



ORGANIZATIONAL AMBIDEXTERITY WITHIN SUPPLY CHAIN MANAGEMENT: A SCOPING REVIEW

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ABSTRACT. Background: Organizational ambidexterity is an emerging concept and it permeates too many functional domains in the discussion of organizational performance. The importance of understanding this concept motivates researchers to explore organizational ambidexterity as internal and external capabilities in the context of supply chain. Despite its importance in building oriented capabilities to organizations, little information is known about organizational ambidexterity in supply chain context. The objective of this review is to produce a comprehensive mapping of themes related to organizational ambidexterity studies in supply chain research, particularly in improving firm performance.

Method: A scoping review of the literature was conducted using Web of Science (WoS), Scopus and EconBiz databases to identify what is the nature of published scientific literature on this topic and what are the emerging themes of organizational ambidexterity in relation to supply chain studies.

Result: This study found three main themes and eleven sub-themes in relation to inter-organization ambidexterity in the supply chain context. The main themes include learning process, outcome and leadership. The review indicates that most of the studies are conducted in understanding learning process.

Conclusion: The management of supply chain has a positive association with organizational ambidexterity. Supply chain operations involve selection, development, and implementation of new process(es) or technology (exploitation) - the outcome of a prior search procedure (exploration), which has been described as a sequential approach to exploration and exploitation and both processes are important especially in a dynamic environment. The findings from this scoping review indicate the importance of developing and managing a supply chain that supports exploration and exploitation practices. Therefore, managers should understand that maximizing a firm's current skills is critical to profitability and market share. While continuous refinement of existing knowledge is important, it is the generation and application of new knowledge that leads to increased value (profitability) and competitive advantage. Organizational ambidexterity within supply chain management provides significant benefits to big firms in improving their long-term efficiency. This offers avenue for future research to compare the effect of organizational ambidexterity in small firm.

Keywords: scoping review, organizational ambidexterity, supply chain management, supply network.

INTRODUCTION

Recent development in the environment has compelled business organisations to revisit their strategies in building resilient network to survive in the volatile environment. Organizational ambidexterity has been introduced as the ability to pursue incremental and discontinuous innovation simultaneously and this is achieved by hosting multiple

contradictory structures, processes, and cultures within the same firm [O'Reilly III, Tushman, 2013]. Many studies have ventured into this topic, and recently more researchers are interested to study organizational ambidexterity beyond the scope of a single organization [Aoki, Wilhelm, 2017; Kristal, Huang, Roth, 2010]. The main idea within this literature focuses on the pursuit of finding the balance between exploration and exploitation through inter-organizational relationships and

alliances [Partanen et al., 2020]. As organizational ambidexterity has been extensively discussed from the lens of a single firm, researches related to achieving ambidextrous capabilities through inter-organizational collaboration such as supply chain is still at infancy and requires more deliberation.

According to Birkinshaw and Gibson [2004], organizational ambidexterity is the ability of an organization's to carry out exploration and exploitation activities in order to generate values needed for the organization's long-term success. In particular, exploration competence focuses on the ability of a firm to learn new knowledge, to find new capabilities and to explore new opportunities to expand business activities, while exploitation competence refers to the ability of a firm to use existing internal knowledge, to implement existing capabilities and to make sound decisions to maximize profits from firm activities [Benner, Tushman, 2003, O'Reilly III, Tushman, 2007]. However, balancing exploration and exploitation in the context of innovation for long-term success and sustainability is not easy, and in fact is a very challenging task [March, 1991, McGrath, 2001, McNamara, Baden-Fuller, 1999]. Some researchers i.e. Gupta, Smith and Shalley [2006] and; Simsek et al. [2009] suggested that the balance can only be achieved through structural or temporal separation. This notion is in line with earlier discussion on ambidexterity that suggests firms should develop different business units to simultaneously benefit from alignment and adaptation [i.e. Puranam, Singh, Zollo, 2006, Tushman, O'Reilly III, 1996]. As a result of this, organizational ambidexterity becomes a valid concept in large firms as structural or temporal separations are more evident in this type of firms.

Generally, the importance of ambidexterity can also be manifested through the collaborative initiatives in the supply chain environment [Aslam et al., 2020]. From the perspective of inter-organizational environment, ambidexterity capabilities would allow firm to mobilize the network to explore and exploit in order to make sound decisions for long-term profits [Cenamor, Parida &

Wincent, 2019]. According to research, ambidexterity in the workplace leads to better levels of dynamism [Ricciardi, Zardini & Rossignoli, 2016], organization performance [Boumgarden, Nickerson & Zenger, 2012; Junni et al., 2013; Ramachandran, Lengnick-Hall & Badrinarayanan, 2019] and competitive advantage [O'Reilly III & Tushman, 2011]. While substantial study is under way into organizational ambidexterity, there is very little research from the supply chain perspective [see for some notable exceptions: Kristal, Huang & Roth, 2010; Ojha, Acharya & Cooper, 2018; Partanen et al., 2020; Rojo-Gallego-Burin, Llorens-Montes & Perez-Arostegui, 2016]. Clearly, organizational ambidexterity and supply chain management are rarely considered in the same context.

