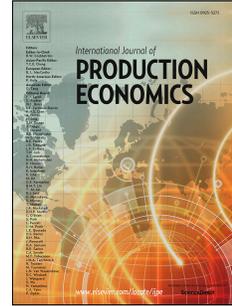


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## **Operations management research grounded in the resource-based view: a meta-analysis**

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# Operations management research grounded in the resource-based view: A meta-analysis

## Abstract

The resource-based view (RBV) has long been adopted in strategic management research, but its use in operations management (OM) research is relatively new. Many empirical studies based upon RBV have investigated OM functions/capabilities and their impacts on business performance. Despite the considerable amount of research that has been conducted, there is no meta-analysis of application of RBV in the OM field. Hitt et al. (2016) reviewed the use and application of RBV in OM, based upon studies published in nine elite OM journals in the period 2007-2013. We take a meta-analytic approach to statistically combine and critically analyze application of RBV in OM over the period 2007-2020. We identify three primary operational functions/capabilities, namely flexibility, supply chain integration, and organizational capability, that have a positive impact on business performance in general, and on competitive performance, financial performance, and operational performance in particular. This study contributes to the literature on application RBV in OM and provides future research directions.

**Key Words:** meta-analysis; resource-based view; flexibility; supply chain integration, organizational capability

**Paper type:** Literature Review

## 1. Introduction

The resource-based view (RBV) of the firm suggests that possessing essential resources enables a firm to create competitive advantage and enhance performance (Barney 1991; Slotegraaf et al., 2003; Vorhies and Morgan, 2005). The perspective of RBV helps firms develop an effective strategy and dynamic capability to meet their strategic objectives (see, e.g., Burnard and Bhamra, 2011; Ismail et al., 2011), and attain sustainable competitive advantage (Chen, 2008; Elkins et al., 2004; Inman et al., 2011). RBV's significance has been widely discussed and recognized in the business literature (see, e.g., Wernerfelt, 1984; Barney, 1991; Peteraf, 1993; Hitt et al., 2016; Rugman and Verbeke, 2002; Greer and Theuri, 2012). Although recognized initially in the strategic management field, RBV has been applied in all the business functional areas, including operations management (OM). The primary motivation for using RBV in various OM domains is that it offers a compelling framework for integrating multiple dissimilar resources to explain their synergistic and differential effects on performance, and the similar contingencies. Plentiful empirical RBV-based studies have been conducted to understand and assess various operational, strategic tools, and to ascertain their value in creating competitive advantage systematically and coherently. In the last three decades, the use of RBV in OM research has experienced an exponential growth: in the

1990s, only 1.7% of the papers published in major OM journals explicitly referred RBV, whereas in the period 2000-2006 that proportion increased to 8.3%. In the period 2007-2013, more than 95 conceptual and empirical papers published in major OM journals drew on RBV (according to a search of OM journals indexed in various business databases). More recently, about 35 RBV-based research papers were published in OM journals documenting varied results over the period 2014-2019. This upward trend indicates the growing importance of RBV for OM research. Despite the increasing use of RBV in OM research, little is known about how firms develop, evaluate, and align their resources according to the RBV perspective to achieve their strategic objectives.

Meta-analysis is one of the emerging methodologies that consolidates the results of previous empirical studies on a set of related hypotheses and provides a more robust estimate of the true effect size than a single study. Despite the considerable amount of research that has been conducted, there is no meta-analysis of application of RBV in the OM field. Hitt et al. (2016) reviewed the use and application of RBV in OM, based upon studies published in nine elite OM journals in the period 2007-2013. Their work led to further exchanges published as notes (Bromiley and Rau, 2016; Hitt et al., 2016). Such narrative reviews usually summarize particular features, and their nature is neither comprehensive nor quantitative (Grant and Booth, 2009). It is noted that a narrative review, by definition, does not summarize and synthesize a large body of empirical evidence. In contrast, a meta-analytical review of studies on application of RBV in OM is valuable by critically analysing and quantitatively synthesizing the results of past studies in this area of research. At its core, meta-analysis averages out the unreliability associated with individual studies, provides a better estimate in aggregate, and more importantly, offers an opportunity to test for the moderators that could explain the heterogeneity (Borenstein et al., 2009). Thus, we advance the literature by conducting a meta-analysis of studies on application of RBV in OM published in eight reputable OM journals over the period 2007-2020. Based on empirical research on RBV in operations management, we identify flexibility, supply chain integration, and organizational capability as the three major groups of research interest. Following this, we conduct group-wise meta-analysis to estimate the sizes of the relationships between the three operational capabilities and firm performance to assess the generalizability of the research findings. We establish significant moderate effect sizes for all the three relationships. We also explore whether the moderators help explain the variability in the effect sizes reported in the respective individual

studies. Among the three capabilities, we find that the nature of industry and country context influence the relationship between organizational capability and business performance.

Specifically, our study contributes to the existing OM literature in four ways. First, we contribute to the literature by identifying the nature and types of operational capabilities, and their impacts on firm performance using meta-analysis. We provide an aggregate analysis of studies focusing on the role of RBV in OM in the context of three primary operational capabilities, namely flexibility, supply chain integration, and organizational capability. Second, we provide a quantitative empirical aggregation of prior empirical studies on the impacts of flexibility, supply chain integration, and organizational capability on business performance in general, and on competitive performance, financial performance, and operational performance in particular. Third, we find that substantive and methodological moderators might account for some of the variance in the reported relationships between the operational capabilities and firm performance. Hence, we analyse whether substantive moderators, namely type of industry and country context, moderate the relationships between the three primary operational functions/capabilities and operational performance. Fourth, we also investigate whether methodological variables like type of data collection method moderate the three relationships.

We organize the rest of the paper as follows: In Section 2, we briefly review the theoretical background of RBV. In Section 3, we introduce the research methodology. In Section 4, we discuss the modelling for evaluating and developing OM themes. In Section 5, we present the meta-analytical study, including the detailed analysis, findings, and discussions. In Section 6, we conclude the paper and suggest future research directions.

## **2. Theoretical Framework and Hypothesis Development**

### ***2.1 Resource-based View in OM Research***

The field of RBV is vast. Researchers have made a distinction between studies on RBV and resource-based theory (RBT) in the business literature. Although there is a certain degree of overlap between RBV and RBT, we focus on the adoption of RBV in OM research with a view to examining the impacts of OM functions/capabilities and the corresponding organizational culture under which they operate on organizational performance.

Developed by Penrose (1959), RBV argues that the competitive advantage of an organization is determined by the critical resources that it owns (Barney, 1991). They comprise productive resources that possess rare characteristics and contribute to organizational competitive

advantage. RBV assumes that resources are heterogeneously distributed among organizations and that rare resources are not perfectly imitable or substitutable (Barney, 1991). He also stated that organizational resources that can create advantage must possess four characteristics, namely valuable (resources that enable a firm to conceive or implement strategies that improve its efficiency or effectiveness), rare (resources that should not be possessed by a large number of competing firms), imperfectly imitable (resources that should not be easily imitated), and non-substitutable (resources that should not be easily replaced by other substitutes). They are known as the VRIN characteristics. On the other hand, studies such as Locket et al. (2001), Priem and Butler (2001) and Wade and Hulland (2004) have criticized RBV for being vague and tautological. Rouse and Daellenbach (1999) also criticized RBV on varied methodological issues. However, despite these criticisms, RBV supporters (e.g., Barney (2001), Day (1994); Grant (1996) etc.) remarked its benefits to outweigh its criticisms, leading to its growing importance in the business literature.

RBV started attracting attention in the OM field when Wernerfelt (1984) asserted that firms could be viewed as collections of resources, and suggested that resources enable the pursuit of effective product/market strategies. RBV has been applied in the OM context to address various OM issues such as capability, flexibility, supply chain integration, IT, outsourcing etc. Table 1 summarizes the key OM functions/capabilities that firms can leverage to create competitive advantage.

The literature also advocates that, from the RBV perspective, strategic resources generate economic value and an organization that possesses such resources that cannot be easily replicated can create competitive advantage. In contrast, the resource-based advantage can sustain over time (Hoopes et al., 2003). Thus, organizations with strategic resources should have sustained competitive advantage over competitors that lack such resources (Barney, 1991). Perhaps because the competitive advantage is difficult to measure (Ketchen et al., 2007), many researchers have sought to empirically link strategic resources and performance (Barney and Arian, 2001). The assumption is that if strategic resources and performance are related, then a competitive advantage must exist. In many studies, competitive advantage is almost synonymous with performance in the sense that competitive advantage is “generally used to describe the relative performance of rivals in a given (product) market environment” (Peteraf and Barney, 2003: 313). Consequently, across the pool of RBV studies, we expect that various OM functions/capabilities including organization capability, manufacturing flexibility, supply chain integration, IT superiority, outsourcing efficacy etc. that use

strategic resources should relate positively to organizational performance or in other words, to sustainable competitive advantage. However, RBV's impact on sustainable competitive advantage is refuted by Bromiley and Rau (2015). The authors expressed that RBV theory does clearly state about the dependent and independent variables that affect the organizational performance. Furthermore, all these OM functions/capabilities impact business performance in terms of financial, non-financial, and innovative performance measures. We discuss in the following the primary OM functions/capabilities identified (Please see Figure 1).

## *2.2 Flexibility*

Flexibility plays a key role in strategically developing operations as a means to create competitive advantage (Slack, 2005) and is an essential capability in the RBV context (Worren et al., 2002). Flexibility is described as a firm's ability to adapt and respond to changes in production volume or mix to give customers individual treatment or to introduce new products/services (Chan, 2003; Slack et al., 2009). Narasimhan et al. (2004) remarked that flexibility enables firms to adapt to a changing environment and to keep ahead of their competitors. A manufacturing firm's flexibility, in a dynamic supply chain, is important to sustain its competitive position and long-term profitability (Stevenson and Spring, 2007). Studies have supported the significant and positive effects of flexibility on financial and market-based performance indicators (Jacobs et al., 2011; Antonio et al., 2007; Tracey, Kim and Volderembse, 2005). Several studies report a positive relationship between flexibility, as a firm's logistics capability, and firm performance, indicating the role of flexibility as a source of competitive advantage (Fawcett et al., 1996; Zhao et al. 2001). Flexibility in supply networks implies achieving multiple performance requirements (e.g., speed, ease, and cost) by managing new knowledge, new technologies, market changes, or other development needs in the course of creating and delivering value (Sanchez, 1995; Conner and Prahalad, 1996; Martinez-Sanchez and Perez, 2005). Swamidass and Newell (1987) found a positive relationship between manufacturing flexibility and economic performance. Besides, Tombak (1988) observed that flexibility has a positive impact on strategic business units (SBUs). Extending the measures of manufacturing performance, Pagell and Krause (2004) introduced such non-financial performance measures as product quality, delivery speed, dependability, and new product introduction. Ojha et al. (2013) studied the effects of manufacturing flexibility on operational performance outcomes such as speed, system efficiency, cost, and inventory. Fantasy et al. (2009) also considered the different effects of the different dimensions of supply chain flexibility on both financial and non-

financial performance outcomes such as lead time and customer satisfaction. Eckstein et al. (2015) tested the impacts of supply chain agility on both operational and cost performance. Chavez et al. (2017) also found positive associations between flexibility and various financial performance measures. Jin et al. (2014) established a positive relationship between supply chain flexibility and the firm's competitive performance. The select papers on flexibility and performance relationship are given in table 3a.

### 2.3 Supply Chain Integration (SCI)

SCI is defined as the degree of strategic collaboration of a firm with its supply chain partners, and cooperative management of intra and inter-organizational processes that lead to efficient and effective flows of goods, services, money, information etc. at a low cost and a high speed to the final customers that enhance the value to them (Frohlich and Westbrook, 2001; Vaart and Donk, 2004, 2008). It involves establishing strategic relationships with supply chain partners (Jacobs et al. 2016; Zimmermann and Foerstl, 2014; Leuschner et al. 2013; Yu et al., 2013; Wu et al., 2006). Pagell (2004) considered SCI as the gist of the supply chain management (SCM) philosophy, while Horvath (2001) considered it as the crucial factor that creates value for the entire supply chain. Flynn et al. (2010) considered developing continuous links with upstream suppliers and downstream customers, and total internal functional synergy as pivotal to SCI. SCI is considered as a strategic resource that can create competitive advantage and lead to improved firm performance (Barney, 2012). SCI includes restructuring of activities to link and simplify processes to help firms in allocating, aligning, and utilizing both internal and external resources (Chen et al., 2009). Achieving both internal and external integration is complex and requires unique capabilities that may be difficult or costly to imitate or implement (Barney, 2012). Because of the employment of both internal and external resources, the relevance of RBV to SCI becomes apparent (Chen et al., 2009). There are many papers recognizing the relevance of RBV to SCI (Olavarrieta and Ellinger, 1997; Leuschner et al., 2013).

RBV also regards SCI as a relational resource that is valuable and inimitable, and leads to competitive advantage. Specifically, developing long-term relations with suppliers helps in developing mutual trust and cooperation, and reducing opportunistic behaviour, ultimately leading to low transaction costs (Zhang and Huo, 2013). Smooth and timely delivery of raw materials is also facilitated by having close alignment with suppliers, which decreases the logistics costs and

enhances overall business performance (Cousins and Menguc, 2006). Flynn et al. (2010) considered that proper integration of a firm with its supply chain partners enables it to reduce production cost, increase product quality, shorten cycle time, and improve customer satisfaction, all of which ultimately create a competitive advantage for the firm. Kim (2009) suggested that SCI provides benefits like product quality, delivery reliability, process flexibility, and cost leadership.

The list of selected empirical papers on SCI and performance relationships are given in table 3b.

