Information sharing, ordinary capabilities and firm performance: the moderating role of market orientation

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Information Sharing, Ordinary Capabilities and Firm Performance:

The Moderating Role of Market Orientation

SONG Moxi

A thesis submitted in partial fulfilment of the requirements

for the degree of

Doctor of Philosophy

Principal Supervisor: Dr. WU Wei-ping

Hong Kong Baptist University

August 2014
DECLARATION

I hereby declare that this thesis represents my own work which has been done after registration for the degree of PhD at Hong Kong Baptist University, and has not been previously included in a thesis, dissertation submitted to this or any other institution for a degree, diploma or other qualification.

Signature: _______________

Date: Aug 2014
ABSTRACT

Today’s turbulent business environment has made external knowledge a dominant source of information in firms’ attempt to develop and maintain a sustainable competitive advantage. Firms need to share and acquire new knowledge as they seek to develop new applications and to survive. Therefore, whether inter-firm information sharing has a direct effect on firm performance has become a central question in studies on strategic management and supply chain management. However, the empirical results remain largely divergent and inconclusive, ranging from a positive relationship to a negative relationship. This study advanced the literature by examining the mediating role of ordinary capabilities (manifested by operations capabilities) in the relationship between information sharing and firm performance. By drawing on the dynamic capabilities perspective, we propose that information sharing, as a dynamic capability, deploys and reconfigures the existing operations capabilities, which in turn lead to superior firm performance.

Furthermore, we used a dimensional approach to look at how the two types of information sharing, focal manufacturer-key suppliers (MS) information sharing and focal manufacturer-key buyers (MB) information sharing, may affect both ordinary capabilities and firm performance. Moreover, this study investigated how a firm’s market orientation moderates the information sharing-operations capabilities link. We argue that market orientation positively strengthens the effects of both MS information sharing and MB information sharing on operations capabilities by driving a continuous and proactive disposition to meeting customer needs.

We randomly chose as our sample manufacturing firms from the official list provided by the provincial Association of Entrepreneurs in the Ning Xia autonomous region of China. The data collection was performed over a two-month period and 154 cases were considered valid for our study. Multiple regression and bootstrapping methods were used to test our model. Most of the key hypotheses have been supported. First, operations capabilities fully mediate the relationships between both types of information sharing and performance. Moreover, the three dimensions of market orientation (i.e., market intelligence
generation, dissemination, and responsiveness) positively moderate the effects of both MS and MB information sharing on operations capabilities, except for the moderating effect of market intelligence generation in the relationship between MB information sharing and operations capabilities.

Several implications, both theoretical and practical, are envisaged. First, our findings, which reveal that operations capabilities fully mediate the effects of information sharing on firm performance, contribute to unpacking the black box of information sharing and performance relationship in the buyer-supplier relationship context. The study offers an alternative explanation for the inconclusive empirical results regarding the relationship between information sharing and firm performance. We propose and verify a theoretical claim suggesting that information sharing is a necessary but insufficient condition to improve firm performance, and operations capabilities that are extended, modified, changed, and/or created by using information sharing determine the firm’s market position, which in turn transforms the potential benefits of information sharing into superior firm performance. Second, our study goes one step beyond existing studies on the interactive effects of marketing capabilities and marketing orientation on firm performance. We demonstrate that it is the interactive effects of dynamic capabilities (information sharing) and market orientation on the development of ordinary capabilities (operations capabilities) that really matter to a firm’s sustained performance supremacy in the long term.

The practical implication is that managers must ensure that their firms have ongoing inter-firm information sharing arrangements with their suppliers and buyers. At the same time, they should have good operations capabilities to take advantage of the shared information and transform the benefits into superior firm performance. Another practical implication is that manufacturers need a corporate culture of market orientation to maximize the positive effects of both MS and MB inter-firm information sharing on the development of operations capabilities since at the end of the day it is operations capabilities that contribute directly to the supremacy of a firm’s performance.

**Keywords:** Information Sharing; Dynamic Capabilities; Ordinary Capabilities; Market Orientation
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They have shown great love and constant support during the past years. They do whatever they can for me so that I can concentrate on my studies. Every time I encountered difficulties or challenges, they encouraged me and motivated me to do better. Every member in my big family has contributed significantly to my studies. Their selfless support always encourages me to work harder and harder.
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CHAPTER 1 INTRODUCTION

1.1 Research Background

The turbulent business environment has made external knowledge a dominant source of information for a firm to use in developing and maintaining a sustainable competitive advantage (Lyles & Salk, 1996; Tsai, 2001). Firms need to share and acquire new knowledge as they seek to develop new applications and to survive (Henderson & Cockburn, 1994; Kogut & Zander, 1992). Especially in the supply chain context, frequent information sharing with supply chain partners becomes salient because the shared information allows the manufacturing firm to beef up its internal competencies, which in turn determine its product market position and therefore its performance (Kulp et al., 2004; Swink et al., 2007). Similarly, in the academic world, information sharing, referring to the mutual sharing of business and market information between exchange partners, has become a prime concern of many empirical studies in both strategic management and supply chain management (Kotabe et al., 2003; McEvily & Marcus, 2005; Dyer & Hatch, 2006; Mesquita et al., 2008; Cheung et al., 2011; Fey & Birkinshaw, 2005; Li, 2002; Wu, 2008; Koufteros et al., 2005;
Kotabe et al., 2007; Narasimhan & Kim, 2002; Kulp et al., 2004; Swink et al., 2007). A growing number of studies have begun to further explore the performance benefit of information sharing (Ingram & Simons, 2002; Kulp et al., 2004; Wu, 2008; Swink et al., 2007; Das et al., 2006). However, the empirical results remain largely inconclusive, ranging from a positive relationship (Ingram & Simons, 2002; Kulp et al., 2004; Wu, 2008) to a negative relationship (Swink et al., 2007; Das et al., 2006). For example, on one hand, Kulp et al. (2004) found that knowledge sharing on either inventory or customer needs is positively associated with firm performance. On the other hand, Das et al. (2006) reported that information sharing between supplier and manufacturer negatively influences the manufacturer’s performance. Given the state of the empirical findings, information sharing may be in danger of being inappropriately exploited in practice if the mechanisms that influence the information sharing-performance link are not critically and amply examined. Hence, the current research was intended to revisit this important information sharing-performance link and offer an alternative explanation for the divergent empirical results on the effects of information sharing on performance.
Our current study will unpack the black box of the information sharing-performance link by drawing on the dynamic capabilities perspective, as information sharing was explicitly regarded as a dynamic capability in Teece (2007). One influential view of the dynamic capabilities perspective advocates that dynamic capabilities are necessary but insufficient to improve firm performance (Eisenhardt & Martin, 2000; Zott, 2003; Winter, 2003; Zahra et al., 2006) because dynamic capabilities are valuable and rare, but neither inimitable nor immobile. For example, Zott (2003) suggested that dynamic capabilities are not directly linked to firm performance. Instead, dynamic capabilities may influence performance by modifying a firm’s bundle of resources or routines. Drawing on this view of dynamic capabilities, we propose that information sharing is necessary but insufficient to improve firm performance, and the performance effects of information sharing are leveraged with ordinary capabilities as a mediator. The long-term competitive advantage lies in a firm’s using information sharing sooner, more astutely, or more fortuitously than the competition to extend, modify, change, and/or create ordinary capabilities, which in turn determine the firm’s product market position and therefore its performance, and not in the information sharing itself. Moreover, in the existing
literature, ordinary capabilities, especially operations capabilities, have been widely regarded not only as a key benefit of information sharing (Kotabe et al., 2003; Dyer & Hatch, 2006; Mesquita et al., 2008; Cheung et al., 2011; Li, 2002), but also as a significant antecedent of firm performance (Day, 1994; Grant, 1996; Dutta et al., 1999). However, relatively few studies have been conducted to unravel the black box of the information sharing-performance link and explore the mediating role of ordinary capabilities (operations capabilities) in a single study.

Moreover, very little has been done to explore the boundary conditions of the proposed indirect relationship between information sharing and firm performance via ordinary capabilities. Information sharing may not have the expected positive effect on ordinary capabilities if valuable information cannot be proactively and effectively used when the firm is not ready or does not have the ability to change (Teece, 2007). Therefore, we propose that market orientation may be such a boundary condition for the information sharing-ordinary capabilities relationship. Market orientation, as a corporate culture (Slater & Narver, 1994a) or information processing capability (Kohli &
Jaworski, 1990), characterizes an organization’s disposition to deliver superior value to its customers continuously (Day, 1994). Market orientation is defined as the organization-wide generation of market intelligence pertaining to current and future customer needs, dissemination of the intelligence across departments, and organization-wide responsiveness to it (Kohli & Jaworski, 1990). It drives the firm to learn about customers, competitors, and channel members so as to continuously sense and act on events and trends in present and prospective markets (Slater & Narver, 1994a).

Several previous studies have suggested that the effects of ordinary capabilities on firm performance are contingent on market orientation. However, few studies have investigated the moderating role of market orientation in the information sharing - ordinary capabilities relationship. For example, Morgan et al. (2009) posited and verified that market orientation and marketing capabilities are complementary assets, enabling a firm to align its resource deployments with its market environment better than its rivals (e.g., Day, 1994; Eisenhardt & Martin, 2000), that contribute to superior firm performance. Menguc and Auh (2006) found that the effect of innovativeness on firm performance is strengthened when
innovativeness is bundled together with complementary resources, such as market orientation. However, according to the indirect view of the dynamic capabilities (Eisenhardt & Martin, 2000), even though ordinary capabilities are valuable, rare, imperfectly imitable, and imperfectly substitutable, they are merely an expropriating tool and not the real source for a firm to sustain its long-term performance supremacy, particularly in a rapidly changing environment. In these markets, dynamic capabilities, “ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments”, (Teece et al., 1997, 516) are the true source of a firm’s sustained competitive advantage. They constantly enable a firm to rebuild and reconfigure ordinary capabilities, which in turn determine the firm’s product market position and ultimately its performance. Therefore, it is imperative to shift our attention to the interactive effects of dynamic capabilities (information sharing in this study) and market orientation on firm performance via ordinary capabilities (operations capabilities in the current study) from the interactive effects of market orientation and ordinary capabilities, such as marketing capabilities and innovativeness on firm performance. Therefore, there remain two research questions, presented below.
1.2 Research Questions

1. Do operations capabilities mediate the information sharing and firm performance relationship?

2. Does market orientation moderate the relationship between information sharing and operations capabilities?

1.3 Research Scope

The thesis is focused on the information sharing and firm performance relationship with market orientation as the boundary condition of the information sharing-operations capabilities link in the supply chain context. Moreover, the key backbone theory employed is the dynamic capabilities perspective.

1.4 Research Objectives

This study has three main objectives. First, the current study revisits the essential information sharing-firm performance relationship by exploring the mediating role of operations capabilities. We propose that information sharing is necessary but insufficient to have a direct impact on firm performance; although valuable and rare, it is neither inimitable nor immobile. It is ordinary capabilities that are
rebuilt and reconfigured through information sharing. These capabilities determine a firm’s product market position and ultimately its performance, consequently transforming the potential benefits of information sharing into superior firm performance. Our findings will contribute to the unpacking of the black box of the process of the impact of information sharing on firm performance and, therefore, offer an alternative explanation for the inconclusive empirical results on the relationship between information sharing and firm performance. Furthermore, very little has been done to investigate the effects of both types of information sharing on operations capabilities simultaneously in a single study. This study uses a dimensional approach by dividing information sharing into two different types: information sharing between a manufacturer and its key supplier (MS information sharing) and information sharing between a manufacturer and its key buyer (MB information sharing) because important technology and market changes can be sensed and seized through the two approaches (Swink et al., 2007). Thus, the current study may add value to the existing research by revealing that ordinary capabilities mediate both types of information sharing in firm performance, hence offering further support to the proposed mediation model.
Second, this study also explores the role of market orientation as the market-based boundary condition of the proposed indirect relationship between information sharing and firm performance via ordinary capabilities. When a firm has a disposition to generate and disseminate customer-related information and swiftly responds to that information, it is more likely to take better advantage of valuable information acquired from its key suppliers and buyers through MS and MB information sharing in the redeployment and reconfiguration of its internal resources and competencies in a more optimal and effective manner. As a result, the impact of information sharing on ordinary capabilities will be boosted. Therefore, our investigation, by going one step further, shifts the focus from the existing study of the complementary effects between ordinary capabilities and marketing orientation on firm performance (Morgan et al., 2009; Menguc & Auh, 2006) to the complementary effects of dynamic capabilities (information sharing) and market orientation on the development of ordinary capabilities. Our finding will shed a new light on the existing literature on the information sharing-performance relationship by exploring the boundary condition of the proposed indirect relationship between information sharing and firm performance via ordinary capabilities. Moreover, our study also contributes to
the market orientation literature, as it demonstrates that market orientation, as a moderator, strengthens the benefits of information sharing on the development of ordinary capabilities, thus offering an extremely important contribution to the extant literature of market orientation that market orientation may have an equally pivotal effect on the dynamic capabilities-ordinary capabilities link.

