshoring. We also consider control and full models. The control model regresses CARi from Day 0 to Day 1 against all control variables. The full model includes control variables and moderating factors represented by the second-stage outcome model in formula (3). The maximum Variance Inflation Factor (VIF) value across all independent variables included in the full model is 2.235, which is well below the suggested threshold of 10 and indicates multicollinearity is not a major concern. We also include a full model without the IMR and obtain consistent test results as a robustness check. The models shown in Table 7 focus on the difference between in-house versus insourced reshoring announcements as one of our hypotheses. However, we further examine the impact of OTO reshoring compared to other reshoring types in subsequent analyses (Table 9).

Table 8. Regression Results for Event Period Days 0 to 1

	Control Model with IMR	Full Model with IMR	Full Model without IMR
	Unstandardized Coefficients (Standard Error)	**Unstandardized Coefficients (Standard Error)**	**Unstandardized Coefficients (Standard Error)**
Intercept	−0.005(0.015)	−0.023(0.016)	−0.018(0.09)
Firm size	−0.000(0.000)	0.000(0.000)	0.000(0.000)
ROA	0.001(0.001)	0.001(0.001)	0.001(0.001)
Leverage	0.000(0.000)	0.000(0.000)	0.000(0.000)
Oil price volatility	0.151(0.056)**	0.150(0.055)**	0.152(0.055)**
Labor intensity	−1.173(0.449)**	−1.051(0.452)*	−0.995(0.427)*
Offshore sales proportion	0.002(0.007)	0.003(0.007)	0.003(0.007)
Offshore sales growth	0.001(0.001)	0.001(0.001)	0.001(0.001)
Offshore GDP growth	0.000(0.030)	0.008(0.031)	0.012(0.029)
Product recall	0.000(0.000)	0.001(0.000)	0.000(0.000)
Offshore 45 days announcements	0.000(0.004)	−0.001(0.004)	0.000(0.004)
Nearshore 45 days announcements	0.001(0.007)	−0.002(0.007)	−0.001(0.007)
Manufacturing process: raw material	0.006(0.004)	0.005(0.004)	0.005(0.004)
Manufacturing process: final manufacturing	0.002(0.003)	0.002(0.003)	0.002(0.003)
Top 10 states for business	−0.002(0.003)	−0.003(0.003)	−0.003(0.003)
Build new plant	0.001(0.003)	0.003(0.003)	0.003(0.003)
Close facility	0.002(0.004)	0.002(0.004)	0.002(0.004)
Reshoring proportion	0.008(0.005)	0.011(0.005)*	0.011(0.005)*
Offshore China	−0.002(0.003)	−0.003(0.003)	−0.003(0.003)
Offshore G7	0.000(0.004)	0.004(0.004)	0.004(0.004)
Operating capability	−0.006(0.009)	0.003(0.009)	0.003(0.009)
IMR	0.002(0.005)	0.002(0.005)	
H1: Foreign currency risk		0.176(0.097)*	0.180(0.097)*
H2: Foreign IP risk		0.002(0.001)*	0.002(0.001)*
H3: Insourced reshoring		−0.008(0.004)*	−0.008(0.004)*
H4: Democratic-led States		−0.003(0.002)*	−0.003(0.002)*
N	243	243	243
R square	0.133	0.191	0.190
AR square	0.051	0.097	0.101
F	1.614	2.045	2.132
Sig	0.048*	0.003**	0.002**

Notes: +$p < 0.10$; * $p < 0.05$; ** $p < 0.01$ (two-tailed tests for control factors and one-tailed tests for hypothesized predictors); cumulative abnormal returns are based on the Fama–French three-factor model. Standard errors are indicated in parentheses; the sample size for regression analysis is 243 (rather than 281) because OTO reshoring (n = 29) is not included at this stage. Also, some "reshoring proportion" data are missing (i.e., we cannot identify the number of offshore factories for 9 firms).

Table 8 presents the results of the hierarchical linear regression analysis.[41] Based on our analysis of the full model as defined in Formula (3) stated in Section 4.8,[42] we find a more

[41] For the overfitting issue, we adopt backward regression and exclude the nine least relevant control factors, reducing the total number of regression parameters from 25 to 16 and the events per variable (EVP) to a more robust level of 15 (i.e., 243/16 = 15.2). The four explanatory factors remain significant, and the control factors continue to be very similar, alleviating the concern of overfitting.

[42] Our regression model is significant, with an *F*-value of 2.045 for the full model. The adjusted *R* square is 0.097, and the level is acceptable because our regression is based on cross-sectional data (Klassen & McLaughlin, 1996). The variance inflation factor for the independence of all variables is under 5 (from 1.070 to 2.235; (Neter, 1996). The results suggest our model has low multicollinearity. Additionally, we find that IMR is not statistically significant. We thus believe our research model is unbiased with no major endogeneity concern.

positive market reaction for a firm's reshoring under higher currency volatility risk and higher foreign IP risk in offshore countries ($p < 0.05$). Hence, the results suggest that foreign currency and IP risk significantly affect CAR; thus, H1 and H2 are supported. Next, as explained earlier, a Type (2) insourced reshoring strategy can be riskier than a Type (1) in-house reshoring strategy. The coefficient of insourced reshoring is negatively significant ($p < 0.05$), supporting H3. Finally, reshoring to Democratic-led states is also negatively significant ($p < 0.05$). This result implies that, compared to Republican-led states, there is a more negative stock market reaction when a company reshores to Democratic-led states. Hence, H4 is supported.

In summary, the market reacts more negatively toward reshoring announcements that entail Type (2) insourced reshoring strategies and/or reshoring announcements involving Democratic-led states. The market responds more positively when firms reshore from offshore countries with a higher currency volatility relative to the U.S. dollar and from offshore countries with lower IP protection scores than the United States (i.e., a higher foreign IP risk). Notice that the finding of a more positive market reaction for reshoring under high currency volatility and IP risks in foreign countries aligns with previous literature (Fratocchi et al., 2016; Gray et al., 2013; Ellram, Schoenherr, & Petersen, 2014; Vanchan et al., 2018). These risks increase offshore countries' transactions, operations, and supply chain coordination costs, motivating firms to reshore.

When a firm returns to the U.S., the market expects the firm to create more job opportunities. However, if the products or components were previously outsourced, the firm may not have related expertise or experience regarding specific products. The unavailability of high-skilled labor and technical know-how would impose risks, and the firm would have to redesign production processes from scratch. Compared to Democratic-led states, Republican-led states generally provide a more business-friendly environment for reshoring firms, increasing their chance of success and leading to more positive market reactions.

Among the control factors, oil price volatility is positively significant ($p < 0.01$), whereas labor intensity is negatively significant ($p < 0.05$). Like foreign currency volatility, oil price volatility typically leads to uncertainty in logistics and total costs (Ashby, 2016; Gharleghi et al., 2020; Tate, 2014b). Returning to the home country might decrease the uncertainty of logistics costs caused by oil price volatility, which leads to a more positive market reaction. At the same time, high labor intensity of a firm means the high labor cost when the firm's production returns to the US. The high labor cost and the challenge of recruiting skilled laborers could also lead to adverse market reactions. The effect of reshoring proportion is also positively significant ($p < 0.05$). A higher proportion of reshoring reflects the significance of the reshoring activity to the firm.

We further explore potential interaction effects among the four risk factors. Specifically, we explore whether the two offshore risks (foreign currency risk and foreign IP risk) interact for higher risks and whether two onshore risks (insourced reshoring and Democratic-led states) interact to discourage firms reshoring back to the United States. The results in Table 8 show an insignificant interactive effect between foreign currency risk and IP risk ($p > 0.1$) but a significantly negative interactive effect between insourced reshoring and Democratic-led states ($p < 0.1$), indicating that setting up (or expanding) new production facilities without prior in-house production experience or expertise in Democratic-led states creates extra difficulties.

The analysis above focused on the differences between insourced and in-house reshoring. However, depending on the manufacturing types, moving critical outsourced raw materials or products back home and subcontracting them to local suppliers (i.e., OTO reshoring) can also be an essential strategy for supply chain restructuring (McIvor & Bals, 2021; Shih, 2014). Accordingly, we further examine investor reactions to OTO reshoring while simultaneously reexamining the impact of insourced reshoring in our regression analysis. We create two dummy variables, OTO reshoring effect (OTO reshoring = 1; otherwise = 0) and the insourced

reshoring effect (insourced reshoring = 1; otherwise = 0), and explore their relative impacts in the same model. As shown in the second column of Table 9 (OTO Reshoring Effect Model), the impact of OTO reshoring is not significant ($p > 0.1$), whereas the impact of insourced reshoring remains negative and significant ($p < 0.05$).

Table 9. Exploring Interaction Effect and OTO Reshoring Effect

	Interaction Effect Model	**OTO Reshoring Effect Model**
	Unstandardized Coefficients (Standard Error)	Unstandardized Coefficients (Standard Error)
Intercept	−0.020(0.016)	−0.032(0.014)*
Control variables	included	included
H1: Foreign currency risk	0.169(0.097)*	0.155(0.091)*
H2: Foreign IP risk	0.003(0.001)*	0.002(0.001)+
H3: Insourced reshoring	−0.008(0.004)*	
Insourced reshoring effect		−0.007(0.003)*
OTO reshoring effect		0.001(0.005)
H4 Democratic-led States	−0.003(0.002)*	−0.003(0.002)*
Insourced reshoring * Democratic-led States (H3 * H4)	−0.007(0.005)+	
Foreign IP risk * Foreign currency risk (H2 * H1)	0.042(0.073)	
N	243	272
R square	0.199	0.150
AR square	0.099	0.064
F	1.982	1.738
Sig	0.004**	0.019*

Remarks: +p < 0.10; * p < 0.05; ** p < 0.01 (one-tailed tests for postulated predictors); cumulative abnormal returns are based on the Fama–French three-factor model. The standard errors are indicated in parentheses and control variables are included. The sample sizes for Interaction Effect Model and OTO Reshoring Effect Model are 243 (same as above) and 272 (including 29 OTO announcements), respectively. Some "reshoring proportion" data are missing (i.e., we cannot identify the number of offshore factories for 9 firms).

3.5.3. Market Reaction Toward Different Types of Reshoring Strategies

Our results in Table 8 indicate that the market reacts more positively toward Type (1) in-house reshoring (relative to Type [2] insourced reshoring). This observation motivates us to investigate further the absolute (rather than relative) market reactions toward different types of reshoring announcements. Of the 281 reshoring announcements included in our study, 216 (76.87%) are in-house reshoring, whereas 36 (12.81%) are insourced reshoring and 29 (10.32%) are OTO reshoring. Table 10 reports the market reaction to these three types of reshoring announcements. Reshoring announcements based on Type (1) in-house reshoring resulted in a positive market reaction on Day 0, and Day 0 to 1. The mean (median) abnormal return for Day 0 to 1 is 0.26% (0.16%) and positively significant ($p < 0.05$ for both mean and

median). However, reshoring announcements based on Type (2) insourced reshoring exhibited a negative market reaction on Day 0, and Day 0 to 1. The mean (median) abnormal return is −0.79% (−0.73%) and negatively significant ($p < 0.01$ for both mean and median). We cannot find significant results for Type (4) OTO reshoring ($p > 0.1$ for all tests). The test results for these three types of reshoring announcements remain consistent when the market model and the four-factor model (instead of the three-factor model) are used to estimate the stock market reactions, as shown in Tables A20 and A21 in the Appendix.

Table 10. Abnormal Returns Associated with In-house, Insourced, and OTO Reshoring

						Placebo test			
	Day	**Day −1**	**Day 0**	**Day 1**	**Day 0 to 1**	**Day −1**	**Day 0**	**Day 1**	**Day 0 to 1**
Type (1) In-house reshoring	*N*	215	216	216	216	216	216	216	216
	Mean abnormal returns	0.0002	0.0020	0.0006	0.0026	0.0008	−0.0010	0.0009	−0.0001
	t-statistic	0.1500	1.9010*	0.5910	2.1490*	0.7983	−0.7510	0.8196	−0.0396
	Median abnormal return	−0.0011	0.0011	0.0006	0.0016	−0.0005	0.0006	−0.0005	−0.0008
	Wilcoxon signed-rank *Z*-statistic	−0.2860	1.7010*	0.5430	1.9840*	−0.185	0.0980	−0.0950	−0.3300
	% positive abnormal returns	47.44%	54.17%	51.85%	52.78%	46.30%	52.32%	48.15%	47.22%
	Binomial sign test *Z*-statistic	−0.6820	1.1570	0.4760	0.7480	−1.0206	0.6124	−0.4763	−0.6152
Type (2) Insourced reshoring	*N*	36	36	36	36	36	36	36	36
	Mean abnormal returns	0.0007	−0.0056	−0.0032	−0.0079	0.0001	−0.0002	0.0026	0.0025
	t-statistic	0.2220	−2.3770**	−1.1170	−2.8400**	0.0431	−0.0359	0.6061	0.3184
	Median abnormal return	−0.0002	−0.0029	0.0004	−0.0073	−0.0009	0.0012	−0.0015	−0.0002
	Wilcoxon signed-rank *Z*-statistic	−0.0390	−1.9870*	0.8960	−2.7420**	−0.8330	0.5030	−0.3600	0.0000
	% positive abnormal returns	50.00%	38.89%	52.78%	33.33%	47.22%	52.78%	41.67%	50.00%
	Binomial sign test *Z*-statistic	0.0000	−1.1670	0.1670	−1.8330*	−0.1667	0.1667	−0.6761	0.0000
Type (4) OTO reshoring	*N*	29	29	29	29	29	29	29	29
	Mean abnormal returns	0.0034	0.0020	−0.0011	0.0009	0.0040	0.0075	−0.0165	−0.0090
	t-statistic	1.2750	1.1350	−0.6640	0.3840	0.5164	0.6965	−1.2599	−0.6141
	Median abnormal return	−0.0008	0.0006	−0.0031	−0.0025	−0.0012	−0.0021	−0.0016	−0.0057
	Wilcoxon signed-rank *Z*-statistic	−0.7890	1.1140	−1.1570	−0.4000	−0.3350	−0.3780	−1.1570	−1.2110
	% positive abnormal returns	48.28%	58.62%	37.93%	44.83%	41.38%	41.38%	44.83%	37.93%
	Binomial sign test *Z*-statistic	0.0000	0.7430	−1.1140	−0.3710	−0.74278	−0.7428	−0.3714	−1.1142

Notes: * $p < 0.05$; ** $p < 0.01$; Based on the Fama–French three-factor model.