#### *2.4 Organizational Capability*

RBV provides a framework to delineate how firms' resources and capabilities help create a competitive advantage for them (Corbett and Claridge, 2002). A large number of studies have established strong relationships between different firms' functional capabilities and firm performance (Dutta et al., 1999; Krasnikov and Jayachandran, 2008; Terjesen et al., 2011; Yu et al., 2014). Barney (1991) viewed that the RBV perspective suggests that the owning of resources that are VRIN leads to dynamic capability. Dynamic capability is "the firm's ability to integrate, build and reconfigure internal and external competences to assess rapidly changing environments" (Ambrosini and Bowman, 2009: pp. 30). According to RBV, to understand the dynamism of a firm's competitive actions, a proper understanding of the growth of the firm's resources and capabilities and how the resources are used is important (Coates and McDermott, 2002). The competitive advantage of a firm stems from the heterogeneous unique specific capabilities that the firm owns (Montgomery and Wernerfelt, 1988; Rumelt, 1984). Capabilities are considered as the most important source of a firm's success (Day, 1994; Srivastava et al., 1998; Teece et al., 1997) and capitalizing on capabilities is vital to securing competitive advantage (Lev, 2004; Ulrich and Smallwood, 2004). Capabilities are argued as the source of the greatest value (Ulrich and Smallwood, 2004) and the intangible nature of firm capabilities has attracted wide attention in recent years (Carmeli and Tishler, 2004) as they are difficult to duplicate (Rumelt, 1984; Dierickx and Cool, 1989).

Amit and Schoemaker (1993, pp. 35) defined organizational capability as "information-based tangible or intangible processes that are firm-specific and are developed over time through complex interactions among the firm's resources." Organizational capability is considered as anything that is the strength of a firm (Wernerfelt, 1984). Focusing on its competitive potential, Coates and McDermott (2002, pp. 436) defined organizational capability as "a bundle of abilities, skills and technologies that a firm performs better than its competitors, that is difficult to imitate

and provides an advantage in the marketplace.” The RBV and OM literature has identified different organizational capabilities that help create a competitive advantage and enhance business performance (Table 3c).

Regarding resources and capabilities as basic constructs, RBV views that firms have different resources and different levels of capabilities in regard to resource exploitation (Barney, 1991; Grant, 1991). Resources (tangible and intangible) are a firm’s assets that can be used for productive purposes (Amit and Schomaker, 1993; Grant, 1991). On the other hand, capabilities that are embedded in the dynamic interactions of multiple knowledge sources are specific and less transferable, which lead to competitive advantage (Peng et al., 2008). Organizational capability refers to the ability of a firm to use its resources “to effect a desired end” (Amit and Schoemaker, 1993). Firms require a wide variety of capabilities to create economic value and sustain competitive advantage (Day, 1994; Estampe et al., 2013). Many studies have examined the relationships between firm capabilities and firm performance (Barnett et al., 1994; Barney and Arkan, 2001). The importance of organizational capability to firm performance and business operations has been well noted (Mahmood et al., 2011). Manufacturing capability has long been recognized as a competitive weapon for firms (Skinner, 1996; Capon et al., 1990). Many studies have found support for positive associations between different manufacturing capabilities like delivery and cost, and organizational performance, but some studies fail to find such support (Lau et al., 2007; Swink et al., 2007). Specifically, Lau et al. (2010) found that while delivery is positively associated with organizational performance in terms of sales, profit, and customer satisfaction, low cost and product quality are not significantly associated with organizational performance. Rosenzweig et al. (2003) found no significant association between cost and customer satisfaction, while low delivery reliability and process flexibility lead to negative financial performance. Wu et al. (2006) considered supply chain capability as firm-specific and difficult to copy across organizations, which serves as a catalyst for converting IT resources into improved firm performance. Han et al. (1998), Janssen and Randy (2006), and Oke et al. (2007) also established a positive association between firm’s innovation performance and financial performance in terms of sales growth, profitability, market share, and customer satisfaction. In addition, Ortega and Villaverde (2008), Vorhies and Morgan (2005), and Karray and Amin (2015) found a positive impact of marketing capability on organizational performance. In view of the above findings, we propose the following hypothesis:

*Hypothesis 1: RBV predicts that operational capabilities including (a) flexibility, (b) supply chain integration, and (c) organizational capability have positive and significant impacts on overall business performance (BP), operational performance (OP), financial performance (FP), and competitive performance (CP).*

### **3. Moderators of the Relationships between Operational Capabilities and Performance**

We examine the impacts of moderator categories on the relationship between operational capabilities and firm performance. We use both methodological moderator, i.e., data collection method (online versus offline) and two substantive moderators, i.e., nature of the industry (manufacturing versus service) and country context (developed versus developing).

#### *3.1 Data Collection*

The literature documents the impact of data collection method in the research results. Kim and Peterson (2017) suggested that the response rate is somewhat higher and better for offline data collection methods than online data collection methods. Since respondents have sufficient time to respond offline than through online method, it is comparatively easier for them to fill the offline questionnaire. This consequently also results in more realistic findings. Our meta-analytical review suggests that the type of data collection method has a varied impact on the effect sizes of the relationships. We find both offline (e.g., mail survey, personal contact survey etc.) and online (e.g., web-based, e-mail etc.) data collection methods used in the selected empirical OM studies. Many offline survey-based studies reveal a somewhat higher impact of supply chain integration on operational performance (e.g., Liu et al., 2016) than their online counterparts (such as Cho et al., 2017). However, studies based on online surveys such as Cao and Zhang (2011) show a greater impact of supply chain integration on financial performance than those based on offline surveys. Similarly, the impact of flexibility on operational performance is higher for offline surveys (e.g., Han et al., 2017a; Kortman et al., 2014a) than for online surveys (e.g., Liao et al., 2010; Kortman et al., 2014b). However, the impact of organizational capability on operational performance is opposite to those of the earlier two operational capabilities. The relationship between organisational capability and operational performance is stronger when online methods are used (Kortman et al., 2014a; 2014b). Thus, we propose the following hypothesis:

*Hypothesis 2: The difference in the effect size between offline and online data collection methods is significant, with a greater effect size in studies based on offline data collection methods than in studies based on online data collection methods.*

### 3.2 Context

Many studies have been conducted in developed and developing countries to examine the relationships between operational capabilities and firm performance. There are differences between developed and developing countries. Since developed countries are well established with robust regularized and monitored internal and external environments, the effect sizes of the relationships between operational capabilities and firm performance are expected to be higher in developed countries than in developing countries (Hoskisson et al., 2000). Villar et al. (2012) remarked that developed countries are characterized by high market potential and provide opportunities for firms to achieve economies of scale and efficiency in their activities through equity modes. Besides, we also argue that the level of awareness and exposure being more among the respondents of developed countries, will have an impact on the item responses. Numbers of studies conducted in developed and developing settings recorded varied results in the selected relationships. Studies conducted in a developed setting such as Alfalla et al., 2014; Cho et al., 2017; Mishra and Shah, 2009 and developing countries such as Huo, 2012; Huo et al., 2016; and Liu et al., 2016 show variation in the impact of SCI on firm performance. Similarly, variation is also observed for the impact of flexibility (Blome et al., 2013; Camison and Lopez, 2010; Chavez et al., 2017; Kortman et al., 2014); and organizational capability (Jin et al., 2013, 2014; Kortmann et al., 2014; Camison and Lopez, 2010; Terziovski et al., 2010; Sardana et al., 2016) on performance. So we propose that the ranges and impacts of flexibility, supply-chain integration, and organizational capability on firm performance are different in developed and developing countries. Thus, we suggest the following hypothesis:

*Hypothesis3: The difference in the effect size between developed and developing countries is significant, with a greater effect size in developed countries than in developing countries.*

### 3.3 Nature of Industry

Since services have intangible characteristics like intangibility, inseparability, heterogeneity, and perishability, services industry affects operational capabilities and firm performance relationship

differently from the manufacturing industry. Further, services being complex in nature and dependent more upon customers' and employees' perceptions, the impact of production and delivery of services is difficult to measure in the service industry. Hence, capabilities can impact the performance differently in the manufacturing and service sectors, leading to variation in the effect sizes of the relationships between operational capabilities and firm performance in the manufacturing and service industries. In view of the nature of the direct interaction between organizations and customers, we argue that the relationships between flexibility, SCI, and organizational capability and business performance are somewhat weaker in the service sector than the manufacturing sector. A number of studies on flexibility (e.g., Blome et al., 2013; Chavez et al., 2017; Hartman and Grahl, 2011); SCI (e.g., Alfalla et al., 2014; Huo, 2012; Terziovski et al., 2010); outsourcing/organizational capability (e.g., Jin et al., 2014; Liao and Kuo, 2014; Liao et al., 2017) are conducted in the manufacturing sector to establish relationship between select operational capabilities and performance. Similarly, literature also documents the impact of these capabilities on performance in the service sector. Please refer research studies namely Martinnez-Sanchez et al., 2007; Han et al., 2017; Hartman and Grahl, 2011 for flexibility; Fawcett et al., 2011; Wang et al., 2016 for SCI and Kortmann et al., 2014; Lun et al., 2016; Wang et al., 2016; for outsourcing/organizational capability. However, we find variations in the effects of the three operational capabilities on performance between the manufacturing and services sectors. Hence, we hypothesize the following:

*Hypothesis 4: The difference in the effect size between the manufacturing and the service industries is significant, with a greater effect size in the manufacturing industries than in service industries.*

## **4. Method**

### *4.1 Database Development*

Our literature review covers RBV-based OM research in the period 2007-2020. We employed several approaches to conduct the literature search. We first conducted a keyword search using the keywords “resource-based view in operations management”, “RBV in OM”, “resource-based view”, “RBV”, “resource-based theory”, “RBT”, “resource-based theory in operations management”, and “RBT in OM” to search electronic databases, including ABI Inform, Emerald, JSTOR, ProQuest, EBSCO, and Science Direct. We supplemented the electronic search with an

issue-by-issue search of the abstracts of articles published in eight premium journals in the fields of OM and general management, including *Journal of Operations Management*, *International Journal of Production Economics*, *International Journal of Production Research*, *Decision Sciences Journal*, *Journal of Supply Chain Management*, *Supply Chain Management: An International Journal*, *Strategic Management Journal*, and *International Journal of Operations and Production Management*. Adopting the Hitt et al.'s (2016) framework for RBV-based OM research review, we excluded studies published in the lesser journals and conferences and unpublished works. We concluded the database development for the meta-analysis when additional search efforts failed to yield additional studies in the said period. We initially identified a total of 2042 papers published in the eight OM and business journals. To be included, a study had to: (i) report at least one relationship about OM functions/capabilities, (ii) measure the relationship from either financial/non-financial and/or market perspectives, (iii) be quantitative or empirical, (iv) disclose the sample size, and (v) provide the correlation coefficient  $r$  and/or convertible equivalents, e.g.,  $\beta$ ,  $t$ , and  $p$  values. We converted the  $\beta$  or  $t$  value into  $r$  to supplement the eligible studies. Applying the above filtering criteria, we reduced the number of selected studies to 67.

#### 4.2 Coding Strategy

At the outset, we scrutinized the selected 67 papers to identify their contributions and to code them based on homogeneity. Three researchers independently coded each study based on conceptualization, antecedents and outcomes, sample size, data collection, reliability value, and other pertinent indicators to calculate the effect size. This process of examination resulted in six operational capabilities, namely supply chain integration, flexibility, organizational capability, resources, outsourcing, and capacity. Since the numbers of papers falling into the outsourcing, capacity, and resources categories were fewer than the minimum threshold (we adopted ten papers as the minimum) for conducting the meta-analysis, we excluded from further analysis. Consequently, we obtained 51 papers grouped under three categories of operational capabilities, i.e., supply chain integration (28 papers), flexibility (13 papers), and organizational capability (17 papers). Table 2 reports the year-wise (2007-2020) numbers of empirical papers published in the nine journals in the three categories. However as per the search selection criteria, we did not find relevant empirical papers on the impacts of flexibility, supply chain integration, and organisational capability on business performance published in 2015, 2017, 2018, 2019, and 2020 (March) in the eight selected journals.

Furthermore, we checked all the empirical papers in the respective categories to make sure that they have consistent and coherent conceptualizations of SCI, flexibility, and organizational capability. To have a thorough assessment of the scale items, we identified whether the scales are consistent with the conceptualizations of SCI, flexibility, and organizational capability; whether each construct is consistent with the dimensions of the respective construct; whether each construct is consistent with the firm performance measures; and also identified the presence of moderators. According to Hunter and Schmidt (2004), 75% of the items of each construct should match the selected conceptualizations of the study. Hence, we excluded the constructs measured from different perspectives than the generic selected conceptualizations in their respective categories, e.g., Debrzykowski et al. (2015), Kamoj et al. (2015), and Liu et al. (2012).

We also checked the items underlying the constructs used in the studies in the respective categories to confirm the level of homogeneity with the respective concepts. Three researchers independently read and coded the papers on the basis of three types of variables, namely operational capabilities and characteristics functions, organizational performance, and study characteristics. To ensure uniformity, consistency, and completeness, we coded the data on Excel and resolved disagreements through discussion after the review of each paper by the group. Agreement among the researchers was high, with initial unanimity occurring in 92 per cent of the papers. We coded and discussed the papers in small lots. We coded a total of 78 (Flexibility, Internal Integration, External Integration, SCI, and Capability) findings from the 51 studies. Collectively, the studies encompass 29,561 organizations.

#### **4.3 Meta-analytic Procedure**

Meta-analysis is “the statistical analysis of a large collection of analysis results from individual studies for the purpose of integrating the findings” (Glass, 1976). It is considered as a methodological approach that combines the results of individual studies on the same aspect to produce a quantified and reproducible synthesis. Since the findings across studies are based on different statistical tests, a common metric is determined. Specifically, the effect size index  $d$ , which represents the effect of an independent variable on a dependent variable. Among the various meta-analytical procedures available in the literature such as Hedges and Olkin (1985), Rosenthal and Rubin (1978, 1988), and Bornstein et al. (2009), we adopted the procedure given by Hunter and Schmidt (2004). The main reason for selecting Hunter and Schmidt’s (2004) procedure is that it is more sophisticated than the other procedures in its efforts to correct the effect sizes for errors (e.g.,

sampling error, reliability of dependent and independent variables etc.). Based on Hunter and Schmidt (2004), we took the following steps to conduct the meta-analysis:

#### *4.3.1 Effect size*

Meta-analysis is based on the common effect size metric in each study. The Pearson correlation coefficient  $r$  is a widely used metric in meta-analysis studies. So we examined and recorded the correlation coefficients between operational capabilities and firm performance in all the studies. In a few papers where the correlation values were not given, we re-produced them either from the sum of the product of pathways from each possible tracing between the variables (Kenny, 1979, p. 30) or calculated them using the other reported test statistics such as the  $t$ ,  $F$ , and chi-square values (Wolf, 1986). Furthermore, according to Hunter and Schmidt (2004), the inclusion of multiple relational aspects in a single study, if considered, can inflate the sample size and effect size, so affecting the meta-analytical results. Hence, we also examined the empirical papers and adjusted for multiple publication criteria to avoid inflation of results. We used composites of the correlation coefficients based on an aggregation method to remove the inflated results as suggested in Hunter and Schmidt (2004). Furthermore, we also examined the effect size at aggregate and individual levels for varied business measures. Finally, to retain the homogenous base of the sample, we excluded the most extreme effect size values (outliers) based on the prior effect size and the effect size after adjusting for sampling errors (Hunter and Schmidt, 2004).