Last, but not least, our study also contributes to the existing research on the dynamic capabilities perspective. The finding of an indirect relationship between information sharing and firm performance via ordinary capabilities will help substantiate the theoretical position that firm performance lies in operational capabilities that are extended, modified, changed, and created by using dynamic capabilities, not in the dynamic capabilities themselves (Zott, 2003; Winter, 2003; Zahra et al., 2006). Dynamic capabilities are seen as higher order capabilities that help a firm extend, modify, or improve its ordinary capabilities that are relevant to managing any given task. Therefore, this study also contributes to the current debate on whether there is an indirect relationship between dynamic capabilities and firm performance.
1.5 Structure of This Study

The thesis is organized as follows: Chapter 1 will introduce the research background, define the research scope, raise the research problems, and summarize the objectives of the study. Chapter 2 will review the literature. Related key theories will be examined, including the research-based view (RBV) theory and the dynamic capabilities theory. Moreover, the definitions and related knowledge of the construct, such as information sharing, operations capabilities, and market orientation, will be reviewed. Chapter 3 will present the conceptual model and the hypotheses development. Chapter 4 will describe the research design, including the data collection process, measurement scales of each variable, common method bias, and tests of construct validity and reliability. Chapter 5 will present detailed results of the hypotheses tested by multiple regressions and bootstrapping. Chapter 6 will provide the discussion and the theoretical and empirical implications, as well as the limitations and future research directions. Chapter 7 will present the conclusion.
2.1 Resource-Based View

We use the dynamic capabilities view as the backbone theory to explain our mediation model of information sharing and firm performance via ordinary capabilities. As it is an extension of the resources-based view (RBV), we will first review the theoretical foundation - resources-based view (RBV). Resources are defined as all assets, capabilities, organizational processes, firm attributes, information, and knowledge controlled by a firm (Barney, 1991). The resource-based view suggests that firms possess resources that enable them to achieve a competitive advantage, thus leading to superior performance (Barney, 1991; Grant, 1991; Wernerfelt, 1984). RBV emphasizes analysis of the heterogeneity in resource endowments across firms and explains how these differences can be the source of a sustainable competitive advantage (Barney, 1986, 1991; Wernerfelt, 1984).

In his foundational work, Barney (1991) argued that organizational resources that are valuable, rare, difficult to imitate, and non-substitutable (VRIN) can yield
sustained competitive advantages. Barney (1991) reckoned that two assumptions are critical to RBV: (1) Resources are distributed heterogeneously across firms and (2) these productive resources cannot be transferred from firm to firm without cost (i.e., resources are "sticky"). He went on to explain that resources contribute to competitive advantage if they are valuable, rare, costly to imitate, and non-substitutable. Resources are valuable if they facilitate improvements in the firm’s efficiency and effectiveness (Barney, 1991). The conditions under which resources become valuable are context dependent (Barney, 1991, 2001; Conner, 1991), such as organizational strategy and external environments (Priem & Butler, 2001a). Moreover, resources should also be rare to provide competitive advantage; otherwise, valuable resources can only provide competitive parity (Barney, 1991). In addition, a valuable and rare resource can sustain a firm’s competitive advantage if the resource is also difficult to imitate (Barney, 1991). The sources of inimitability include (1) unique historical conditions under which resource bundles are created, (2) a causally ambiguous relationship between the resources and resulting competitive advantage, and (3) the social complexity of the resources (Dierickx & Cool, 1989; Lippman & Rumelt, 1982). Finally, valuable, rare, and difficult-to-imitate resources can contribute to sustained competitive
advantage if no equivalent resources exist (Barney, 1991); if such resources do exist, a firm that has valuable, rare, and inimitable resources may not be able to secure a sustainable competitive advantage (Barney, 2001).

However, many RBV researchers who followed or extended Barney’s framework defined new terms without formally specifying the original. They either paraphrased Barney’s (1991) statements or simply cited his articles without augmenting the definition (e.g., Powell, 1992a; Bates & Flynn, 1995; Combs & Ketchen, 1999; Brush & Artz, 1999; Litz, 1996; McWilliams & Smart, 1995; Mosakowski, 1998; Rindova & Fombrun, 1999; Yeoh & Roth, 1999). Studies that further defined RBV constructs or clarified the causal relationship are scarce. Powell (1992a) stated that to generate sustainable competitive advantage a resource must provide economic value and be presently scarce, difficult to imitate, nonsubstitutable, and not readily obtainable in factor markets (Barney, 1991; Dierickx & Cool, 1989). Bates and Flynn (1995) said that this theory rests on two key points: First, resources are the determinants of firm performance (Barney, 1991) and, second, resources must be rare, valuable, difficult to imitate, and nonsubstitutable by other rare resources. When this occurs, a competitive
advantage is created (Barney, 1991). Combs and Ketchen (1999) showed that to be a source of sustained above-average performance resources must meet three criteria. They must be (1) valuable, meaning buyers are willing to purchase the resources’ outputs at prices significantly above their costs, (2) rare, so that buyers cannot turn to competitors with the same or substitute resources, and (3) imperfectly imitable, meaning it is difficult for competitors to either imitate or purchase the resources (Barney, 1991).

The underlying assumptions are that resources differ across organizations and these differences can be sustained over time. RBV explains how some firms achieve super firm performance in equilibrium, which is essentially a static view (Barney, 2001a, 2001b; Priem & Butler, 2001; Lockett et al., 2009). However, RBV does not specifically address how the firm can generate valuable resources in the future or how the firm can refresh current VRIN resources in changing environments.

Though numerous empirical studies have contributed to the RBV literature, many challenges remain in testing RBV constructs in empirical studies. For example,
Rouse and Daellenbach (1999) were criticized for using cross-sectional analysis on large-sample observations with secondary data, as the analysis failed to extract the effects from the variety of sources and was not able to isolate sustained sources of advantage. They recommended comparing carefully selected firms to extract the effects of sources of advantage, whereas other researchers (e.g., Levitas & Chi, 2002; Makadok & Walker, 2000) believed that this approach has limitations if it does not recognize the value of observable variables and does not support efforts to validate conclusions.

2.2 Dynamic Capabilities Theory

2.2.1 Definition of Dynamic Capabilities

The dynamic capabilities perspective is considered an extension of RBV. It shares similar assumptions with RBV (Barney, 2001b); it facilitates understanding the evolution of the firm’s resources over time and the sustainability of competitive advantage. The dynamic capabilities perspective considers the higher order capacity that helps the firm generate new resources and refresh or alter its resource mix in a rapidly changing environment (Teece et al., 1997). Rindova and Kotha (2001) argued that the top management team and its beliefs about
organizational evolution may play an important role in developing dynamic capabilities.

Teece et al. (1997) offered one of the two foundational works in the dynamic capabilities view, defining dynamic capabilities as a firm’s ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments. Following his steps, numerous theoretical studies emerged to consolidate the framework (e.g., Winter, 2003; Zahra et al., 2006; Zollo & Winter, 2002). They provided new but related definitions of dynamic capabilities (Table 1). Some were close to RBV, but others followed evolutionary economics. Overall, these studies provided competing arguments regarding the nature, specific role, relevant context, implementation and deployment mechanisms, and outcomes of dynamic capabilities.
<table>
<thead>
<tr>
<th>Study</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teece &amp; Pisano (1994)</td>
<td>The subset of the competences and capabilities that allow the firm to create new products and processes and respond to changing market circumstances.</td>
</tr>
<tr>
<td>Teece et al. (1997)</td>
<td>The firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments.</td>
</tr>
<tr>
<td>Eisenhardt &amp; Martin (2000)</td>
<td>The firm’s processes that use resources—specifically the processes to integrate, reconfigure, gain, and release resources—to match and even create market change; dynamic capabilities thus are the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die</td>
</tr>
<tr>
<td>Teece (2000)</td>
<td>The ability to sense and then seize opportunities quickly and proficiently</td>
</tr>
<tr>
<td>Zollo &amp; Winter (2002)</td>
<td>A dynamic capabilities is a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness</td>
</tr>
<tr>
<td>Winter (2003)</td>
<td>Those (capabilities) that operate to extend, modify, or create ordinary capabilities</td>
</tr>
<tr>
<td>Zahra et al. (2006)</td>
<td>The abilities to reconfigure a firm’s resources and routines in the manner envisioned and deemed appropriate by its principal decision maker(s)</td>
</tr>
<tr>
<td>Helfat et al. (2007)</td>
<td>The capacity of an organization to purposefully create, extend, or modify its resource base</td>
</tr>
<tr>
<td>Teece (2007)</td>
<td>Dynamic capabilities can be disaggregated into the capacity (a) to sense and shape opportunities and threats, (b) to seize opportunities, and (c) to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise’s intangible and tangible assets</td>
</tr>
</tbody>
</table>
**Nature.** Dynamic capabilities have been defined as capabilities or processes (routines). Drawing on Teece et al. (1997), some researchers have suggested that dynamic capabilities are organizational capabilities (Helfat et al., 2007; Teece et al., 1997; Teece, 2007; Zahra et al., 2006). Helfat et al. (2007) defined organizational capabilities as not only the ability to perform a task in at least a minimally acceptable manner but also the ability to repeat the task many times. Other authors have argued that dynamic capabilities are a process or routine (Eisenhardt & Martin, 2000; Zollo & Winter, 2002; Winter, 2003). For example, Eisenhardt and Martin (2000) noted that dynamic capabilities are specific and identifiable processes, whereas Zollo and Winter (2002) defined dynamic capabilities as regular and predictable patterns of collective activity. Furthermore, Eisenhardt and Martin (2000) suggested that market dynamics influence the nature of dynamic capabilities, such as detailed routines on the basis of existing knowledge and simple routines on the basis of situation-specific new knowledge.

**Specific Role.** Prior studies have suggested that the primary role of dynamic capabilities is to change the key internal components of the firm, although the locus of change is quite different across elements such as resources and
capabilities (e.g., Helfat et al., 2007; Teece et al., 1997; Teece, 2007; Zahra et al., 2006) and resources and routines (Zollo & Winter, 2002; Winter, 2003). Some researchers raised a two-level hierarchy, that is, zero-level capabilities and higher level capabilities. In line with that view, zero-level capabilities refer to ordinary capabilities that enable a firm to make a living in the short term (Winter, 2003) or substantive capabilities that facilitate the firm to solve a problem (Zahra et al., 2006). On the other hand, dynamic capabilities are considered higher level capabilities that rebuild and reconfigure ordinary capabilities (Winter, 2003; Zahra et al., 2006). Zollo and Winter (2002) classified two types of routines: (1) operating routines, those deployed in the operational activity, and (2) dynamic capabilities, those that modify the operating routines.

### 2.2.2 Dimensions of Dynamic Capabilities

According to Teece (2007), dynamic capabilities consist of three path-based capabilities: (1) sense and shape opportunities and threats, (2) seize opportunities, and (3) maintenance of competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise’s intangible and tangible assets (Table 2).
**Sense and Shape Opportunities and Threats.** Sensing and shaping new opportunities is defined as scanning, creating, learning, and interpreting activity. A firm must constantly scan, search, and explore across technologies and markets to identify and shape opportunities (Nelson & Winter, 1982). This includes not only research activity and analysis of customer needs and technological possibilities, but also forecasting customer demand, industry and market evolution, and likely supplier and competitor response (Teece, 2007). Firms may gain more opportunities if they explore technological opportunities by engaging in research and development (R&D) and studying the research output of others while inquiring about customer needs (Teece, 2007). When opportunities are recognized, a firm needs to further investigate how to interpret new events and developments, which technologies to use, and which market segments to target. They must analyze and forecast the technology evolution and the response of competitors, suppliers, and customers. In contrast, competitors may or may not recognize the opportunity, and even if they do they may calibrate it differently. Their actions, along with those of customers and suppliers, can also change the nature of the opportunity and the manner in which competition will unfold (Teece, 2007).
**Seizing Opportunity.** The sensed opportunities must be addressed through new products or services, which require investment in development and commercialization activity. The firm should remain flexible until the dominant design emerges and then invest heavily. Moreover, the manner and time at which an enterprise must place its bets depend on competition in the “input” markets and on the identity of the enterprise itself. Maintaining and improving technological capabilities are the foundation of addressing opportunities. When the opportunity is ripe, the firm can invest heavily in the particular technologies and designs that are most likely to achieve market acceptance. Therefore, the firm needs to consider seriously its investment decisions, getting the timing right, building on increasing return advantages, and leveraging products and services from one application to another (Teece, 2007). Moreover, the firm should also construct a business model that defines its investment priorities, as it is widely accepted that business success depends as much on organizational innovation, such as the design of business models, as it does on the selection of physical technology (Teece, 2007).