Thus, the aim of this paper is to produce a comprehensive mapping of the extant of research that has been done on organizational ambidexterity in the context of supply chain. To accomplish this, a scoping review was conducted in order to combine them and also to demonstrate research gaps and directions through several theoretical lenses. Scope review is an adequate approach for strengthening the suggested research problem, summarising and disseminating research findings and thus justifying the contribution of research via gaps in identification [Arksey & O'Malley, 2005; Peterson et al., 2016]. In other words, this scoping review would allow researchers to understand the importance of the concept from a different perspective that opens the door for more deliberation of the concept. Through contextual mapping of researches in this context would also inform us the plausibility of extending the concept beyond supply chain environment. In addition to this introductory section, this paper is structured as follows: Section 2 describes the proposed scoping review method, while Section 3 details the results. Finally, Section 4 brings the discussion, recommendation and conclusion in the subject.

Ambidexterity and supply chain

Ambidexterity in the context of supply chain can be discussed from several perspectives. Firstly, ambidexterity can be discussed as capabilities that can bring benefits

by enabling the efficient use of existing supply chains while capitalizing on unexplored supply chain opportunities, particularly in a dynamic environment [Partanen et al., 2020]. As suggested by Abd Aziz, Hanafiah and Abd Latif [2020], a more systematic supply chain management will ensure continuity of firm's success. After all, innovations and new ideas frequently arise in networks [Baum, Calabrese, Silverman, 2000, Powell, Koput, Smith-Doerr, 1993], and suppliers in particular are instrumental in promoting innovation [Song, Di Benedetto, 2008]. Therefore, firms especially in the manufacturing sector are able to take advantage by exploiting existing capabilities and simultaneously building new competitive advantage for the future [Kristal, Huang, Roth, 2010].

Secondly, supply chain ambidexterity can be discussed from the perspective of process, looking at the combination of two separate activities, namely exploration and exploitation. According to Levinthal and March [1993], supply chain exploitation focuses on clearly specified short-term, measurable objectives, reliability, risk mitigation and overall supply chain performance which can be regarded as a conventional strategy for management of the supply chain. On the other hand, supply chain exploration refers to long-term success, uncertain outcomes, high autonomy and innovation in the supply chain [Adler, Goldoftas, Levine, 1999, Levinthal, March, 1993, Ojha et al., 2018]. Therefore, the combination of exploration and exploitation in the context of supply chain involves the process of refining and expanding the existing resources in the network, whilst developing skills for future advantages in the supply chain environment [Ojha et al., 2018, Partanen et al., 2020].

Emerging discussions in the supply chain environment indicate the importance to leverage the supply chain network through developing organizational level ambidexterity skills in exploiting existing supply chain related activities and exploring new capabilities. Past studies have shown empirical evidences about organizational ambidexterity and its impact on the supply chain. For example, Rojo-Gallego-Burin, Llorens-Montes and Perez-Arostegui [2016] found that supply

chain ambidexterity helps manufacturing firms to achieve supply chain flexibility, which, in turn, builds supply chain skills and improves firm performance. A study by Im and Rai [2008] suggested positive effect on the performance when long-term relations between supply chain vendors stimulate explorative and exploitative knowledge sharing. Interestingly, Kristal, Huang and Roth [2010] found that the ambidextrous supply chain strategies are pursued to be abreast with combined competitive abilities of manufacturers (i.e. their capacity to simultaneously excel in quality, delivery speed, versatility in processes and low cost) that lead to firm efficiency. Drawing from these studies, a reciprocal and reinforcing effect is likely to exist between exploration and exploitation of organizational ambidexterity in the supply chain [He, Wong, 2004]. This indicates that in the context of supply chain, exploration practices enables the creation of new information and ideas, however, they can only generate value if they are exploited, selected and implemented [Ojha, Acharya, Cooper, 2018].

Nevertheless, review from previous literature shows that knowledge about organizational ambidexterity within supply chain is still at infancy and need more clarification. To the best of our knowledge, review on research works within this topic has not been specifically performed, yet issue of managing collaborative network is becoming the focal of discussion in dynamic business environment. Although systematic review has been done on organizational ambidexterity, it is focused on firm [Pertusa-Ortega et al., 2020], but not dedicated to explicate its importance in the supply chain context. Similarly, other narrative explorations only focus on persistent tensions arising from the exploration – exploitation continuum [Andriopoulos, Lewis, 2009]. Looking at the importance of organizational ambidexterity in the context of supply chain, this scoping review is imperative to map previous works in this topic in order to set the importance of organizational ambidexterity within the supply chain. Using this approach, the conclusion will highlight the advantages that can be derived from leveraging the supply chain network using supply chain ambidexterity. The scoping review approach will establish the condition of

evidence of an issue that offers ample opportunity to clarify before rigorous empirical studies are carried out [Levac, Colquhoun, O'Brien, 2010].

MATERIAL AND METHODS

The framework for this scoping review is based on the study of Arksey and O'Malley [2005], along with recommendations by Levac, Colquhoun and O'Brien [2010]. This method is applied to identify all materials related to this topic with the objective to provide comprehensive overview of the breadth of the concept, excluding the depth of the evidence [Davis, Drey, Gould, 2009]. In other words, scoping review does not comply with quality assessment [Levac, Colquhoun, O'Brien, 2010] and this issue posed a limitation to this exercise [Pham et al., 2014]. Based on this premise, five methodological stages in the scoping review process will be applied as explained below.