To further corroborate our results, we randomly select firms without reshoring announcements from the same industry for placebo tests. The results are also presented in Table 10. The nonsignificant results of the placebo tests suggest that other factors, such as general economic conditions, are unlikely to drive the abnormal stock returns documented in our study.

Reshoring involves bringing previously offshore production activities back home, regardless of the governance mode of the earlier offshored activities overseas (insourced or outsourced) (Barbieri, Ciabuschi, Fratocchi, & Vignoli, 2018). Yet, investors react negatively when reshoring and insourcing are carried out simultaneously. Bals, Kirchoff, and Foerstl (2016b) suggest that a change from offshore-outsource to domestic-in-house (i.e., insourced reshoring) is "the most drastic two-dimensional movement" (p. 109). As supported by some recent case research, combining reshoring and insourcing decisions are more often associated with fluctuating costs, quality problems, and capacity constraints, suggesting that such reshoring initiatives are riskier and often require more time (e.g., multiple years) to complete (Barbieri, Dosi, & Vignoli, 2022). Rather than a one-shot shift from "buy" to "make," scholars suggest that the change of governance mode should evolve slowly alongside the strategic relocation (Barbieri et al., 2022; Chen et al., 2022).

Our research suggests no simple direct relationship between reshoring initiatives and market reactions, as shown in Table 6. Instead, one should consider various offshore risks (e.g., foreign currency risk, foreign IP risk) and inshore risks (e.g., reshoring type, business environment) to reveal the full effect of reshoring.

3.6. Implications

3.6.1. Implications for MNEs

Our empirical findings based on a sample of 281 reshoring announcements from 2009–2022 suggest that a different type of reshoring strategy can create a different market reaction. This

result indicates that investors believe a change of sourcing strategy from "buy" to "make" during reshoring (i.e., insourced reshoring) can be costly, even if the firms may receive tax and other financial incentives from federal and state governments. Additionally, we find that reshoring to Republican-led states reduces reshoring risk significantly. Investors may consider that Republican-led states provide more favorable business environments, including favorable tax policies and investment incentives, such as direct grants, subsidized training of employees, and cheap access to land (Wang & Heyes, 2022). Firms with offshore operations experience significant threats regarding IP loss. Reshoring helps protect patents, copyrights, industrial designs, trade secrets, and more (Srai & Ané, 2016). The lower the offshore country's IP protection score is, the more positively investors react to reshoring announcements.

As discussed above, the simultaneous decisions for reshoring and change in the make-or-buy governance mode from outsourcing to in-house can be risky, suggesting that MNEs might separate the two, or a slow, multiple steps for this process is recommended (see, e.g., (Bals et al., 2016). Business environment and government support are important for the success of reshoring. In particular, the negative interactive effect between insourced reshoring and Democrat-led states seems to indicate that insourced reshoring requires an exceedingly business-friendly environment, and a lack of government support might create extra hurdles for MNEs that consider insourced reshoring and integrating it into their current operations. All in all, the benefits of reshoring depend on several factors, including reshoring type, foreign currency fluctuation, reshoring location (the state), and IP protection in an offshore country. Therefore, depending on different factors, gradual reshoring and coexisting offshore and reshoring productions are alternative options and sourcing decisions managers can consider in the future (Hilletofth, Eriksson, Tate, & Kinkel, 2019; Joubioux & Vanpoucke, 2016; Radi, Lamantia, & Bischi, 2021; Tate & Bals, 2017).

3.6.2. Implications for Policymakers

Ellram et al. (2013) use exploratory factor analysis to identify potential reshoring risk factors. Their model also includes foreign currency volatility and government trade policies. Our results provide additional empirical evidence to support their suggestions. We show how the type of reshoring strategy (in-house reshoring vs. insourced reshoring) and reshoring location (Democratic- vs. Republican-led states) can create different market reactions. Our regression analysis suggests that federal and state governments play a prominent role in stimulating reshoring strategies. Firms should closely monitor state policies in their home country to choose a favorable location with the government's support for reshoring. Policymakers should offer appropriate incentives and policies to guide reshoring firms to take a less risky route to achieve the intended goal: creating jobs and sustaining success. For instance, to fill the workforce skills gap, the state government may plan a long-term training program with colleges and universities (Moser, 2018). These training programs could help the new generation acquire solid technical skills with more job opportunities and better wages. Offshore countries' policymakers could also increase tax incentives and exit costs and reduce currency volatility to encourage MNEs to remain overseas instead of reshoring. They could also develop policies to enhance currency stability and IP protection of foreign investors in their countries.

3.6.3. Limitations and Future Opportunities

We identify a few limitations of this study, which provide suggestions for future research. First, while we provide possible explanations for our research hypotheses, our study is not designed to provide causal identification of these arguments. We collect announcement data from the Reshoring Initiative and rely on this database to identify reshoring news. Although this platform provides a comprehensive database of U.S. reshoring news, some reshoring announcements might be missing. Future researchers can expand this to small and medium-

sized manufacturers and private companies as our study mainly focuses on publicly traded MNEs. This may enhance the generalizability of the findings. Furthermore, some factors, including country risks from foreign countries and the capability of the senior management team (e.g., CEO, board members with reshoring experience) to make reshoring decisions, have not been explored in this study. In future research, we may evaluate the economic factors of reshoring and their impacts on the social community's matrix (e.g., employment rate, living standard). These factors can be critical in reshoring implementation and providing valuable information for policymakers.

This study explores how different reshoring risks are potentially related to the positive (or negative) market reaction to reshoring announcements. Our findings provide insights for senior management to evaluate different reshoring options. When firms reshore from offshore countries with high foreign currency and IP risks, applying in-house reshoring strategies to a Republican-led state, they are likely to obtain better performance (measured in abnormal stock returns). Overall, our findings provide suggestions to both firms and policymakers. When MNEs reshore, they should not underestimate the impact of different reshoring strategies and reshore locations (i.e., the state) when making reshoring decisions. For policymakers, our regression analysis provides evidence that state governments play an essential role in facilitating reshoring. Republican-led states may provide more business-friendly policies and favorable regulatory environments, strengthening positive market reactions. This finding also suggests that offshore countries should maintain an attractive business environment and a stable currency and protect foreign investors' IP rights to entice firms to stay.

Chapter 4: Top Management Team's Influence on Reshoring Decision

4.1 Introduction

In the last chapter, we applied the short-term event study to investigate the reshoring performance with four moderating risk factors. The study provides insights to top management teams and governments. Although we provided evidence that external risk factors can affect reshoring and firm performance in the previous chapter, the influence of the internal factor, such as TMT, is not well discussed.

In this chapter, we continue the sample collected in chapter three to examine the TMT characteristics of U.S.-listed firms and the likelihood of reshoring. This study contributes to empirical findings of reshoring strategy in operations management literature. First, we provided empirical evidence of the relationships between TMT characteristics and reshoring initiatives. Second, TMT characteristics and background, such as nationality diversity, age diversity, average age, board independence, and team size, influence the likelihood of reshoring, providing insight into the firms. For example, to increase the reshoring likelihood, the firms can reduce the number of independent directors with younger board members and increase nationality diversity. In the study, we would like to know 1) whether the decision on reshoring is affected by the TMT composition? 2) Whether the composition of TMT hinder some firms' ability to respond to the supply chain risk by reshoring? We will elaborate on these questions in the next section.

4.2 Theoretical Background and Hypotheses

4.2.1 Reshoring and risk management

Offshore production started in the late 1960s and has become the most popular low-cost sourcing strategy for competitive advantage since the 1970s. (Platts & Song, 2010). Besides, offshore production can be closer to the key resources, including raw materials, knowledge,

and workforce. However, offshore production also leads to high transaction costs for suppliers' search, agency or intermediaries, and economic instability (Carmel & Nicholson, 2005). When the cost saved in offshore countries (mainly lower cost of labor and environmental protection) cannot compensate for the increasing cost of supply chain disruptions, it strongly incentivizes the TMT team to consider reshoring.

Since the last decade, the U.S. government has encouraged firms to reshore to reduce the trade deficit with increased manufacturing jobs. Reinvesting in the U.S. has become the slogan of both political parties (i.e., Democrats and Republicans). According to the Reshoring Initiative 2020 data report, the reshoring activities reached a record high, with over 1 million jobs returned. [43] The U.S. government imposed heavy tariffs and tax penalties on overseas production by providing the carrots and sticks while giving additional subsidies and tax incentives to firms that decided to reshore. For example, the U.S. government imposed a CHIP and Science Act in 2022 to encourage the semiconductor industry to reshore, with US52.7 billion (Kannan & Feldgoise, 2022). Therefore, some firms claim reshoring is a risk-averse decision for them. When the offshore countries' risk is higher than the home countries, the firms are more likely to consider reshoring. There are many offshore risks: currency fluctuation, political stability, environmental protection, intellectual theft, logistics disruptions, and general economic risks (e.g., Foerstl et al., 2016; Fratocchi et al., 2014; Gray et al., 2017; Sodhi & Tang, 2012; Tate, 2014). When the production plant is closer to the headquarters, reshoring can improve knowledge transfer and quality control problems (Grappi et al., 2015; Hartman, Ogden, Wirthlin, & Hazen, 2017; Moretto et al., 2020). Reshoring can shorten production lead time with flexible planning, allowing firms to respond more to uncertainties. TMT believes that reshoring is the risk management strategy, especially after the border lockdown during the

[43] https://reshorenow.org/blog/reshoring-initiative-2020-data-report/

COVID-19 period (Barbieri et al., 2020; Barbieri et al., 2018; Ciabuschi, Lindahl, Barbieri, & Fratocchi, 2019). Brandon-Jones et al. (2017) suggest that reshoring decisions positively impact short-term firm performance.

However, reshoring also involves implementation risks, including the reshoring approach and location choices discussed in the last chapter (Moretto et al., 2020). The incentive policies in some states might motivate firms to set up new factories instead of sourcing from another onshore supplier. Those reshoring incentives, such as free land usage and financial support of new equipment, will be provided by states, with a condition of job creation in a specific time frame. If the firms cannot select the reshoring approach or locations wisely, they cannot enjoy the incentives the states provide. Also, new risk in knowledge transfer because of insufficient skilled workers in the home country(Fjellström, Lui, & Caceres, 2017; Sayem, Feldmann, & Ortega-Mier, 2019). Thus, reshoring might become a risk-seeking decision with such complications, and traditional upper echelons theory cannot simply apply to explain the likelihood of reshoring decisions.

Furthermore, GE's CEO Jeff Immelt said reshoring is " as risky an investment as we have ever made" (Crooks, 2012). Reshoring can be costly and time-consuming and is no quick fix for the supply chain risk(Ashcroft, 2021). In comparison, the diversity of TMT cannot be defined as more risk-averse. It is conditional on how the TMT composition perceives the reshoring as a risk-averse or risk-seeking decision. TMT composition shall affect the risk perception of reshoring decision

4.2 Upper Echelons Theory

The upper echelons theory (Hambrick & Mason, 1984) explains how top management teams' demographic characteristics (Hambrick, 2007) affect the firms' strategies and firm performance

(Wang, Holmes Jr, Oh, & Zhu, 2016). TMT is responsible for formulating the firm's strategies. It usually consists of several top managers and a Chief executive officer (CEO) in the firms (Finkelstein, Cannella, & Hambrick, 2008). When the firms face uncertainty from the macro environment, including the political, environmental, and economic instability (for example, COVID-19, Brexit, the tariff imposed by the U.S. government, and the Ukraine war), the possibility of changing in sourcing strategies would become the crucial topic in the boardroom.

While TMT makes the group strategic decision, each individual's experiences, skills, and values construe the managerial decision using their personalized lenses. TMT's values and cognition affect strategic choice, while observable characteristics such as age, education, and gender can measure values and cognition for TMT. Thus, these characteristics associate with strategic decisions and finally affect organizational outcomes. (Carpenter, Geletkanycz, & Sanders, 2004).

Demographic characteristics in the upper echelon theory include gender, age, nationality, and education (Hambrick, 2007). These upper-echelon characteristics significantly affect TMT's interpretation of managerial discretion on different strategic choices, including product innovation and acquisition (Ren, Wang, Hu, & Yan, 2021; Wang et al., 2016). TMT characteristics could affect the firms' overall risk-taking level (Bromiley & Rau, 2016; Lin & Cheng, 2013). Some literature claims that team heterogeneity can be a double-edged sword for the firm (Lui, Lo, & Ngai, 2019). For example, Nielsen and Nielsen (2011) suggest team diversity might lengthen decision time due to argument and disagreement, while some studies propose that team diversity and characteristics can reduce the risk and improve firm performance (Baixauli-Soler, Belda-Ruiz, & Sanchez-Marin, 2015; Fernández-Mesa, Iborra, & Safón, 2013; Kumar & Paraskevas, 2018; Perryman, Fernando, & Tripathy, 2016). Perryman

et al. (2016) discovered that firms with greater TMT team gender diversity are less risky and reveal better firm performance. Age diversity is also positively related to firm performance in sales growth (Richard & Shelor, 2002). Thus, we believe that team diversity can influence TMT's attitude to supply chain risk management and as a theoretical foundation of this study.

4.3. Hypotheses

4.3.1 Nationality Diversity and Reshoring

TMT team with national cultural and value differences provides various insights when encountering problems (Watson, Kumar, & Michaelsen, 1993). In MNEs, TMT has to review its sourcing strategies across different geographical regions to leverage the firm's resources in multiple offices (Boone, Lokshin, Guenter, & Belderbos, 2019). While international experience is accumulated from prior experience, more nationality diversity with international background and experience in offshore production help to effectively assess foreign environments and gather information (Nielsen & Nielsen, 2011).

Knowledge of the foreign market, access the foreign environments, and extensive international networks help them effectively evaluate the current foreign market risk and decide whether reshoring is appropriate. TMT nationality diversity might highly correlate to firm internationalization strategies (Kaczmarek & Ruigrok, 2013; Nielsen, 2010; Pisani, Muller, & Bogăţan, 2018; Ruigrok, Georgakakis, & Greve, 2013).