**Managing Threats and Reconfiguration.** Success will generate some level of
routine because it is necessary for operational efficiency. Routines facilitate the firm in sustaining continuity until there is a shift in the environment. To sustain a competitive advantage and maintain evolutionary fitness, the dominant capabilities involve reconfiguring assets and organizational structures over time. However, changing routine is costly and departure from routine often leads to heightened anxiety within the organization unless the culture is shaped to accept high levels of internal change. Decentralization is a micro foundation to realize the reconfiguration, as it enables the top managers to catch new technologies, customers, and markets. Also, semi-continuous asset orchestration and corporate renewal are critical to sustaining dynamic capabilities because they allow the firm to build, maintain, and adjust the complementarity of product offerings, systems, routines, and structures. Moreover, redeployment and reconfiguration may also facilitate the business model’s redesign and the revamping of routines. Helfat and Peteraf (2003) suggested that capabilities redeployment takes one of two forms: the sharing of capabilities between the old and the new and the geographic transfer of capabilities from one market to another (Table 2).
### Table 2 Main Features of Dynamic Capabilities

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Nature</strong></td>
<td>Ability or capacity (Helfat et al., 2007; Teece, 2000, 2007; Winter, 2003; Zahra et al., 2006)</td>
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<td></td>
<td>Process or routine (Eisenhardt &amp; Martin, 2000; Zollo &amp; Winter, 2002; Collis, 1994)</td>
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<td></td>
<td>Change resources and capabilities (Eisenhardt &amp; Martin, 2000; Helfat et al., 2007; Teece et al., 1997; Winter, 2003)</td>
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<tr>
<td><strong>Role</strong></td>
<td>Change operating routines (Zollo &amp; Winter, 2002)</td>
</tr>
<tr>
<td></td>
<td>Change resources and routines (Zahra et al., 2006)</td>
</tr>
<tr>
<td></td>
<td>Underlying processes: reconfiguration, leveraging, learning and creative integration (Teece et al., 1997)</td>
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<tr>
<td></td>
<td>Underlying processes: sensing, seizing and reconfiguring (Teece, 2007)</td>
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<tr>
<td><strong>Micro foundation</strong></td>
<td>Learning mechanisms to generate DCs such as accumulated experience, knowledge articulation and knowledge codification (Zollo &amp; Winter, 2002)</td>
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<td></td>
<td>Repeated practice, learning from past mistakes and pace of experience (Eisenhardt &amp; Martin, 2000)</td>
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<tr>
<td></td>
<td>Trial and error, improvisation and imitation (Zahra et al., 2006)</td>
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<tr>
<td><strong>Real DCs</strong></td>
<td>New product development (Pavlou &amp; El Sawy, 2010; Zollo &amp; Winter, 2002; Helfat, 1997; Danneels, 2002)</td>
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<td></td>
<td>Alliances and acquisitions management (Karim &amp; Mitchell, 2000; Katkalo et al., 2010; Zollo &amp; Singh, 2004)</td>
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<tr>
<td><strong>Performance Relation</strong></td>
<td>Absorptive Capacity (Zahra &amp; George, 2002)</td>
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<td></td>
<td>Organizational structure reconfiguration (Karim, 2006)</td>
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<td>Resource divestment (Moliterno &amp; Wiersema, 2007)</td>
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<td></td>
<td>Direct relationship (Teece et al., 1997; Lee et al., 2001; Makadok, 2001; Zollo &amp; Winter, 2002)</td>
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<td></td>
<td>Indirect relationship (Eisenhardt &amp; Martin, 2000; Zott, 2003; Zahra et al., 2006; Winter, 2003; Bowman &amp; Ambrosini, 2003; Helfat et al., 2007; Teece, 2007)</td>
</tr>
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</table>
2.2.3 Operationalization of Dynamic Capabilities

Several prior studies have explained the application and utilization of dynamic capabilities. Eisenhardt and Martin (2000) claimed that dynamic capabilities actually consist of identifiable and specific routines. They argued that acquisitions, alliances, and product innovation can be considered dynamic capabilities because they allow for the renewal and reconfiguration of a firm’s resources. Helfat (1997) defined R&D as a dynamic capability and argued that R&D activities are enhanced to respond to market changes. Karim and Mitchell (2000) also claimed acquisition as a dynamic capability. They further explained that acquisitions allow firms to reconfigure their mix of resources, that they are a means through which firms modify their resource base over time, and that they allow firms to overcome failure and exploit opportunities in their environment. Danneels (2002) stated that product innovation that generates development and renewal of firm competencies can be defined as a dynamic capability. Zahra and George (2002) stated that absorptive capacity is a dynamic capability that influences a firm’s ability to create and deploy the knowledge necessary to build other organizational capabilities and they argued that absorptive capabilities allow the firm to exploit new knowledge and provide them with the flexibility to
change in dynamic markets. Karim (2006) claimed that organizational structure reconfiguration is a dynamic capability through which firms can reconfigure their resources and adjust to environmental changes. On the basis of a data set of professional baseball franchises, Moliterno and Wiersema (2007) argued that resource divestment is a dynamic capability. They explained the mechanisms of human resource divestment dynamic capabilities and suggested that managers’ judgment and perceptions and contextual feedback in the form of firm performance relative to aspirations were critical to the deployment of this capability.

Information sharing is considered a dynamic capability in this study. Information sharing, which has been widely accepted as a learning activity, offers some of the functions of a dynamic capability, such as sensing and learning external knowledge and providing a key micro foundation of dynamic capabilities (Teece, 2007). Eisenhardt and Martin (2000) also argued that acquisitions and alliances can be considered dynamic capabilities because they allow for the renewal and reconfiguration of a firm’s resources. In a study of alliance learning and alliance success, Kale and Singh (2007) used knowledge sharing as a dimension of
2.2.4 Theoretical and Empirical Studies of Dynamic Capabilities and Firm Performance

Prior research assumed a direct relationship between firms’ dynamic capabilities and their performance (Teece et al., 1997). The rationale was that RBV does not adequately explain how and why certain firms have a competitive advantage in situations of rapid and unpredictable change. In these markets, where the competitive landscape is shifting, firm managers often use dynamic capabilities to “integrate, build, and reconfigure internal and external competencies to address rapidly changing environments” (Teece et al., 1997, 516) and these capabilities become the source of sustained competitive advantage. The manipulation of knowledge resources, in particular, is especially critical in such markets (Grant, 1996; Kogut, 1996). In line with this framework, Lee et al. (2001) suggested that dynamic capabilities are conceived as a source of sustainable advantage in Shumpeterian regimes of rapid change. Makadok (2001) also conceptualized the dynamic capabilities approach as a causal mechanism (along with RBV) by which firms create economic rents or economic profit. Zollo and Winter (2002) proposed a direct relationship between dynamic
capabilities and superior firm performance in changing environmental conditions. More recently, Teece (2007) reiterated that the ambition of the dynamic capabilities framework is nothing less than to explain the sources of enterprise-level competitive advantage over time and that dynamic capabilities lie at the core of enterprise success (and failure).

In contrast, other researchers have shown less confidence in the direct link between dynamic capabilities and performance. Eisenhardt and Martin (2000) contended that dynamic capabilities are necessary, but not sufficient, conditions for competitive advantage. In their view, the sustainability of a competitive advantage does not directly rely on the dynamic capabilities themselves but rather on the resource configurations and advantages of ordinary capabilities created by the dynamic capabilities and by using dynamic capabilities sooner, more astutely, and more fortuitously than the competition (Eisenhardt & Martin, 2000). Similarly, Zott (2003) suggested that dynamic capabilities are not directly linked to firm performance. Instead, dynamic capabilities may influence performance by modifying a firm’s bundle of resources or routines. Moreover, Zott (2003) argued that firms with identical dynamic capabilities may actually
build different bundles of resources and consequently have differentiated performance levels. Zahra et al. (2006) also proposed that the relationship between dynamic capabilities and performance is rather indirect via the quality of substantive capabilities changed by dynamic capabilities. They also noted that dynamic capabilities may damage rather than improve a firm’s performance if the dynamic capabilities are used when there is no need for them or when incorrect cause-effect assumptions are made. Winter (2003) posited that other types of costs make dynamic capabilities not necessarily advantageous even in terms of internal choice to use them or develop them. According to his argument, not only do dynamic capabilities involve long-term commitments to specialized resources (and without any benefit as long as they are not exercised), but they also are associated with an important opportunity cost, namely, the existence of an alternative way to generate change through ad hoc problem solving. Similarly, Bowman and Ambrosini (2003) suggested that the VRIN resource base is directly linked to rents, but as dynamic capabilities are one step removed from rent generation, their effect is indirect. Finally, Helfat et al. (2007) decoupled the notion of dynamic capabilities and performance and argued that dynamic capabilities do not necessarily lead to competitive advantage. They explained
that, while the dynamic capabilities may change the resource base, this renewal may not necessarily be valuable; it may not create any VRIN resources (i.e., the new set may either only give competitive parity or be irrelevant to the market).

In addition, Zollo and Winter (2002) and Winter (2003) cautioned that the maintenance of dynamic capabilities is expensive and that an ad hoc approach may be less costly: “Dynamic capabilities typically involve long-term commitments to specialized resources ... by contrast, the costs of ad-hoc problem solving largely disappear if there is no problem to solve” (Winter 2003, 993). Lavie (2006) also addressed the cost of dynamic capabilities by suggesting that dynamic capabilities involve substantial cognitive, managerial, and operational costs and that deploying dynamic capabilities requires high levels of time and energy from committed managers. The firm will then experience both the costs of the dynamic capabilities and the negative consequences of their deployment (Zahra et al., 2006). This leads us back to the discussion on competitive advantage and the point that although dynamic capabilities “are developed in order to realize strategic advantages, their development does not ensure organizational success” (Zahra et al., 2006, 926).
However, empirical work on dynamic capabilities remains sparse (Zahra et al., 2006; Ambrosini & Bowman, 2009; Peteraf et al., 2013). For example, Pavlou and El Sawy (2006) identified five processes that constitute dynamic capabilities in new product development (NPD): reconfiguring resources to better match the environment, sensing the environment, learning, and coordinating activities, and integrating interaction patterns. Their findings indicated that dynamic capabilities positively contribute to firm performance. Kale and Singh (2007) showed that an alliance learning process, which involves articulation, codification, sharing, and internalization of alliance management know-how, can be defined as a dynamic capability. They found that an alliance learning process is positively related to a firm’s overall alliance success.

2.3 Ordinary Capabilities

2.3.1 Definition of Ordinary Capabilities

To distinguish ordinary capabilities from dynamic capabilities, some researchers have raised a two-level hierarchy, that is, zero-level capabilities and higher level capabilities. In line with that view, zero-level capabilities refer to ordinary capabilities, the ability to make money in the short term (Winter, 2003), or
substantive capabilities, the ability to solve a problem (Zahra et al., 2006). On the other hand, dynamic capabilities are considered higher level capabilities that rebuild and reconfigure ordinary capabilities (Winter, 2003; Zahra et al., 2006). Zollo and Winter (2002) classified two types of routines: (1) operating routines, those deployed in operational activity, and (2) dynamic capabilities, those that modify operating routines.

Consider a hypothetical firm in equilibrium, an organization that keeps earning money by producing and selling the same product, on the same scale, and to the same customer population over time. The capabilities exercised in that stationary process are zero-level capabilities, or “how we earn a living now” capabilities. Without ordinary capabilities, the firm could not collect the revenue from its customers that allows it to buy more inputs and do the whole thing over again. In contrast, capabilities that would change the product, the production process, the scale, or the customers (markets) served are not at the zero level.

2.3.2 Dimensions of Ordinary Capabilities and Their Relationship with Information Sharing and Performance

Capabilities are demarcated according to their different functional areas. Many
kinds of ordinary capabilities that are common to businesses can be identified. Technological, product development, production process, manufacturing, and logistics capabilities allow a firm to keep costs down and differentiate its offerings. Increased production efficiency reduces costs, improves consistency in delivery, and ultimately increases competitiveness. Marketing capabilities, such as skills in segmentation, targeting, pricing, and advertising, permit the business to take advantage of its market sensing and technological capabilities and to implement effective marketing programs. Capabilities in information technology (IT) help the firm diffuse market information effectively across all relevant functional areas so that it can exploit directly the new product development process. Finally, management-related capabilities support all of the above and include human resource management, financial management, and profit and revenue forecasting, among others.