Stage 1 relates to the identification of research questions. For this scoping review, two research questions have been developed: Firstly, what is the nature of published scientific literature on organizational ambidexterity within supply chain literature? Secondly, what are the emerging themes in relation to ambidexterity within the context of supply chain?

Stage 2 relates to the identification of the relevant studies. Academic journals were retrieved from three main databases: Web of Science (WoS), Scopus and EconBiz. Web of Science (WoS) is a database by Thomson Reuters. The collection covers more than 12,000 live journals, 23 million patents, 148,000 congress proceedings, with more than 40 million and 760 million references comprising of various disciplines of knowledge such as environmental studies, sciences, social sciences, and technology since 1945. Scopus database was introduced by Elsevier in 2004, with citation analysis since 1996 that covers bibliographic database of scientific, multidisciplinary and international literature [Sánchez, Del Río, García, 2016]. Finally is EconBiz, a business and economic studies portal developed by the German

National Library of Economics that includes over 10 million publications from various databases - journal articles, books, and working papers, online and print, open access and licenced material [Clermont, Dyckhoff, 2012]. The search strategy included a comprehensive search string of keywords related to organizational ambidexterity i.e. ambidexterity, organisational ambidexterity, ambidextrous, supply chain management, supply chain, supply network combined with Boolean operators OR and AND (Table 1).

Stage 3 relates to the screening to remove redundant articles. To perform this, the first criterion of selection is the type of literature in which this research is focused. For this exercise, only research articles and conference proceedings are included. Both sources of documents serve as the primary source of analytical evidences. In addition, the study exclude publications in the form of systematic review articles, review articles, meta-analysis articles, meta-synthesis articles, book series, book chapters and newspaper articles. All publications that are selected are published in English. Importantly, only articles published within the last six years (2016-2021) were included and articles from other fields of sciences such as agricultural science and biology are not selected in order to avoid irrelevant article or proceeding paper (Table 2).

Stage 4 involves the charting of the data. Specifically, the data obtained will be tabulated (Table 3) using Microsoft Excel to assist thematic and comparative analysis. Information on authorship, year, research design, variables or construct, key findings and theme were recorded in this form.

Stage 5 involves processes to collate, summarize, and report the results. Common themes and findings from the articles are compiled to understand the importance of organizational ambidexterity within supply chain context and the extent of emerging themes researched under this topic. Other important information that is recorded is location of study, year of publication and other relevant information to the objectives of the study.

Table 1. The search string

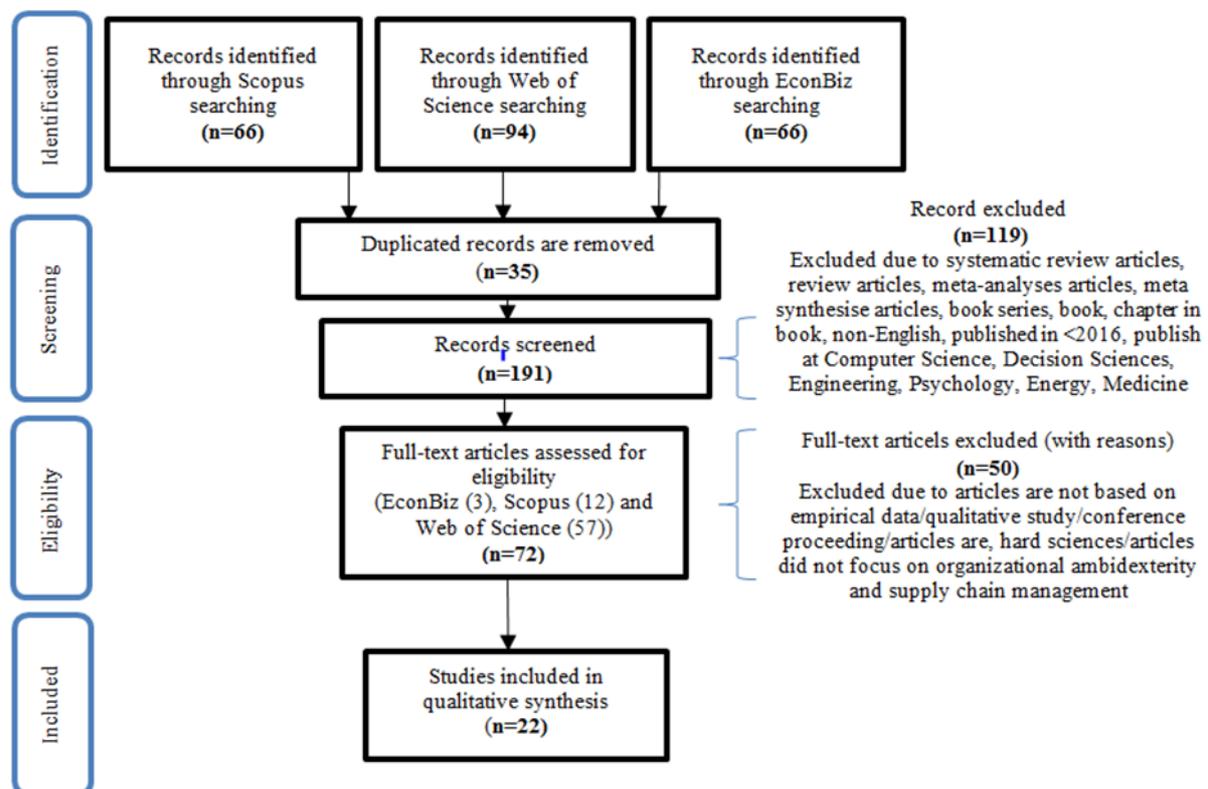
Database search string	
WoS	TS=(("Organizational ambidexterity" OR "ambidexterity" OR "organisational ambidexterity" OR "ambidextrous") AND ("Supply chain management" OR "supply chain" OR "supply network"))
Scopus	TITLE-ABS-KEY (("Organizational ambidexterity" OR "ambidexterity" OR "organisational ambidexterity" OR "ambidextrous") AND ("Supply chain management" OR "supply chain" OR "supply network"))
EconBiz	("Organizational ambidexterity" OR "ambidexterity" OR "organisational ambidexterity" OR "ambidextrous") AND ("Supply chain management" OR "supply chain" OR "supply network"))