As reshoring results from the internationalization strategy, TMT, with diversified cultural and international knowledge, can evaluate all aspects of uncertainties (Boone et al., 2019). Diverse TMTs are more likely to identify the potential risks by understanding the international business situation from their networks, providing a comprehensive picture to make complex decisions with less risk, and the global view for sourcing and international knowledge to prevent and forecast potential risks (e.g., change in government policies). For example, Tesla

changed their strategies to open the China Gigafactory after adding two independent directors (including Robyn M. Denholm from Australia, Financial Expert) in 2018 (Matsika, 2020). Similarly, when TMTs provide judgment of reshoring decisions, less diverse TMTs might prefer to maintain the existing sourcing strategy (Herrmann & Datta, 2006). In contrast, more diversity with better global knowledge can take a high risk. Nielsen and Nielsen (2011) suggest that TMTs with nationality diversity can construct and generate better international decision-making alternatives and reduce the risk through discussion. Greater nationality diversity TMTs will perceive reshoring strategy would be able to observe the benefits of reshoring with the consideration of all uncertainties (Boone et al., 2019; Herrmann & Datta, 2006). We hypothesize that:

Hypothesis 1. TMT nationality diversity has a positive effect on the likelihood of reshoring announcements.

4.3.2 TMT Age and Reshoring

TMT's age is a vital demographic characteristic that affects the strategy's decision (G. Wang et al., 2016). Average age and age diversity have been widely discussed in TMT-related literature (e.g., Auh & Menguc, 2005; Ferrero-Ferrero, Fernández-Izquierdo, & Muñoz-Torres, 2015; Kilduff, Angelmar, & Mehra, 2000; Richard & Shelor, 2002; Schneid, Isidor, Steinmetz, & Kabst, 2016; Simons, Pelled, & Smith, 1999). Age is a proxy of TMT's prior experience, knowledge, and cognitive ability accumulation. Previous research demonstrates the average TMT age significantly impacts sourcing decisions, e.g., international diversification (Tihanyi, Ellstrand, Daily, & Dalton, 2000) and firm performance (Tanikawa & Jung, 2016).

As stated, reshoring can be a risk-seeking or risk-averse decision for TMTs depending on the context. When the firms return their production to the home country, manufacturing-related risks, including quality and lead time, can be reduced with better control(Ciabuschi et

al., 2019; Hartman, Ogden, Wirthlin, et al., 2017; van Hoek & Dobrzykowski, 2021; Vanchan et al., 2018).

At the same time, implementing reshoring would bring risks to firms (Ciabuschi et al., 2019; Fjellström et al., 2017). The U.S. is always a high-cost country with premium labor costs (Ancarani & Di Mauro, 2018). Labor shortage, especially for highly skilled labor, is not new to manufacturing firms (Bentley, 2021). Unskilled labor and high labor costs are the reshoring firms' most significant concerns, and it is not a risk-free strategy (Ashton, 2021). Manufacturing industries considering reshoring create uncertainty, including internal operations and external influence (Williams, 2021). Thus, when the TMT reviews the reshoring strategies, senior directors will perceive reshoring as risk-seeking when they have good experiential knowledge during outsourcing and consider the implementation risks based on their experience. The extra investment, operational change, and political risk in the home country will be the high-risk decision for these senior directors. Also, the path dependency can guide TMT to follow their successful experience (Ciabuschi et al., 2019), especially when they have sound experience in offshore countries. Therefore, a higher average TMT age is less likely to make the reshoring decision than younger directors since reshoring is risky for them.

In addition, the reshoring process sometimes takes more than one term of presidency. For instance, Trump's corporate tax reductions in 2017 and tariffs in 2019 pushed the reshoring, while Biden partially released Trump’s tariffs in 2022 and proposed to increase the corporate tax again to 28% (Bonner, 2022; Lobosco, 2022). The short-term policy change in the environment and government incentives would be the potential risks for reshoring firms, as reshoring is a long-term decision. The senior directors have to secure their financial and career status and are unwilling to take reshoring risks (Ren & Zeng, 2022). In contrast, previous literature suggests younger TMT members are more likely to choose innovative

decisions and internationalization, which is risk-seeking in nature (Rivas, 2012). Thus, firms with a lower average TMT age will likely take risks with new sourcing strategies, while senior executives prefer a more risk-averse strategy with conservative decision-making and avoid risk compared to younger directors (Wiersema & Bantel, 1992).

Hypothesis 2a. Higher average TMT age negatively affects the likelihood of reshoring announcements.

Similar to nationality diversity, age diversity offers diverse viewpoints and knowledge based on the TMT's experience (Li, Chu, Lam, & Liao, 2011). Some research suggests an age-heterogeneous team is positively associated with profitability, especially in a challenging situation (Amason, Shrader, & Tompson, 2006; Li et al., 2011; Van der Walt, Ingley, Shergill, & Townsend, 2006). Based on the decision-making perspective, diversity provides information and experience to the team when they have to make complex decisions. Syakhroza, Diyanty, and Dewo (2021) propose that age diversity can bring a different point of view with rich information in the discussion and improve the firm performance. Rivas (2012) proposes TMT age diversity can provide advice and resources to the team to make the right decision and reduce the risk.

We hypothesize that:

Hypothesis 2b. TMT age diversity has a positive effect on the likelihood of reshoring announcements.

4.3.3 Board independence

Independent directors are the non-executive directors who do not involve in normal operations. According to Section 149 of the Companies Act 2013 in the U.S. [44], publicly listed firms need

[44] https://ca2013.com/149-company-to-have-board-of-directors/

to have one-third of independent directors. Over 83% of Standard and Poor's 500 firms have over 70% of independent directors in their TMT (Lightner & Francis, 2016). Independent directors have an essential growing role in TMT (Johanson & Østergren, 2010). Their main objective is to improve firms' strategic decision-making and risk management (Chen, Hsu, & Chang, 2016). Independent directors could provide extra resources, information, and monitoring for the executive directors (i.e., internal). The external experience, knowledge, and network tie from independent directors will facilitate the TMT to review a broader picture and make the reshoring decision (Kaymak and Bektas,2008). The independent directors can also ensure that the financial controls and risk management balance the interests between stakeholders and the management team. Independent directors bring in knowledge about the external environment, guiding the TMT to reduce the risk while achieving long-term goals. With the help of independent directors, the TMT can further enhance the firms' performance and competitiveness (Hillman & Dalziel, 2003). The research proposes that directors with market experience will increase the likelihood of entering a new market (Diestre, Rajagopalan, & Dutta, 2015).

A high percentage of independent directors improves the board monitoring and expands the experience and network tie for the TMT, to ensure the TMT is commencing a profitable project with risk management (Chen, 2013). The TMT will review the strategies and whether reshoring is the best option throughout the discussion. The independent directors might provide different angles and information for low-cost countries like Africa or Myanmar to replace reshoring to the U.S. while avoiding the risk in other regions with a trade war with the U.S.. More independent directors are more likely to access different market information and offer a broader range of decision criteria and strategic alternatives to the TMT (Kim, Burns, & Prescott, 2009). While independent directors have the sufficient technical knowledge to

identify opportunities and risks (Osma, 2008), they might consider reshoring as a risk-seeking action with their expertise and experience, while there are many less risky offshore alternatives. We hypothesize that:

Hypothesis 3: The greater board independence has a more negative effect on the likelihood of reshoring announcements.

4.3 Data Sources and Variables

4.3.1 Sample collection process

We collected the reshoring announcements from the U.S.-listed firms in Reshoring Initiative[45]. We only focused on the firms' headquartered that manufactured in the U.S. before offshore production. Our study only considers the firms with standard industrial classification (SIC) codes 2000- 3999. To ensure announcement accuracy for the date and reshore locations, we cross-checked each announcement using Google News and Factiva. Data were collected during the period 2000–2021 by contacting 176 announcement firm-years with 73 US-listed manufacturing firms.

For the 73 U.S. firms making 176 reshoring announcement firm-years in our sample, we collect financial data, historical stock prices, and market index data from S&P's COMPUSTAT and the Bloomberg databases. In addition, we collect the TMT data from BoardEx in the COMPUSTAT database, including directors' profiles, education background, age, gender, and network size. This dataset provides extensive data on the boards of the listed companies globally, with over 900,000 directors and senior management profiles. The financial data,

[45] https://www.reshorenow.org/

including our sample size's sales, ROA, and net income, are also collected in the Compustat database.

We apply the same fiscal year as observation cases for the control firms. As we only consider the manufacturing industry, we deliberate the firm's four-digit SIC code from 2000 to 3999. The control firms should also have offshore production to consider reshoring decisions. This process found 8,419 and 176 control and announcing firm-years, respectively. Afterward, we further match the detailed TMT information from Compustat Execucomp BoardEx. Availability of data on TMT characteristics (including profile and educational background) significantly reduced our sample to a final size of 8,424 records with 1,146 firms: 176 announcing company-year observations and 8,248 control company-years (Appendix A22). Table 10 provides descriptive statistics of the sample firms' financial performance and compares the descriptive statistics between observation and control samples in Appendix 25. We found a significantly different between control and observation firms if we review the descriptive statistics of both groups. The observation firms have larger total assets, number of employees, net income, sales, market value, ROA, and smaller leverage. It shows that the observed firms are stronger in financial status and size, which gives them more power to implement the reshoring.

Table 10. Descriptive Statistics for firms, including observation and control samples

	Mean	Median	Std. Deviation	Minimum	Maximum
Total Asset (USD, in millions)	5,730.43	462.11	23,248.92	0.00	362,597
Number of Employees in thousands)	8.80	1.10	23.60	0.00	297
Net Income(USD, in millions)	333.81	6.08	1,780.45	-22,440	44,880
Sales (USD, in millions)	4,373.88	381.02	18,108.04	-0.14	433,526
Market Value (USD, in millions)	7,443.10	728.36	28,403.16	0.01	677,443
ROA	-0.07	0.09	0.47	-8.14	1.94
Debt/Equity Ratio	4.82	0.71	324.41	-2,556.42	29,585.00

4.3.2 Empirical Data Analysis

4.3.2.1 Dependent Variables

We measure the likelihood of announcing a reshoring initiative. We measure this variable, *event*, as a dummy variable, which takes on the value of 1 if the firm has a reshoring announcement and 0 otherwise.

4.3.2.2 Independent Variables

The TMT predictors hypothesized to have a direct effect on the likelihood of reshoring announcements are nationality diversity (nationality_div), age diversity (Age_div), the average age of TMT (average_age), and board independence (board_structure). All four variables were obtained from Compustat Execucomp BoardEx.

Nationality diversity(*nationality_div*): We calculated **nationality diversity** in a top management team using a Blau index to measure group heterogeneity (Carpenter 2002; Finkelstein and Hambrick 1996). We applied the nationality mix [46] in BoardEx to calculate Blau's heterogeneity index(Wiersema & Bantel, 1993). Blau's heterogeneity index has been widely used in TMT diversity. The Blau index depicts the TMT members' distribution for their nationalities. The index is calculated as

$$1 - \sum_{Pi} 2$$

While P_i represents the group member in i nationality category, higher index scores mean more background diversity among TMT members(Naranjo-Gil, Hartmann, & Maas, 2008).

Age diversity(*age-div*) and average age(*average_age*): we estimated the **team's average age** by dividing the sum of team members' ages by the number of board members in the firms. For

[46] :Proportion of Directors from different countries at the Annual Report Date selected

age diversity, we calculate the coefficient of variation of age. The coefficient of variation is calculated for each firm and is defined as:

$$\sqrt{\left[\frac{\sum(x_i - \overline{x})^2}{n}\right]} \Big/ \bar{x}$$

The standard deviation is divided by the mean (Solanas 2012), where 'x' is the age of each board of directors member in the announcement year, and 'n' is the number of members on the board.

Board Independence *(board_structure)*: We calculate the proportion of TMT independent directors in BoardEx and Blau's heterogeneity index as nationality diversity.

4.3.2.3. Control Variables

We control other TMT characteristics with financial data despite the diversity of nationality, age, and board independence. We collect both financial and TMT data from Compustat.

CEO duality (*CEO_duality*): We control whether the CEO is also the chairperson of the TMT. CEO duality can provide advantages and disadvantages to the firm (Boyd, 1995; Ramdani & Witteloostuijn, 2010). CEO duality offers too much power to the CEO, which might weaken the power of TMT. However, it might be effective with quick decision-making. CEO duality is a dummy variable with a value of 1 if the CEO is also a chairperson in TMT and 0 otherwise.

Gender diversity*(gen_div):* We calculate gender diversity using Blau's heterogeneity index. More female team members will be more concerned about society, which would be favorable for reshoring. Gender diversity can provide more practical information shared with better decision-making.

Network diversity*(network_div):* We recognize the individual network size in the BoardEx database (Tasheva & Nielsen, 2020). The network size is the calculation of individuals' education and employment overlaps[47]. Then, we calculate the coefficient of variation of network size as network diversity for the team. The more diverse the network, the more information the team members can get from their network to decide. This network relationship is an invaluable asset for TMT that reduces the risk when deciding.

Education diversity(*Edu_div*): To calculate the education diversity, we first code the TMT education level based on 1=below bachelor's degree, 2= bachelor's degree, 3= Master, 4 = Ph.D. Afterward, we calculate Blau's heterogeneity index for education diversity. More diversity of educational backgrounds can provide more comprehensive discussions with different ideas. The diverse educational background represents rich and complex information regarding the person's values and cognitive preferences that can influence these values and priorities.

Board size(*board_size*): The board size is the "number of directors on board" in BoardEx. It includes all directors at the annual report date selected. Larger board size can enhance a firm's ability to connect with other firms and secure resources (Williams, Fadil, & Armstrong, 2005).

Firm size (total sales), Return on asset (ROA), and Debit/equity ratio (DE ratio) are the control factors since the firm size and firm performance change the likelihood of reshoring (Ancarani et al., 2015). Year dummies are controlled for temporal effects, and industry dummies are controlled for possible industry effects.