In our study, we look at operations capabilities, representing one of the key ordinary capabilities, and their impact on performance because superior operations capabilities are the core competence for a manufacturing firm to maintain daily operations, generate technical fitness, and consequently earn a
competitive advantage for the firm (Teece, 2007). Operations capabilities have been widely regarded not only as a key benefit of information sharing (Kotabe et al., 2003; Dyer & Hatch, 2006; Mesquita et al., 2008; Cheung et al., 2011; Li, 2002; Koufteros et al., 2005; Kotabe et al., 2007; Fey & Birkinshaw, 2005; Das et al., 2006), but also as a significant antecedent of firm performance (Day, 1994; Grant, 1996; Dutta et al., 1999). For example, Kotabe et al. (2003) found that knowledge sharing is positively associated with improvements in suppliers’ operations capabilities. Superior operations capabilities increase efficiency in the delivery process and reduce costs of operations, which in turn lead to the firm’s superior performance (Day, 1994). However, very few studies have been conducted specifically to explore the mediating role of operations capabilities in the information sharing and firm performance relationship. Therefore, our study uses operations capability as a manifestation of ordinary capabilities.

*Operations Capabilities.* Leong et al. (1990) identified four operations capabilities or dimensions along which an organization must be able to compete, widely accepted as being relevant to an organization’s success: quality, delivery, cost, and flexibility. Dutta et al. (1999) defined operations capabilities as the
integration of a complex set of tasks performed by a firm to enhance its output through the most efficient use of its production capabilities, technology, and flow of materials. Roth (1996) defined operations capabilities as a manufacturer’s ability to excel simultaneously on quality, delivery, flexibility, and low cost. Petersen et al. (2003) considered operations capabilities to be the firm’s ability to effectively and efficiently produce a product. Operations capabilities are focused on performing organizational activities efficiently and flexibly with a minimum waste of resources (Krasnikov & Jayachandran, 2008). Operations capabilities can also involve a firm’s new product design and development, just-in-time manufacturing, and total quality management capabilities (Hsu et al., 2009). Tan et al. (2012) defined operations capabilities as a firm’s leveraging of its manufacturing function to support organizational success.

On one hand, in the existing literature, numerous studies have reported on the information sharing and operations capability (or operational performance) relationship in the supply chain context. For example, Kotabe et al. (2003) found that knowledge transfer and exchange was positively associated with supplier operational performance improvement (product quality and lead time).
Hult et al. (2004) demonstrated that the knowledge sharing process explained substantial variance in cycle times. Hult et al. (2007) indicated that the culture of competitiveness and information sharing has an interaction effect on operational performance (cycle time). McEvily and Marcus (2005) illustrated that joint problem solving mediates the relationship between information sharing and quality management capability. Dyer and Hatch (2006) showed that knowledge sharing has a significant influence on firm operational performance (product quality, inventory cost). Selnes and Sallis (2003) found that information sharing has a strong, positive effect on relational performance (logistic cost, product quality, new product development). Cheung et al. (2011) indicated that information sharing contributes to relational performance (quality, delivery speed, new product, cost). All the above findings illuminate the benefits of information sharing.

On the other hand, the manufacturing strategy literature has highlighted the role of operations capabilities in firm performance (Gonzalez-Benito & Gonzalez-Benito, 2005; Hayes & Pisano, 1996; Roth & Miller, 1990). The literature has argued that a firm can achieve competitive advantage by
implementation of an efficient material flow process, careful utilization of assets, and acquisition and dissemination of superior process knowledge (Tan et al., 2007). Superior operations capabilities increase efficiency in the delivery process, reduce the cost of operations, and achieve competitive advantage (Day, 1994). Dutta et al. (1999) argued that the great complexity in the operations function helps to make superior operations capabilities imperfectly mobile and imperfectly imitable, thereby conferring competitive advantage on firms. Rosenzweig et al. (2003) found that operations capabilities enhance an organization’s chances for growth and survival. Hsu et al. (2008) showed that superior operations capabilities reduce cost and lead times and increase quality, which in turn lead to improvements in measures of firm performance.

2.4 Information Sharing and Firm Performance

2.4.1 Definition of Information Sharing

In our study, we regard information sharing as the application of dynamic capabilities. Teece (2007) defined dynamic capacities as the abilities to sense and shape opportunities and threats and to maintain competitiveness by enhancing, combining, protecting, and reconfiguring the business enterprise’s intangible and
tangible assets, in which sensing and shaping new opportunities is very much a scanning, creating, learning, and interpreting activity. Information sharing, which has been widely accepted as a learning activity, offers some of the functions of a dynamic capability, such as sensing and learning external knowledge, providing a key micro foundation of dynamic capabilities (Teece, 2007). Eisenhardt and Martin (2000) also argued that acquisitions and alliances can be considered dynamic capabilities because they allow for the renewal and reconfiguration of a firm’s resources. In a study of alliance learning and alliance success, Kale and Singh (2007) used knowledge sharing as a dimension of dynamic capabilities. Therefore, we have defined information sharing as a dynamic capability.

Information sharing in the supply chain context refers to the extent to which operational and strategic information is available to members of the supply chain. Mohr and Spekman (1994) defined information sharing as the degree of exchange of critical information between a buyer and a supplier (Table 3). Lee (2001) referred to knowledge sharing as activities of transferring or disseminating knowledge from one person, group, or organization to another. Organizational knowledge sharing refers to the process through which
organizational actors (teams, units, organizations) exchange, receive, and are influenced by the experience and knowledge of others (Van Wijk et al., 2008). Flynn et al. (2010) referred to information sharing as the degree to which key information content, such as inventory, planning, and capacity, is shared. Some studies have defined knowledge transfer processes in alternative but related ways, such as knowledge transfer (Mowery et al., 1996; Tsai, 2001), knowledge flows (Gupta & Govindarajan, 2000), and knowledge acquisition (Lyles & Salk, 1996).
Table 3 Main Definitions of Information Sharing

<table>
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<tr>
<th>Study</th>
<th>Definition</th>
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<tr>
<td>Mohr &amp; Spekman (1994)</td>
<td>Information sharing is the degree of exchange of critical information between a buyer and a supplier.</td>
</tr>
<tr>
<td>Lee (2001)</td>
<td>Knowledge sharing is activities of transferring or disseminating knowledge from one person, group or organization to another.</td>
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<tr>
<td>Li &amp; Lin (2006)</td>
<td>Information sharing is in terms of quality (i.e. timeliness, accuracy, completeness, adequateness, and reliability) and contents,</td>
</tr>
<tr>
<td>Van Wijk et al. (2008)</td>
<td>Organizational knowledge sharing refers to the process through which organizational actors – teams, units, or organizations – exchange, receive and are influenced by the experience and knowledge of others</td>
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<tr>
<td>Flynn et al. (2009)</td>
<td>Refer to information sharing as the degree of sharing of key information content, such as inventory, planning, and capacity.</td>
</tr>
<tr>
<td>Foss et al. (2010)</td>
<td>Knowledge sharing as the provision or receipt of task information, know how, and feedback on a product or a procedure.</td>
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<tr>
<td>Wu (2008)</td>
<td>Information sharing refers to the mutual sharing of business and market information between exchange partners.</td>
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</table>
2.4.2 Dimensions of Information Sharing

Prior studies have categorized information sharing into different forms (Table 4). For example, Bowersox et al. (1999) indicated that customer information sharing involves core competencies derived from coordination with critical customers, whereas supplier information sharing involves core competencies related to coordination with critical suppliers. Narasimhan and Kim (2002) suggested that information sharing includes sharing with suppliers and customers, in which the company builds strategic partnerships with suppliers and customers and jointly develops strategies to capitalize on market opportunities. Swink et al. (2007) classified external information sharing into information sharing with suppliers (information sharing that occurs between suppliers and manufacturers) and information sharing with key buyers (information sharing that occurs between manufacturers and key buyers). Devaraj et al. (2007) differentiated demand-oriented information sharing of real-time point-of-sales data, sales forecasts, customer profiling, and customer relationship management from supply-oriented sharing of inventory ordering policies, inventory levels, and production schedules.
**Manufacturer-Key Suppliers Information Sharing.** Manufacturer-key suppliers (MS) information sharing is defined as the extent to which information is shared between key suppliers and manufacturers, such as production schedules, product quality, inventory level, and quality level of raw material, which increases the transparency of the supply capabilities (Swink et al., 2007; Narasimhan & Kim, 2002; Devaraj et al., 2007). This approach tends to be subsumed into related areas of just-in-time management (Lee et al., 2001; Choi & Krause, 2006) and mass customization in the supply chain (Berman, 2002; Salvador et al., 2002).

**Manufacturer-Key Buyers Information Sharing.** Manufacturer-key buyers (MB) information sharing is defined as the extent to which key buyers and manufacturers share information related to real-time point-of-sales data, changes in end customer’s requirements and preferences, production schedules, and product quality. In other words, it is the process of exchanging customer requirements information and related knowledge (Swink et al., 2007; Narasimhan & Kim, 2002; Devaraj et al., 2007). MB information sharing allows firms to respond directly to customer needs and can be coordinated through multiple organizations or networks.
Even though existing studies have investigated upstream information sharing and downstream information sharing (Swink et al., 2007; Narasimhan & Kim, 2002; Devaraj et al., 2007), their focus has been on exploration of the direct effects of both types of information sharing on operations capabilities or performance rather than the indirect effects on performance via ordinary capabilities. Given the importance of this research gap in the existing literature, we propose that ordinary capabilities mediate the relationships between MB information sharing and performance and between MS information sharing and performance.

2.4.3 Empirical Studies of Information Sharing and Firm Performance

The information sharing-performance link has been a prime concern of many empirical studies (Kotabe et al., 2003; McEvily & Marcus, 2005; Dyer & Hatch, 2006; Mesquita et al., 2008; Cheung et al., 2011; Fey & Birkinshaw, 2005; Li, 2002; Koufteros, 2005; Kotabe, 2007; Narasimhan & Kim, 2002; Kulp et al., 2004; Swink et al., 2007) (Table 4). A growing number of studies has started to dig deeper into the relationship between information sharing and firm performance (Ingram & Simons, 2002; Kulp et al., 2004; Wu, 2008, Swink et al., 2007). However, the empirical results remain largely inconclusive, ranging from...
a positive relationship (Ingram & Simons, 2002; Kulp et al., 2004; Wu, 2008) to
a negative relationship (Swink et al., 2007; Das et al., 2006).

For example, on one hand, Kotabe et al. (2003) found that knowledge sharing
indicated that knowledge sharing has a significant positive influence on firm
performance. Kulp et al. (2004) showed that knowledge sharing on either
inventory or customer needs is positively associated with firm performance. Wu
(2008) revealed that information sharing is positively related to firm
performance. Ingram and Simons (2002) found that knowledge transfer improves
a firm’s performance within organizational groups. Narasimhan and Nair (2005)
demonstrated that information sharing between buyer and supplier has a positive
impact on strategic alliance formation, which in turn has a significant impact on
firm performance. Mesquita et al. (2008) found that relational performance is a
function of suppliers acquiring know-how in the buyer-supplier relationship.
Kale and Singh (2007) showed that knowledge sharing is positively related to a
firm’s overall alliance success. Ragatz et al. (2002) indicated that the supplier
information sharing process may lead to significant improvements in cost,
quality, and cycle time objectives.