Table 2. The inclusion and exclusion criteria

Criterion	Eligibility	Exclusion
Literature type	Journal (research articles), conference proceeding	Journals (review), book series, book, chapter in book,
Language	English	Non-English
Time line	Between 2016 and 2021	<2016
Subject area	Business, Management and Accounting, Social Sciences, Economics, Econometrics and Finance	Computer Science, Decision Sciences, Engineering, Psychology, Energy, Medicine

RESULTS

Following the search strategies explained above, 226 articles were identified from the database search. Out of this number, 35 articles were excluded from the initial hit due to duplication. Based on the title and abstract, 119 articles were then excluded due to types of review (systematic, meta-analysis etc.), language, and subject. From the remaining 72 articles, 50 articles were further excluded after full reading of the articles due to apparent irrelevancy to the objective of the scoping review. After going a rigor process of selection, only 22 articles were found to be relevant and fulfill the objective of this study based on preferred reporting items for systemic review (PRISMA, [Moher et al., 2015] (Fig. 1)).



Source: adapted from Moher et al., 2015

Fig. 1. Flow diagram of the study selection process using the Preferred Reporting Items for Systematic Reviews (PRISMA)

The selection of articles was only focused on quantitative empirical studies from journal articles within a period of 6 years based on several factors. Firstly, conference proceedings were not included because there was a lack of systematization and transparency due to traditional reviews which likely influenced by the author's subjectivity [Hodgkinson, Ford, 2014]. Secondly, the concept of supply chain ambidexterity only emerged after 2015 [Ojha et al., 2018, Partanen et al., 2020]. Thirdly, the research on particular topic which has been carried out for a period of at least 6 years indicates the maturity of the subject [Kraus, Breier, Dasí-Rodríguez, 2020]. Therefore, it is appropriate for this study to make a selection of quality articles at least within 6 years to conduct a scoping review.

Main findings

Based on the criteria above, Table 3 shows 22 articles of current research that were included for the scoping review [Ardito et al., 2018, Aslam et al., 2018, Aslam et al., 2020, Bravo, Ruiz-Moreno, Montes, 2018, Cheng, Lu, 2017, Gu, Yang, Huo, 2020, Gualandris, Legenvre, Kalchschmidt, 2018, Huang, Lu, 2020, Im, Rai, Lambert, 2019, Jermstittiparsert, Pithuk, 2019, Luu, 2017, Mehdi, Ahmed, 2019, Ojha, Acharya, Cooper, 2018, Partanen et al., 2020, Pu, Wang, Chan, 2018, Rojo-Gallego-Burin et al., 2020, Rojo-Gallego-Burin, Llorens-Montes, Perez-Arostegui, 2016, Rojo-Gallego-Burin, Perez-Arostegui, Llorens-

Montes, 2020, Shukor et al., 2020, Tuan, 2016, Wamba et al., 2020, Wei et al., 2019].

The scoping exercise has identified 11 subthemes under three major headings. The major headings are process, outcome and enabler. First, the theme process emerged based on the developing capabilities to realize exploration and exploitation and the learning processes involved in knowledge acquisition and knowledge sharing. Two major capabilities that often become the subject of scrutiny under supply chain ambidexterity are network capability and information technology (IT) capability. Second, of the sub themes falls under outcome are agility, flexibility, resilience, and adaptability. Third, the sub theme for enabler that has been explored for organizational ambidexterity is leadership, whereby support from different types of leadership (i.e. transformational, ambidextrous) yields better supply chain ambidexterity.

The analysis also found that majority of the articles focus more on learning and agility which indicate the importance of supply chain ambidexterity assimilating new learning (exploration) and applying what is learned (exploitation) to improve profitability. Therefore, there is need to understand how supply chain ambidexterity could affect how businesses operate in the dynamic environment.