4.3.2.1 Probit regression

We apply probit regression to test the hypotheses in section 2.3 to evaluate binary outcomes with matched samples. The probit regression estimates the likelihood of reshoring news in a

[47] https://wrds-www.wharton.upenn.edu/login/?next=/documents/798/BoardEx_WRDS_Data_Dictionary_102020.pdf

given year relative to other firms with similar characteristics. The probit regression formula is as follows:

$$\text{Model 1 : } Event_{(i,t-1)} = \beta 0 + \beta 1 * CEO\_duality_{(i,t-1)} + \beta 2 * gen\_div_{(i,t-1)} + \beta 3 * network\_div_{(i,t-1)} + \beta 4 * edu\_div_{(i,t-1)} + \beta 5 * board\_size + \beta 6 * total\_sales_{(i,t-1)} + \beta 7 * ROA_{(i,t-1)} + \beta 8 * DE\ ratio_{(i,t-1)} + \beta 9 * year\ dummies_{(i,t-1)} + \beta 10 * industry\ dummies_{(i,t-1)} + \mu_{(i,t-1)}$$

$$\text{Full model : } Event_{(i,t-1)} = \beta 0 + \beta 1 * CEO\_duality_{(i,t-1)} + \beta 2 * gen\_div_{(i,t-1)} + \beta 3 * network\_div_{(i,t-1)} + \beta 4 * edu\_div_{(i,t-1)} + \beta 5 * board\_size + \beta 6 * total\_sales_{(i,t-1)} + \beta 7 * ROA_{(i,t-1)} + \beta 8 * DE\ ratio_{(i,t-1)} + \beta 9 * year\ dummies_{(i,t-1)} + \beta 10 * industry\ dummies_{(i,t-1)} + \beta 11 * nationality\_div_{(i,t-1)} + \beta 12 * age\_div_{(i,t-1)} + \beta 13 * average\_age_{(i,t-1)} + \beta 14 * board\_structure_{(i,t-1)} + \mu_{(i,t-1)}$$

$$\text{Interacting Effect Model : } Event_{(i,t-1)} = \beta 0 + \beta 1 * CEO\_duality_{(i,t-1)} + \beta 2 * gen\_div_{(i,t-1)} + \beta 3 * network\_div_{(i,t-1)} + \beta 4 * edu\_div_{(i,t-1)} + \beta 5 * board\_size + \beta 6 * total\_sales_{(i,t-1)} + \beta 7 * ROA_{(i,t-1)} + \beta 8 * DE\ ratio_{(i,t-1)} + \beta 9 * year\ dummies_{(i,t-1)} + \beta 10 * industry\ dummies_{(i,t-1)} + \beta 11 * nationality\_div_{(i,t-1)} + \beta 12 * age\_div_{(i,t-1)} + \beta 13 * average\_age_{(i,t-1)} + \beta 14 * board\_structure_{(i,t-1)} + \beta 15 * c.nationality\_div_{(i,t-1)} * c.age\_div_{(i,t-1)} + \beta 16 * c.nationality\_div_{(i,t-1)} * c.average\_age_{(i,t-1)} + \mu_{(i,t-1)}$$

when the dependent variable, $Event_{(i,t-1)}$ takes on the value of 1 if the manufacturing firm i have a reshoring announcement and 0 otherwise. Nationality_div, age_div, average_age, and board_structure represent the four predictors directly affecting the likelihood of reshoring announcements. Other control variables include firm-level control: total_sales, ROA, D/E ratio, and micro-level control: CEO-duality, gen_div, network_div, edu_div, and board_size. We use Stata 17 to perform probit regression. Since introducing interaction effects increases the risk of collinearity, we mean-center the TMT predictors (nationality diversity, average age,

and age diversity) in the interacting effect model. To minimize the risk of collinearity, which can bias our estimates, we examined each predictor's variance inflation factor (VIF). Most predictors (including dependent and control variables) are under 5. We also review the correlation coefficient to check for the multicollinearity issue. Table 11 shows the correlation tables for all predictor variables. The correlations between variables are used to identify the potential multicollinearity issue. The highest pairwise correlation coefficient is 0.482 from board structure and board size, and it is still within tolerance and lower than 0.8.

Table 11 Correlation table for all predictor variables

Correlations

		Mean	Std. Deviation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	event	0.018	0.131																					
2	CEOduality	0.041	0.199	-0.014																				
3	gen_div	0.203	0.160	.080**	-.052**																			
4	education_div	0.591	0.151	0.007	0.013	-.082**																		
5	network_div	0.938	0.409	-.073**	.043**	-.257**	.318**																	
6	board_size	8.119	2.161	.175**	-.126**	.380**	.053**	-.195**																
7	total_sales	4373.875	18108.040	.242**	-.040**	.167**	.038**	-.153**	.337**															
8	ROA	-0.007	0.507	.042**	-0.019	.104**	.059**	.052**	.232**	.098**														
9	DEratio	4.824	324.413	-0.001	-0.005	-0.011	0.002	0.001	-0.015	0.001	-0.013													
10	SIC20	0.043	0.202	-.024*	.037**	.093**	.092**	.062**	.124**	.069**	.069**	-0.004												
11	SIC21	0.001	0.024	-0.003	-0.005	0.005	-0.007	0.018	-0.010	-0.005	0.010	0.000	-0.005											
12	SIC22	0.007	0.086	.050**	.057**	-0.009	.096**	.068**	-0.009	-0.013	.033**	-0.001	-0.018	-0.002										
13	SIC23	0.015	0.122	.034**	.027*	.089**	.095**	.044**	.069**	-0.008	.046**	-0.001	-.026*	-0.003	-0.011									
14	SIC24	0.009	0.095	-0.013	-0.020	-0.004	.027*	.024*	-0.005	-0.014	.038**	-0.001	-0.020	-0.002	-0.008	-0.012								
15	SIC25	0.012	0.107	-0.006	-.022*	.070**	-0.006	0.012	.061**	-0.006	.041**	-0.002	-.023*	-0.003	-0.009	-0.013	-0.010							
16	SIC26	0.011	0.103	0.003	0.001	.044**	-0.007	-.024*	.121**	.031**	.044**	0.000	-.022*	-0.003	-0.009	-0.013	-0.010	-0.011						
17	SIC27	0.014	0.116	-0.001	-.025*	.041**	.026*	.035**	.056**	-0.016	.037**	-0.002	-.025*	-0.003	-0.010	-0.015	-0.011	-0.013	-0.012					
18	SIC28	0.303	0.460	-.065**	-0.017	0.013	-.089**	-.162**	-.111**	-.082**	-.323**	0.016	-.139**	-0.016	-.057**	-.081**	-.063**	-.071**	-.069**	-.078**				
19	SIC29	0.017	0.127	-0.003	-0.009	0.017	.022*	-0.009	.063**	.400**	.045**	-0.002	-.027*	-0.003	-0.011	-0.016	-0.012	-0.014	-0.014	-0.015	-.086**			
20	SIC30	0.016	0.125	0.004	-0.017	.061**	-0.008	-0.010	.069**	-0.011	.044**	-0.001	-.027*	-0.003	-0.011	-0.016	-0.012	-0.014	-0.013	-0.015	-.084**	-0.016		
21	SIC31	0.008	0.089	-0.002	.061**	.062**	.052**	.079**	.030**	-0.012	.037**	-0.001	-0.019	-0.002	-0.008	-0.011	-0.009	-0.010	-0.009	-0.011	-.059**	-0.012	-0.011	
22	SIC32	0.007	0.082	-0.011	-0.017	0.007	-0.011	-0.010	-0.014	-0.012	0.020	0.000	-0.017	-0.002	-0.007	-0.010	-0.008	-0.009	-0.009	-0.010	-.054**	-0.011	-0.010	-0.007
23	SIC33	0.024	0.152	.049**	.037**	0.010	.054**	0.011	0.017	-0.006	.047**	-0.002	-.033**	-0.004	-0.014	-0.019	-0.015	-0.017	-0.016	-0.018	-.103**	-0.020	-0.020	-0.014
24	SIC34	0.033	0.179	-0.005	-.029**	0.002	.023*	.099**	.057**	-.021*	.065**	-0.002	-.039**	-0.004	-0.016	-.023*	-0.018	-0.020	-0.019	-.022*	-.122**	-.024*	-.024*	-0.017
25	SIC35	0.102	0.302	-0.004	0.009	-.025*	-.023*	-.039**	0.013	0.000	.114**	0.000	-.071**	-0.008	-.029**	-.042**	-.032**	-.036**	-.035**	-.040**	-.222**	-.044**	-.043**	-.030**
26	SIC36	0.164	0.370	0.017	0.002	-.149**	.034**	.095**	-.097**	-.058**	.061**	-0.005	-.093**	-0.011	-.038**	-.055**	-.042**	-.048**	-.046**	-.052**	-.292**	-.057**	-.056**	-.039**

Table 11 Correlation table for all predictor variables (continue)

Correlations

		Mean	Std. Deviation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
27	SIC37	0.055	0.228	.123**	-.037**	-.037**	-0.008	-.026*	.111**	.124**	.068**	-0.003	-.031**	-0.006	-0.021	-.030**	-.023*	-.026*	-.025*	-.028**	-.159**	-.031**	-.031**	-.022*
28	SIC38	0.150	0.357	-.036**	0.003	0.003	-.073**	-0.001	-.091**	-.057**	-0.007	-0.006	-.089**	-0.010	-.036**	-.052**	-.040**	-.045**	-.044**	-.050**	-.277**	-.054**	-.053**	-.037**
29	SIC39	0.013	0.112	0.016	0.018	0.015	.027*	.041**	.029**	-0.018	.035**	-0.001	-.024*	-0.003	-0.010	-0.014	-0.011	-0.012	-0.012	-0.013	-.075**	-0.015	-0.014	-0.010
30	year_dummy2009	0.009	0.092	-0.012	0.006	-.049**	.054**	.069**	-0.017	-0.018	.027*	-0.001	0.018	-0.002	.021*	.030**	0.018	.025*	-0.010	.021*	-.042**	-0.012	-0.012	-0.008
31	year_dummy2010	0.072	0.258	-.024*	0.019	-.108**	.076**	.089**	.024*	0.002	.065**	-0.007	0.010	-0.007	0.007	0.014	-0.003	0.008	0.001	0.010	-.063**	-0.004	0.008	0.001
32	year_dummy2011	0.074	0.262	-0.014	0.010	-.099**	.055**	.074**	0.019	0.012	.057**	-0.003	0.006	-0.007	0.007	0.013	-0.004	0.003	0.001	0.009	-.061**	0.002	0.007	0.005
33	year_dummy2012	0.075	0.263	0.006	0.001	-.079**	.040**	.060**	.025*	0.018	.048**	-0.002	0.010	-0.007	0.006	0.008	-0.004	0.002	0.000	0.008	-.060**	0.012	0.006	0.010
34	year_dummy2013	0.079	0.269	0.007	-0.007	-.071**	.021*	.032**	0.019	0.016	.047**	-0.003	0.011	-0.007	0.005	0.003	-0.001	0.001	-0.001	0.014	-.043**	0.010	0.001	0.008
35	year_dummy2014	0.085	0.279	-0.006	-0.005	-.055**	0.016	0.013	0.003	0.009	.022*	0.000	0.002	-0.007	0.003	-0.007	0.002	0.002	-0.008	0.004	-0.009	0.006	0.002	0.001
36	year_dummy2015	0.090	0.287	-0.005	0.000	-.040**	0.006	-0.003	-0.002	-0.006	0.011	-0.004	0.004	-0.008	-0.004	-0.002	-0.004	0.000	0.002	0.001	0.003	0.004	-0.001	0.004
37	year_dummy2016	0.095	0.293	0.014	-0.003	-.025*	-0.014	-.021*	-0.013	-0.010	-.032**	-0.004	-0.007	0.009	0.000	-0.004	-0.002	-0.005	0.005	-0.001	0.013	0.002	0.000	-0.002
38	year_dummy2017	0.099	0.299	0.000	-0.005	0.004	-0.019	-.035**	-0.020	-0.006	-.030**	0.000	-0.003	0.008	-0.002	-0.006	0.001	-0.003	0.003	-0.006	.023*	-0.003	-0.002	-0.003
39	year_dummy2018	0.104	0.305	0.015	0.004	.051**	-.038**	-.050**	-0.016	-0.001	-.054**	.031**	-0.008	0.008	-0.003	-0.008	0.004	-0.005	0.001	-0.007	.037**	-0.005	-0.003	-0.005
40	year_dummy2019	0.110	0.313	.029**	-0.006	.147**	-.059**	-.061**	-0.017	-0.006	-.073**	-0.006	-0.008	0.007	-0.005	-0.004	0.002	-0.003	-0.001	-0.013	.053**	-0.008	-0.006	-0.006
41	year_dummy2020	0.109	0.311	-.024*	-0.007	.224**	-.071**	-.079**	-0.005	-0.016	-.034**	-0.004	-0.018	0.007	-0.017	-0.012	0.002	-0.006	0.000	-0.019	.085**	-0.007	-0.005	-0.006
42	nationality_div	0.121	0.196	.068**	-.027*	.097**	.029**	-.137**	.248**	.100**	0.000	0.018	0.002	-0.015	.033**	-.027*	-.043**	-.027*	.031**	-0.010	.123**	0.012	0.016	0.007
43	average_age	67.664	5.552	-.028*	0.011	-.213**	.183**	.288**	.057**	.029*	.197**	0.001	.031**	-0.017	.067**	.043**	-0.013	0.018	-0.021	.024*	-.207**	0.009	0.020	-0.004
44	Age_div	0.116	0.099	-0.016	-0.014	-.031**	0.021	.048**	-.033**	-.048**	-.030**	-0.004	0.014	.027*	-0.005	0.005	-0.008	-0.012	-0.007	-0.004	.027*	-0.013	-0.016	0.012
45	board_structure	0.366	0.104	-.108**	-.059**	-.294**	.092**	.242**	-.482**	-.267**	-.162**	0.000	0.002	.024*	0.009	-.044**	-0.006	0.005	-.076**	0.013	.040**	-.072**	-.032**	0.001

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 11 Correlation table for all predictor variables (continue)