On the other hand, Cousins and Menguc (2006) found that supply chain information sharing failed to improve suppliers’ performance. Wang et al. (2006) argued that vertical information sharing is unlikely to contribute directly to a manufacturer’s performance. According to Flynn et al. (2010), customer information sharing is positively related to firm performance, whereas supplier information sharing has no significant effects on firm performance. Devaraj et al. (2007) indicated that information sharing with the supplier has a positive impact on firm performance, whereas information sharing with customers has no effect on firm performance. Koufteros et al. (2005) demonstrated that information sharing with customers positively influences product innovation and quality, whereas information sharing with suppliers negatively affects product innovation and quality. Droge et al. (2004) indicated that information sharing is related to time-based performance, which in turn is related to firm performance, and information sharing directly affects firm performance even after time-based performance is taken into account. Das et al. (2006) stated that information sharing between supplier and manufacturer negatively influences firm
Some researchers have begun to investigate mediators, such as operations capabilities between information sharing and firm performance. For example, Rosenzweig et al. (2003) showed that manufacturing-based competitive capabilities partially mediated the relationship between supply chain information sharing and firm performance. Swink et al. (2007) found an indirect relationship between both supplier information sharing and customer information sharing and firm performance; specifically, the supplier information sharing and performance link is mediated by the competitive capabilities. However, there is no systematic theoretical explanation of the mediating role of ordinary capabilities in the relationship between information sharing and firm performance. Therefore, the current study goes one step further by providing a theoretical framework, evoking the dynamic capabilities perspective as the backbone theory and empirically testing the mediating role of operations capabilities in the proposed indirect relationship between information sharing and firm performance.
<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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<tbody>
<tr>
<td>Classification</td>
<td>MB information sharing (Kotabe et al., 2003; Mesquita et al., 2008; Cousins &amp; Menguc, 2006; Kulp et al., 2004)</td>
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<td></td>
<td>MS information sharing (Dyer &amp; Nobeoka, 2000; Dyer &amp; Hatch, 2006; Ragatz et al., 2002).</td>
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<td></td>
<td>MB and MS information sharing (Bowersox et al., 1999; Stank et al., 2001b; Narasimhan &amp; Kim, 2002; Swink et al., 2007; Devaraj et al., 2007)</td>
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<td>Consequences</td>
<td>New product development (Koufteros et al., 2005; Gosain et al., 2004; Petersen et al., 2003; Fang, 2011; Koufteros et al., 2005; Foss et al., 2011)</td>
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<td>Operational cost (Ragatz et al., 2002; Selnes &amp; Sallis, 2003; Wang et al., 2006; Droge et al., 2004; Swink et al., 2007; Rosenzweig et al., 2003)</td>
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<td>Alliance (Mesquita et al., 2008; Kale &amp; Singh, 2007; Narasimhan &amp; Nair, 2005)</td>
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<td>Overall performance (Kotabe et al., 2003; Dyer &amp; Hatch, 2006; Kulp et al., 2004; Wu, 2008; Ingram &amp; Simons, 2002; Narasimhan &amp; Nair, 2005; Cousins &amp; Menguc, 2006; Flynn et al., 2010; Devaraj et al., 2007; Swink et al., 2007; Droge et al., 2004; Rosenzweig et al., 2003; Das et al., 2006)</td>
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<tr>
<td>Performance Relations</td>
<td>Positive relationship (Kotabe et al., 2003; Dyer &amp; Hatch, 2006; Kulp et al., 2004; Wu, 2008; Ingram &amp; Simons, 2002; Sampson et al., 2007; Narasimhan &amp; Nair, 2005; Mesquita et al., 2008; Kale &amp; Singh, 2007; Ragatz et al., 2002; Selnes &amp; Sallis, 2003; Koufteros et al., 2007; Gosain et al., 2004; Petersen et al., 2003; Fang, 2011)</td>
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<td>Negative relationship (Cousins &amp; Menguc, 2006; Wang et al., 2006; Flynn et al., 2010; Devaraj et al., 2007; Koufteros et al., 2005)</td>
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<td>Indirect relationship (Foss et al., 2010; Swink et al., 2007; Dorge et al., 2004; Rosenzweig et al., 2003)</td>
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</table>
Given the state of the empirical findings, information sharing may be in danger of being inappropriately exploited in practice if the mechanisms that influence the information sharing-performance link are not critically and amply examined. Hence, the current study revisits the information sharing-performance link and unpacks the black box of this important relationship by offering an alternative explanation for these mysterious empirical findings in the existing literature.

2.5 Market Orientation

2.5.1 Definition of Market Orientation

This study proposes market orientation as the market-based boundary condition of the mediation model of information sharing and firm performance via ordinary capabilities. Market orientation as a corporate culture characterizes an organization’s disposition to deliver superior value to its customers continuously (Slater & Narver, 1994a) (Table 5). The creation of superior customer value entails an organization-wide commitment to continuous information gathering and coordination of customers’ needs, competitors’ capabilities, and the provisions of other significant market agents and authorities (Slater & Narver, 1994b, 1995). The result is an integrated effort on the part of employees and
across departments in an organization, which in turn gives rise to superior performance (Kohli & Jaworski, 1990). Market orientation has been conceptualized from both behavioral and cultural perspectives (Homburg & Pflesser, 2000). The behavioral perspective has concentrated on organizational activities that are related to the generation and dissemination of and responsiveness to market intelligence (e.g., Kohli & Jaworski, 1990). These studies have defined market orientation as the generation and dissemination of market intelligence that is composed of information about customers’ current and future needs and exogenous factors that influence those needs (e.g., competition, government regulation) (Kohli & Jaworski, 1990). The value of the information is maximized when it is shared among virtually all functions in an organization. Ultimately, the organization must be prepared to act rapidly on the information. The result is that a market orientation appears to provide a unifying focus for the efforts and projects of individuals and departments within the organization, thereby leading to superior performance (Kohli & Jaworski, 1990). The cultural perspective closely parallels Kohli and Jaworski’s (1990) definition and consists of three behavioral components (customer orientation, competitor orientation, interfunctional coordination), each of which involves intelligence generation and
dissemination and managerial action (Slater & Narver, 1994a). In a cross-sectional study, Slater and Narver (1994a) found a substantial positive relationship between the magnitude of a business’s market orientation and its profitability. We adopted Kohli and Jaworski’s (1990) definition of market orientation for this study as a more comprehensive conceptualization of the construct. Market orientation is the organization-wide generation of market intelligence pertaining to current and future customer needs, dissemination of the intelligence across departments, and organization-wide responsiveness to it.

2.5.2 Dimensions of Market Orientation

*Market Intelligence Generation.* Market intelligence generation is defined as the organization-wide generation of market intelligence pertaining to current and future customer needs (Kohli & Jaworski, 1990). The starting point of a market orientation is market intelligence. Market intelligence is a broader concept than customers’ verbalized needs and preferences in that it includes an analysis of exogenous factors that influence those needs and preferences. The monitoring factors include government regulation, technology, competitors, and other environmental forces. Also, effective market intelligence pertains not only to
current needs, but also to future needs, as it often takes years for an organization to develop a new product offering. The generation of market intelligence relies on customer surveys and a host of complementary mechanisms. The mechanisms include meetings and discussions with customers and trade partners (e.g., distributors), analysis of sales reports, analysis of world-wide customer databases, and formal market research such as customer attitude surveys and sales response in test markets. Intelligence generation is not the exclusive responsibility of a marketing department. Rather, market intelligence is generated collectively by individuals and departments throughout an organization. For example, R&D engineers may obtain information at scientific conferences, and senior executives might uncover trends reported in trade journals.

**Market Intelligence Dissemination.** Market intelligence dissemination is defined as the internal dissemination of intelligence within the organization (Kohli & Jaworski, 1990). For an organization to adapt to market needs, market intelligence must be communicated, disseminated, and perhaps even sold to relevant departments and individuals in the organization. Effective dissemination of market intelligence is important because it provides a shared basis for
concerted actions by different departments. A firm should have formal intelligence channels, such as periodic newsletters to facilitate dissemination of market intelligence. A formal intelligence dissemination procedure is obviously important, but informal “hall talk” is also an extremely powerful tool for keeping employees attuned to customers and their needs. Horizontal communication of market intelligence is one form of intelligence dissemination within an organization. It is the lateral flow that occurs both within and between departments and serves to coordinate people and departments to facilitate the attainment of overall organizational goals.

*Organization-Wide Responsiveness.* Responsiveness is the action taken in response to intelligence that is generated and disseminated (Kohli & Jaworski, 1990). Responsiveness to market intelligence takes the form of selecting target markets, designing and offering products/services that cater to consumers’ current and anticipated needs, and producing, distributing, and promoting products in a way that elicits favorable end customer response. Virtually all the departments, not just marketing, participate in responding to market trends in a market-oriented company.
2.5.3 Market Orientation and Ordinary Capabilities

Several previous studies have suggested a close relationship between ordinary capabilities and market orientation (Table 5). For example, Day (1994) stated that market orientation captures the essence of market-sensing capabilities. Each element of Kohli and Jaworski’s (1990) definition describes a distinct activity having to do with collecting and acting on information about customer needs and the influence of technology, competition, and other environmental forces.

Morgan et al. (2009) further examined market orientation as a key market-based asset and a firm’s marketing capabilities as a key market-related deployment mechanism. Their finding indicated that market orientation and marketing capabilities are complementary assets that contribute to superior firm performance (Morgan et al., 2009). Both resource-based theory and its dynamic capabilities extensions indicate the importance of the interaction between a firm’s know-what knowledge resources and its complementary know-how deployment capabilities (e.g., Grant, 1996). This suggests that a firm’s market orientation and marketing capabilities may interact to enable the firm to align its resource deployments with its market environment better than its rivals (e.g., Day,
However, very little has been done to explore the moderating role of market orientation on the proposed indirect link between dynamic capabilities and performance via ordinary capabilities. Drawing on the dynamic capabilities perspective, even though the marketing capabilities are valuable, rare, imperfectly imitable, and imperfectly substitutable, they are only an expropriating tool that helps the firm earn competitive advantage and then generate superior performance at a point in time (Barney, 2001a,b). Market orientation is not the true source of a firm’s sustained competitive advantage in situations of rapid and unpredictable change. In these markets, where the competitive landscape is shifting, dynamic capabilities by which firm managers “integrate, build, and reconfigure internal and external competencies to address rapidly changing environments” (Teece et al., 1997, 516) are the true source of sustained competitive advantage through constant rebuilding and reconfiguring of the ordinary capabilities, which in turn determine the firm’s product market position and ultimately its performance. Therefore, the research focus is shifted from the interactive effects between marketing capabilities and market
orientation to the complementary effects between information sharing and market orientation on ordinary capabilities, which in turn lead to enhanced firm performance.

### 2.5.5 Consequences of Marketing Orientation

The consequences of market orientation are organized into four categories: organizational performance, customer consequences, innovation consequences, and employee consequences (Jaworski & Kohli, 1996) (Table 5). Strategic management (e.g., Dobni & Luffman, 2003; Hult & Ketchen, 2001) and marketing researchers (e.g., Jaworski & Kohli, 1993) have posited that a market orientation provides firms with a source of competitive advantage. They suggested that market orientation provides a firm with market-sensing and customer-linking capabilities that lead to superior organizational performance (Day, 1994; Hult & Ketchen, 2001). Narver et al. (1999) showed that market orientation is significantly related to sales growth but not to corporate return on investment. Market orientation has a positive relationship with return on assets (ROA) (Narver & Slater, 1990), sales growth, new product success (Slater & Narver, 1994), and relative product quality (Pelham & Wilson, 1996). A recent
meta-analysis supports a positive, significant, and robust link between market orientation and performance (Kirca et al., 2005).

Customer consequences include the perceived quality of products or services that a firm provides, customer loyalty, and customer satisfaction with the organization’s products and services (Jaworski & Kohli, 1993, 1996). Market orientation is proposed to enhance customer-perceived quality of the organization’s products and services by helping create and maintain superior customer value (Brady & Cronin, 2001). Market orientation enhances customer satisfaction and loyalty because market-oriented firms are well positioned to anticipate customer needs and to offer goods and services to satisfy those needs (Slater & Narver, 1994b).

Innovation consequences include firms’ innovativeness, their ability to create and implement new ideas, products, and processes (Hult & Ketchen, 2001), and new product performance (i.e., the success of new products in terms of market share, sales, return on investment, and profitability) (Im & Workman, 2004). Market orientation should enhance an organization’s innovativeness and new product
performance because it drives a continuous and proactive disposition toward meeting customer needs and it emphasizes greater information use (Atuahene-Gima, 1996; Han et al., 1998).

For employee consequences, Kohli and Jaworski (1990) argued that by instilling a sense of pride and camaraderie among employees market orientation enhances organizational commitment (i.e., willingness to sacrifice for the organization), employee team spirit, customer orientation (i.e., the motivation of employees to satisfy customer needs), and job satisfaction. In addition, market orientation can reduce role conflict, which Siguaw et al. (1994) defined as the incompatibility of communicated expectations that hamper employees’ role performance.