Table 3. Charting form

Publication	Variables/Construct	Key findings	Theme
Wamba et al. [2020] <i>United States</i>	<u>Independent</u> : big data analytics. <u>Mediating</u> : supply chain ambidexterity <u>Moderating</u> : environmental dynamism. <u>Dependent</u> : organizational performance	Big data analytics can help enhance supply chain ambidexterity and organizational performance, but these effects are contingent upon the level of environmental dynamism	Learning, IT
Partanen et al. [2020] <i>Sweden</i>	<u>Independent</u> : supply chain ambidexterity. <u>Moderating</u> : network capability and strategic information flow <u>Dependent</u> : SMEs' financial performance	Supply chain ambidexterity is negatively associated with performance, network capabilities and strategic information flow may be necessary to lower the negative effects	Network capability
Shukor et al. [2020] <i>Malaysia</i>	<u>Independent</u> : uncertainties, organizational ambidexterity, supply chain integration. <u>Dependent</u> : supply chain agility, organizational flexibility	Organizational ambidexterity has a significant relationship with supply chain integration, and supply chain integrations were shown to have a positive impact on the firm's supply chain agility and organizational flexibility	Agility, flexibility
Rojo-Gallego-Burin et al. [2020] <i>Iberian</i>	<u>Independent</u> : ambidextrous supply chain strategy, ISO 9001 standard facilitates, ISO 9001 standard. <u>Dependent</u> : supply chain flexibility, sourcing flexibility, operating system flexibility, distribution flexibility, information system flexibility	Ambidextrous supply chain strategy is shown to have a positive effect on information system flexibility irrespective of the presence of ISO 9001 certification whereas for the other three dimensions of supply chain flexibility, the effect of ambidextrous supply chain strategy is dependent on ISO 9001 implementation	Flexibility, IT

Publication	Variables/Construct	Key findings	Theme
Aslam et al. [2020] <i>Pakistan</i>	<u>Independent</u> : supply chain ambidexterity. <u>Mediating</u> : supply chain agility. <u>Moderating</u> : uncertainty. <u>Dependent</u> : supply chain resilience	Supply chain ambidexterity on supply chain resilience a positive effect, supply chain agility positively mediates the relationship between supply chain ambidexterity and supply chain resilience, but this relationship does not vary at different levels of environmental uncertainty	Agility, resilience
Rojo-Gallego-Burin, Perez-Arostegui and Llorens-Montes [2020] <i>Spanish</i>	<u>Independent</u> : supply chain ambidexterity. <u>Moderating</u> : IT competence. <u>Dependent</u> : supply chain flexibility	Supply chain ambidexterity significant to supply chain flexibility, and a high IT competence facilitates can moderates the relationship between supply chain ambidexterity and supply chain flexibility	Flexibility, IT
Gu, Yang and Huo [2020] <i>China</i>	<u>Independent</u> : supplier IT use for exploitation, customer IT use for exploitation, ambidextrous supplier IT use, ambidextrous customer IT use, supplier IT use for exploration, customer IT use for exploration. <u>Dependent</u> : supplier resilience, customer resilience, supply chain performance	Supplier IT and customer IT resilience could improve supply chain performance. To achieve the two aspects of supply chain resilience, only explorative use of IT with suppliers and customers have significant effects, and the ambidextrous use of IT on the customer side takes effect. The exploitative and explorative use of IT complement each other to improve customer resilience	Resilience, IT
Huang and Lu [2020] <i>Taiwan</i>	<u>Independent</u> : configuration flexibility, rather than manufacturing flexibility, manufacturing flexibility, rather than configuration flexibility, degree of ambidexterity in its supply network flexibility. <u>Dependent</u> : exploratory partnerships, exploitative partnerships, both exploration and exploitation partnership	Configuration flexibility has a greater influence on exploratory partnerships, while manufacturing flexibility has a greater impact on exploitative partnerships. Ambidextrous (i.e. have both types of flexibility), they are able to simultaneously obtain both exploratory and exploitative partnerships. Balancing network flexibility is critical when firms execute ambidextrous alliance strategies	Flexibility
Jermisittiparsert and Pithuk [2019] <i>Indonesia</i>	<u>Independent</u> : supply chain ambidexterity. <u>Mediating</u> : supply chain agility. <u>Dependent</u> : supply chain adaptability, market sensing	Supply chain ambidexterity significant to supply chain adaptability and market sensing, and supply chain agility can mediate the relationship between supply chain ambidexterity and supply chain adaptability	Agility, adaptability
Mehdi and Ahmed [2019] <i>India</i>	<u>Independent</u> : knowledge practices, innovative practices, exploratory learning. <u>Dependent</u> : ambidextrous supply chain	Exploration factors (knowledge practices, innovative practices, exploratory learning) affecting an ambidextrous supply chain	Learning
Wei et al. [2019] <i>China</i>	<u>Independent</u> : information sharing, collaborative planning. <u>Moderating</u> : explorative IT capability, exploitative IT capability, explorative and exploitative IT capabilities. <u>Dependent</u> : firm performance	Information sharing and collaborative planning significant effect to firm performance. Explorative and exploitative IT capabilities are complementary in moderating the link between collaborative planning and firm performance but substitutive in moderating the relationship between information sharing and firm performance	Knowledge-sharing, learning, IT
Im, Rai and Lambert [2019] <i>United States</i>	<u>Independent</u> : goal ambidexterity, incentive ambidexterity. <u>Mediating</u> : knowledge-sharing ambidexterity. <u>Dependent</u> : relationship benefits	Goal ambidexterity an incentive ambidexterity significant effect to knowledge-sharing ambidexterity. Knowledge-sharing ambidexterity can mediate the relationship between goal ambidexterity, incentive ambidexterity and relationship benefits from supply chain relationships	Knowledge-sharing
Ojha, Acharya and Cooper [2018] <i>United States</i>	<u>Independent</u> : transformational leadership. <u>Mediating</u> : supply chain organizational learning. <u>Dependent</u> : supply chain ambidexterity	Supply chain organizational learning is a mechanism through which leadership support influences supply chain ambidexterity	Learning, leadership
Ardito et al. [2018] <i>Italy</i>	<u>Independent</u> : sourcing knowledge from suppliers, sourcing knowledge from customers, sourcing knowledge from competitors. <u>Dependent</u> : innovation ambidexterity	Sourcing knowledge from suppliers, sourcing knowledge from customers, sourcing knowledge from competitors significant and positively affects innovation ambidexterity	Knowledge acquisition
Pu, Wang and Chan [2018] <i>China</i>	<u>Independent</u> : open e-logistic standards, supply chain process ambidexterity. <u>Moderating</u> : number of suppliers, relationship duration. <u>Dependent</u> : operational performance, financial performance	Open e-logistic standards, through balancing the contradictory requirements of integration and flexibility, can lead to ambidexterity in the supply chain	Knowledge, network capability
Bravo, Ruiz-Moreno and Montes [2018] <i>Iberian</i>	<u>Independent</u> : desorptive capacity. <u>Moderating</u> : balanced ambidexterity, combined ambidexterity. <u>Dependent</u> : supply chain competence	The positive and significant relationship between the buying organization's desorptive capacity and supply chain competence; and, second, the key moderating role of organizational ambidexterity, especially in its combined dimension, in this relationship	Learning