#### *4.3.2. Corrections for Artefacts /Dis-attenuation*

After recording the effect sizes, we corrected them by removing the imperfections that are known as artefacts. Hunter and Schmidt (2004) identified 11 artefacts, which include sampling errors, measurement errors of dependent and independent variables, dichotomization of continuous independent variable, and others. Hunter and Schmidt (1990, 2004) suggested that the best estimate of effect size is based on the weighted average, in which each correlation is weighted using the sample size of each study and later adjusted according to the measurement errors of both dependent and independent variables. Based on the information available, we corrected only three artefacts, namely sampling errors, and measurement errors of dependent variables and measurement errors of independent variables. We corrected the sampling error artefact by assigning larger weights to studies having larger samples, and assigning comparatively smaller weights to studies based on smaller sample sizes. The measurement error artefact value is equal to the square root of the product of reliability values. In case a paper did not record the alpha values, we took the average of

the reliability values of the remaining papers. For the correction of measurement errors, we divided the respective effect sizes by the artefact value that provides the corrected effect size. Furthermore, we replaced the missing reliability values in a few studies by the sample-size weighted mean reliability value of the remaining studies (Bamberger et al., 1999; Hunter and Schmidt, 1990).

Accordingly, we calculated the effect size estimate as the mean of the sample-size weighted correlations  $r$  of the studies. This estimate offers more accuracy than the estimate obtained from any one study because the positive and negative sampling errors cancel out each other (Hunter and Schmidt, 1990). After sampling errors, measurement errors have the largest impacts on the findings and hence are adjusted by dividing the correlation by the square root of the respective squared reliability values of the dependent and independent values. Most RBV-based studies do not report the reliability coefficient of each measure, making it impossible to correct each study individually for the measurement errors. Thus, we used the mean of the available reliability values to correct  $r$ .

#### *4.3.3 Moderation*

Following artefact corrections, we conducted a homogeneity analysis to confirm the presence of potential moderators using the credibility interval. We also used the random-effects model that assumes a heterogeneous distribution of the effect size. The credibility interval refers to the distribution of parameter values rather than a single value (Hunter and Schmidt, 2004). This interval is constructed with the distribution of corrected effect sizes that results after corrections for artefacts have been made (Whitener, 1990). Inclusion of zero in the interval indicates the presence of moderators in the relationship, while the exclusion of zero suggests the absence of moderators. Furthermore, in case of the absence of potential moderators, we conducted subgroup analysis to examine the roles of the methodological and substantive variables. We employed the independent sample  $t$ -test to examine whether there exist any significant differences in the subgroups created on the basis of the methodological and substantive variables at 95%. We constructed confidence intervals around each  $r$  to facilitate hypothesis testing (Whitener, 1990). Because our predictions are directional, we used one-tailed tests. We tested the main effect hypothesized in Hypothesis 1 by finding whether the confidence intervals include zero. We tested the moderator hypotheses, i.e., Hypotheses 2, 3, and 4, by grouping the effects according to the moderator of interest, calculating the  $r$  value for each group, and testing for their differences (Hunter and Schmidt, 1990).

#### *4.3.4 Correct effect size/ population effect size*

After correcting the individual effect sizes for the measurement and sampling errors, we computed the total of the corrected effect sizes. We divided the total of the corrected effect sizes by the total sample size of all the included papers to yield the corrected population effect size. Furthermore, we examined the significance of the mean effect size using the confidence interval. The confidence interval confirms the degree of precision in the estimate of the mean effect size based upon the presence or absence of zero in the confidence interval.

## 5. Results

Before performing the meta-analysis, we examined the data set to detect and eliminate the outliers in all the three categories operational capabilities, i.e., flexibility, SCI, and organizational capability. We examined the uncorrected and corrected effect sizes for abnormal deviations from the sets of values. Consequently, we deleted one observation in Squire et al. (2009) having a sample size of 104 out of the set of 14 observations in the flexibility category; one observation in Mesquita et al. (2007) having a sample size of 182 with an extremely low effect size of 0.03 out of 25 observations in the SCI category; one observation in Sardana et al. (2016) having a sample size of 1,206. Furthermore, Hunter and Schmidt (2004), and Borenstein et al. (2009) suggested the use of the random effects model for aggregating the results of the sample studies using corrections for artefacts. As discussed above, we used sample size and reliability measures of dependent variables and reliability measures of independent variables as three artefacts for corrections. The corrected effect size results in three identified categories as follows:

### 5.1 Flexibility-Performance Relationship

The corrected effect size of flexibility on performance is 0.598, which is higher than the uncorrected effect size (Table 4a). The confidence interval, ranging from 0.624 to 0.573, show a significant and positive relationship between flexibility and overall business performance. Hence, hypothesis H1a (BP) is accepted. To further understand this relationship, we examine the relationship of flexibility with three sub-performance measures, namely operational performance, financial performance, and competitive performance. The effect size of flexibility on operational performance, financial performance and competitive performance are 0.534, 0.390, and 0.639, with confidence interval ranging from 0.623 to 0.445, 0.443 to 0.337, and 0.683 to 0.595 respectively. The results show a positive and significant relationship between flexibility and the three sub-performance measures. Thus, hypotheses H1a (OP), H1a (FP), and H1a (CP), are accepted,.

Furthermore, the impact of flexibility is found to be higher for competitive performance, followed by operational performance and financial performance.

### 5.2 SCI-Performance Relationship

The overall effect size of SCI on business performance is 0.366 with confidence interval ranging between 0.384 to 0.349 (Table 4b), establishing a significant and positive relationship between the two. Hence, hypothesis H1b (BP) stands accepted. Furthermore, the corrected effects of SCI on operational performance; ( $r_c = 0.356$  and confidence interval (CI): 0.378 to 0.333); financial performance ( $r_c = 0.336$  and CI = 0.366 to 0.307) and competitive performance ( $r_c = .482$  and CI: 0.545 to 0.419) show positive and moderate relationships between them. Thus all the three sub-hypotheses- H1b (SCI and operational performance), H1b (SCI and financial performance), and H1b (SCI and competitive performance) are accepted.

### 5.3 Organizational Capability-Performance Relationship

The corrected effect size between organizational capability and performance is 0.374, with confidence interval ranging from 0.391 to 0.357, reflecting a moderate significant relationship between organizational capability and overall business performance Table 4c). Hence, hypothesis H1c (BP) is accepted. The relationship between organizational capability and financial performance ( $r_c =$  and CI: 0.334 to 0.277) and competitive performance ( $r_c = 0.475$  and CI: 0.508 to 0.441) are positive and significant, leading to acceptance of hypotheses- H1c (FP) and H1c (CP). However hypothesis H1c (OP) is rejected ( $r_c = 0.093$ , and CI: 0.221 to -0.034).

### 5.4 Role of Methodological Variable: Data Collection

The effect size values of online data and offline surveys are 0.627 (CI: 0.689 to 0.564) and 0.570 (CI: 0.628 to 0.507) for the flexibility-performance link, with total sample sizes of 1,258 and 1187, respectively. The results indicate that studies using online data collection methods have a slightly larger effect size than studies using offline collection methods. Furthermore, we used the  $t$ -test to test the presence of a significant difference in the effect size between the two groups. The mean effect sizes are 0.078 and 0.095 for the online and offline data collection groups, respectively. The  $F$ -test value is 0.521 ( $p = 0.484$ ), and the  $t$ -test value is -0.635 ( $p = 0.537$ ), establishing an insignificant difference in the effect size between the two groups. Thus, hypothesis H2a (BP) is rejected.

We could not examine the moderating role of data collection in SCI and OC studies as the majority of the studies included in the database using only offline data collection methods for SCI studies and online data collection methods for organizational capability studies.

### *5.5 Role of Substantive Variables*

Since the number of papers on flexibility and SCI are small in contexts of developed countries and the service sector, we could not ascertain the moderating role of the substantive variables in relationship of flexibility and SCI with performance. Thus, impact of the industry (manufacturing/services) and country (developed/developing) as two substantive variables are checked for the organizational capability and business performance only using sub-group analysis (Table 5).

The effect sizes are 0.337 for the manufacturing group comprising 16 observations with a total sample size of 7,461, and 0.550 for the service group comprising eight observations with a total sample size of 1,559, with the corresponding confidence intervals ranging from 0.362 to 0.312 and 0.583 to 0.518, respectively. The results show a moderate and significant relationship between organizational capability and firm performance, with a somewhat larger effect size in the service sector than in the manufacturing sector. Furthermore, the average effect sizes of 0.021 (SD=0.028) and 0.069 (SD=0.081) for the manufacturing and service sector groups, respectively, result in insignificant difference between the manufacturing and services sectors ( $F$ -value = 3.542,  $p$  = 0.073) and ( $t$ -value = -2.138,  $p$  = 0.044)). Hence, hypothesis H3 (OC) is rejected.

In the country context, the developed countries group contains nine observations with a sample size of 2,524, while the developing countries group contains 15 observations with a sample size of 6,496. The average effect size for the developed and developing countries groups are 0.12 (CI: 0.148 to 0.092) and 0.473 (CI: 0.491 to 0.454) respectively, indicating higher effect size in studies conducted in developing countries than in developed countries group. The results indicate a significant relationship between organizational capability and performance in studies conducted in both developed and developing countries. The mean effect sizes for the developed and developing countries groups are calculated as 0.0133 and 0.0315, respectively with  $t$ -value as 1.546 ( $p$ =0.136). The result reveals an insignificant difference in the results of the two groups. Hence, Hypothesis H4 (OC) is rejected.

## **6. Discussion**

Unlike Hitt et al.'s classification of RBV studies in OM in four groups, we identify three major groups of the select empirical literature - flexibility, SCI, and organizational capability, using an application of meta-analysis procedure on RBV-based OM research. We present the findings in each category as follows:

### *6.1 Flexibility*

Leveraging insights from RBV, we conduct a meta-analysis to ascertain the impact of flexibility on overall business performance and its sub-performance measures, i.e., operational performance, financial performance, and competitive performance measures. The effect sizes in the selected studies, namely Martinez and Sanchez (2007a, b, c), and Liao et al. (2010), are low, ranging from 0.147 to 0.283, and moderate, ranging from 0.41 to .657, in studies such as Kortman et al. (2014a, b), Han et al. (2017a, b, c), Camison and Lopez (2010b), Cheng et al. (2014), Hartman and Grahl (2011), Jin et al. (2013a, b), and Kortman et al. (2014c). Our meta-analysis results find 0.598 as correct effect size for the flexibility and performance relationship, which is moderate and significant. We also find the impact of flexibility on different performance measures, with corrected mean effect size recorded as 0.534, 0.390, and 0.639 for operational, financial, and competitive performance measures, respectively. Among the three sub-performance measures, the impact of flexibility is highest on competitive performance and least on financial performance, which is similar with the findings of Andriopoulos and Lewis (2009), Gibson and Birkinshaw (2004), and Uotila et al. (2009).

The majority of the selected studies, conducted in the manufacturing sector and developed countries, consider flexibility as a valuable capability from the perspective of RBV. Their corrected mean effect sizes are 0.60 and 0.583, respectively, which are somewhat equal to the overall effect size of the studies on the flexibility-performance relationship. However, the sub-group analysis of the methodological variable, i.e., data collection methods (online and offline), shows no significant difference in the impact of flexibility on business performance between online and offline data collection methods.

### *6.2 Supply Chain Integration*

Our meta-analysis examines the links between SCI and business performance and its various sub-performance measures. The results indicate a significant positive association between SCI and overall business performance in the selected RBV-based OM studies. The uncorrected effect sizes in the studies range from low, e.g., 0.12 in Mishra and Shah (2009), and 0.13 in Cho et al. (2017),

to moderate, e.g., 0.566 in Alfalla-Luque et al. (2014), whereas the meta-analysis results reveal that the average effect size of SCI on firm performance is 0.366, showing a moderate association between SCI and aggregate performance, comprising financial, non-financial, and operational performance. Our findings are consistent with the results of studies such as Alfalla-Luque et al. (2014), Huo (2012), and Terziovski, (2010). Despite the varying intensity, our results are consistent with the results of the meta-analysis on the SCI-performance link conducted by Leuschner et al. (2013). On the other hand, our results are inconsistent with a meta-analysis results of Sofyahoglu and Ozturk (2012), who found an insignificant relationship between SCI and firm performance. However, both of two studies measured SCI and performance relationship from a generic perspective, i.e., they made no distinction in the effect size results of RBV-based and non-RBV-based studies.

Furthermore, our study also establishes a significant and positive relationship between SCI and the sub-performance measures of operational, financial, and competitive performance, with corrected effect sizes of 0.534, 0.390, and 0.639, respectively. These results show that the impact of SCI is somewhat greater on competitive performance and least on financial performance. However, our results concerning the operational and financial performance measures are higher than those of Leuschner et al. (2013), which may be due to the fact that our study focuses on RBV-based OM studies exclusively, which helps firms attain competitive performance. Furthermore, the SCI-operational performance link, which is moderate and significant, agrees with the results of Leuschner et al. (2013), but is different from those of Sofyahoglu and Ozturk (2012), who found an insignificant relationship between SCI and operational performance.

Furthermore, we also find all the dimensions of SCI, i.e., internal integration, customer integration, supplier integration, and overall external integration, to have a positive impact on business performance. Among the three SCI dimensions, the impact of internal integration on business performance is greatest at 0.420, which differs from the results of Hartman and Grahl (2011), and Pradabwong et al. (2017), who found that the impact of external integration on business performance is the largest. The greater impact of internal integration might be due to the fact that RBV-focused firms first effectively integrate internally before making external integration attempts. In the literature, many studies conceptualize internal integration as a precursor of external integration (Tracey, 2004; Braunscheidel and Suresh, 2009). Tracey (2004) advised that internal attitudes and procedures need to be aligned before including partners in the integration efforts for

maximizing the results. Further, our sub-group analysis results reveal insignificant differences between the developed and developing countries groups for internal and customer integrations and significant difference for external integration.