Moreover, researchers have started to investigate the black box of this market orientation-performance link. Hult et al. (2005, 1173) posited that simply assessing the direct link between market orientation and performance is not fruitful; rather, the key question must address the processes by which market orientation affects performance. Kirca et al. (2005) revealed that market orientation might not have a direct impact on firm performance and that internal
processes, such as innovativeness, customer loyalty, and quality, have a greater influence than organizational structure variables in implementing market orientation. In particular, Kirca et al. (2005) emphasized customer-related outcomes such as customer loyalty as the most researched process variables. Less examined, however, are the processes internal to organizations, such as product cost and quality, through which market orientation enhances performance. Therefore, further research should uncover product-related variables such as product cost and quality as internal process factors. Ketchen et al. (2007) indicated that competitive advantage represents an important but missing component in existing market orientation research, which augments the need to consider competitive advantage indicators such as product quality in future studies.
## Table 5 Main Definitions and Features of Market Orientation

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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<tr>
<td><strong>Definition</strong></td>
<td>Culture Perspective  (Slater &amp; Narver, 1994a; Han et al., 1998)  &lt;br&gt; Behavior Perspective (Kohli &amp; Jaworski, 1990; Jaworski &amp; Kohli, 1993; Siguaw et al., 1998; Zhou et al., 2008; Hult et al., 2005; Dobni &amp; Luffman, 2003)</td>
</tr>
<tr>
<td><strong>Ordinary Capabilities</strong></td>
<td>Capture the essence of marketing capacities (Day, 1994)  &lt;br&gt; Interactive effects on firm performance (Morgan et al., 2009)</td>
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<tr>
<td><strong>Relationship</strong></td>
<td></td>
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<tr>
<td><strong>Consequences</strong></td>
<td>Customer consequences  (Jaworski &amp; Kohli, 1993, 1996; Slater &amp; Narver, 1994b)  &lt;br&gt; Innovation consequences (Hult &amp; Ketchen, 2001; Im &amp; Workman, 2004; Atuahene-Gima, 1996; Han et al., 1998)  &lt;br&gt; Employee consequences  (Kohli &amp; Jaworski, 1990; Siguaw et al., 1994)  &lt;br&gt; Overall performance  (Day 1994; Hult &amp; Ketchen 2001; Narver &amp; Slater, 1990; Kirca et al., 2005)</td>
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CHAPTER 3 CONCEPTUAL MODEL AND HYPOTHESIS

DEVELOPMENT

3.1 Conceptual Model

Based on the research objectives, we offer our conceptual model (Figure 1) with operations capabilities as the mediator, mediating the relationships between manufacturer-key buyers (MB) information sharing and performance and between manufacturer-key suppliers (MS) information sharing and performance. In addition, we propose that market orientation (market intelligence generation, market intelligence dissemination, and responsiveness) positively moderates the effects of both MB information sharing and MS information sharing on operations capabilities.
Figure 1 Conceptual Model

- Intelligence Generation
- Intelligence Dissemination
- Responsiveness

- MS Information Sharing
- MB Information Sharing

- Operations Capabilities
- Performance

Control Variables:
- Firm Age
- Firm Size
- Industry Type
- Firm Revenue
- Firm Profit
- Firm Ownership
- Environment
- Turbulence
3.2 Information Sharing and Firm Performance: A Dynamic Capabilities Perspective

The current study intends to unpack the black box of the information sharing-performance link by using a dynamic capabilities perspective, as information sharing is considered a dynamic capability. Teece (2007) suggested that knowledge sharing is critical to business performance since it is a key micro foundation of dynamic capabilities. Eisenhardt and Martin (2000) also argued that acquisitions and alliances can be considered dynamic capabilities because they allow for the renewal and reconfiguration of a firm’s resources. In a study of alliance learning and alliance success, Kale and Singh (2007) used knowledge sharing as a dimension of dynamic capabilities.

Drawing on the foundational work of Eisenhardt and Martin (2000) suggesting an indirect relationship between dynamic capabilities and firm performance, we propose that information sharing is necessary but insufficient to improve firm performance and that the performance effects of information sharing should be leveraged via ordinary capabilities. Information sharing as a dynamic capability allows the firm to sense and seize external knowledge. However, information sharing is valuable and rare, but is also equifinal and hence neither inimitable nor
immobile. Competitors can readily copy it or independently develop it themselves. This quality implies that information sharing is not itself the source of sustainable competitive advantage; rather, it is a necessary but insufficient condition to improve firm performance. The long-term competitive advantage lies in a firm’s using information sharing sooner, more astutely, or more fortuitously than the competition to extend, modify, change, and/or create the ordinary capabilities, which in turn determine the firm’s product market position and therefore its performance, not in the information sharing itself. In other words, the sustained competitive advantage depends on how well the firm captures the key variables and relationships that need to be manipulated and uses valuable information to create, protect, and leverage intangible assets so as to achieve superior performance. The difference in strategic or investment choice, such as the timing of resource deployment to effect adaptive change, the resource position the firm chooses to manipulate, and the cost of resource deployment, can lead to significant performance differences (Zott, 2003). Therefore, it is not the information sharing itself, but the ordinary capabilities that are extended, modified, changed, and/or created by using information sharing to help the firm sustain its competitive advantage and appropriate benefits. For example, given
identical MB information sharing, the firm that effectively utilizes the valuable customer-related information to improve its operations capabilities may adjust its production plan more quickly and flexibly and produce better customized products at lower cost, higher quality, and faster speed than its competitors, consequently out-performing the competition. Hence, to translate the potential benefits of information sharing into superior firm performance, competitive ordinary capabilities such as operations capabilities are needed as leveraging mechanisms.

3.2.1 Information Sharing, Operations Capabilities, and Firm Performance

Roth (1996) defined operations capabilities as a manufacturer’s ability to excel simultaneously on cost, quality, delivery, and flexibility. On one hand, we posit that MS information sharing enhances a firm’s operations capabilities. Frequent MS information sharing allows the manufacturer to acquire supplier-side information, such as the supplier’s production plan, technical know-how, and unexpected production changes, so that the manufacturer can organize and control its production more accurately and effectively and avoid unnecessary production changes and errors. This improves the effectiveness and efficiency
of its production system, which in turn decreases the production costs and improves production quality, delivery speed, and flexibility (Roth, 1996; Dyer & Singh, 1998). Moreover, the focal firm’s operations capabilities can also be boosted by MS information sharing via improving the quality of raw materials. Frequent MS information sharing facilitates the supply chain entities to accumulate transaction-specific know-how. Hence, firms that engage in frequent information sharing will be less likely to misread blueprints or misinterpret information when implementing product designs or changes (Dyer, 1996; Leonard-Barton et al., 1994). By establishing a deeper understanding of the manufacturer’s requirements, key suppliers will be more likely to produce customized items at lower cost, higher quality, faster speed, and higher flexibility, in accordance with the manufacturer’s specific requirements (Kotabe et al., 2003; Dyer & Hatch, 2006; Petersen et al., 2003). As a result, these quality components and raw materials and speedy delivery will help the buyer (manufacturer) enhance its operations capabilities to produce its products at lower cost and higher quality and to deliver them to target customers faster than its rivals.
In the same vein, we propose that MB information sharing leads to a positive improvement in a firm’s operations capabilities as well. MB information sharing allows the focal firm to acquire buyer-related information (e.g., the inventory level, price strategies, profit margin of its key buyer-distributor or retailer), by which the firm can effectively adjust its production plan and avert production redundancy, thereby boosting its operations capabilities (Roth, 1996; Dyer & Singh, 1998). Furthermore, via MB information sharing, the firm can obtain access to concrete information regarding customer needs, such as feedback on product quality and specific requirements for product design, according to which the firm can organize its product design and volume flexibly (Mesquita et al., 2008; Laseter & Ramdas, 2002) and produce products with customers’ required cost and quality (Sahin & Robinson, Jr., 2005). In addition, the information about the manufacturer’s competitor, such as its product innovations, new pricing strategy, and new engineering technology, can also be obtained via MB information sharing. With these sensitive information, the firm will be in a much better position to manage its production cost, quality, flexibility, and delivery speed more optimally than its rival, and meanwhile learn valuable knowledge, such as new engineering technology and product
innovations, which in turn generate superior operations capabilities.

On the other hand, a manufacturer’s operations capabilities have a positive impact on firm performance. Superior operations capabilities increase efficiency in the delivery process, reduce the cost of operations, and achieve competitive advantage. For example, Dutta et al. (1999) argued that the great complexity of the operations function helps to make superior operations capabilities imperfectly mobile and imperfectly imitable, thereby conferring competitive advantage on firms that possess them. Rosenzweig et al. (2003) found that operations capabilities enhance an organization’s chances for growth and survival. Hsu et al. (2009) showed that superior operations capabilities can reduce cost and lead times and increase quality, which in turn leads to improvements in firm performance.

Based on the above arguments, we opine that information sharing can be leveraged via operations capabilities to deliver superior firm performance. As we mentioned above, though information sharing is rare and valuable, it is neither inimitable nor immobile; therefore, it cannot contribute to superior firm
performance directly. It is the operations capabilities, extended, modified, changed, and/or created as a result of the shared information, that determine the firm’s market position and consequently its performance. When the firm uses valuable information sooner, more astutely, or more fortuitously than its competitors to rebuild and reconfigure its operations capabilities, the firm can transform the potential benefits of the shared information into superior firm performance via well-reconfigured operations capabilities in the form of lower cost, higher quality, faster speed, and higher flexibility. Hence, we offer the following hypotheses:

Hypothesis 1a: Operations capabilities positively mediate the effects of information sharing between a manufacturer and its key buyers on the manufacturer’s firm performance.

Hypothesis 1b: Operations capabilities positively mediate the effects of information sharing between a manufacturer and its key suppliers on the manufacturer’s firm performance.

3.3 The Moderating Effect of Market Orientation

This study posits market orientation as the market-based boundary condition of the proposed indirect relationship between information sharing and firm
performance via ordinary capabilities. As discussed above, information sharing may not have the expected positive effect on ordinary capabilities if the valuable information cannot be proactively and effectively employed when the firm is not ready or does not have the ability to change (Teece, 2007). Therefore, market orientation is considered just such a boundary condition for the relationship between information sharing and ordinary capabilities.

Market orientation as a corporate culture (Slater & Narver, 1994a) or information processing capability (Kohli & Jaworski, 1990) characterizes an organization’s disposition to deliver superior value to its customers continuously (Day, 1994). It is defined as the organization-wide generation of market intelligence pertaining to current and future customer needs, dissemination of the intelligence across departments, and organization-wide responsiveness to it (Kohli & Jaworski, 1990). In market-oriented firms, the processes for gathering, interpreting, and using market information are more proactive, systematic, thoughtful, and anticipatory than in other firms. The processes drive the firm to learn about customers, competitors, and channel members to continuously sense and act on events and trends in present and prospective markets (Slater & Narver, 1994a).
The value of the information obtained from the supply chain entities is maximized when it is shared among virtually all functions in an organization. The result is an integrated effort on the part of employees and across departments in an organization, which in turn gives rise to superior performance (Kohli & Jaworski, 1990). Therefore, we posit that market orientation can amplify the effects of information sharing on ordinary capabilities because it drives a continuous and proactive disposition to meet customer needs and use greater amounts of information (Atuahene-Gima, 1996; Han et al., 1998).

3.3.1 The Moderating Effect of Market Intelligence Generation

A firm may have the competencies to acquire external information, but not have the abilities to generate valuable knowledge from it for internal consumption. As a result, the firm may not be able to maximize the benefits of the external information in the development of its operations capabilities. Market intelligence generation is defined as the organization-wide generation of market intelligence pertaining to current and future customer needs (Kohli & Jaworski, 1990). High in market intelligence generation, a firm can generate new information about current customer needs by interpreting and analyzing the information received.
from key suppliers and buyers, as well as forecast future needs by carefully analyzing and subsequently interpreting the exogenous factors that influence those needs and preferences, such as technology, competitors, and other environmental forces (Kohli & Jaworski, 1990). Therefore, a firm’s ability of information generation can help the firm to take better advantage of shared information from both supplier and buyer. Hence, when a firm has a high level of information generation, the firm can enhance the impact of valuable shared information from its key suppliers or buyers to redeploy, rebuild, and reconfigure its ordinary capabilities more effectively than its rivals.

More specifically, we propose that the effects of MS information sharing on the development of a focal manufacturer’s operations capabilities are contingent on its level of market intelligence generation. When the level of market intelligence generation is high, the firm can generate more useful information about current and anticipated customer needs and preferences, such as the feedback of the product quality and specific requirement of the product design, via some systematic interpreting mechanisms, for example, the in-house market research and analysis towards the supplier-side information (Kohli & Jaworski,
1990). The well-generated customer needs and preferences allows the firm to organize and control its production more precisely and avoid unnecessary production changes and errors, consequently producing products with lower cost, higher quality, faster speed, and higher flexibility. Therefore, the effects of MS information sharing on operations capabilities are contingent on a firm’s market intelligence generation. Furthermore, by taking advantage of valuable information, such as customer needs, the firm can share more specific requirements with key suppliers, thereby improving raw material quality and consequently enhancing the manufacturer’s operations capabilities (Swink et al., 2007). Therefore, MS information sharing can have a greater effect on operations capabilities when the firm has a higher level of market intelligence generation.

Market intelligence generation can also bolster the impact of MB information sharing on a focal firm’s operations capabilities. When the focal firm has a higher level of market intelligence generation, it can take better advantage of the information shared with its key buyers to improve its operations capabilities, for example, by accurately interpreting customer-related information (De Luca
& Atuahene-Gima, 2007). With knowledge of customer-specific needs, the firm can design and adjust its production accordingly and avoid unnecessary production redundancies and errors, thereby more effectively reducing production costs and improving product quality, delivery speed, and flexibility. Therefore, the effects of MB information sharing on the manufacturer’s operations capabilities will be amplified by the manufacturer’s market intelligence generation. Hence, we offer the following hypotheses:

*Hypothesis 2a*: Market intelligence generation positively moderates the impact of information sharing between a focal manufacturer and its key suppliers on the manufacturer’s operations capabilities.