Correlations

		Mean	Std. Deviation	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
23	SIC33	0.02	0.15	-0.01																			
24	SIC34	0.03	0.18	-0.02	-.029**																		
25	SIC35	0.10	0.30	-.028*	-.052**	-.062**																	
26	SIC36	0.16	0.37	-.036**	-.069**	-.082**	-.149**																
27	SIC37	0.06	0.23	-0.02	-.038**	-.045**	-.081**	-.107**															
28	SIC38	0.15	0.36	-.035**	-.065**	-.078**	-.141**	-.186**	-.101**														
29	SIC39	0.01	0.11	-0.01	-0.02	-0.02	-.038**	-.050**	-.027*	-.048**													
30	year_dummy2009	0.01	0.09	0.01	0.00	0.00	-0.01	.030**	-0.01	0.00	0.00												
31	year_dummy2010	0.07	0.26	0.00	0.01	0.01	0.02	0.02	0.01	0.01	0.01	-.026*											
32	year_dummy2011	0.07	0.26	0.00	0.01	0.01	0.02	0.02	0.01	0.01	0.01	-.026*	-.079**										
33	year_dummy2012	0.07	0.26	0.00	0.00	0.01	0.02	0.02	0.01	0.01	0.01	-.027*	-.079**	-.080**									
34	year_dummy2013	0.08	0.27	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	-.027*	-.081**	-.083**	-.083**								
35	year_dummy2014	0.08	0.28	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	-.028**	-.085**	-.086**	-.087**	-.089**							
36	year_dummy2015	0.09	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-.029**	-.088**	-.089**	-.090**	-.092**	-.096**						
37	year_dummy2016	0.09	0.29	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	-.030**	-.090**	-.091**	-.092**	-.095**	-.098**	-.102**					
38	year_dummy2017	0.10	0.30	0.01	0.00	0.00	0.00	-0.01	0.00	-0.01	0.00	-.031**	-.092**	-.094**	-.095**	-.097**	-.101**	-.105**	-.107**				
39	year_dummy2018	0.10	0.31	-0.01	0.00	0.00	-0.01	-0.01	-0.01	0.00	0.01	-.032**	-.095**	-.096**	-.097**	-.100**	-.104**	-.107**	-.110**	-.113**			
40	year_dummy2019	0.11	0.31	-0.01	-0.01	-0.01	-0.02	-0.02	-0.01	0.00	0.00	-.033**	-.098**	-.099**	-.100**	-.103**	-.107**	-.111**	-.114**	-.117**	-.120**		
41	year_dummy2020	0.11	0.31	-0.01	-0.01	-0.01	-0.02	-.030**	-0.01	-0.01	0.00	-.033**	-.097**	-.099**	-.099**	-.102**	-.106**	-.110**	-.113**	-.116**	-.119**	-.123**	
42	Nationality_div	0.12	0.20	-.037**	-0.02	-.040**	-.046**	-.026*	-.047**	-.025*	0.01	-.023*	-0.01	0.00	0.00	-0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.02
43	Average_age	67.66	5.55	-0.02	.039**	.098**	.051**	.055**	.047**	.032**	-.047**	.106**	.236**	.213**	.181**	.141**	.082**	.034**	-0.02	-.077**	-.148**	-.222**	-.284**
44	Age_div	0.12	0.10	0.00	-0.02	-0.01	-0.02	0.01	-.024*	0.00	0.02	-0.01	-0.02	-0.02	-0.02	-0.01	-0.01	-0.01	0.00	0.00	0.01	.050**	0.02
45	board_structure	0.37	0.10	0.00	-.062**	.022*	-.025*	.056**	-.072**	.035**	0.00	.030**	0.00	0.00	-0.02	-0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

4.4 Probit Regression Results

Table 12 shows the probit results for our models. The first hypothesis predicted a positive effect of TMT nationality diversity, and we found support for hypothesis 1 ($p<0.05$) in both the full model and model 3 with an interaction effect. Hypothesis 2, regarding TMT age diversity and average age on the likelihood of reshoring, was negatively supported for 2b ($p<0.01$), not supported in 2a. Hypothesis 3 also supports negatively significant ($p<0.1$) in the full model, and it is more significant with the interaction between board structure and board size ($p<0.01$). Furthermore, the network diversity becomes significant with interaction with nationality diversity ($p<0.1$). Finally, most control variables are statistically insignificant to the dependent variables. Only the board size and firm size with some year dummies had a significant positive effect, and network diversity had a significant negative effect. We will further discuss the next section. We further work on the logit regression (model 4) as the robustness test to ensure the robustness of our results. The results from the logit regression are very close to the original probit regression.

We also explore potential interaction effects among the variables with significant results. Specifically, we explore whether nationality diversity interacts with average age and age diversity. The results in Table 12 show a significant interactive effect between nationality diversity with average age and age diversity ($p > 0.01$). Although age diversity does not favor reshoring in model 2, it becomes significant to the reshoring likelihood. Also, the interaction of nationality diversity with average age is strong if we consider both factors together.

Table 12: Probit regression result

	variables	Model 1 (Control variables)	Model 2 full model	Model 3 Interaction effect	Model 4 Robust Logit regression	Model 2 VIF
1	CEO duality	-0.157(0.291)	-0.207(0.320)	-0.186(0.329)	-0.256(0.704)	1.07
2	gender diversity	0.694 (0.362)+	0.194(0.436)	0.109(0.441)	-0.024(1.023)	1.5
3	network diversity	-0.523(0.160)**	-0.373(0.193)+	-0.381(0.191)*	-1.160(0.464)*	1.38
4	education diversity	0.109 (0.329)	0.067(0.388)	-0.075(0.394)	-0.308 (0.851)	1.18
5	board size	0.196(0.022)**	0.203(0.029)**	0.208(0.030)**	0.475(0.066)**	1.79
6	Firm size (sales)	0.000(0.000)**	0.000(0.000)**	0.000(0.000)**	0.000(0.000)**	1.45
7	ROA	-0.050(0.106)	-0.007(0.147)	-0.029 (0.147)	0.211(0.579)	1.23
8	D/E ratio	-0.001(0.001)	-0.001(0.001)	-0.001(0.001)	-0.002(0.001)+	1
9	Year dummies			Included		
10	SIC dummies			Included		
11	Nationality diversity		0.512(0.238)*	-1143.185(439.192)**	-2400.313(941.762)*	1.12
12	Age diversity		-1.564(1.660)	-1.930(0.825)*	-4.045(1.796)*	1.04
13	Average age		-0.039 (0.014)**	-0.031(0.0143)*	-0.077 (0.034)*	1.68
14	Board structure		-1.229(0.556)*	-1.333(0.555)*	-2.335(1.276)+	1.48
15	Nationality diversity*age diversity			-16.924(6.500)**	-35.535(13.938)*	
16	Nationality diversity*average age			-0.179(0.051)**	-0.424(0.113)**	
	Constant	-3.689(604.456)	-0.469(700.971)	137.184(355.775)	289.543(2895.787)	
	number of observation	8,424	7,270	7,270	7,270	
	Log-likelihood	-566.759	-423.978	-416.097	-412.339	
	Pseudo R2	0.328	0.337	0.35	0.356	

Remarks: +p < 0.10; * p < 0.05; ** p < 0.01

** SIC. 21, 24, 32 Omitted

4.4 Discussion and implication

4.4.1 Theoretical contribution

Previous research suggests external factors, including currencies, political instability, intellectual property, and quality risks, affect the reshoring decision. This study provides another view of internal factors that change the likelihood of reshoring. Especially in recent years, MNCs have revisited their sourcing strategies to meet the challenges of a globalizing, dynamic world. While TMT is essential in sourcing decision-making, TMT characteristics and reshoring decisions have received limited attention. Thus, we would like to make progress in this direction. This study integrates the upper echelons theory to explain the effect of TMT characteristics and the likelihood of reshoring. As reshoring receives much attention from supply chain management (Tate, 2014), firms need to understand the rationale behind the decision-making process.

Prior research suggests that a sourcing strategy like internationalization is affected by TMT characteristics like age and tenure (Mohr & Batsakis, 2019; Rivas, 2012). Despite age and nationality diversity, we further suggest that board independence, network size, and board size also affect the reshoring strategy. These characteristics are not widely discussed in the sourcing-related topic. Therefore, we provide new insight and expand different upper-echelon theory characteristics with sourcing-related topics.

5.2 Practical implications

This study delivers the following contributions to the operation management literature. First, our findings prove that TMT influences the sourcing strategy through decisions. Due to the complexity of analyzing the sourcing strategy, especially in the challenging market situation. TMT must carefully consider all the consequences and possible outcomes of the

decision. We indicate that TMT composition plays a vital role in reshoring decisions with upper echelons theory, which is not yet discovered in the research area. The TMT team diversity, especially in MNEs, is commonly found. Our study extends our understanding of the influence of specific demographic traits on the reshoring decision.

Generally, the study indicates that firms with high nationality diversity and a lower-than-average TMT age are more engaged in reshore their production to the US. The findings are consistent with previous upper echelons research on risk aversion in sourcing decisions (Kaczmarek & Ruigrok, 2013; Lin & Cheng, 2013; Nielsen, 2010; Rivas, 2012; Tihanyi et al., 2000). Our study's age diversity is insignificant, so we investigated the average age. We found a significant negative result to test whether senior directors influence the reshoring likelihood. Therefore, we can conclude that the younger directors are more likely to reshore the production. Prior research (Tihanyi et al., 2000; Wiersema & Bantel, 1992) suggests that strategic change (e.g., international diversification) is positively associated with younger directors. Our finding, aligned with the prior research, suggests that senior directors may be less willing to adapt to changes as risk-seeking action might harm their security and jobs (Wiersema & Bantel, 1992). Adopting a reshoring strategy might mean failure for the senior directors as they might apply offshore strategies over the years. Since senior directors fear failure when taking risks, the likelihood of reshoring for senior directors is lesser than for younger directors. It is also why age diversity is insignificant, as it depends on the proportion of senior and young directors. Simultaneously, Tihanyi et al. (2000) found young directors might be more likely to internationalize since riskier potentially brings more rewards.

The board's independence and network diversity are negatively significant, suggesting that although diversity can provide different knowledge and information to the team during decision-making, team diversity would reduce the likelihood of reshoring. The possible reason is during the discussion in the meeting, TMT has sufficient information to analyze the

global situation and conclude that reshoring is not the only solution to reduce the sourcing risk (Abbasi, 2016; C. Joubioux & E. Vanpoucke, 2016; Tate & Bals, 2017). Therefore, it will reduce the reshoring likelihood. Some research also suggests that right-shoring (Hilletofth, Eriksson, Tate, & Kinkel, 2019) might be one of the possible solutions to replace offshore sourcing. More information they receive from their network and team members can review and calculate the total cost of ownership (Hartman, Ogden, Wirthlin, et al., 2017) to make the decision.

The board size and firm size are positively affecting the likelihood of reshoring. As more giant boards and firm sizes provide more information and connect with external firms(Hui, 2020), they can get more knowledge regarding the global situation, even the reshoring feedback from other firms to consider when they decide. With a larger network size and board size, the team quickly accesses the information, especially the industry and global information, for making the reshoring decision.

The interacting effect provides another insight for TMT, the nationality diversity with average age and age diversity suggests that managers should consider both nationality and age diversities together when reviewing the TMT since the age diversity becomes significant when interacting with nationality diversity.

Our empirical findings can guide the partitioners in assessing the TMT to corporate reshoring. For example, our results show that younger, less independent directors' teams with nationality diversity and larger team sizes are most likely to reshore. Generally, our study proves the relationship between TMT characteristics and reshoring. Therefore, the firms that would like to reshore can review their TMT internal characteristics, such as average age, nationality diversity, number of independent directors, and TMT size.

4.6 Limitations and future directions

The main objective of this study is to answer whether reshoring decisions are affected by the TMT composition. Our study is the first to prove the relationship between the likelihood of reshoring and TMT characteristics. We use the panel data to review the reshoring likelihood with the TMT composition. The probit regression results show that the diversity of TMT nationality with younger and less independent directors can influence the likelihood of reshoring. However, TMT age diversity does not directly impact reshoring announcements. The study has several implications and future directions. First, this research provides a deeper understanding of the benefits of TMT for reshoring. The research is helpful for regulators to input policies related to directors to encourage them to reshore. We focus on the likelihood of reshoring with the TMT characteristics as a starting point. Future research can further examine the reshoring of firm performance or firm risk with TMT characteristics. Also, we can further extend TMT characteristics such as tenure, compensation, and political behavior with the firm performance.

Furthermore, some countries and industries, for example, the United Kingdom in Europe and Korea in Asia, are putting much effort (including government incentives) into reshoring. We can further investigate and compare the TMT characteristics in different regions since different regions might have different cultures, leading to different characteristics. Also, additional research on different industry settings can further analyze TMT heterogeneity and reshoring decision.

Chapter 5 Conclusion

This thesis was motivated by the supply chain disruption in recent years. First, with the citation network and main path analysis review of the relevant literature in the last two decades, I have identified five main research domains: "**reshoring motivation**," "**offshore and reshore evaluation,"** and "**knowledge transfer**", "**consumers perspective,"** and **"Post-COVID-19 era"** from 162 articles focusing on reshoring strategy. The main path analysis provides the backbone for each domain, which helps me identify each domain's future trend of reshoring research. While the external factors that affect reshoring have been well investigated, this thesis focuses on two theoretical perspectives 1) how risk factors affect the reshoring and the market reaction; 2) TMT characteristics in reshoring decision-making. These two avenues are unexplored in OM literature.

To answer question 1, I applied the short-term event study in Chapter 3. This empirical study examined the impact of reshoring announcements on a firm's stock return in the US market. Our results show that the market reacts negatively to reshoring announcements that applied insourced reshoring strategies and reshored to Democratic-led states.

On the other hand, the market reaction is favorable to the firms that are reshored from high foreign currency and IP risk, which aligns with the previous findings. We also explore the potential interaction effect for our moderating risk factors. Our results indicate the significant negative effect of the insourced reshoring and Democratic-led states. If the firms select the insourced reshoring and return to Democratic-led states, it might create additional obstacles. These results provide new insights to operations managers and governments. For example, the Democratic-led states can review their government incentives for reshoring firms.

Further support from the government can motivate more firms to reshore. Also, managers can review the currency and IP risk they face offshore. Then, when they return home, they can choose in-house reshoring instead of insourced reshoring to reduce the risk.

To answer research question 2, I reviewed the TMT characteristics with the existing reshoring firms collected from the Reshoring initiative dataset in Chapter 3. The study examined the internal factors influencing the reshoring decision. I use the probit regression to review the TMT characteristics and determine the difference between the reshoring and control firms. Our results show that the high nationality diversity provides more information, experience, and knowledge to make the reshoring decision. At the same time, young directors are more likely to engage in reshoring than senior directors. The small number of independent directors prefer to reshore as they do not have the whole picture of the global sourcing situation. Reshoring may not be their priority when the directors receive more information and experience for the sourcing locations. Our results also indicate that nationality diversity interacts with age diversity and average age. The higher nationality diversity and younger age and less age diversity can further enhance the likelihood of reshoring. This study provides insight into the top management, especially potential reshoring firms.