Publication	Variables/Construct	Key findings	Theme
Gualandris, Legenvre and Kalchschmidt [2018] <i>European</i>	<u>Independent</u> : balance dimension of purchasing ambidexterity, combined dimension of purchasing ambidexterity. <u>Mediating</u> : supplier product innovation, supplier efficiency. <u>Dependent</u> : buyer financial performance	Purchasing function's ability to advance the combined magnitude of exploratory and exploitative activities represents an essential determinant of supplier efficiency, supplier product innovation, and buyer financial performance; and also discovers that balancing the magnitudes of exploratory and exploitative activities on a relative basis produces negative effects on the innovativeness of the supply network	Ability, network capability
Aslam et al. [2018] <i>Pakistan</i>	<u>Independent</u> : market sensing, supply chain adaptability. <u>Mediating</u> : supply chain agility. <u>Dependent</u> : supply chain ambidexterity	Market-sensing capability is an antecedent of supply chain agility and supply chain adaptability; supply chain agility, directly, and supply chain adaptability, indirectly, affect supply chain ambidexterity; therefore, supply chain agility can mediate the relationship between supply chain adaptability and supply chain ambidexterity	Agility, adaptability
Cheng and Lu [2017] <i>Taiwan</i>	<u>Independent</u> : operating frontier, trajectory, absorptive capacity. <u>Dependent</u> supply chain resilience	Operating frontier, trajectory and absorptive capacity activities to improve proactive and reactive dimension of supply chain resilience	Learning
Luu [2017] <i>Vietnam</i>	<u>Independent</u> : ambidextrous leadership. <u>Mediating</u> : entrepreneurial orientation. <u>Moderating</u> : external supply chain integration. <u>Dependent</u> : market responsiveness	Ambidextrous leadership positive effect on entrepreneurial orientation, which in turn contributes to market responsiveness. The moderation role that external supply chain integration plays on the entrepreneurial orientation –market responsiveness linkage was also grounded on the data set	Leadership
Tuan [2016] <i>Vietnam</i>	<u>Independent</u> : organisational ambidexterity, external knowledge sharing. <u>Moderating</u> : competitive intelligence. <u>Dependent</u> : supply chain agility	Organizational ambidexterity has a positive effect on supply chain agility with competitive intelligence as a moderator for this effects	Knowledge-sharing, agility
Rojo-Gallego-Burin, Llorens-Montes, Perez-Arostegui [2016] <i>Spain</i>	<u>Independent</u> : supply chain ambidexterity, supply chain flexibility fit, supply chain competence. <u>Dependent</u> : supply chain flexibility fit, supply chain competence, firm performance	Supply chain ambidexterity helps to achieve the optimal level of supply chain fit and that supply chain management is important to firm performance	Flexibility