*Hypothesis 2b*: Market intelligence generation positively moderates the impact of information sharing between a focal manufacturer and its key buyers on the manufacturer’s operations capabilities.

**3.3.2 The Moderating Effect of Market Intelligence Dissemination**

For a firm to fully utilize shared information and knowledge in the development of operations capabilities, the information must be disseminated to all the functional units in a timely manner. Market intelligence dissemination, defined as the internal dissemination of intelligence within an organization,
helps a firm effectively share valuable information in a timely manner within the organization through formal and informal channels, such as developing and circulating periodic newsletters and organizing informal “hall talk” within and between departments (Kohli & Jaworski, 1990). With a high level of market intelligence dissemination, all the functional units will receive the most important information without delay and work together to react to the market needs that are arising. Hence, the firm with a high level of market intelligence dissemination can coordinate all the functional units to better utilize the acquired information and, hence, enhance the impact of information sharing on its operations capabilities.

The effects of MS information sharing on operations capabilities can be enhanced if there is a high level of market intelligence dissemination in a firm. Under this condition, the manufacturing unit can have fast access to the generated customer needs and preferences, for example, through interdepartmental meetings or informal hall talk. Such information can be passed on to key suppliers via MS information sharing. Consequently, key suppliers will be able to adjust their production and provide better tailor-made
components and services to the focal firm, and, in turn, the manufacturer can produce customized products with higher quality and with lower cost, faster speed, and higher flexibility. Moreover, a high level of market intelligence dissemination allows not only the manufacturing unit but also the purchasing personnel who have frequent contact with suppliers to understand customer needs more quickly and accurately. They then can coordinate with the manufacturing unit to introduce specific requirements for raw materials more precisely to the suppliers (Han et al., 1998) or discuss problems the suppliers encounter in their production process so that the suppliers can produce and deliver tailor-made, higher quality, and lower cost raw materials or components faster and more flexibly due to their better understanding of customer requirements. Therefore, market intelligence dissemination can enhance the positive effects of MS information sharing on the focal firm’s operations capabilities.

Similarly, the MB information sharing-operations capabilities link is positively moderated by market intelligence dissemination. All the functional units, including the manufacturing unit, can be informed of customer needs and
preferences via information sharing with key buyers without delay in a firm that has a cultural value or mechanism of superior market intelligence dissemination. The units then coordinate with one another; for example, the marketing unit will discuss in detail the specific customer requirements for product design and quality with key buyers. Clearly, market intelligence dissemination enhances the impact of MB information sharing on the focal firm’s operations capabilities as well. Hence, we offer the following hypotheses:

*Hypothesis 3a: Market intelligence dissemination positively moderates the impact of information sharing between manufacturer and key suppliers on the manufacturer’s operations capabilities.*

*Hypothesis 3b: Market intelligence dissemination positively moderates the impact of information sharing between manufacturer and key buyers on the manufacturer’s operations capabilities.*

### 3.3.3 The Moderating Effect of Responsiveness

Responsiveness is the action taken in response to intelligence that is generated and disseminated (Kohli & Jaworski, 1990). Therefore, it helps a firm react proactively, quickly, and efficiently to the external environment by taking the form of selecting target markets, designing and offering products/services that
cater to current and anticipated needs, and producing, distributing, and promoting products in a way that elicits favorable end customer response (Kohli & Jaworski, 1990; Hult et al., 2005). This ability motivates all the functional units to be more responsive and, therefore, enhances the effects of information sharing on a focal firm’s operations capabilities.

Responsiveness enhances the effects of MS information sharing on a manufacturer’s operations capabilities. The firm with a high level of responsiveness is often in a position to quickly react to new or important information. For example, once a firm receives information, such as the inventory level, production changes, and innovation of raw materials, from the key suppliers, it is in a better position to make swift responses by reorganizing its production accordingly (Hult et al., 2005; Roth, 1996). The research and development (R&D) unit will take swift action to design innovative products as soon as it has access to the knowledge of innovative raw materials and components or new engineering techniques. Therefore, a firm being highly responsive can bolster the effects of MS information sharing on operations capabilities.
In the same vein, responsiveness has a positive impact on the MB information sharing-operations capabilities link since the firm is in a better position to react faster and more proactively to changing customer needs, which can have an enhanced positive effect on its operations capabilities. For instance, as soon as information such as new customer needs and tastes is passed on to the R&D unit, it can respond more quickly than its rivals in developing innovative products. Hence, responsiveness supremacy contributes to the increased positive effects of MB information sharing on operations capabilities. Hence, we offer the following hypotheses:

_Hypothesis 4a:_ Responsiveness positively moderates the impact of information sharing between manufacturer and key suppliers on the manufacturer’s operations capabilities.

_Hypothesis 4b:_ Responsiveness positively moderates the impact of information sharing between manufacturer and key buyers on the manufacturer’s operations capabilities.
CHAPTER 4 METHODOLOGY

4.1 Sample and Data Collection

The sampling frame was Chinese manufacturing firms based in the Ning Xia autonomous region of China. To generate a list of informants, a systematic random sampling method was adopted for its simplicity and quickness. Each subject of the population was numbered, and then every third number was selected from the official list provided by the provincial Association of Entrepreneurs. Middle managers or above are the key informants of our study because these managers are responsible for the operations of the whole company and they are knowledgeable about the information sharing and ordinary capabilities of the whole company, making them appropriate respondents to our self-administered survey. To ensure that key informants had relevant knowledge, we asked how long the informants had been working in their companies and in their current position. On average, the informants had 7.5 years of working experience in their companies and 5 years in their current position. These numbers suggest that the respondents are experienced and knowledgeable about operational capabilities of the whole firm (cf. Jap &
Ganesan, 2000). Following Kumar et al. (1993), we further assessed the knowledge of the respondents by asking how much they knew about (1) firm performance, (2) suppliers, and (3) customers. The mean knowledge level was 5.5 out of 7 (1 = Not familiar at all, 7 = Very familiar), which suggests that our respondents are knowledgeable informants.

We contracted a local university to collect the data. The data collection period lasted for two months. By the end of the data collection period, 200 completed questionnaires had been received, achieving a response rate of 67%. A split-half means test was conducted to check whether there was any non-response bias. No significant differences were found between the split-half groups for all items related to company information, such as year of establishment and number of employees, which indicated that the sample was representative of the population. However, because of the missing data, only 154 responses were considered usable for further statistical analysis. Of the 154 valid responses, 27% was from the food industry, 16.5% from textile, 27.5% from metals, and 29% from automatic machinery. Twenty percent of the firms had been established more than 15 years ago, 40% was established 10-15 years ago, and
37% was established 5-10 years ago. Most of the firms that participated in the survey can be categorized as small to medium-sized enterprises (SMEs), with 26% employing fewer than 40 staff members, 36% employing 40-100 staff members, and 38% employing more than 100 staff members.

4.2 Measurements

We adapted the measures from existing literature whenever possible (Table 6). All the scales, unless specifically otherwise indicated, were measured with a 7-point Likert scale (1 = strongly disagree; 7 = strongly agree).

**Independent Variables.** We used an 11-item scale of manufacturer-key suppliers (MS) information sharing with the sample items, such as “We share details of upcoming product or service related changes” and “We share promotion and marketing plans with our key supplier” from Gosain et al. (2004) and “We share information related to changes in the technology of the focal products” and “We share information as soon as possible of any unexpected problems” from Selnes and Sallis (2003). We used a 14-item scale of manufacturer-key buyers (MB) information sharing with sample items such as “We share customer feedback on
major product innovations with our key customers,” “We share customer feedback on major changes in the delivery system with our key customers,” and “We share customer feedback on major improvements needed in product quality with our key customers” from Frazier et al. (2009).

Mediating Variables. For operations capabilities, we adopted a 16-item scale from Hitt and Ireland (1985), with the stem “Please rate the plant’s manufacturing competitive capabilities as indicated by performance relative to that of their principal competition,” including reduce inventory, increase capacity utilization, reduce production costs, and increase labor productivity.

Moderating Variables. For market orientation, we adopted the 32-item scale directly from Jaworski and Kohli (1993). Of these items, 10 were used to measure market intelligence generation, such as “In this business unit, we meet with customers at least once a year to find out what products or services they will need in the future,” “Individuals from our manufacturing department interact directly with customers to learn how to serve them better,” and “In this business unit, we do a lot of in-house market research.” Eight items were used to measure
market intelligence dissemination, such as “A lot of informal ‘hall talk’ in this business unit concerns our competitors’ tactics or strategies,” “We have interdepartmental meetings at least once a quarter to discuss market trends and developments,” and “Marketing personnel in our business unit spend time discussing customers' future needs with other functional departments.” We used 14 items to measure responsiveness, such as “It takes us forever to decide how to respond to our competitors' price changes,” “Principles of market segmentation drive new product development efforts in this business unit,” and “For one reason or another we tend to ignore changes in our customers' product or service needs.”

**Dependent Variable.** To capture firm performance, we directly adopted the items in Lichtenthaler (2009), using four items with the stem, “Relative to your competitors in the industry, how does your firm perform concerning the following statements in the past three years: Overall performance; Market Share Growth; Sales Growth Rate; Profit Growth Rate; and Return on Investment.”

**Control Variables.** We included firm age, firm size, type of ownership, type of
industry, average revenue increase, average profit increase, and environmental turbulence as controls for differences in performance that may be explained by scale effects. Firm size is measured by the number of employees and firm age is measured by the year of establishment. Ownership type is controlled with (1) representing privately owned, (2) state-owned, (3) collectively owned, (4) joint ventures, and (5) wholly owned foreign subsidiaries. We used the firm’s average percentage of total revenue increase in the past three years to measure average revenue increase and used the firm’s average percentage of total profit increase in the past three years to measure average profit increase. Environment turbulence was measured by 12 items, such as “The technology is changing rapidly,” “Technological developments are rather minor,” “Customers’ product preferences change quite a bit over time,” and “Our firm has experienced counterfeiting of our new products by other firms.”

4.3 Common Method Bias

To control the common method bias problem, we used both procedural and statistical approaches. First, the two-informant approach was adopted to reduce common method bias. We used the data of independent variables provided by
the first informant and the data of dependent variables provided by the second informant. Second, following Podsakoff and Organ (1986), we assessed whether common method bias existed by performing a Harman one-factor test that loads all the variables into a principal component factor analysis. According to this test, if either (a) a single factor emerges from the factor analysis or (b) several factors emerge but factor 1 accounts for the majority of the variances, then common method bias is a concern. For our data, a factor analysis of all the measurement items revealed a solution that accounts for 60.42% of the total variance. Because a single factor did not emerge and factor 1 did not explain most of the variance, common method bias is not a concern in our data. Third, we teased out the effects of common method bias by controlling for the effects of an unmeasured latent methods factor in the measurement model (Podsakoff et al., 2003). For this model, we added one first-order factor with all the indicators of MS information sharing, MB information sharing, operations capabilities, market intelligence generation, market intelligence dissemination, responsiveness, and performance. In this way, the first-order factor serves as the common method factor that controls for any systematic variance between both types of information sharing, operations
capabilities, and firm performance. Finally, we extracted 2% variance as the common method bias, which is within an acceptable range, indicating that common method bias will not seriously influence the effects of information sharing on firm performance.

4.4 Construct Validity

Prior to analysis of our hypotheses, we assessed the measures following the guideline outlined by Anderson and Gerbing (1988). First, our exploratory factor analysis for all the items of multi-item scales resulted in factor solutions, as theoretically expected. Then, we computed the reliability coefficient (Cronbach’s alpha) for each scale, and each coefficient was greater than 0.70, exceeding acceptable standards of reliability (Table 6). Third, we used confirmatory factor analyses (CFA) to assess the convergent and discriminant validity of the measures. To maintain adequate sample size-to-parameter ratios, this study divided measures into two subsets (Bentler & Chou, 1987; Vorhies et al., 2009; Morgan et al., 2009). We first examined a four-factor CFA model that includes MS information sharing, MB information sharing, operations capabilities, and performance. The model fits the data within an acceptable
range ($\chi^2 (854) = 5683.69$, $p = 0.000$, goodness-of-fit index [GFI] = 0.9, comparative fit index [CFI] = 0.93, incremental fit index [IFI] = 0.95; root mean square of error approximation [RMSEA] = 0.05). We then examined a three-factor CFA model of the market orientation construct, which includes the three dimensions of market intelligence generation, market intelligence dissemination, and responsiveness. The model fits the data within an acceptable range ($\chi^2 (461) = 3068.122$, $p < 0.01$, GFI = 0.91, CFI = 0.90, IFI = 0.92, RMSEA = 0.067). All factor loadings are highly significant ($p < 0.001$), pointing to the uni-dimensionality of the measures (Anderson & Gerbing, 1988). Furthermore, the composite reliabilities (ranging from 0.92 to 0.96) were all above the 0.70 benchmark, and the average variance-extracted indexes were greater than or equal to the 0.50 benchmark. Thus, these measures demonstrate adequate convergent validity and composite reliability (Table 6). We then assessed the discriminant validity by calculating the shared variance between all possible pairs of constructs to determine whether they were lower than the average variance extracted for the individual constructs. The results showed that for each construct, the average variance extracted was much higher than its highest shared variance with other constructs, indicating high
discriminant validity (Table 6) (Fornell & Larker, 1981). Overall, these results have ensured that our measures possess satisfactory reliability and validity.