Reshoring is a trending topic in the OM field, especially after some events like Brexit and COVID-19. Firms in developed economies are revisiting their existing sourcing strategies with the goal to mitigate overall risks in operations. The supply chain disruption and the intervention of government policies are discouraging offshore strategies. Some firms believe moving back to their home countries not only reduce risk but also solving quality and lead time issues. However, some research proposes that the reshoring strategy is not the only solution for firms. Near-shoring or right-reshoring would be a better alternatives for them. When the business environment becomes more complicated, how-to reshoring wisely will be the future topic for firms and researchers to study. We can further investigate reshoring with different

topics. For example, can reshoring improve the products' lead time and quality? How long will the reshored operations survive? What is the difference between reshoring in the US, Japan, China, and Europe? We can provide more insights and answers for the managers to consider reshoring strategy through further research. Also, for some industries, like the fashion industry, are labor-intensive industries. Prior research (Ancarani & Di Mauro, 2018) claims these labor-intensive industries might not be suitable for reshoring without the help of new technologies. According to the U.S. Census Bureau, U.S. firms import less from China by sourcing or producing in other developing countries, such as Myanmar, Vietnam, and Bangladesh instead of coming home (Weijia, 2021). With the help of these future researches, firms could formulate better sourcing decisions contingent to their specific operational and environmental contexts, while government policy makers can develop proper trade policy to minimize risks while promoting economic growth.

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Appendix

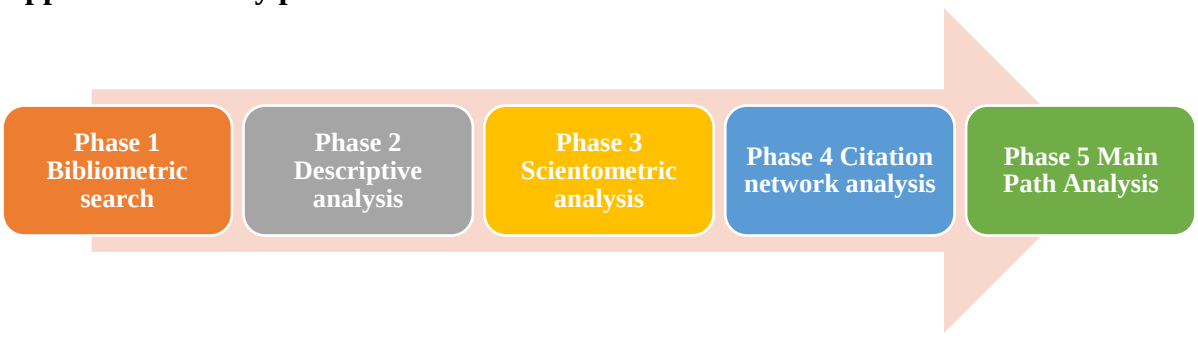
Appendix A1 Keywords search in Web of Science.

TS=(reshoring Or reshore Or reshored Or re-shore or reshoring Or re-shored Or in-shore Or in-shoring or in-shored Or inshoring Or inshore Or inshored Or backshoring Or backshore or backshored or back-shore Or back-shoring Or back-shored or homeshoring Or home-shoring Or home shoring Or homeshore Or home-shore Or homeshoring Or Back-reshoring Or Back-reshore Or back-reshored Or Backsourcing or back-sourcing or back-sourced or backsourcing or backsource or backsourced or onshored or onshore or onshoring or onshore Or onshored Or onshoring Or "reverse sourcing" Or "manufacturing relocation" or re-localisation or Relocalisation or "Production repatriation" or "Production relocation" or "manufacturing repatriation" or "reversed outsourcing" or "reverse outsourcing" or "reverse offshoring" or "opposite offshoring" or "return production" or "return domestic product manufacturing" or "return manufacturing" or "return home country" or "return offshore" or "relocate production back" or "come home" or "move back" or "move back manufacturing" Or "move back production" Or "return operation" Or "move back operation" Or "relocate operation" Or "reverse offshore" Or "operation relocation" Or "operation repatriation" Or "reverse outsource" Or "operation repatriation" Or "Domestic production" Or back-reshoring Or "plant relocation" Or "re-insourcing")

Appendix A2 Keywords search process.

Step 1 Initial search	**Step 2 Filter the search**	**Step 3 scanning articles**	**Final sample Size**
Search the specific keywords in advanced search Timespan: 2006-2023 Indexes: SCI-EXPANDED, SSCI, A&HCI **Total: 21,666**	Refined by: WEB OF SCIENCE CATEGORIES: (BUSINESS OR ECONOMICS OR MANAGEMENT OR OPERATIONS RESEARCH MANAGEMENT SCIENCE) **Total : 1,090**	Select only **Quartile 1** journal list under Scimago Journal & Country Rank (SJR) **Total:216**	Reviewing abstracts **Total: 162**

Appendix A3 Study process flow



Appendix A4 : Top 15 most cited reshoring articles from 2006 to 2023.

Author	Article Title	Source Title	Total Citation	Publication Year	Cluster
Merino, 2021	Back-shoring vs near-shoring: a comparative exploratory study in the footwear industry	OPERATIONS MANAGEMENT RESEARCH	186	2021	2
Di Mauro, 2018	Offshoring and backshoring: A multiple case study analysis	JOURNAL OF PURCHASING AND SUPPLY MANAGEMENT	180	2018	1
Pegoraro, 2022	Regional factors enabling manufacturing reshoring strategies: A case study perspective	JOURNAL OF INTERNATIONAL BUSINESS POLICY	136	2022	1
Wan, 2019	Reshoring: Does home country matter?	JOURNAL OF PURCHASING AND SUPPLY MANAGEMENT	134	2019	1
Dey, 2022	Brexit or Brand it? The Effects of Attitude Towards Brexit and Reshored Brands on Consumer Purchase Intention	BRITISH JOURNAL OF MANAGEMENT	134	2022	3
Ancarani, 2015	Prior to reshoring: A duration analysis of foreign manufacturing ventures	INTERNATIONAL JOURNAL OF PRODUCTION ECONOMICS	130	2015	1
Ancarani, 2019	Backshoring strategy and the adoption of Industry 4.0: Evidence from Europe	JOURNAL OF WORLD BUSINESS	124	2019	1
Kafouros, 2022	Cycles of de-internationalization and re-internationalization: Towards an integrative framework	JOURNAL OF WORLD BUSINESS	122	2022	2
Gyarmathy, 2020	Theoretical Framework for a Local, Agile Supply Chain to Create Innovative Product Closer to End-user: Onshore-Offshore Debate	OPERATIONS AND SUPPLY CHAIN MANAGEMENT-AN INTERNATIONAL JOURNAL	119	2020	3
Hilletofth, 2019	Three novel fuzzy logic concepts applied to reshoring decision-making	EXPERT SYSTEMS WITH APPLICATIONS	116	2019	1
Wan, 2019	Entry modes in reshoring strategies: An empirical analysis	JOURNAL OF PURCHASING AND SUPPLY MANAGEMENT	115	2019	1
Barbieri, 2022	How does Industry 4.0 affect international exposure? The interplay between firm innovation and home-country policies in post-offshoring relocation decisions	INTERNATIONAL BUSINESS REVIEW	115	2022	1
Mazzola, 2019	The curvilinear effect of manufacturing outsourcing and captive-offshoring on firms' innovation: The role of temporal endurance	INTERNATIONAL JOURNAL OF PRODUCTION ECONOMICS	110	2019	2
Theyel, 2021	Manufacturing location decisions and organizational agility	MULTINATIONAL BUSINESS REVIEW	110	2021	1
McIvor, 2021	A multi-theory framework for understanding the reshoring decision	INTERNATIONAL BUSINESS REVIEW	109	2021	1

Appendix A5 The journal list and total citation score for reshoring articles (Based on the number of times cited)

Publication Titles	Number of articles	Times Cited
Operations Management Research	16	1182
Journal of Purchasing and Supply Management	16	1097
International Journal of Production Economics	10	745
British Journal of Management	6	603
Journal of World Business	5	490
International Journal of Production Research	6	479
Journal of Manufacturing Technology Management	7	463
International Business Review	4	383
International Journal of Physical Distribution Logistics Management	5	371
Cambridge Journal of Regions Economy and Society	4	298
Journal of Business Research	4	236
Production Planning Control	3	230
International Journal of Operations Production Management	3	228
Journal of Operations Management	3	222
Journal of International Business Policy	2	213
Regional Studies	2	204
Journal of Management Information Systems	2	202
Operations and Supply Chain Management An International Journal	2	169
BRQ Business Research Quarterly	2	156
Management International Review	2	140
European Journal of Operational Research	2	125
Expert Systems with Applications	1	116
OMEGA International Journal of Management Science	2	116
Multinational Business Review	1	110
M SOM Manufacturing Service Operations Management	3	109
Journal of Industrial and Business Economics	2	108
Structural Change and Economics Dynamics	1	107
Decision Sciences	2	106
European Management Journal	2	102
California Management Review	2	97
Production and Operations Management	2	88
Industrial Marketing Management	1	85
Journal of Organizational Behavior	1	82
Journal of Supply Chain Management	2	81
Management Science	2	80
Journal of Cultural Economy	1	78
Business Horizons	4	77
Journal of Business Industrial Marketing	1	77
Economics of Innovation and New Technology	1	76
Journal of Fashion Marketing and Management	2	76
Journal of Management Studies	1	74
International Journal of Logistics Research and Applications	1	71
Journal of Cleaner Production	1	71

Publication Titles	Record Count	Times Cited
European Business Review	1	67
TQM Journal	1	67
Journal of The Academy of Marketing Science	1	65
Public Management Review	1	65
Personnel Review	1	64
Competition Change	1	60
Cambridge Journal of Economics	1	58
JCMS Journal of Common Market Studies	1	58
International Journal of Logistics Management	1	56
American Economic Review	1	48
Journal of International Economics	1	48
Journal of Information Technology	1	47
European Economic Review	1	46
Economic Modelling	1	41
Journal of Asia Business Studies	1	39
Service Business	1	29
Supply Chain Management An International Journal	1	26
IMF Economic Review	1	23
Information Management	1	13
MIT Sloan Management Review	1	7

Appendix A6 The distribution of empirical articles by industries researched

Top 3 Industries	Numbers of articles
Multiple industries[48]	75
Textile and apparel industry	8
Automobile	4

Appendix A7: The distribution of empirical articles by countries researched

Countries	Numbers of articles
Developed countries	76
Multiple countries	23
Developing countries	1

Appendix A8 Top 20 strong co-authorship linked publication-productive authors (High total link strength)

Author	Documents	Citations	Total link strength	Citation per publication
Fratocchi, Luciano	13	700	48	53.84615
Di mauro, Carmela	9	608	30	67.55556
Barbieri, Paolo	7	425	28	60.71429
Ancarani, Alessandro	7	328	23	46.85714

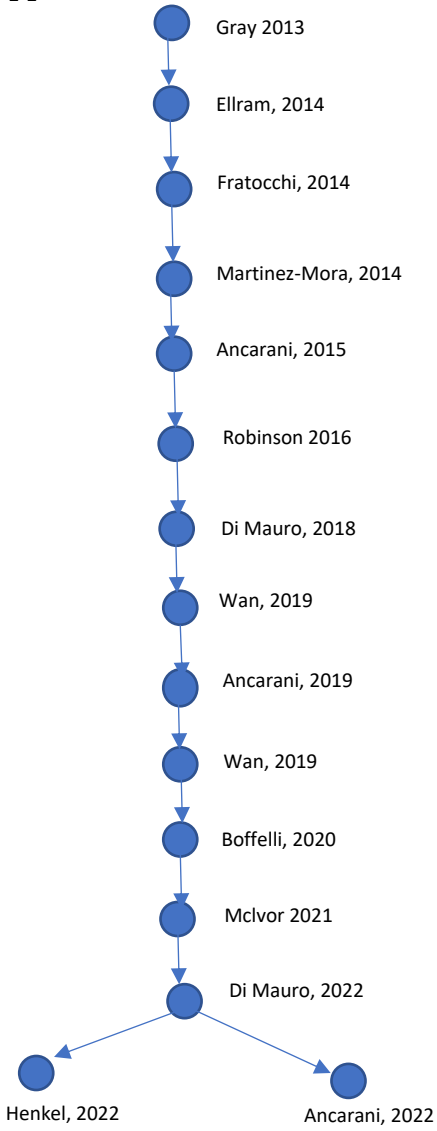
[48] Multiple industries mean more than one industry discussed in the articles. For example, the database includes the fashion, electronics, automobile, and food industries. It is commonly found in empirical studies.