Background of the studies included in the review

Based on Figure 2, location for the study of organizational ambidexterity within supply chain management is detailed out to indicate the context of the studies. The analysis shows that 12 countries and one continent have been used as the location for this study. Specifically, three previous studies have focused on supply chain management in United States [Im, Rai, Lambert, 2019, Ojha, Acharya, Cooper, 2018, Wamba et al., 2020], three studies in China [Gu, Yang, Huo, 2020, Pu, Wang, Chan, 2018, Wei et al., 2019] and two studies in the Iberian [Bravo, Ruiz-Moreno, Montes, 2018, Rojo-Gallego-Burin et al., 2020], two studies in Pakistan [Aslam et al., 2018, Aslam et al., 2020], two studies in Spain [Rojo-Gallego-Burin, Llorens-Montes, Perez-Arostegui, 2016, Rojo-Gallego-Burin, Perez-Arostegui, Llorens-Montes, 2020], two studies in Taiwan [Cheng, Lu, 2017, Huang, Lu, 2020] and two studies in Vietnam [Luu, 2017, Tuan, 2016]. In addition, only one study has been conducted on supply chain management in Sweden [Partanen et al., 2020], Malaysia [Shukor et al., 2020],

Indonesia [Jermstipparsert, Pithuk, 2019], and India [Mehdi, Ahmed, 2019], Italy [Ardito et al., 2018]. There is one study which has been conducted in among European countries [Gualandris, Legenvre, Kalchschmidt, 2018].

These findings suggest that ambidexterity in supply chain management has been explored in both developed and developing countries and this allow us to understand supply chain ambidexterity in competitive market. In terms of concept, developed and developing countries are increasingly relying on functionally differentiated ambidexterity organizations (i.e., alliances based on their value chain functions such as exploratory R&D alliances or exploitative commercialization alliances) to achieve good long-term success, especially in the functional domain of supply chain management. Thus, innovative products will be the focus of manufacturing outcome to be competitive and sustain in the dynamic environment. Since environment dictates how firms strategize for long-term profits, incorporating organizational ambidexterity within supply chain management is one of the

solutions to achieve differentiation and cost related advantages.



Fig. 2. Number of study based on countries

In terms of years of publication, Fig.3 shows the number of articles published in Web of Science (WoS), Scopus and EconBiz from 2016 to 2020. A total of two articles were published in 2016 [Rojo-Gallego-Burin, Llorens-Montes, Perez-Arostegui, 2016, Tuan, 2016] and 2017 [Cheng, Lu, 2017, Luu, 2017]. Next, six articles were published in 2018 [Ardito et al., 2018, Aslam et al., 2018, Bravo, Ruiz-Moreno, Montes, 2018, Gualandris, Legenvre, Kalchschmidt, 2018, Ojha, Acharya, Cooper, 2018, Pu, Wang, Chan, 2018], followed by four articles published in 2019 [Im, Rai, Lambert, 2019, Jermstipparsert, Pithuk, 2019, Mehdi, Ahmed, 2019, Wei et al., 2019]. Recently, eight articles were published in 2020 [Aslam et al., 2020, Gu, Yang, Huo, 2020; Huang, Lu, 2020; Partanen et al., 2020; Rojo-Gallego-Burin et al., 2020, Rojo-Gallego-Burin, Perez-Arostegui, Llorens-Montes, 2020, Shukor et al., 2020, Wamba et al., 2020]. In addition, the articles were in the fields of business, management and accounting, social sciences, economics, econometrics and finance.

In summary, the number of articles published on this topic is increasing from year to year. However, the number is still small as compared to publication in the topic of ambidexterity in general. This shows that the concern about supply chain ambidexterity is still at infancy and more exploration about this topic is required. In 2020, the publication reached its peak of 8 articles and this shows

that organizational ambidexterity has good potential to be a focus in future studies. This is not limited to supply chain context, since inter-organizational collaboration is evident especially in the context of operational expansion such as in project-based initiatives, consortium, and technology based alliances. This is in line with recommendations in existing publications on the potential of this topic to be deliberated in future studies [Zakrzewska-Bielawska, 2021]. More importantly, the issue of dynamic environment compelled organizations to identify best practices and factors that could enhance performance amidst the challenge of uncertainties. Thus, future researchers can continue this effort to help firms achieve maximum levels of innovation performance to thrive in the increasingly challenging business environment.

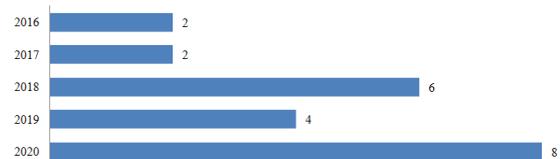


Fig. 3. Year of publication in Web of Science (WoS) Scopus and EconBiz database

DISCUSSION AND RECOMMENDATION

This scoping review provides an overview on organizational ambidexterity within supply chain. Generally, it was suggested from the findings of this review that supply chain ambidexterity will help improve business performance among large firms, especially in the manufacturing sector [Kristal, Huang, Roth, 2010]. On the other hand, small firms which are often challenged from the issue of resource shortages and lacking of capability to achieve fit between exploration and exploitation [Arend, Wisner, 2005], can leveraged network capabilities to mitigate the negative link between supply chain ambidexterity and performance [Partanen et

al., 2020]. Therefore, it can be concluded that for small firms to get the advantage from supply chain ambidexterity, they need to have strong alliance management capability to generate interorganizational exploitation instead of exploration. Hence, they need to develop supply chain ambidexterity by building capabilities such as network and IT capabilities to support simultaneous process of exploration and exploitation. Using this framework, small firms can create advantages from the inter-organizational collaboration within the supply chain network.