### *6.3 Organizational Capability*

Our meta-analysis results reveal a positive and significant effect size (.366, CI: 0.35 to 0.32) for organizational capability and performance relationship. The relationships between organizational capability and financial and competitive performance measures are also significant and positive with corrected effect sizes recorded as 0.306 and 0.475, respectively. However, the impact is least and insignificant on operational performance. The moderator analysis reveals significant differences in the effects of organizational capability on performance in the service and manufacturing sectors. This might be due to the better customized relationships between the owner and the customers. However, there exists no significant difference in the results of studies conducted in developed and developing countries and also between online and offline data collection methods.

## **7. Study Implications**

RBV advocates that superior business performance can be achieved when firms have valuable resources and capabilities (Wernerfelt, 1984; Barney, 1986; Peteraf, 1993). Our study reveals that the focus of RBV-based OM research has shifted from tangible and intangible resources to capabilities to sustain competitive advantage. The study has both managerial and research implications.

### *7.1 Managerial Implications*

The study provides valuable insights for operations managers on managing manufacturing/service operations within their firms. Although study finds a comparatively higher impact of flexibility and SCI than organizational capability on firm performance, but we recommend that managers need to focus on all the three operational capabilities to enhance firm performance. It is suggested that firms that consider these capabilities simultaneously that is use flexibility in its production, labour, suppliers, and IT management, implement SCI (both internal and external) in their manufacturing/service operations and focus on managing organisational capability can sustain competitive advantage. In addition, we also find that firm characteristics like industry and nature of developing and developed country context also impact organizational capability-performance link.

Overall, the study suggests that operations managers should promote flexibility in the work environment to maximize business performance as it helps forge a closer link between products/services and customer need, resulting in enhanced customer satisfaction. By improving flexibility such as labour, volume etc., the chances for managers to make their firms successful in an uncertain environment are more as flexible firms have access to flexible resources, enabling them to create a range of strategic options (Sanchez, 1995; Wright and Snell, 1998). Also, flexible allocation of resources enables firms to produce a wide array of products/services, paving the way to introduce innovative products/services that deliver customized solutions to the customers. However, an over-emphasis on flexibility could result in a lower return on investment (Andriopoulos and Lewis, 2009; Gibson and Birkinshaw, 2004; Uotila et al., 2009). Hence, managers should craft their strategies by striking a proper balance between flexibility and rigidity to sustain competitive advantage.

Similar to flexibility, we suggest that managers should pursue SCI in their firms to enhance business performance. As the resources in firms are limited, managers need to allocate resources judiciously to build SCI infrastructure to reap the maximum possible benefit. We find positive relationships between SCI and overall business performance and its three sub-measures. Our findings provide answers to many managerial questions such as which dimension of SCI (internal /external/customer) has the greatest impact on overall performance, competitive performance, operational performance, and financial performance. Specifically, study findings reveal that managers should pursue internal integration before external integration as internal integration has the greatest impact on business performance. To this end, managers need to ensure that the internal processes, functions, and teams within their firms are properly aligned before engaging in integration and collaboration activities with external partners, i.e., customers and suppliers. Successful implementation of SCI can ultimately help firms create a competitive advantage. In addition, since there are differences in the impact of external integration on business performance in developed and developing countries, managers in developing countries need to focus more on the external-related aspects of integration to enhance business performance.

Lastly with regard to organizational capability, the study recommends that managers make concerted efforts to develop various aspects of organizational capability spanning domains of marketing, production, IT etc. to create competitive advantage and boost firm performance. It should also be kept in mind that various aspects of organizational capability are not necessarily

independent; in fact, an organizational capability becomes more valuable when its different aspects are coordinated and mutually reinforcing (Ordanini and Rubera, 2008).

### *7.2 Implications for research*

This paper has implications for operations management research. First, this paper indicates the need to understand the role of flexibility, supply chain integration, and organisational capabilities from the operational capabilities perspective in OM research. Although flexibility, supply chain integration, and organisational capabilities are significant operational capabilities, a comparison of the effect sizes (Tables 4a, 4b and 4c) indicate that the effects of flexibility and supply chain integration on organisational performance are almost same, i.e., .6, while the impact of organisational capability on organisational performance is comparatively low, i.e., .4. We recommend that researchers consider the role of the flexibility and supply chain integration in view of the aggregated findings presented here.

Research studies in OM have not explored the impacts of country context and service type on the links between the three operational capabilities and organisational performance. However such methodological moderators have been considered significant in other functional areas like strategic management, marketing, and human resources. We suggest that OM researchers consider the findings of our meta-analysis in developing their research models. Specifically, we recommend that researchers explicitly discuss and empirically measure the impacts of service and country contexts.

## **8. Conclusions and Future Research**

We find that flexibility, SCI, and organizational capability have a significant positive but moderate effect on business performance in general, and on operational performance, financial performance, and competitive performance in particular. Specifically, their impact is highest on competitive performance, followed by operational and financial performance.

We conduct this study amidst certain limitations, which need to be considered before generalizing the results. First, we perform a meta-analysis on flexibility, supply chain integration, and organizational capability, based on empirical research papers published only in the A\* and A journals on the ABDC list of journals. Although the papers published in such journals possess methodological rigour, all the relevant studies published in other journals as well should be considered in the future to avoid publication bias. In the future, papers from all the journals should be considered to form a large pool of studies for conducting the meta-analysis. Further, to build

confidence in the study results, future research needs to conduct file drawer or failsafe analysis. Second, we evaluated select characteristics/artefacts based on Hunter and Schmidt (2004) methodology. Meta-analysis procedure given by scholars such as Borenstein (2009) can be used in future to compare and establish similarity in the select relationships relating to flexibility, supply chain integration and organizational capability. Third, the results on the roles of potential moderators, i.e., type of industry, country context, and data collection methodology, in the various tested relationships can be empirically tested in future studies for validation and be examined using meta-analysis. Fourth, although we take into account sampling and measurement errors in the dependent and independent variables by assigning weights to the included studies on the basis of sample size and by using construct reliabilities, there are other undetectable and inevitable artefacts such as deviation from perfect construct validity (in both dependent and independent variables), and reporting and transcriptional errors (Hunter and Schmidt, 2004), which constitute some of the potential unknown limitations of this study like any other meta-analysis. Fifth, since organisational capability is generic in nature, its role as a moderator and mediator in the flexibility-performance link and supply chain integration-performance link can be explored in future research for enhanced firm performance.

## References

- Alfalla-Luque, R., Marin-Garcia, J.A., & Medina-Lopez, C. (2014) An analysis of the direct and mediating effects of employee commitment and supply chain integration on organisational performance. *International Journal of Production Economics*, 162, 242-257.
- Allred, C.R., Fawcett, S.E., Wallin, C., & Mangan, G.M. (2011) A dynamic collaboration capability as a source of competitive advantage. *Decision Sciences*, 42(1), 129-161.
- Ambrosini, V., & Bowman, C. (2009) What are dynamic capabilities and are they a useful construct in strategic management? *International Journal of Management Review*, 11(1), 29-49.
- Amit, R., & Schoemaker, P.H. (1993) Strategic assets and organisational rent. *Strategic Management Journal*, 14(1), 33-46.
- Anand, G., & Ward, P.T. (2004) Fit, flexibility and performance in manufacturing: coping with dynamic environments. *Production and Operations Management*, 13(4), 369-385.
- Andriopoulos, C., & Lewis, M.W. (2009) Exploitation-exploration tensions and organizational ambidexterity: Managing paradoxes of innovation. *Organization Science*, 20(4), 696-717.
- Antonio, L., Yam, K.W., & Tang, E. (2007) The impacts of product modularity on competitive capabilities and performance: An empirical study. *International Journal of Production Economics*, 105(1), 1-20.
- Ataseven, C., & Nair, A. (2017) Assessment of supply chain integration and performance relationships: A meta-analytical investigation of the literature. *International Journal of Production Economics*, 185, 252-265.
- Bamberger, P.A., Kluger, A.N., & Suchard, R. (1999) The antecedents and consequences of union commitment: a meta-analysis, *Academy of Management Journal*, 42, 304-18
- Barnett, W.P., Greve, H.R., & Park D.Y. (1994) An evolutionary model of organizational performance. *Strategic Management Journal*, 15, 11-28.
- Barney, J.B. (1986) Strategic factor markets: Expectations, luck and business strategy, *Management Science*, 42, 1231-1241.
- Barney, J.B. (1991) Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.
- Barney, J.B. (2012) Purchasing, supply chain management and sustained competitive advantage: The relevance of resource-based theory. *Journal of Supply Chain Management*, 48(2), 3-6.
- Barney, J.B., & Arikan, A.M. (2001) The resource-based view: Origins and implications. *The Blackwell Handbook of Strategic Management*. Blackwell, Oxford.
- Blome, C., Schoenherr, T., & Rexhausen, D. (2013) Antecedents and enablers of supply chain agility and its effects on performance: a dynamic capabilities perspective. *International Journal of Production Research*, 5(4), 1295-1318.
- Borenstein, M., Hedges, L.V., Higgins, J.P., & Rothstein, H.R. (2009) *Introduction to Meta-analysis (First Edition)*. Wiley, London.
- Bouyer, K.K., & Lewis, M.W. (2002) Competitive priorities: Investigating the need for trade-offs in operations strategy. *International Journal of Operations and Production Management*, 11(1), 9-20.
- Braunscheidel, M.J., & Suresh, N.C. (2009) The organizational antecedents of a firm's supply chain agility for risk mitigation and response, *Journal of Operations Management*, 27(2), 119-140.
- Bromiley, P., & Rau, D. (2016) Operations management and the resource based view: Another view. *Journal of Operations Management*, 41, 95-106.

- Burnard, K., & Bhamra, R. (2011) Organisational resilience: Development of a conceptual framework for organisational responses. *International Journal of Production Research*, 49, 5581-5599.
- Cao, M., & Zhang, Q. (2011) Supply chain collaboration: Impact on collaborative advantage and firm performance. *Journal of Operations Management*, 29, 163-180.
- Capon, N., Farley, J.U., & Hoenig, S. (1990) Determinants of financial performance: A meta-analysis. *Management Science*, 36(10), 1143-1159.
- Camison, C., & Lopez, A.V. (2010) An examination of the relationship between manufacturing flexibility and firm performance: A mediating role of innovation. *International Journal of Operations and Production Management*, 30(8), 853-878.
- Carmeli, A., & Tishler, A. (2004) The relationships between intangible organisational elements and organisational performance. *Strategic Management Journal*, 25, 1257-1278.
- Chan, F. (2003) Performance measurement in a supply chain. *International Journal of Advance Manufacturing Technology*, 21(7), 534-548.
- Chavez, R., Wantao, Y., & Feng, M.A. (2017) Manufacturing capabilities and organisational performance: The role of entrepreneurial orientation. *International Journal of Production Economics*, 184, 33-46.
- Chen, C.C. (2008) An objective-oriented and product-line-based manufacturing performance measurement. *International Journal of Production Economics*, 112, 380-390.
- Chen, H., Pee, P., & Lay, T. (2009) Drivers of dynamic learning and dynamic competitive capabilities in international strategic alliances. *Journal of Business Research*, 62-12, 1289-1295.
- Cheng, J.-H., Chen, M.-C., & Huang, C.-M. (2014) Assessing inter-organisational innovation performance through relational governance and dynamic capabilities in supply chains. *Supply Chain Management: An International Journal*, 19(2), 173-186.
- Cho, Y.S., Jung, J.Y., & Linderman, K. (2017) The QM evolution: Behavioral quality management as a firm's strategic resource. *International Journal of Production Economics*, 191, 233-249.
- Coates, T.T., & McDermott, C.M. (2002) An exploratory analysis of new competencies: A resource based view perspective. *Journal of Operations Management*, 20(5), 435-450.
- Conner, K.R., & Prahalad, C.K. (1996) A resource-based theory of the firm knowledge versus opportunism. *Organisation Science*, 7(5), 477-501.
- Corbett, L.M., & Claridge, G.S. (2002) Key manufacturing capability elements and business performance. *International Journal of Production Research*, 40(1), 109-131.
- Cousins, P.D., & Menguc, B. (2006) The implications of socialization and integration in supply chain management. *Journal of Operations Management*, 24(5), 604-620.
- Day, G.S. (1994) The capabilities of market driven organisation. *Journal of Marketing*, 58(4), 37-52.
- Debrzykowski, D.D., Leuschner, R., Hong, P.C., & Roh, J.J. (2015) Examining absorptive capacity in supply chains: Linking responsive strategy and firm performance. *Journal of Supply Chain Management*, 51(4), 3-28.
- Dierickx, J., & Cool, K. (1989) Asset stock accumulation and sustainability of competitive advantage. *Management Science*, 35, 1504-1511.
- Dutta, S., Narashiman, O., & Surendra, R. (1999) Success in high technology markets: Is marketing capability critical? *Marketing Science*, 18(4), 547-568.