Author	Documents	Citations	Total link strength	Citation per publication
Sartor, Marco	5	352	21	70.4
Boffelli, Albachiara	6	136	19	22.66667
Nassimbeni, Guido	4	344	18	86
Elia, Stefano	5	146	18	29.2
Orzes, Guido	5	253	17	50.6
Kalchschmidt, Matteo	4	88	15	22
Hilletofth, Per	5	46	15	9.2
Zanoni, Andrea	2	305	11	152.5
Heikkila, Jussi	4	247	11	61.75
Olhager, Jan	5	206	11	41.2
Stentoft, Jan	4	181	11	45.25
Kinkel, Steffen	6	595	9	99.16667
Tate, Wendy l.	5	545	9	109
Vignoli, Matteo	2	129	9	64.5
Huchzermeier, Arnd	2	47	9	23.5
Gray, John v.	3	282	8	94

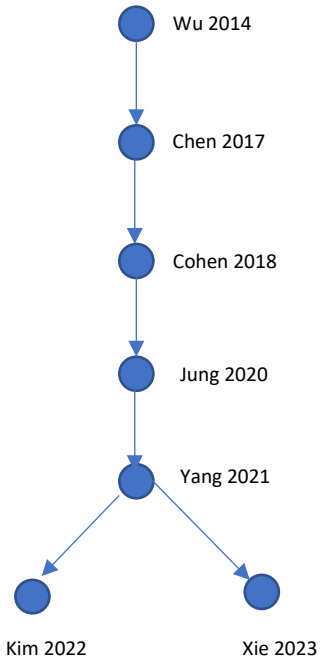
Appendix A9 Top 15 countries of authors in terms of total publications

Country	Documents	Citations	Total link strength
US	59	2074	37
Italy	38	1090	24
Germany	22	1039	23
UK	36	731	29
Denmark	10	471	9
Sweden	20	426	19
Finland	7	282	9
China	11	251	9
Spain	13	217	3
Austria	5	199	8
Australia	6	120	4
France	7	91	11
Netherlands	5	52	3

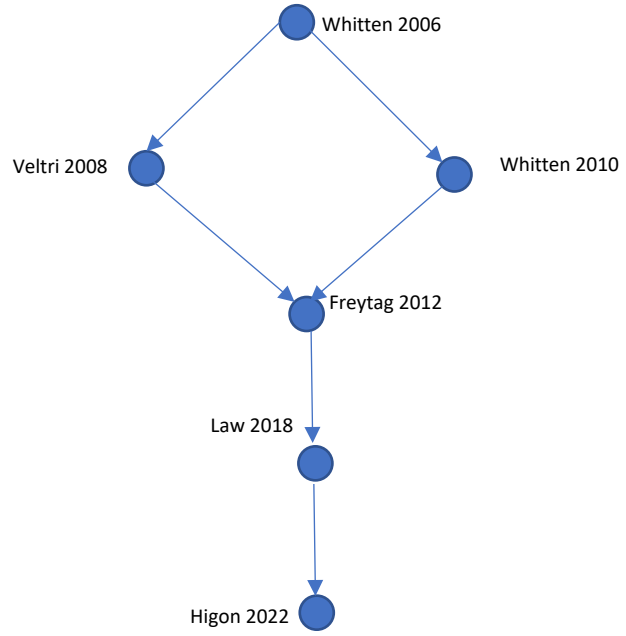
Appendix A10 Cluster 1 Reshoring Motivation reshoring Main Path



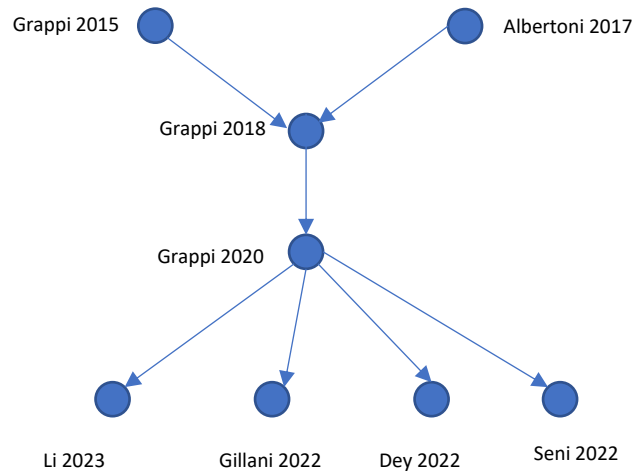
Appendix A11 Cluster 2 Offshore and reshore evaluation Main Path



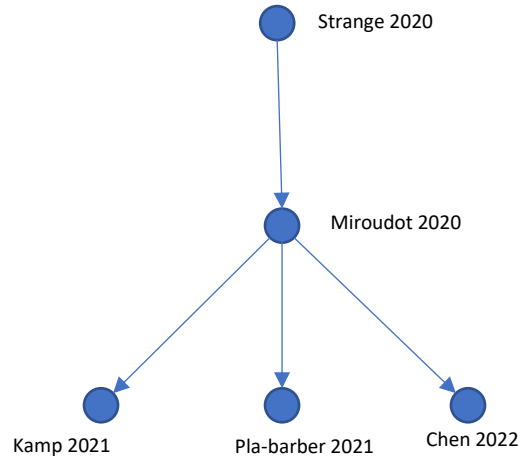
Appendix A12 Cluster 3 Knowledge Transfer Main Path



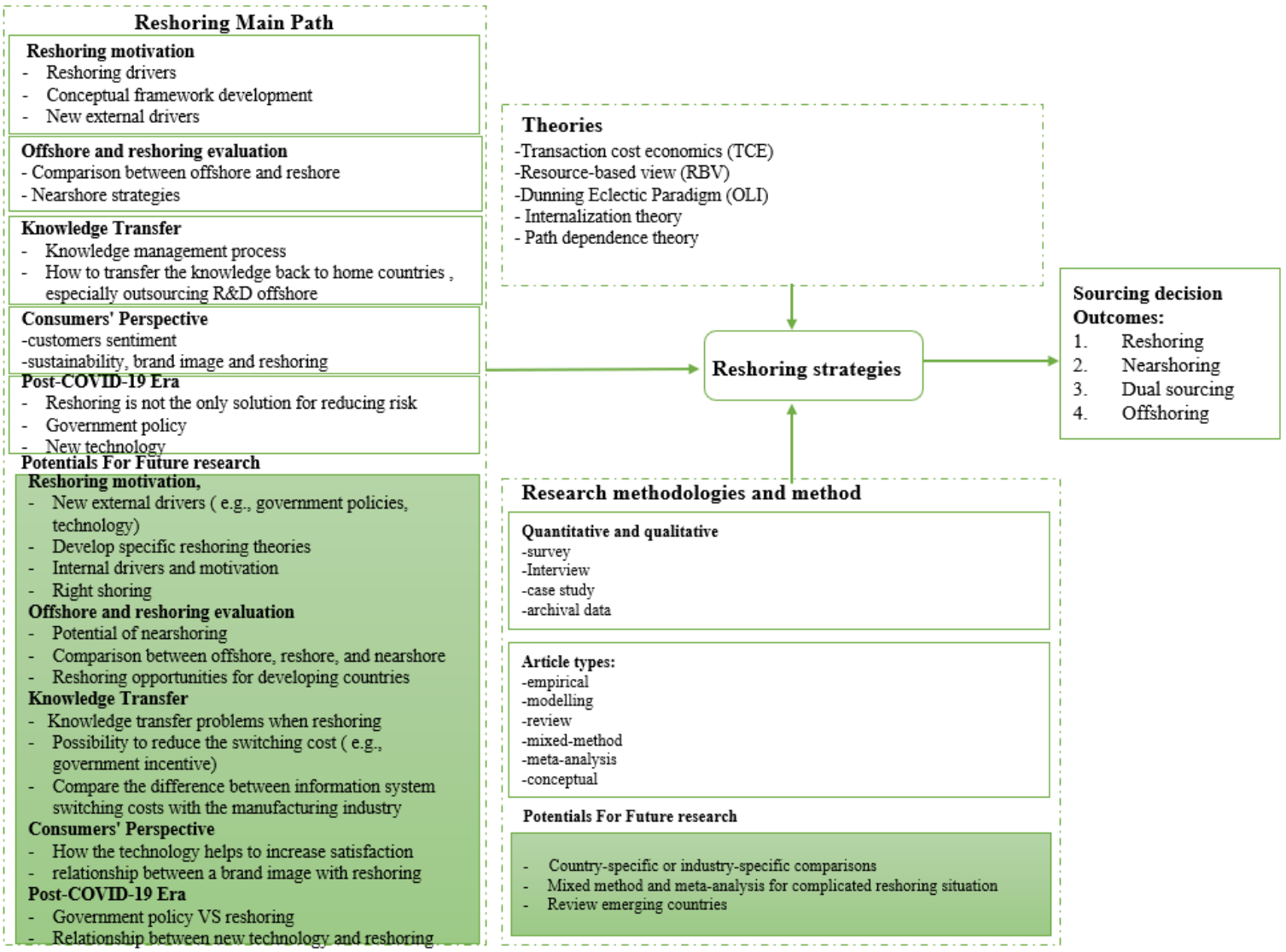
Appendix A13 Cluster 4 Consumers' Perspective Main Path



Appendix A14 Cluster 5 Post COVID-19 Era Main Path



Appendix A15a Summary of the study

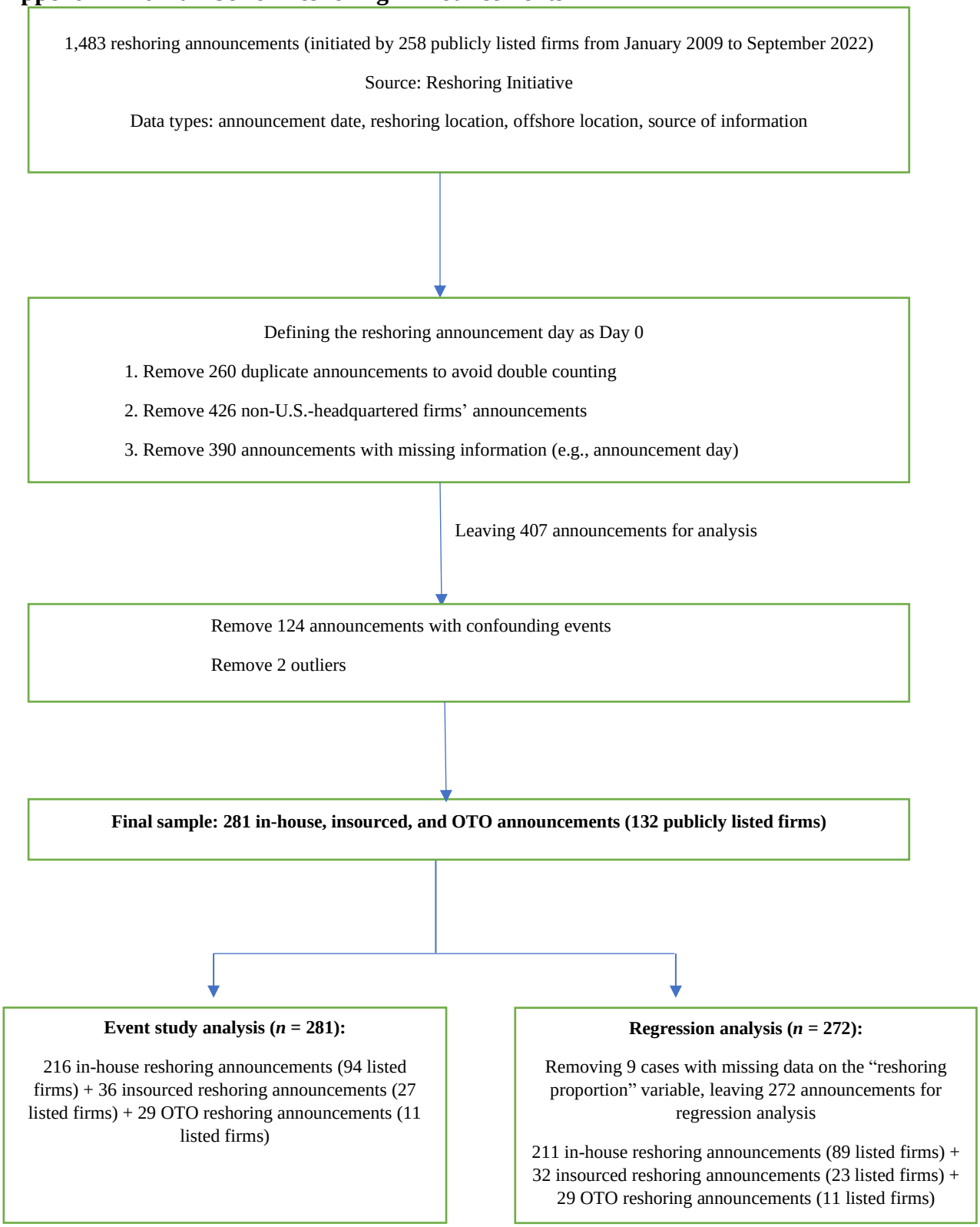


Appendix A15b Future trend summary for each domain

Domain	Key future direction
Domain 1: Reshoring motivation	- Internal factors like organizational culture or TMT preference need to focus on as they are the key players - TMT's working experience, management capabilities, political consideration and background would be the moderating factors. - Improve the existing theories and framework as the existing sourcing theories cannot provide a comprehensive explanation for reshoring - Comparison between different countries and industries (Reshoring drivers between the U.S. and Europe) - In-depth investigation of prominent sourcing topics such as quality, flexibility, lead time, and reshoring performance. - Some questions regarding the reshoring performance: 1. Is the reshoring improving the firms' quality and lead time?

	2. Is the firm performance improved because of better quality after reshoring? 3. Is reshoring the right sourcing direction? Or can right-shoring perform better? - Some questions related to government policy: 1. Are government incentives motivate the reshoring movement? 2. What kind of incentives can the government offer to the reshored firms? 3. Can the improved infrastructure and skilled labor attract firms?
Domain 2: Offshore and reshore evaluation	- It is an essential and uptrend domain. - Comparison between near-shore and reshore would be the new trend for the researchers to study. - Different comparisons between offshore, reshore, nearshore and right-sourcing - Developing countries like China might also be future research as the government invites firms to return home. - Will Chinese manufacturers reshore their production from Cambodia and Vietnam?
Domain 3: Knowledge transfer Main Path	- Reshored firms might need to face knowledge transfer problems between firms - Topics such as transferring tacit and implicit knowledge and building trust and motivation to the outsourced firms during the knowledge transfer can further develop. - What are the reshoring drivers and performance when firms reshore service-related jobs such as call centers? - Can government incentives motivate service-related jobs?
Domain 4: Consumers' Perspective Main Path	- Besides sustainability, brand image to consumers can also be discussed. - The researchers are focusing on the UK. Other countries, such as Germany and the US can further investigate. - Can the government promote ethnonationalism to increase the customers' attributions to reshoring and brands?
Domain 5: Post-COVID-19 Era Main Path	- Is reshoring the only solution for managing risk management? - Mathematical modeling can be developed for different scenarios and calculate the equilibrium point and suitable sourcing strategies for different firms. - How does the government policy attract more firms to reshore after COVID-19, especially some crucial industries like the pharmaceutical industry?