Moreover, it can be concluded that majority of these studies concurred that supply chain ambidexterity could lead to outcomes such as agility, flexibility and adaptability that are incumbent in dynamic environment. Obviously, having these abilities will ensure firms to thrive and sustain in hostile competitive environment. The construct of supply chain ambidexterity is mainly positioned as independent variable to influence the organizational performance. In addition, only two studies that have been conducted in regards to the enabler. The studies indicate that leadership is an important factor that can influence supply chain ambidexterity particularly in big firms. On the other hand, supply chain ambidexterity also can moderate the relationship between leadership and market responsiveness. The mapping of previous studies based on the positioning of ambidexterity construct and major themes is illustrated in Table 4.

In another perspective, supply chain management that is involved in either R&D alliances (explorative) or commercialization alliances (exploitative) can be characterized as a sequential approach to achieve organizational ambidexterity [O'Reilly III, Tushman, 2013, Simsek et al., 2009]. The review of the articles in this study confirms that exploration activities will eventually be followed by exploitation in sequential manner [i.e. Huang, Lu, 2020, Wei et al., 2019] particularly in big firms. However, the analysis found that, the

result is different in other functional activities such as marketing or finance that may experience non-sequential process in the application of this framework. This can lead to the conclusion that in the context of supply chain management, a sequential process of exploration and exploitation work best in big firms. This creates an avenue for future research to look into this effect on small firms.

The review of the quantitative studies also reveal that the outcome of supply chain ambidexterity can be explored from two different perspectives namely financial or non-financial performance. This offers inclusive perspective of how supply chain ambidexterity works in the context of dynamic environment. Hence, more appropriate and valuable implications can be offered in developing theory, evaluating programs, and developing interventions [Baxter, Jack, 2008].

Although this study focused only limited publications in the Web of Science (WoS), Scopus databases and EconBiz, the trend shows that the possibilities of increase in the number of publications in future is expected. This is due to the issue of organizational ambidexterity is drawing much attention and concerns among researchers recently. Existing studies that covers different geographic regions shows that the issue is imminent, and more need to be gauged to help firms discovers the potential of supply chain management in different economies. In line with this, exploring database sources such as Science Direct, Taylor Francis, Springer and Sage allows for more comprehensive data and future researchers can conduct systematic literature reviews. According to Petrosino et al. [2001], a systematic review can be characterized as identifying, integrating and analyzing all data available in quantitative and qualitative ways to provide an observationally determined answer to a committed research query. Therefore, future research studies may obtain more database resources to make an in-depth study about organizational ambidexterity within supply chain management.

Table 4. Positioning of organizational ambidexterity as a construct in supply chain research

	Independent	Mediating/Moderating	Dependent
Process	Partanen et al. [2020] Rojo-Gallego-Burin et al. [2020] Rojo-Gallego-Burin, Perez-Arostegui and Llorens-Montes [2020] Gu, Yang and Huo [2020] Im, Rai and Lambert [2019] Pu, Wang and Chan [2018]	Wamba et al. [2020] Wei et al. [2019] Im, Rai and Lambert [2019]	Huang and Lu [2020] Mehdi and Ahmed [2019] Ardito et al. [2018]
Outcome	Shukor et al. [2020] Rojo-Gallego-Burin et al. [2020] Aslam et al. [2020] Rojo-Gallego-Burin, Perez-Arostegui and Llorens-Montes [2020] Jermisittiparsert and Pithuk [2019] Gualandris, Legenvre and Kalchschmidt [2018] Cheng and Lu [2017] Tuan [2016] Rojo-Gallego-Burin, Llorens-Montes and Perez-Arostegui [2016]	Bravo, Ruiz-Moreno and Montes [2018]	
Enabler	Luu [2017]	Ojha, Acharya and Cooper [2018]	

CONCLUSION

The discussion about organizational ambidexterity within supply chain management has enriched the literature and strengthened the conceptualization of organizational ambidexterity. First, by developing specific supply chain ambidexterity to enhance exploration or exploitation capabilities, a firm can cultivate valuable, intangible, and differentiating capabilities that may lead to competitive advantage. Second, supply chain related activities may be involved in the selection, development and implementation of a new process or technology (exploitation) - the result of previous search initiatives (exploration). Furthermore, our paper informs management about the significance of developing and managing a supply chain that supports exploration and exploitation practices. While continuous refinement of existing knowledge is important, it is the production and application of new knowledge that results in the realisation of increasing value (profits). This is critical in providing significant advantages, particularly to major corporations in increasing their long-term efficiency. The findings of this study highlight three main themes with eleven sub-themes that are prevalent in the discussion on organizational ambidexterity within supply chain management context. This study suggests that future research could conduct in depth studies of organizational ambidexterity in the context of small firms to establish the

sequential process of exploration and exploitation of organizational ambidexterity beyond the scope of size and types of collaboration. A systematic literature review could also offers a more comprehensive view in understanding supply chain ambidexterity concept.

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