- Eckstein, D., Goellner, M., Blome, C., & Henke, M. (2015) The performance impact of supply chain agility and supply chain adaptability: The moderating effect of product complexity. *International Journal of Production Research*, 53(10), 3028-3046.
- Elkins, D.A., Huang, N., & Alden, J.M. (2004) Agile manufacturing systems in the automotive industry. *International Journal of Production Economics*, 91, 201-214.
- Estampe, D., Lamouri, S., & Paris, J. (2013) A framework for analysing supply chain performance evaluation models. *International Journal of Production Economics*, 142(2), 247-258.
- Fantasy, K.A., Kumar, V., & Kumar, U. (2009) An empirical study of the relationships among strategy, flexibility and performance in the supply chain context. *Supply Chain Management: An International Journal*, 14(3), 177-188.
- Fawcett, S.E., Calantone, R., & Smith, S.R. (1996) An investigation of the impact of flexibility on global reach and firm performance. *Journal of Business Logistics*, 17(2), 167-196.
- Fawcett, S.E., Wallin, C., Allred, C., Fawcett, A.M., & Magnan, G.M. (2011) Information technology as an enabler of supply chain collaboration: A dynamic capabilities perspective. *Journal of Supply Chain Management*, 47(1), 38-59.
- Flynn, B.B., Huo, B., & Zhao, X. (2010) The impact of supply chain integration on performance: A contingency and configuration approach. *Journal of Operations Management*, 28(1), 58-71.
- Frohlich, M.T., & Westbrook, R. (2001) Arcs of integration: An international study of supply chain strategies. *Journal of Operations Management*, 19, 185-200.
- Gibson, C.B., & Birkinshaw, J. (2004) The antecedents, consequences, and mediating role of organizational ambidexterity. *Academy of Management Journal*, 47(2), 209-226.
- Glass G. (1976) Primary, secondary and meta-analysis of research. *Educational Researcher*, 5(10), 3-8.
- Grant, M.J., & Booth, A. (2009) A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Information & Libraries Journal*, 26, 91-108.
- Grant, R.M. (1991) The Resource-based theory of competitive advantage: Implications for strategy formulation. *California Management Review*, 114-135.
- Greer, B.M., & Theuri, P. (2012) Linking supply chain management superiority to multifaceted firm financial performance. *Journal of Supply Chain Management*, 48(3), 97-106.
- Han, J.H., Wanh, Y., & Naim, M. (2017) Reconceptualization of information technology flexibility for supply chain management: An empirical study. *International Journal of Production Economics*, 187, 196-215.
- Han, J.K., Kim, N., & Srivastava, R.K. (1998) Market orientation and organizational performance: Is innovation a missing link? *Journal of Marketing*, 62(October), 30-45.
- Hartmann, E., & Grahl, A.D. (2011) The flexibility of logistics services providers and its impact on customer loyalty: An empirical study. *Journal of Supply Chain Management*, 47(3), 63-85.
- Hedges, L.V., & Olkin, I. (1985) *Statistical Methods for Meta-analysis*. Academy Press, San Diego.
- Hitt, M.A., Xu, K., & Carnes, C.M. (2016) Resource based theory in operations management research. *Journal of Operations Management*, 41, 77-94.
- Hoopes, D.G., Madsen, T.L., & Walker, G. (2003) Why is there a resource-based view? Towards a theory of competitive heterogeneity. *Strategic Management Journal*, 24(10), 559- 902.
- Hoskisson, R.E., Eden, L., Lau, C.M., & Wright, M. (2000) Strategy in emerging economies. *Academy of Management Journal*, 43(3), 249-267.
- Horvath, L. (2001) Collaboration: The key to value creation in supply chain management. *Supply Chain Management: An International Journal*, 5(6), 205-207.

- Hult, G.T., J.R., D.J., & Arrfelt, M. (2007) Strategic supply chain management: Improving performance through a culture of competitiveness and knowledge development. *Strategic Management Journal*, 28, 1035-1052.
- Hunter, J.E., & Schmidt, F.L. (1990) *Methods of Meta-analysis: Correcting Error and Bias in Research Findings*. Sage, Newbury Park.
- Hunter, J.E., & Schmidt, F.L. (2004) *Methods of Meta-analysis: Correcting Error and Bias in Research Findings (Second Edition)*. Sage, Newbury Park.
- Huo, B. (2012) The impact of supply chain integration on company performance: an organisational capability perspective. *Supply Chain Management: An International Journal*, 17(6), 596-610.
- Huo, B., Han, Z., & Prajoga, D. (2016) Antecedents and consequences of supply chain information integration: a resource-based view. *Supply Chain Management: An International Journal*, 21(6), 661-677.
- Inman, R.A., Sale, R.S., Green, K.W., & Whitten, D. (2011) Agile manufacturing: Relation to JIT, operational performance and firm performance. *Journal of Operations Management*, 29, 343-355.
- Ismail, H.S., Poolton, J., & Sharif, H. (2011) The role of agile strategic capabilities in achieving resilience in manufacturing based small companies. *International Journal of Production Research*, 49, 5469-5487.
- Jacobs, M., Yu, W., & Chavez, R. (2016) The effect of internal communication and employee satisfaction on supply chain integration. *International Journal of Production Economics*, 171(1), 60-70.
- Jacobs, M., Droge, C., Vickery, S., & Calantone, R. (2011) The effect of product and process modularity on agility and firm growth performance. *Journal of Product Innovation Management*, 28(1), 124-138.
- Jenssen, J.I., & Randy, T. (2006) The performance effect of innovation in shipping companies. *Maritime Policy and Management: An International Journal of Shipping and Port Research*, 33(4), 327-343.
- Jin, Y., Vonderembse, M., & Raguathan, T.S. (2013) Proprietary technologies: building a manufacturer's flexibility and competitive advantage. *International Journal of Production Research*, 51(19), 5711-5727.
- Jin, Y., Vonderembse, M., Raguathan, T.S., & Smith, J.T. (2014) Exploring the relationships among IT enabled sharing capability, supply chain flexibility and competitive performance. *International Journal of Production Economics*, 153, 24-34.
- Kamoj, S., Goyal, P., & Rahman, Z. (2015) A resource-based view on marketing capability, operations capabilities and financial performance. *Procedia of Social and Behavioural Sciences*, 189, 406-415.
- Ketchen Jr, D.J., Hult, G.T.M., & Slater, S.F. (2007) Toward greater understanding of market orientation and the resource-based view. *Strategic Management Journal*, 28(9), 961-964.
- Kortmann, S., Gelhard, C., Zimmermann, C., & Piller, F.T. (2014) Linking strategic flexibility and operational efficiency: The mediating role of ambidextrous operational capabilities. *Journal of Operations Management*, 32, 475-490.
- Krasnikov, A., & Jayachandran, S. (2008) The relative impact of marketing, research and development and operations capabilities on firm performance. *Journal of Marketing*, 72(4), 1-11.

- Karray, S., & Amin, S.H. (2015) Cooperative advertising in a supply chain with retail competition. *International Journal of Production Research*, 53(1), 88-105.
- Kenny, D. A. (1979). *Correlation and Causality*. Wiley, New York.
- Ketchen, D.J., & Hult, G.T. (2007) Bridging organization theory and supply chain management: The case of best value supply chains. *Journal of Operations Management*, 25(2), 573-580.
- Kim, S.W. (2009) An investigation on the direct and indirect effect of supply chain integration on firm performance. *International Journal of Production Economics*, 119, 328-346.
- Kim, Y., & Peterson, R.A. (2017) A meta-analysis of online trust relationship in e-commerce. *Journal of Interactive Marketing*, 38, 44-54.
- Koufteros, X.A., Rawski, G.E. and Rupak, R. (2010) Organizational integration for product development: the effects on glitches, on-time execution of engineering change orders, and market success. *Decision Sciences*, 41(1), 49-80.
- Lau, A., Yam, R., & Tang, E. (2010) Supply chain integration and product modularity: An empirical study of product performance for selected Hong Kong manufacturing industries. *International Journal of Operations & Production Management*, 30, 20-56.
- Lee, H.L. (2004) The triple-A supply chain. *Harvard Business Review*, 82(10), 102-113.
- Lee, C., Lee, K., & Pennings, J.M. (2001) Internal capabilities, external networks and performance: A study on technology based ventures. *Strategic Management Journal*, 22(6), 615-640.
- Leuschner, R., Rogers, D.S., & Charvet, F.F. (2013) A Meta-analysis of supply chain integration and firm performance. *Journal of Supply Chain Management*, 49(2), 34-57.
- Lev, B. (2004) Sharpening the intangibles edge. *Harvard Business Review*, 82(6), 109-116.
- Liao, Y., Hong, P., & Rao, S.S. (2010) Supply management, supply flexibility and performance outcomes: An empirical investigation of manufacturing firms. *Journal of Supply Chain Management*, 46(3), 6-22.
- Liao, S.H., Hu, D.C., & Ding, L.W. (2017) Assessing the influence of supply chain collaboration value innovation, supply chain capability and competitive advantage in Taiwan's networking communication industry. *International Journal of Production Economics*, 191, 143-153.
- Liao, S.H., & Kuo, F.I. (2014) The study of relationship between the collaboration for supply chain, supply chain capabilities and firm performance: A case of the Taiwan's TFT-LCD industry. *International Journal of Production Economics*, 156, 295-304.
- Liu, G., Shah, R., & Schroeder, R.G. (2012) The relationships among functional integration, mass customisation and firm performance. *International Journal of Production Research*, 50(3), 677-690.
- Liu, H., Ke, W., Wei, K.K., & Hua, Z. (2013) Effect of supply chain integration and market orientation on firm performance. *International Journal of Operations and Production Management*, 33(3), 322-346.
- Liu, H., Wei, S., Ke, W., Wei, K.K., & Hua, Z. (2016) The configuration between supply chain integration and information technology competency: A resource orchestration perspective. *Journal of Operations Management*, 44, 13-29.
- Liu, Z., Prajoga, D., & Oke, A. (2016) Supply chain technologies: Linking adoption, Utilization and performance. *Journal of Supply Chain Management*, 52(4), 22-41.
- Lun, Y.V., Shang, K.C., Lai, K.H., & Cheng, T.C.E. (2016) Examining the influence of organisational capability in innovative business operations and the mediation of profitability on customer satisfaction: An application in intermodal transport operators in Taiwan. *International Journal of Production Economics*, 171, 179-188.

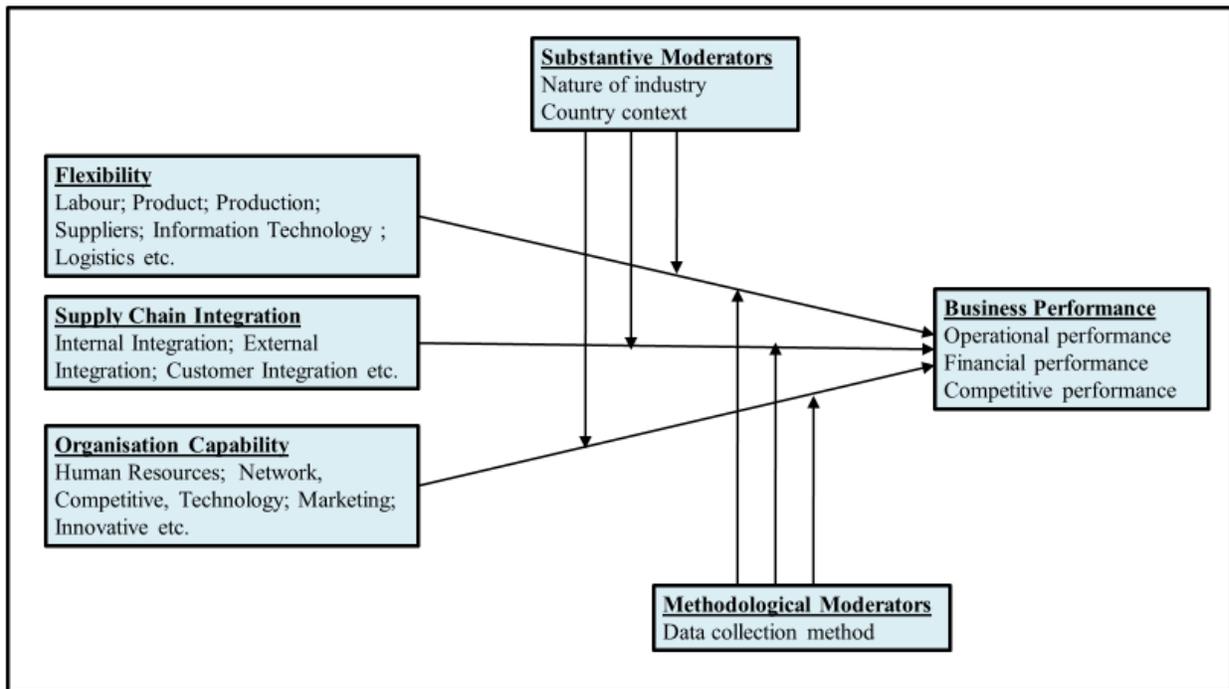
- Mahmood, A., Qureshi, M.A., & Shahbaz, Q. (2011) An examination of the quality of tacit knowledge sharing through the theory of reasoned action. *Journal of Quality and Technology Management*, 7(1), 39-55.
- Martinez-Sanchez., & Perez, M. (2005) Supply chain flexibility and firm performance: a conceptual model and empirical study in the automotive industry. *International Journal of Operations and Production Management*, 25(7), 681-700.
- Martinez-Sanchez, A., Vela-Jimenez, M.J., Luis-Carnicer, P.D., & Perez-Perez, M. (2007) Managerial perceptions of workplace flexibility and firm performance. *International Journal of Operations and Production Management*, 7, 714-734.
- Mesquita, L.F., Lazzarini, S.G., & Cronim, P. (2007) Determinants of firm competitiveness in Latin American emerging economies - Evidence from Brazil's auto-parts industry. *International Journal of Operations and Production Management*, 27(5), 501-523.
- Mishra, A.A., & Shah, R. (2009) In union lies strength: Collaborative competence in new product development and its performance effects. *Journal of Operations Management*, 27, 324-338.
- Moore, M., & Fairhurst, A. (2003) Marketing capabilities and firm performance in fashion retailing. *Journal of Marketing Management*, 7(4), 386-397.
- Montgomery, C.A., & Wernerfelt, B. (1988) Diversification, Ricardian rents and Tobin's  $q$ . *Rand Journal of Economics*, 19(4), 623-632.
- Morgan, N.A., Vohies, D.W., & Mason, C.H. (2009) Market orientation, marketing capabilities and firm performance. *Strategic Management Journal*, 30, 909-920.
- Narasimhan, R., Talluri, S., & Das, A. (2004) Exploring flexibility and execution competencies of manufacturing firms. *Journal of Operations Management*, 22(1), 91-107.
- Ojha, D., White, R.E., & Rogers, P.P. (2013) Managing demand variability using requisite variety of improved workforce and operational performance: the role of manufacturing flexibility. *International Journal of Production Research*, 51(10), 2915-2934.
- Oke, A., Burke, G., & Myers, A. (2007) Innovation types and performance in growing UK SMEs. *International Journal of Operations & Production Management*, 27(7), 735-753.
- Olavarrieta, S., & Ellinger, A.E. (1997) Resource-based theory and strategic logistics research. *International Journal of Physical Distribution and Logistics Management*, 27(9), 559-587.
- Ordanini, A., & Rubera, G. (2008) Strategic capabilities and internet resources in procurement: A resource-based view of B-to-B buying process. *International Journal of Operations & Production Management*, 28(1), 27-52.
- Ortega, M.R., & Villaverde, P.G. (2008) Capabilities and competitive tactics influences on performance: Implications of the moment of entry. *Journal of Business Research*, 61, 332-345.
- Pagell, M. (2004) Understanding the factors that enable and inhibit the integration of operations, purchasing and logistics. *Journal of Operations Management*, 22(5), 459-487.
- Pagell, M., & Krause, D.R. (2004) Re-exploring the relationship between flexibility and the external environment. *Journal of Operations Management*, 21, 629-649.
- Peng, D.X., Schroeder, R.G., & Shah, R. (2008) Linking routines to operations capabilities: A new perspective. *Journal of Operations Management*, 26(6), 730-748.
- Penrose, E.T. (1959) *The Theory of the Growth of the Firm*. New York: Wiley.
- Peteraf, M.A. (1993) The cornerstone of competitive advantage: A resource-based view. *Strategic Management Journal*, 14, 179-191.
- Peteraf, M.A., & Barney, J.B. (2003) Unraveling the resource-based tangle. *Managerial and Decision Economics*, 24, 309-323.