Appendix A16 Number of Reshoring Announcements



Appendix A17 Number of Reshoring Announcements Per Year

Year	Number of Reshoring Announcements
2009	3
2010	10
2011	10
2012	21
2013	39
2014	16
2015	17
2016	9
2017	18
2018	15
2019	38
2020	32
2021	34
2022*	19
Total	281

** up to September, 2022.*

Figure A18 Word Cloud Denoting the Frequency of 67,418 Words in 149 Documents

Appendix A19 Classification of Reshoring Types

Introduction:

The purpose of this document is to provide guidelines and instructions for researchers to classify the reshoring types from reshoring announcements. First, researchers are required to read the original announcements and search for additional supporting information (e.g., from the annual reports and/or official websites of companies) if needed. Researchers are required to identify the location and ownership in offshore and reshoring locations and determine the reshoring type following the definitions below.

Definitions of Reshoring types:

Reshoring decisions can be classified according to four distinct reshoring strategies:

1. *In-house-to-in-house reshoring* (hereafter ***in-house reshoring***) -- the original offshored operations were performed **in-house**, and the reshored operations will also be performed **inhouse** (Type 1).
2. *Outsourcing-to-in-house reshoring (hereafter **insourced reshoring**) -- the original offshored operations were "**outsourced**" to foreign suppliers, but the reshored operations will be performed **in-house** (Type 2).*
3. *In-house-to-outsourcing reshoring* -- the original offshored operations were performed **in-house**, but the reshored operations will be "**outsourced**" to domestic suppliers (Type 3).
4. *Outsourcing-to-outsourcing reshoring*-- the original offshored operations were **outsourced**, and the reshored operations will be **outsourced** also (Type 4).

Here are examples for each reshoring type:

1. Type (1) Inhouse reshoring

General Motors (GM) made on October 29, 2014, "GM to move production of Volt part to US" in AP News (APnews, 2014). In the article, we identify the offshore location in Mexico and the reshoring

location in Detroit. General Motors "moved the Chevrolet Volt's electric drive unit from **Mexico to a Detroit factory**….". The article also stated it is an inhouse production in US: "moving the electric drive from Ramo Arzipe, Mexico to Warren Michigan transmission plants means……". As we cannot identify the offshore location Mexico's operation belongs to General Motors, we searched Ramo Arzipe with the company name and found the operation in Mexico is owned by General Motors [49]. Therefore, we may suggest this case as Type (1) in-house reshoring.

2. Type (2) Insourced reshoring

Williams-Sonoma (WSM) made on June 4, 2019 "Williams-Sonoma will halve **China sourcing** in the next year" in Supply Chain Dive (Cosgrove, 2019). In the article, CEO from William-Sonoma advises that "Williams-Sonoma will halve the amount of goods it sources from China today by 2020" and …. **expanding its U.S. manufacturing operation** by hiring 500 additional workers for its Tupelo, **Miss., factories**". The offshore location is China and the offshore ownership is outsourced. When they return to the US, they go back to Mississippi. Therefore, the reshoring location is Mississippi and reshoring ownership is in-house. Consequently, we might suggest that it is Type 2 insourced reshoring.

3. Type (3) Inhouse-to-outsourcing reshoring (hypothetical example)

Company A made a reshoring announcement on May 10, 2020. The company has a **production plant in China** for their furniture orders. However, due to Trump's high tariff, company A decided to reduce its dependence on Chinese manufacturing in the next few years and return to the US. When they returned to US, they decided to **source from a supplier** with their production in **Colorado**. In this case, the offshore location is China and ownership is in-house. The reshoring location is Colorado and ownership is outsourced. This can be Type (3) in-house to outsourced reshoring.

4. Type (4) Outsourcing-to-outsourcing reshoring

[49] https://gmauthority.com/blog/gm/gm-facilities/gm-mexico-facilities/gm-ramos-arizpe-plant/

Ametek (AME) made on November 3, 2016, "Global Manufacturer Goes the Extra Mile to Reshore" in Quality Magazine (QualtyMagazine, 2016). The article mentioned, "Ametek, a global electronics manufacturer, decided to contact Engineering Specialties Inc. (ESI) after **outsourcing its metal stamping operations to Mexico**." The offshore location is Mexico and Ametek was outsourcing the stamping operation in Mexico.

"After continuing to experience problems with the new supplier in Mexico, Ametek decided to **reshore their manufacturing back to ESI**……. ESI was able to meet all the client's needs while also reshoring two jobs at its **Connecticut facility**" When Ametek returned to US, they contacted the company ESI for production. This supplier previously worked with Ametek before they offshore the production to Mexico. Therefore, we can conclude the reshoring location is Connecticut and Ametek is outsourcing to a third-party supplier ESI in the US. It is likely to be Type 4 outsourcing-to-outsourcing reshoring.

Coding Procedures:

We had two rounds of coding. In round 1, independent coders work on the dataset and coding separately provided by the research team following the procedures below. In round 2, coders will first repeat the procedures in round 1. After that, they will review the information collected by each other, meet to discuss the information of each other and make decisions.

Round 1 Procedures:

Step 1: Read the reshoring announcement

There are a total of 243 announcements links in the dataset. Please review the announcement and identify the offshore and reshoring location and ownership. If you can find all the information in the announcement, please specify the reshoring type based on the offshore and reshoring ownership, complete the table below and keep the information. If you cannot determine the required information, please go to Step 2.

Step 2: Go specifically into company websites

Usually, the announcement is related to reshoring decisions of the companies. Therefore, the independent coder can identify the reshoring location and ownership in the article. However, for some information like offshore location or ownership that cannot be found in the announcement, you can go to the company website to search for the "global operations" section and company news, which provides additional information. Please specify the reshoring type based on the offshore and reshoring ownership, complete the Table below and keep the information. If you cannot determine the required information, please go to Step 3.

Step 3: Research for information from Annual Reports

If you cannot find the information from the company website, you can check with the annual report 10K from US Securities and Exchange Commission website: https://www.sec.gov/. Some keywords such as "global operations", "sourcing," and "properties" can be used to search from the annual report. Please specify the reshoring type based on the offshore and reshoring ownership, complete the Table below and keep the information. If you cannot determine the required information, please go to Step 4.

Step 4: Research from open internet sources (google news)

If you cannot find the information from the company website and annual report, you can search from open internet sources such as yahoo news or google search engine. There is some information published in the local magazine that might provide the required information. Please specify the reshoring type based on the offshore and reshoring ownership, complete the table below and keep the information.

Round 2 Procedures:

Part 1

Repeat the Procedures 1-4 in Round 1.

Part 2

Step 5: Review the information provided by another coder for the decisions.

The information obtained by another coder will be provide to you. You can review the information to make decisions. Please specify the reshoring type based on the offshore and reshoring ownership, complete the Table below and keep the information.

Step 6: Meeting and discussions of all information and/or search for new information.

Each coder will describe the information (e.g., location, ownership) he/she has collected and explain the reasons for the decision on the reshoring type to another coder. After reviewing the information and the explanation, search for additional information and complete the table below independently.

Case No.	Offshore Location	Offshore Ownership (in-house vs. outsourcing	Reshoring location	Reshoring Ownership (In-house vs. outsourcing)	Reshoring Types	Remarks
1	Mexico	In-house	Detroit	In-house	1	https://gmauthority.com/blog/gm/gm-facilities/gm-mexico-facilities/gm-ramos-arizpe-plant/
2	China	Outsourced	Mississippi	In-house	2	Nil
3						
4						
…						
…						
243						

Appendix A20 Abnormal Returns Associated with All Reshoring, In-House, and Insourced Reshoring[50] (Market Model)

	Day	Day −1	Day 0	Day 1	Day 0 to 1
All announcements	*N*	281	281	281	281
	Mean abnormal returns	0.0003	0.0005	0.0005	0.0010
	t-statistic	0.3430	0.5440	0.5230	0.8960
	Median abnormal return	−0.0006	0.0002	0.0011	0.0015
	Wilcoxon signed-rank *Z*-statistic	−0.2190	0.5040	0.8370	1.2750
	% positive abnormal returns	46.62%	50.89%	52.67%	53.03%
	Binomial sign test *Z*-statistic	−1.0740	0.3590	1.0200	1.0160
Type (1) In-house reshoring	*N*	215	216	216	216
	Mean abnormal returns	0.0002	0.0020	0.0008	0.0028
	t-statistic	0.2230	1.7900*	0.7140	2.1470*
	Median abnormal return	−0.0004	0.0008	0.0012	0.0029
	Wilcoxon signed-rank *Z*-statistic	−0.0130	1.4990+	1.0810	2.2980*
	% positive abnormal returns	47.69%	52.78%	53.24%	56.02%
	Binomial sign test *Z*-statistic	−0.6120	0.8180	1.0250	1.7730*
Type (2) insourced reshoring	*N*	36	36	36	36
	Mean abnormal returns	−0.0006	−0.0082	−0.0015	−0.0097
	t-statistic	−0.1700	−3.0170**	−0.5290	−2.6350**
	Median abnormal return	−0.0002	−0.0053	0.0014	−0.0070
	Wilcoxon signed-rank *Z*-statistic	−0.3460	−2.6450**	0.3930	−2.5450**
	% positive abnormal returns	44.44%	34.29%	55.56%	36.11%
	Binomial sign test *Z*-statistic	−0.5000	−1.6900*	0.5000	−1.5000+
Type (4) Outsourced-to-outsourced reshoring	*N*	29	29	29	29
	Mean abnormal returns	0.0023	0.0006	0.0008	0.0014
	t-statistic	0.6600	0.2720	0.4080	0.7240
	Median abnormal return	−0.0017	0.0010	−0.0013	0.0005
	Wilcoxon signed-rank *Z*-statistic	−0.1840	0.5730	−0.2050	0.6050
	% positive abnormal returns	41.38%	58.62%	44.83%	51.72%
	Binomial sign test *Z*-statistic	−0.7430	0.7430	−0.1890	0.0000

Remarks: +p < 0.10; * p < 0.05; ** p < 0.01

[50] We found a significant result for *t* test and WSR test with respect to both inhouse and insourced reshoring for Day 0 to Day 1 in the market model and four-factor model.
In Tables A.5 and A.6, we find there are significant stock returns associated with a reshoring announcement a firm makes in both the market model and four-factor model for Day 0 to Day 1. Then, we divide our 214 reshoring announcements into two subsamples. Tables A.5 and A.6 report the market reaction to these two groups of reshoring announcements. Inhouse/insourced reshoring (in both the market model and four-factor model) shows significant abnormal stock price change for Day 0 and Day 0 to Day 1 and provides the best results for Day 0 to Day 1. The results are similar to what we found in the three-factor model.

Appendix A21 Abnormal Returns Associated with All Reshoring, In-House, and Insourced Reshoring (Four-Factor Model)

	Day	Day −1	Day 0	Day 1	Day 0 to 1
All announcements	*N*	280	281	281	281
	Mean abnormal returns	0.0007	0.0005	0.0003	0.0007
	t-statistic	0.6530	0.4990	0.2920	0.7010
	Median abnormal return	−0.0004	0.0002	0.0006	0.0006
	Wilcoxon signed-rank *Z*-statistic	−0.1120	0.3130	0.3230	0.7570
	% positive abnormal returns	48.57%	50.36%	50.53%	50.89%
	Binomial sign test *Z*-statistic	−0.3590	0.0600	0.1190	0.2390
Type (1) In-house reshoring	*N*	215	216	216	216
	Mean abnormal returns	0.0002	0.0017	0.0005	0.0022
	t-statistic	0.1850	1.521+	0.4450	1.74*
	Median abnormal return	−0.0004	0.0012	0.0000	0.0018
	Wilcoxon signed-rank *Z*-statistic	−0.2550	1.264	0.5080	1.781*
	% positive abnormal returns	47.91%	52.56%	50.00%	54.17%
	Binomial sign test *Z*-statistic	−0.4790	0.6820	0.0000	1.1570
Type (2) insourced reshoring	*N*	36	36	36	36
	Mean abnormal returns	0.0010	−0.0070	−0.0009	−0.0079
	t-statistic	0.3050	−3.1550**	−0.3220	−2.9130**
	Median abnormal return	−0.0004	−0.0039	0.0010	−0.0067
	Wilcoxon signed-rank *Z*-statistic	−0.0160	−2.5220**	0.0630	−2.7970**
	% positive abnormal returns	50.00%	36.11%	58.33%	33.33%
	Binomial sign test *Z*-statistic	0.0000	−1.5000+	0.8330	−1.8330*
Type (4) Outsourced-to-outsourced reshoring	*N*	29	29	29	29
	Mean abnormal returns	0.0036	0.0008	0.0001	0.0010
	t-statistic	1.0330	0.4570	0.0660	0.4620
	Median abnormal return	0.0008	0.0011	−0.0007	−0.0001
	Wilcoxon signed-rank *Z*-statistic	0.4870	0.6490	−0.6600	−0.3780
	% positive abnormal returns	51.72%	51.72%	44.83%	48.28%
	Binomial sign test *Z*-statistic	0.0000	0.0000	−0.3710	0.0000

Remarks: +p < 0.10; * p < 0.05; ** p < 0.01

Appendix A22 Number of control and reshoring announcements observations

	Total observations	control observations	reshoring announcements
Firm with US headquarters	98,447	98,271	176
Firms with SIC code 20-39	23,293	23,117	176
Firms with offshore production	8,595	8,419	176
final sample exclude missing data	8,424	8,248	176

Appendix A23 Descriptive statistics comparison between control and reshoring announcements observations

	Control firms					Observation firms				
	Mean	Median	Std. Deviation	Minimum	Maximum	Mean	Median	Std. Deviation	Minimum	Maximum
Total Asset (USD, in millions)	4,901.18	439.67	20,421.31	0.00	362,597.00	51,965.06	17,360.00	72,687.35	14.56	346,196.00
Number of Employees (in Thousands)	7.77	1.02	20.82	0.00	297.00	66.11	41.25	64.21	0.02	225.00
Net income (USD, in millions)	289.72	5.40	1,656.85	-22,440.00	44,880.00	2,791.89	827.00	4,565.07	-1,961.40	21,053.00
Sales (USD, in millions)	3,787.53	357.09	16,380.43	-0.14	433,526.00	37,061.90	14,178.00	50,779.40	0.00	279,332.00
Leverage	4.88	0.70	327.30	-2,556.42	29,585.00	1.63	1.68	23.16	-257.52	101.62
Market Value (USD, in millions)	6,856.67	701.14	27,367.33	0.01	677,443.20	40,065.47	17,149.60	54,371.24	9.98	288,921.03
ROA	-0.07	0.09	0.47	-8.14	1.94	0.09	0.11	0.23	-1.98	0.45