- Pradabwong, J., Braziotis, C., Tannock, J., & Pawar, K. (2017) Business process management and supply chain collaboration: Effects on performance and competitiveness. *Supply Chain Management: An International Journal*, 22(2), 107-121.
- Ragatz, G.L., Handfield, R.B., & Scannell, T.V. (1997) Success factors for integrating suppliers into new product development, *Journal of Product Innovation Management*, 14(3), 190-202.
- Rosenthal, R., & Rubin, D. (1978) Interpersonal expectancy effects: The first 345 studies. *Behavioural and Brain Sciences*, 3, 377-415.
- Rosenthal, R., & Rubin, D. (1988) Comment: Assumptions and procedures in the file drawer problem. *Statistical Sciences*, 3, 120-125.
- Rosenzweig, E.D., Roth, A.V., & Dean, J.W. (2003) The influence of an integration strategy on competitive capabilities and business performance: An exploratory study of consumer products manufacturers. *Journal of Operations Management*, 21, 437-456.
- Rugman, A. M., & Verbeke, A. (2002) Edith Penrose's contribution to the resource- based view of strategic management. *Strategic Management Journal*, 23(8), 769-780.
- Rumelt, R. (1984) *Towards a Strategic Theory of the Firm*. In C.S.R (Ed.). Prentice-Hall, Englewood Cliff:
- Sanchez, R. (1995) Strategic flexibility in product competition. *Strategic Management Journal*, 16, 135-159.
- Sardana, D., Terziovski, M., & Gupta, N. (2016) The impact of strategic alignment and responsiveness to market on manufacturing firm's performance. *International Journal of Production Economics*, 177, 131-138.
- Skinner, W. (1996) Manufacturing - Missing link in corporate strategy. *Harvard Business Review*, 47, 136-145.
- Slack, N. (2005) The changing nature of operations flexibility - Update. *International journal of Operations and Production Management*, 25(12), 1201-1210.
- Slack, N.C., Johnston, S., & Betts, A. (2009) *Operations and Process Management: Principles and Practices for Strategic Impact*. Pearson Education, London.
- Slotegraaf, R., Moorman, C., & Inman, J. (2003) The role of firm resources in returns to market deployment. *Journal of Marketing Research*, 40 295–309.
- Sofyahoglu, C., & Orturk, S. (2012) Meta-analysis of the relationship between supply chain integration dimensions and firm performance. *European Journal of Economics, Finance and Administrative Science*, 52.
- Srivastava, R.K., Shervani, T.A., & Fahey, L. (1998) Market-based assets and shareholder value: A framework for analysis. *Journal of Marketing*, 62, 2-18.
- Stevenson, M., & Spring, M. (2007) Flexibility from a supply chain perspective: definition and review. *International Journal of Operation and Production Management*, 27(7), 685-713.
- Squire, B., Cousins, P.D., Lawson, B., & Brown, S. (2009) The effect of supplier manufacturing capabilities on buyer responsiveness: The role of collaboration. *International Journal of Operations and Production Management*, 29(8), 766-788.
- Swamidass, P.M., & Newell, W.T. (1987) Manufacturing strategy, environment uncertainty and performance: a path analytic model. *Management Science*, 33(4), 509-524.
- Swink, M., Narasimhan, R., & Wang, C. (2007) Managing beyond the factory walls: Effects of four types of strategic integration on manufacturing plant performance. *Journal of Operations Management*, 25(1), 148-164.

- Teece, D.J., Pisano, G., & Shuen, A. (1997) Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533.
- Terjesen, S., Patel, P.C., & Covin, J.G. (2011) Alliance diversity, environmental context and the value of manufacturing capabilities among new high technology ventures. *Journal of Operations Management* (29), 105-115.
- Terziovski, M. (2010) Innovation practice and its performance implications in small and medium enterprises (SMEs) in the manufacturing sector: A resource-based view. *Strategic Management Journal*, 31, 892-902.
- Tombak, M., & De Meyer, A. (1988) Flexibility and FMS: An empirical analysis. *IEEE Transactions on Engineering Management*, 35(2), 101-107.
- Tombak, M. M. (1998) Economic analysis of flexible manufacturing systems, *Ph.D. Dissertation*, Department of Decision Sciences, University of Pennsylvania, Philadelphia, PA.
- Tracey, M. (2004) A holistic approach to new product development: new insights, *Journal of Supply Chain Management*, 40(4) 37-55.
- Tracey, M., Kim, J., & Volderembse, M. (2005) The impact of supply-chain management capabilities on business performance. *Supply Chain Management: An International Journal*, 10(3), 179-191.
- Ulrich, D., & Smallwood, N. (2004) Capitalizing on capabilities. *Harvard Business Review*, 82(6), 119-127.
- Uotila, J., Maula, M., Keil, T., & Zahara, S.A. (2009) Exploration, exploitation, and financial performance: analysis of S&P 500 corporations, *Strategic Management Journal*, 30(2), 221-231.
- Vaart, V.D., & Donk, D. V. (2004) Buyer focus: evaluation of a new concept for supply chain integration. *International Journal of Production Economics*, 92(1), 21-30.
- Vaart, V.D., & Donk, D.V. (2008) A critical review of survey-based research in supply chain integration. *International Journal of Production Economics*, 111(1), 42-55.
- Villar, C., Pla-Barber, J. & León-Darder, F. (2012) Service characteristics as moderators of the entry mode choice: empirical evidence in the hotel industry, *The Service Industries Journal*, 32:7, 1137-1148.
- Vorhies, D.W., & Morgan, N.A. (2005) Benchmarking capabilities for sustainable competitive advantage. *Journal of Marketing*, 68(1), 80-94.
- Wang, Z., Huo, B., Qi, Y., & Zhao, X. (2016) A resource-based view on enablers of supplier integration: Evidence from China. *Industrial Management and Data Systems*, 116(3), 416-444.
- Wernerfelt, B. (1984) A resource-based view of the firm. *Strategic Management Journal*, 5, 171-180.
- Whitener, E.M. (1990) Confusion of confidence intervals and credibility intervals in meta-analysis. *Journal of Applied Psychology*, 75(3), p.315.
- Wolf, F.M. (1986) *Meta-analysis: Quantitative Methods for Research Synthesis*. Sage, Newbury Park, CA.
- Worren, N., Moore, K., & Cardona, P. (2002) Modularity, strategic flexibility and firm performance: A study of the home appliance industry. *Strategic Management Journal*, 23, 1123-1140.
- Wright, P.M. & Snell, S.A. (1998) Toward a unifying framework for exploring fit and flexibility in strategic human resource management. *Academy of Management Review*, 23(4), 756-772.

- Wu, F., Yeniyurt, S., Kim, D., & Cavusgil, S.T. (2006) The impact of information technology on supply chain capabilities and firm performance - A resource-based view. *Industrial and Marketing Management*, 35(4), 493-504.
- Yang, C.C., Barlow, P.B., & Lu, C.S. (2009) Assessing resources, logistics service capabilities, innovation capabilities and the performance of container shipping services in Taiwan. *International Journal of Production Economics*, 122, 4-20.
- Yu, K., Cadeau, J., & Luo, B.N. (2015) Operational flexibility: Review and meta-analysis. *International Journal of Production Economics*, 169, 190-202.
- Yu, W., Jacobs, M.A., Salisbury, W.D., & Enns, H. (2013) The effect of supply chain integration on customer satisfaction and financial performance: An organisational learning perspective. *International Journal of Production Economics*, 146(1), 346-358.
- Yu, W., Ramanathan, R., & Nath, P. (2014) The impact of marketing and operations capabilities on financial performance in the retail sector: A resource-based perspective. *Industrial Marketing Management*, 43, 25-31.
- Zhao, M., Droge, C., & Stank, T.P. (2001) The effects of logistics capabilities on firm performance: Customer- focused versus information- focused capabilities. *Journal of Business Logistics*, 22(2), 91-107.
- Zhao, X., Huo, B., Selen, W., & Yeung, J.Y. (2011) The impact of internal integration and relationship commitment on external integration. *Journal of Operations Management*, 29, 17-32.
- Zhao, X., Xie, J., & Zhanf, W.J. (2002) The impact of information sharing and ordering coordination on supply chain performance. *Supply Chain Management: An International Journal*, 7(1), 24-40.
- Zimmermann, F., & Foerstl, K. (2014) A meta analysis of the purchasing and supply management practice-performance link, *Journal of Supply Chain Management*, 50 (3), 37-54.

Figure 1: Conceptual Framework



**Table 1: OM Functions/Capabilities**

S. No	OM Functions / Capabilities	Definition
1.	Flexibility	It is described as the ability of a firm to adapt and respond to changes in production volume or mix to give customers individual treatment or to introduce new products/services (Chan, 2003; Slack et al., 2009). The present study has identified six types of flexibilities relating to labor, product, manufacturing, strategic, supplier and IT.
2.	Supply Chain Integration	It is the degree of strategic collaboration of a firm with its supply chain partners and cooperative management of intra and inter-organizational processes which leads to efficient and effective flow of goods, services, money, information etc at low cost and high speed to the final customers that enhances the value to them (Frohlich and Westbrook, 2001; Van Der Vaart and Van Donk, 2004, 2008). It involves establishing strategic relationships with supply chain partners (Jacobs and Chavez, 2016; Yu et al., 2013; Wu et al., 2006). Pagell (2004) consider it as the heart of the SCM philosophy and Horvath (2001) consider it as the crucial factor that creates value for the entire supply chain. The present paper has considered studies focusing on internal and external including suppliers' and customers' integration.
3.	Internal Integration	Koufteros et al. 2010 defined internal integration (II) simply as the collaboration between different functions or departments within a single organization. Zhao et al. (2011) described it as the degree to which a firm structures its functional processes and practices into synchronized and collaborative processes. It is considered as the thread that links work performed internally into an uninterrupted process to support customer requirements (Chen et al., 2009)
4.	External integration	External integration is the level to which a company's understands the needs of its clients customers and suppliers) and collaborates with them to develop inter-organizational strategies and shared practices and processes, in order to satisfy its clients' needs (Flynn et al., 2010).
5.	Customer Integration	Customer integration refers to an organized way adopted by a firm of interacting and collaborating with its customers that results in smooth flow of goods and/or services to the intended customers (Zhao et al., 2002). It is also known as forward integration.
6.	Supplier Integration	Supplier integration refers to sharing acquiring operational, technical and financial and operational information with the suppliers resulting in increasing the product and production requirements and using the combined capabilities generated out of such integration in a better way (Swink et al., 2007). It is also known as upstream supply chain integration and backward integration.
7.	Organizational Capabilities	Amit and Schoemaker (1993) defined organizational capabilities as information -based tangible or intangible processes that are firm-specific and are developed over time through complex interactions among the firms' resources. It is also defined as anything that is strength for a firm (Wernerfelt, 1984). The present study has identified eight types of capabilities relating to dynamic capability, mass customization capability, supply chain, networking, innovation, marketing, manufacturing and technology.
8.	Business Performance	It is considered as overall performance measure that includes financial, non-financial, operational and competitive performance measures.
9.	Operational Performance	It primarily represents the performance of the company in terms of quality, cost, flexibility, and delivery (Alfalla-Luque et al. 2014; Blome et al. 2013; Han et al. 2017; Cortman et al. 2014; Lai et al. 2008 etc.).
10,	Financial Performance	It reflects firm's performance in terms of financial measures such as return on assets, return on sales, profitability, profit as a percentage of sales etc. (Cao and Zhang, 2011; Camison and Lopez 2010; Chavez et al. 2017; Morgan et al. 2009; Sardana et al. 2016 etc.)
11	Competitive Performance	Competitive performance is measured using innovation, customer satisfaction and competitive advantage (Chang et al. 2014; Cho et al. 2017; Jin et al. 2014; Lun et al. 2016; Yu et al. 2017 etc.).

**Table 2: Number of RBV-based OM studies published in different journals in the period 2007-2018**

Year	Supply Chain Integration	Flexibility	Organizational Capability
2019	-	-	-
2018	-	-	-
2017	<i>International Journal of Production Economics; International Journal of Operations and Production Management (2); Supply Chain Management: An International Journal</i> Number of papers: 4	<i>International Journal of Production Economics (2)</i> Number of papers: 2	<i>International Journal of Production Economics (2); International Journal of Operations and Production Management; International Journal of Production Research</i> Number of papers: 4
2016	<i>Supply Chain Management: An International Journal; International Journal of Production Economics (2); Journal of Operations Management; Journal of Supply Chain Management</i> Number of papers: 5	-	<i>International Journal of Production Economics (3)</i> Number of papers: 3
2015	-	-	-
2014	<i>International Journal of Production Economics; Supply Chain Management: An International Journal; International Journal of Production Research</i> Number of papers: 3	<i>Supply Chain Management: An International Journal; International Journal of Production Economics; Journal of Operations Management; International Journal of Production Research</i> Number of papers: 4	<i>Supply Chain Management: An International Journal; International Journal of Production Economics (2); Journal of Operations Management</i> Number of papers: 4
2013	<i>International Journal of Operations and Production Management</i> Number of papers: 1	<i>International Journal of Production Research (2)</i> Number of papers: 2	-
2012	<i>Supply Chain Management: An International Journal; International Journal of Production Research; International Journal of Production Economics</i> Number of papers: 3	-	-
2011	<i>Decision Sciences, Journal of Operations Management; Journal of Supply Chain Management (2)</i> Number of papers: 5	<i>Journal of Supply Chain Management</i> Number of papers: 1	<i>Journal of Operations Management</i> Number of papers: 1
2010	<i>Strategic Management Journal</i> Number of papers: 1	<i>International Journal of Operations and Production Management; Journal of Supply Chain Management</i>	<i>Strategic Management Journal</i> Number of Papers: 1

		Number of papers: 2	
2009	<i>Journal of Operations Management; International Journal of Production Economics; International Journal of Operations and Production Management</i> Number of papers: 3	<i>International Journal of Operations and Production Management</i> Number of papers: 1	<i>Strategic Management Journal; Supply Chain Management: An International Journal; International Journal of Production Economics</i> Number of papers: 3
2008	<i>International Journal of Operations and Production Management</i> Number of papers: 1	-	<i>Journal of Supply Chain Management</i> Number of papers: 1
2007	<i>Journal of Operations Management; International Journal of Operations and Production Management</i> Number of papers: 2	<i>International Journal of Operations and Production Management</i> Number of papers: 1	-
Total	28	13	17

**Table 3a: Empirical papers on meta-analysis of flexibility effects**

Authors	Year	No. of Observations	Sample	Research Design	Dependent Variable	Flexibility factor examined	Sector	Country type	Publication type
Chavez et al.	2017	1	329	Mail survey	Organizational performance	Production flexibility	Manufacturing	Developing	A*
Han et al.	2017	3	162	Survey	Firm Performance	IT flexibility	Service	Developed	A*
Eckstein et al.	2015	2	143	Electronic survey	Cost performance and operational performance	Supply chain	Both manufacturing and service	Developed	A
Cheng et al.	2014	1	260	Survey	Innovation performance	IT flexibility	Manufacturing	Developing	A
Jin et al.	2014	1	198	Online survey	Competitive advantage	Suppliers flexibility	Manufacturing	Developed	A*
Kortmann et al.	2014	4	76 (India) & 83 (US)	Web based survey	Cost- based efficiency and Time based efficiency	Production flexibility	Manufacturing	Developing and Developed	A*
Blome et al.	2013	1	121	Mail survey	Operational Performance	Production flexibility	Manufacturing	Developed	A
Jin et al.	2013	3	201	Online survey	Competitive advantage	Production flexibility	Manufacturing	Developed	A
Hartman and Grahl	2011	3	155	Online survey	Customer loyalty	Logistics Flexibility	Service	Developed	A
Camison and Lopez	2010	4	159	Personal interview	Product innovation, Process innovation, Organizational innovation and Organizational Performance	Production flexibility	Manufacturing	Developed	A

<b>Liao et al.</b>	2010	8	201	Web based survey	Supplier Performance, Cost, Time based Performance and Reliability	Suppliers flexibility	Manufacturing	Developed	A
<b>Squire et al.</b>	2009	1	104	Mail survey	Buyer responsiveness	Suppliers flexibility	Manufacturing	Developed	A
<b>Martinez-Sanchez et al.</b>	2007	9	156	Postal survey	Financial Performance, Innovation Performance and Relational Performance	Labour flexibility	Service	Developed	A
*Total no of papers= 13; Total no. of observations= 41; Total sample size= 2348									

**Table 3b: Empirical papers on meta-analysis of SCI effects**

Author	Year	No. of studies	No. of obs.	Sample	Dependent Variable	SCI factor examined	Sector	Country type	Publication type	Research Design
Cho et al.	2017	2	12	152 & 222	Quality outcome, Customer satisfaction and Business performance	Supplier Integration and Customer Integration	Manufacturing and service	Developed and developing	A*	Online survey
Pradabwong	2017	1	8	204	Organizational Performance and Collaborative Advantage	External Integration	Manufacturing	Developed	A	Mailed survey
Vanpoucke et al.	2017	1	6	563	Cost efficiency, Delivery performance and Flexibility performance	External, Internal, Supplier and Customer Integration	Manufacturing	Developed	A	Questionnaire
Huo et al.	2016	1	6	202	Operational efficiency, Service quality and Financial performance	External, Internal and Supplier integration	Manufacturing	Developed	A	Mailed survey
Huo et al.	2016	1	3	317	Competitive Performance	Internal, Supplier and Customer Integration	Manufacturing	Developed and developing	A*	Questionnaire
Liu et al.	2016	1	6	196	Operational Performance and Financial Performance	External Integration and Internal Integration	Manufacturing and services	Developing	A*	Questionnaire
Liu and Prajoga	2016	1	2	202	Delivery Performance	External Integration	Manufacturing	Developed	A	Mailed survey
Wang et al.	2016	2	2	1646(M*) and 686(S*)	Product/Service innovation	Supplier Integration and Customer Integration	Manufacturing and Services (both separate results)	Developing	A*	Postal survey

<b>Alfalla- Luque et al.(2014)</b>	2014	1	20	266	Delivery, Flexibility, Inventory, Quality and Customer Satisfaction	Internal, External, Supplier and Customer Integration	Manufacturing	Developed	A*	Questionnaire
<b>Cheng et al.</b>	2014	1	1	260	Innovation Performance	External Integration	Manufacturing	Developing	A	Questionnaire
<b>Liu et al.</b>	2013	1	6	240	Operational Performance and Business Performance	External Integration and Internal Integration	Manufacturing and services	Developing	A	Questionnaire
<b>Huo et al.</b>	2012	1	9	617	Customer oriented Performance, Supplier oriented Performance and Financial performance	Internal, Supplier and Customer Integration	Manufacturing	Developing	A	Mailed questionnaire
<b>Cao et al.</b>	2011	1	2	221	Firm Performance and Collaborative Advantage	Supplier Integration	Manufacturing	Developed	A*	Web-based
<b>Fawcett et al.</b>	2011	2	4	466 & 266	Operational Performance and customer satisfaction	External Integration and Supplier Integration	Manufacturing and service	Developed (US)	A	Mailed survey
<b>Hartman and Grahl</b>	2011	1	3	155	Customer retention, Customer extension and Customer referrals	External Integration and Supplier Integration	Manufacturing and service	Developed	A	Online survey
<b>Hsu et al.</b>	2011	1	1	165	Firm Performance	External, Supplier and Customer Integration	Manufacturing	Developed	A	Mail survey

<b>Terziovski</b>	2010	1	1	195	SME Performance	External, Supplier and Customer Integration	Manufacturing	Developed	A*	Questionnaire
<b>Mishra and Shah</b>	2009	1	6	189	Project Performance and Market Performance	Internal, Supplier and Customer Integration	Manufacturing	Developed	A*	Mailed survey
<b>Soo Woo Kim</b>	2009	1	4	623	Firm Performance	External Integration	Manufacturing	Developed	A*	Fax and mailed survey
<b>Squire et al.</b>	2009	1	1	104	Buyer Responsiveness	Supplier Integration	Manufacturing	Developed	A	Mail survey
<b>Mesquita et al.</b>	2007	1	2	182	Production efficiency gains	External Integration	Manufacturing	Developing	A	Questionnaire
<b>*Total no. of papers= 21; Total no. of observations= 140; Total sample size= 8339</b>										

**Table 3c: Empirical papers on meta-analysis of organizational capability effects**

Author/Year	Year	No. of obs.	Sample	Dependent Variable	Capability	Sector	Country type	Publication type	Research Design
Chavez et al.	2017	4	329	Organizational Performance (Financial)	Manufacturing	Manufacturing	Developing	A*	Questionnaire
Liao et al.	2017	1	465	Competitive advantage	Supply chain	Manufacturing	Developing	A*	Questionnaire
Mitrege et al.	2017	8	312	Product innovation and firm performance	Supplier relationship capability (selection, attraction and ending- identification and processing)	Manufacturing	Developing	A	Mailed Questionnaire
Yu et al.	2017	2	329	Supply chain integration	Marketing capability and IT capability	Manufacturing	Developing	A	Questionnaire
Lun et al.	2016	6	133	Profitability and customer satisfaction	Organizational capabilities (static, dynamic and creative)	Service	Developing	A*	Questionnaire
Sardana et al.	2016	3	1206	Firm performance	Plant technology capability and competitive capability (delivery capability and cost control capability)	Manufacturing	Developing	A*	Questionnaire
Wang et al.	2016	2	1646(M*) and 686(S*)	Product/Service innovation	Technological capability	Manufacturing and Services (both separate results)	Developing	A*	Postal survey
Cheng et al.	2014	1	260	Innovation Performance	Dynamic	Manufacturing	Developing	A	Questionnaire
Jin et al.	2014	1	198	Competitive advantage	IT enabled sharing	Manufacturing	Developed	A*	Online survey
Kortmann et al.	2014	6	76 (India) and 83 (U.S)	Cost based efficiency and Time based efficiency	Operational( Mass customization and innovative ambidexterity)	Manufacturing	Developing and developed	A*	Web based survey
Liao and Kuo	2014	1	374	Firm performance	Supply chain capabilities	Mixed	Developing	A*	Questionnaire

Tarjesen et al.	2011	6	167	Venture performance (Financial)	Manufacturing capabilities	Manufacturing	Developed	A*	Mail survey
Terziovski	2010	1	600	SME performance	Technological capabilities	Manufacturing	Developed	A*	Questionnaire
Morgan et al.	2009	21	230	Firm performance	Marketing capabilities	Manufacturing and service	Developed	A*	Mail survey
Kim	2009	4	244 (Korea) and 379 (Japan)	Firm Performance	Competition capability	Manufacturing	Developed	A*	Fax and mailed survey
Yang et al.	2009	2	123	Firm performance	Innovation capability and logistics service capability	Service	Developing	A*	Mail survey
Lai et al.	2008	3	105	Cost advantage, service variety advantage and service quality advantage	IT	Service	Developing	A	Mailed questionnaire
<b>Total no. of papers= 17; Total no. of observations =81; Total sample size=7945</b>									

<u>Author/Year</u>	<u>Year</u>	<u>No. of studies</u>	<u>No. of obs.</u>	<u>Sample</u>	<u>Dependent Variable</u>	<u>SC factors examined</u>	<u>Sector</u>	<u>Country type</u>	<u>Pub. Rank</u>	<u>Research Design</u>
<u>Alfalla-Luque et al.(2014)</u>	<u>2014</u>	<u>1</u>	<u>20</u>	<u>266</u>	<u>Delivery, Flexibility, Inventory, Quality and Customer Satisfaction</u>	<u>Internal, External, Supplier and Customer Integration</u>	<u>Manufacturing</u>	<u>Developed</u>	<u>A*</u>	<u>Questionnaire</u>
<u>Cao et al.</u>	<u>2011</u>	<u>1</u>	<u>2</u>	<u>221</u>	<u>Firm Performance and Collaborative Advantage</u>	<u>Supplier Integration</u>	<u>Manufacturing</u>	<u>Developed</u>	<u>A*</u>	<u>Web-based</u>
<u>Cheng et al.</u>	<u>2014</u>	<u>1</u>	<u>1</u>	<u>260</u>	<u>Innovation Performance</u>	<u>External Integration</u>	<u>Manufacturing</u>	<u>Developing</u>	<u>A</u>	<u>Questionnaire</u>
<u>Cho et al.</u>	<u>2017</u>	<u>2</u>	<u>12</u>	<u>152 &amp; 222</u>	<u>Quality outcome, Customer satisfaction and Business performance</u>	<u>Supplier Integration and Customer Integration</u>	<u>Manufacturing and service</u>	<u>Developed and developing</u>	<u>A*</u>	<u>Online survey</u>
<u>Fawcett et al.</u>	<u>2011</u>	<u>2</u>	<u>4</u>	<u>466 &amp;</u>	<u>Operational Performance and</u>	<u>External Integration and</u>	<u>Manufacturing</u>	<u>Developed</u>	<u>A</u>	<u>Mailed survey</u>

<u>Hartman and Grahl</u>	<u>2011</u>	<u>1</u>	<u>3</u>	<u>266</u> <u>155</u>	<u>customer satisfaction</u> <u>Customer retention, Customer extension and Customer referrals</u>	<u>Supplier Integration</u> <u>External Integration and Supplier Integration</u>	<u>and service</u> <u>Manufacturing and service</u>	<u>(US)</u> <u>Developed</u>	<u>A</u>	<u>Online survey</u>
<u>Hsu et al.</u>	<u>2011</u>	<u>1</u>	<u>1</u>	<u>165</u>	<u>Firm Performance</u>	<u>External, Supplier and Customer Integration</u>	<u>Manufacturing</u>	<u>Developed</u>	<u>A</u>	<u>Mail survey</u>
<u>Huo et al.</u>	<u>2012</u>	<u>1</u>	<u>9</u>	<u>617</u>	<u>Customer-oriented Performance, Supplier-oriented Performance and Financial performance</u>	<u>Internal, Supplier and Customer Integration</u>	<u>Manufacturing</u>	<u>Developing</u>	<u>A</u>	<u>Mailed questionnaire</u>
<u>Huo et al.</u>	<u>2016</u>	<u>1</u>	<u>6</u>	<u>202</u>	<u>Operational efficiency, Service quality and Financial performance</u>	<u>External, Internal and Supplier integration</u>	<u>Manufacturing</u>	<u>Developed</u>	<u>A</u>	<u>Mailed survey</u>
<u>Huo et al.</u>	<u>2016</u>	<u>1</u>	<u>3</u>	<u>317</u>	<u>Competitive Performance</u>	<u>Internal, Supplier and Customer Integration</u>	<u>Manufacturing</u>	<u>Developed and developing</u>	<u>A*</u>	<u>Questionnaire</u>
<u>Liu et al.</u>	<u>2016</u>	<u>1</u>	<u>6</u>	<u>196</u>	<u>Operational Performance and Financial Performance</u>	<u>External Integration and Internal Integration</u>	<u>Manufacturing and services</u>	<u>Developing</u>	<u>A*</u>	<u>Questionnaire</u>
<u>Liu et al.</u>	<u>2013</u>	<u>1</u>	<u>6</u>	<u>240</u>	<u>Operational Performance and Business Performance</u>	<u>External Integration and Internal Integration</u>	<u>Manufacturing and services</u>	<u>Developing</u>	<u>A</u>	<u>Questionnaire</u>
<u>Liu and Prajoga</u>	<u>2016</u>	<u>1</u>	<u>2</u>	<u>202</u>	<u>Delivery Performance</u>	<u>External Integration</u>	<u>Manufacturing</u>	<u>Developed</u>	<u>A</u>	<u>Mailed survey</u>
<u>Mesquita et al.</u>	<u>2007</u>	<u>1</u>	<u>2</u>	<u>182</u>	<u>Production efficiency gains</u>	<u>External Integration</u>	<u>Manufacturing</u>	<u>Developing</u>	<u>A</u>	<u>Questionnaire</u>
<u>Mishra and Shah</u>	<u>2009</u>	<u>1</u>	<u>6</u>	<u>189</u>	<u>Project Performance and Market Performance</u>	<u>Internal, Supplier and Customer Integration</u>	<u>Manufacturing</u>	<u>Developed</u>	<u>A*</u>	<u>Mailed survey</u>
<u>Pradabwong</u>	<u>2017</u>	<u>1</u>	<u>8</u>	<u>204</u>	<u>Organizational Performance and Collaborative Advantage</u>	<u>External Integration</u>	<u>Manufacturing</u>	<u>Developed</u>	<u>A</u>	<u>Mailed survey</u>
<u>Soo-Woo Kim</u>	<u>2009</u>	<u>1</u>	<u>4</u>	<u>623</u>	<u>Firm Performance</u>	<u>External Integration</u>	<u>Manufacturing</u>	<u>Developed</u>	<u>A*</u>	<u>Fax and mailed survey</u>
<u>Squire et al.</u>	<u>2009</u>	<u>1</u>	<u>1</u>	<u>104</u>	<u>Buyer Responsiveness</u>	<u>Supplier Integration</u>	<u>Manufacturing</u>	<u>Developed</u>	<u>A</u>	<u>Mail survey</u>
<u>Terziowski</u>	<u>2010</u>	<u>1</u>	<u>1</u>	<u>195</u>	<u>SME Performance</u>	<u>External, Supplier and Customer Integration</u>	<u>Manufacturing</u>	<u>Developed</u>	<u>A*</u>	<u>Questionnaire</u>
<u>Vanpoucke et al.</u>	<u>2017</u>	<u>1</u>	<u>6</u>	<u>563</u>	<u>Cost efficiency, Delivery performance and Flexibility performance</u>	<u>External, Internal, Supplier and Customer Integration</u>	<u>Manufacturing</u>	<u>Developed</u>	<u>A</u>	<u>Questionnaire</u>
<u>Wang et al.</u>	<u>2016</u>	<u>2</u>	<u>2</u>	<u>1646(M*) and 686(S*)</u>	<u>Product/Service innovation</u>	<u>Supplier Integration and Customer Integration</u>	<u>Manufacturing and Services (both separate results)</u>	<u>Developing</u>	<u>A*</u>	<u>Postal survey</u>
<u>Total no. of papers= 21</u>	<u>21</u>		<u>Total observations= 140</u>	<u>Total sample size= 8339</u>						
<u>Author/ Year</u>										

<b>Alfala-Luque et al.(2014)</b>	2014	±	20	266	Delivery, Flexibility, Inventory, Quality and Customer Satisfaction	Internal, External, Supplier and Customer Integration	Manufacturing	Developed	A*	Questionnaire
<b>Cao et al.</b>	2011	±	2	221	Firm Performance and Collaborative Advantage	Supplier Integration	Manufacturing	Developed	A*	Web-based
<b>Cheng et al.</b>	2014	±	±	260	Innovation Performance	External Integration	Manufacturing	Developing	A*	Questionnaire
<b>Cho et al.</b>	2017	±	12	152 & 222	Quality outcome, Customer satisfaction and Business performance	Supplier Integration and Customer Integration	Manufacturing and service	Developed and developing	A*	Online survey
<b>Fawcett et al.</b>	2011	±	4	466 & 266	Operational Performance and customer satisfaction	External Integration and Supplier Integration	Manufacturing and service	Developed (US)	A*	Mailed survey
<b>Hartman and Grahl</b>	2011	±	3	155	Customer retention, Customer extension and Customer referrals	External Integration and Supplier Integration	Manufacturing and service	Developed	A*	Online survey
<b>Hsu et al.</b>	2011	±	±	165	Firm Performance	External, Supplier and Customer Integration	Manufacturing	Developed	A*	Mail survey
<b>Huo et al.</b>	2012	±	9	617	Customer oriented Performance, Supplier oriented Performance and Financial performance	Internal, Supplier and Customer Integration	Manufacturing	Developing	A*	Mailed questionnaire
<b>Huo et al.</b>	2016	±	6	202	Operational efficiency, Service quality and Financial performance	External, Internal and Supplier integration	Manufacturing	Developed	A*	Mailed survey
<b>Huo et al.</b>	2016	±	3	317	Competitive Performance	Internal, Supplier and Customer Integration	Manufacturing	Developed and developing	A*	Questionnaire
<b>Liu et al.</b>	2016	±	6	196	Operational Performance and Financial Performance	External Integration and Internal Integration	Manufacturing and services	Developing	A*	Questionnaire
<b>Liu et al.</b>	2013	±	6	240	Operational Performance and Business Performance	External Integration and Internal Integration	Manufacturing and services	Developing	A*	Questionnaire
<b>Liu and Prajoga</b>	2016	±	±	202	Delivery Performance	External Integration	Manufacturing	Developed	A*	Mailed survey
<b>Mesquita et al.</b>	2007	±	±	182	Production efficiency gains	External Integration	Manufacturing	Developing	A*	Questionnaire
<b>Mishra and Shah</b>	2009	±	6	189	Project Performance and Market Performance	Internal, Supplier and Customer Integration	Manufacturing	Developed	A*	Mailed survey
<b>Pradabwong</b>	2017	±	8	204	Organizational Performance and Collaborative Advantage	External Integration	Manufacturing	Developed	A*	Mailed survey
<b>See-Wee Kim</b>	2009	±	4	623	Firm Performance	External Integration	Manufacturing	Developed	A*	Fax and mailed survey
<b>Squire et al.</b>	2009	±	±	104	Buyer Responsiveness	Supplier Integration	Manufacturing	Developed	A*	Mail survey
<b>Terziowski</b>	2010	±	±	195	SME Performance	External, Supplier and Customer Integration	Manufacturing	Developed	A*	Questionnaire
<b>Vanpoucke et al.</b>	2017	±	6	563	Cost efficiency, Delivery performance and Flexibility	External, Internal, Supplier and Customer	Manufacturing	Developed	A*	Questionnaire

<b>Wang et al.</b>	<b>2016</b>	<b>2</b>	<b>2</b>	<b>1646(M*) and 686(S*)</b>	<b>performance</b> <b>Product/Service innovation</b>	<b>Integration</b> <b>Supplier Integration and Customer Integration</b>	<b>Manufacturing and Services (both separate results)</b>	<b>Developing</b>	<b>A*</b>	<b>Postal survey</b>
<b>Total no. of papers=21</b>	<b>21</b>		<b>Total observation n=140</b>	<b>Total sample size= 8239</b>						

**Table 3c: Empirical papers on meta-analysis of organizational capability effects**

<b>Author/Year</b>	<b>Year</b>	<b>No. of obs.</b>	<b>Sample</b>	<b>Dependent Variable</b>	<b>Capability</b>	<b>Sector</b>	<b>Country type</b>	<b>Pub.</b>	<b>Research Design</b>
<b>Chavez et al.</b>	<b>2017</b>	<b>4</b>	<b>329</b>	<b>Organisational</b>	<b>Manufacturing</b>	<b>Manufacturing</b>	<b>Developing</b>	<b>A*</b>	<b>Questionnaire</b>

				Performance (Financial)					
<b>Cheng et al.</b>	2014	1	260	Innovation Performance	Dynamic	Manufacturing	Developing	A	Questionnaire
<b>Jin et al.</b>	2014	1	198	Competitive advantage	IT-enabled sharing	Manufacturing	Developed	A*	Online survey
<b>Kortmann et al.</b>	2014	6	76 (India) and 83 (U.S)	Cost-based efficiency and Time-based efficiency	Operational (Mass customization and innovative ambidexterity)	Manufacturing	Developing and developed	A*	Web-based survey
<b>Lai et al.</b>	2008	3	105	Cost advantage, service variety advantage and service quality advantage	IT	Service	Developing	A	Mailed questionnaire
<b>Liao et al.</b>	2017	1	465	Competitive advantage	Supply chain	Manufacturing	Developing	A*	Questionnaire
<b>Liao and Kuo</b>	2014	1	374	Firm performance	Supply chain capabilities	Mixed	Developing	A*	Questionnaire
<b>Lun et al.</b>	2016	6	133	Profitability and customer satisfaction	Organisational capabilities (static, dynamic and creative)	Service	Developing	A*	Questionnaire
<b>Mitrege et al.</b>	2017	8	312	Product innovation and firm performance	Supplier relationship capability (selection, attraction and ending-identification and processing)	Manufacturing	Developing	A	Mailed Questionnaire
<b>Morgan et al.</b>	2009	21	230	Firm performance	Marketing capabilities	Manufacturing and service	Developed	A*	Mail survey
<b>Sardana et al.</b>	2016	3	1206	Firm performance	Plant technology capability and competitive capability (delivery capability and cost control capability)	Manufacturing	Developing	A*	Questionnaire
<b>Kim</b>	2009	4	244 (Korea) and 379 (Japan)	Firm Performance	Competition capability	Manufacturing	Developed	A*	Fax and mailed survey
<b>Tarjesen et al.</b>	2011	6	167	Venture performance	Manufacturing	Manufacturing	Developed	A*	Mail survey

				(Financial)	capabilities				
<b>Terziovski</b>	2010	1	600	SME performance	Technological capabilities	Manufacturing	Developed	A*	Questionnaire
<b>Wang et al.</b>	2016	2	1646(M*) and 686(S*)	Product/Service innovation	Technological capability	Manufacturing and Services (both separate results)	Developing	A*	Postal survey
<b>Yang et al.</b>	2009	2	123	Firm performance	Innovation capability and logistics service capability	Service	Developing	A*	Mail survey
<b>Yu et al.</b>	2017	2	329	Supply chain integration	Marketing capability and IT capability	Manufacturing	Developing	A	Questionnaire
<b>Total no. of papers=</b>	17	81	7945						

**Table 43a: Meta-analysis results of the effect of flexibility on performance**

Hypothesis	Relationship	No. of effects	Total sample size	Uncorrected Mean effect size	Mean effect size corrected for errors	UCrL	LCrL	UCL	LCL	Empirical conclusions
Overall										
F1	Flexibility and overall business performance	14	2244	0.481	0.598	0.955	0.241	0.624	0.573	Hypothesis supported
Sub-group analysis based on performance measures										
F2	Flexibility and operational performance	6	786	0.463	0.534	0.732	0.336	0.567	0.501	Hypothesis supported
F3	Flexibility and financial performance	4	787	0.304	0.390	0.601	0.180	0.443	0.337	Hypothesis supported
F4	Flexibility and competitive performance	10	1645	0.50	0.639	1.08	0.202	0.683	0.595	Hypothesis supported

**Table 4b: Meta-analysis results of the effect of supply chain integration on performance**

Hypotheses	Relationship	No. of effects	Total sample size	Uncorrected Mean effect size	Mean effect size corrected for errors	UCrL	LCrL	UCL	LCL	Empirical conclusions
SCI Dimensions										
SCI1	Internal integration and performance	10	2468	0.342	0.420	0.661	0.179	0.444	0.396	Hypothesis supported
SCI2	Customer integration and performance	9	2305	0.254	0.340	0.550	0.129	0.363	0.316	Hypothesis supported
SCI3	Supplier integration and performance	13	5197	0.300	0.413	0.727	0.098	0.437	0.388	Hypothesis supported
SCI4	External integration and performance	17	4143	0.313	0.371	0.679	0.063	0.389	0.353	Hypothesis supported
Overall										
SCI5	SCI and performance	13	3448	0.309	0.366	0.596	0.137	0.384	0.349	Hypothesis supported
Sub-group analysis based on performance measures										
SCI6	SCI and operational performance	9	1968	0.278	0.356	0.560	0.152	0.378	0.333	Hypothesis supported
SCI7	SCI and financial performance	7	1825	0.286	0.336	0.545	0.128	0.366	0.307	Hypothesis supported
SCI8	SCI and competitive performance	4	1257	0.385	0.482	0.732	0.232	0.545	0.419	Hypothesis supported

**Table 4c: Meta-analysis results of the effect of organizational capability on performance**

	Relationship	No. of effects	Total sample size	Uncorrected Mean effect size	Mean effect size corrected for errors	UrCL	LrCL	UCL	LCL	Empirical conclusion
	Overall									
OC1	Organizational capability and performance	24	9,020	0.341	0.374	0.786	-0.039	0.391	0.357	Hypothesis supported
	Sub-group analysis based on performance measures									
OC2	Organizational capability and financial performance	10	3,424	0.299	0.306	0.588	0.023	0.334	0.277	Hypothesis supported
OC3	Organizational capabilities and operational performance	4	864	0.308	0.093	0.605	-0.418	0.221	-0.034	Hypothesis rejected
OC4	Organizational capability and competitive performance	10	4,732	0.396	0.475	0.808	0.141	0.508	0.441	Hypothesis supported

**Table 5: Results of independent sample *t*-test for sub-groups**

S. No.	Group	No. of effects	Mean effect size	Standard deviation	<i>F</i> -test ( <i>p</i> -value)	<i>t</i> -test ( <i>p</i> -value)	Remark	Empirical conclusion
3.	Service	8	0.069	0.081	3.542(0.073)	-	Significant Difference	Hypothesis rejected
4.	Manufacturing	16	0.021	0.028		2.138(0.044)		
5.	Developing	15	0.0315	0.033	1.377	-1.546	Insignificant difference	Hypothesis rejected
6.	Developed	9	0.0133	0.0169	(0.253)	(0.136)		