As there might be endogeneity between information sharing and operations capability, Hausman’s test was carried out via an instrumental variable technique, a two-stage least squares model (2SLS). We used environmental turbulence as our instrumental variable to control the endogeneity problems in the 2SLS model. If endogeneity had been present, then the ordinary least squares (OLS) estimates would have been biased and inconsistent with the 2SLS estimates. For the MS information sharing–operations capability link, the test statistic of OLS (β=.582, P<0.001) turned out to be consistent with the statistic of 2SLS (β=.601, P<0.001). Similarly, OLS estimates (β=.569, P<0.001) are similar to 2SLS estimates (β=.615, P<0.001) in the MB information sharing and operations capabilities relationship. This indicates that OLS estimates were not biased as a result of endogeneity and it was appropriate to apply the OLS method to estimate the hypothesized model.

To avoid the multicollinearity problem, we further assessed the variance
inflation factor (VIF) of each variable. The test statistics of two dimensions of information sharing and three dimensions of market orientation were relatively high (>5), indicating a relatively high level of multicollinearity. One plausible explanation is that the respondent may have had response bias when answering the questions on dimensions within the same construct. Therefore, to control the multicollinearity effects, we tested our mediation model with MS information sharing and MB information sharing separately by using both the SPSS and bootstrapping approaches.
### Table 6 Measurement Items and Validity Assessment

<table>
<thead>
<tr>
<th>Constructs and Items</th>
<th>Factor Loadings</th>
<th>Reliability</th>
<th>Composite Reliability</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MS Information Sharing</strong> <em>(Gosain &amp; Sawy, 2004; Selnes &amp; Sallis, 2003)</em></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Please indicate whether your <em>key suppliers</em> exchange information with your firm in the following areas.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Details of upcoming product or service related changes.</td>
<td>0.91</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Promotion and marketing plans</td>
<td>0.95</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Long-term production plans</td>
<td>0.92</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Capital investments plans</td>
<td>0.96</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Capacity utilization plans</td>
<td>0.85</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Information related to market demand trends and forecasts.</td>
<td>0.91</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Information on demand shifts and changes in customer preferences.</td>
<td>0.89</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Information related to changes in the technology of the focal products.</td>
<td>0.86</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Information as soon as possible of any unexpected problems.</td>
<td>0.93</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Information on changes related to our two organization's strategies and policies.</td>
<td>0.93</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Information that is sensitive for both parties, such as financial performance and company know-how.</td>
<td>0.92</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Information Sharing with the Key Customers** *(Frazier et al., 2009)*

Please indicate whether your *key customers* exchange information with your firm in the following areas.

1. Customer feedback on major product innovations. 0.93
2. Customer feedback on major changes in the delivery system. 0.91
3. Customer feedback on major improvements needed in product quality. 0.87
4. Changes in their trade area on a competitor going out of business. 0.91
5. Changes in their trade area on increased competition. 0.79
6. Changes in their trade area on product innovations by our firm’s competition. 0.81
7. Changes in their trade area on new pricing strategy by our firm’s competition. 0.85
8. Changes in their trade area on service improvements by our firm’s competition. 0.96
9. Plans regarding our key customers’ inventory levels. 0.96
10. Plans regarding our key customers’ pricing strategies. 0.92
11. Plans regarding our key customers’ profit margins. 0.81
12. Plans regarding our key customers’ market segments. 0.86
13. Plans regarding our key customers’ new services. 0.79
14. Plans regarding our key customers’ important customers. 0.89

Operations Capabilities (Hitt & Ireland, 1985) 0.91 0.968 0.653

Please rate the plant’s manufacturing competitive capabilities as indicated by performance relative to that of their principle competition (1=much worse, 4=about the same, 7=much better)
1. Reduce inventory 0.93
2. Increase capacity utilization 0.95
3. Reduce production costs 0.85
4. Increase labor productivity 0.78
5. Provide high performance products 0.89
6. Offer consistent, reliable quality 0.95
7. Improve conformance to design specifications 0.86
8. Provide fast deliveries 0.87
9. Meet delivery promises 0.85
10. Reduce production lead time 0.88
11. Make rapid design changes 0.89
12. Adjust capacity quickly 0.95
13. Make rapid volume changes 0.85
14. Offer a large number of product features 0.71
15. Offer a large degree of product variety 0.89
16. Adjust product mix 0.95

**Market Intelligence Generation** *(Jaworski, & Kohli, 1993)*

<table>
<thead>
<tr>
<th>Description</th>
<th>Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>To what extent do you agree with the following descriptions:</td>
<td></td>
</tr>
<tr>
<td>1. In this business unit, we meet with customers at least once a year to</td>
<td>0.87</td>
</tr>
<tr>
<td>find out what products or services they will need in the future.</td>
<td></td>
</tr>
<tr>
<td>2. Individuals from our manufacturing department interact directly with</td>
<td>0.89</td>
</tr>
<tr>
<td>customers to learn how to serve them better.</td>
<td></td>
</tr>
<tr>
<td>3. In this business unit, we do a lot of in-house market research</td>
<td>0.96</td>
</tr>
<tr>
<td>4. We are slow to detect changes in our customers’ product preferences.</td>
<td>0.79</td>
</tr>
<tr>
<td>(R)</td>
<td></td>
</tr>
<tr>
<td>5. We poll end users at least once a year to assess the quality of our</td>
<td>0.96</td>
</tr>
<tr>
<td>products and services.</td>
<td></td>
</tr>
<tr>
<td>6. We often talk with or survey those who can influence our end users’</td>
<td>0.84</td>
</tr>
<tr>
<td>purchases (e.g., retailers, distributors).</td>
<td></td>
</tr>
</tbody>
</table>
7. We collect industry information through informal means (e.g., lunch with industry friends, talks with trade partners).
8. In our business unit, intelligence on our competitors is generated independently by several departments.
9. We are slow to detect fundamental shifts in our industry (e.g., competition, technology, regulation). (R)
10. We periodically review the likely effect of changes in our business environment (e.g., regulation) on customers.

**Market Intelligence Dissemination** *(Jaworski, & Kohli, 1993)*

<table>
<thead>
<tr>
<th>Description</th>
<th>Score</th>
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</thead>
<tbody>
<tr>
<td>To what extent do you agree with the following descriptions:</td>
<td></td>
</tr>
<tr>
<td>1. A lot of informal &quot;hall talk&quot; in this business unit concerns our competitors' tactics or strategies.</td>
<td>0.95</td>
</tr>
<tr>
<td>2. We have interdepartmental meetings at least once a quarter to discuss market trends and developments.</td>
<td>0.92</td>
</tr>
<tr>
<td>3. Marketing personnel in our business unit spend time discussing customers' future needs with other functional departments.</td>
<td>0.96</td>
</tr>
<tr>
<td>4. Our business unit periodically circulates documents (e.g., reports, newsletters) that provide information on our customers.</td>
<td>0.91</td>
</tr>
<tr>
<td>5. When something important happens to a major customer or market, the whole business unit knows about it in a short period.</td>
<td>0.95</td>
</tr>
<tr>
<td>6. Data on customer satisfaction are disseminated at all levels in this business unit on a regular basis.</td>
<td>0.92</td>
</tr>
<tr>
<td>7. There is minimal communication between marketing and manufacturing departments concerning market developments. (R)</td>
<td>0.96</td>
</tr>
<tr>
<td>8. When one department finds out something important about competitors, it is slow to alert other departments. (R)</td>
<td>0.85</td>
</tr>
</tbody>
</table>


**Responsiveness** *(Jaworski, & Kohli, 1993)*

To what extent do you agree with the following descriptions:

1. It takes us forever to decide how to respond to our competitors' price changes. (R) 0.87
2. Principles of market segmentation drive new product development efforts in this business unit. 0.89
3. For one reason or another we tend to ignore changes in our customers’ product or service needs. (R) 0.96
4. We periodically review our product development efforts to ensure that they are in line with what customers want. 0.79
5. Our business plans are driven more by technological advances than by market research. (R) 0.96
6. Several departments get together periodically to plan a response to changes taking place in our business environment. 0.84
7. The product lines we sell depend more on internal politics than real market needs. (R) 0.87
8. If a major competitor were to launch an intensive campaign targeted at our customers, we would implement a response immediately. 0.89
9. The activities of the different departments in this business unit are well coordinated. 0.87
10. Customer complaints fall on deaf ears in this business unit. (R) 0.89
11. Even if we came up with a great marketing plan, we probably would not be able to implement it in a timely fashion. (R) 0.96
12. We are quick to respond to significant changes in our competitors' pricing structures. 0.89
13. When we find out that customers are unhappy with the quality of our service, we take corrective action immediately. 0.96
14. When we find that customers would like us to modify a product or service, the departments involved make concerted efforts to do so. 0.84
**Firm Performance** *(Lichtenthaler, 2009)*  
Relative to your competitors in the industry, how does your firm perform concerning the following statements:

1. Overall performance  
   0.94
2. Market Share Growth  
   0.95
3. Sales Growth Rate  
   0.95
4. Profit Growth Rate  
   0.89
5. Return on Investment  
   0.91
CHAPTER 5 ANALYSIS AND RESULTS

5.1 Descriptive Statistics

The descriptive statistics are presented in Table 7, including means, standard deviations, and correlations among the variables used in this study. Manufacturer-key suppliers (MS) information sharing and manufacturer-key buyers (MB) information sharing are significantly correlated among themselves and are also positively related to both ordinary capabilities (operations capabilities) and firm performance. Ordinary capabilities and firm performance are also positively related to each other.
Table 7 Descriptive Statistics: Means, Standard Deviations, and Correlations

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
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<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Firm Age</td>
<td>1.459**</td>
<td>0.240**</td>
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<tr>
<td>2. Firm Size</td>
<td>-0.122</td>
<td>-0.447</td>
<td>-0.032</td>
<td></td>
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<tr>
<td>3. Ownership</td>
<td>-0.026</td>
<td>-0.127</td>
<td>-0.070</td>
<td>0.757**</td>
<td></td>
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<tr>
<td>4. Firm Revenue</td>
<td>-0.252**</td>
<td>-0.006</td>
<td>0.166</td>
<td>0.199*</td>
<td>0.134</td>
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<tr>
<td>5. Firm Profit</td>
<td>-0.150</td>
<td>0.019</td>
<td>-0.037</td>
<td>-0.087</td>
<td>-0.182*</td>
<td>-0.143</td>
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<tr>
<td>6. Food/Drink</td>
<td>0.125</td>
<td>-0.162*</td>
<td>-0.029</td>
<td>-0.035</td>
<td>-0.060</td>
<td>-0.264**</td>
<td>-0.115</td>
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<tr>
<td>7. Textile/Clothing</td>
<td>-0.186*</td>
<td>-0.099</td>
<td>0.064</td>
<td>0.056</td>
<td>0.054</td>
<td>-0.305**</td>
<td>-0.133</td>
<td>-0.245**</td>
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<tr>
<td>8. Mental</td>
<td>-0.058</td>
<td>0.056</td>
<td>-0.036</td>
<td>0.351**</td>
<td>-0.366**</td>
<td>-0.163*</td>
<td>0.033</td>
<td>0.296**</td>
<td>-0.184*</td>
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<tr>
<td>9. Automotive/Machinery</td>
<td>-0.001</td>
<td>0.000</td>
<td>-0.058</td>
<td>0.247**</td>
<td>-0.298**</td>
<td>-0.162*</td>
<td>0.020</td>
<td>0.156</td>
<td>-0.059</td>
<td>0.389**</td>
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<tr>
<td>10. Familiarity</td>
<td>-0.010</td>
<td>-0.037</td>
<td>0.081</td>
<td>0.098</td>
<td>0.357**</td>
<td>-0.045</td>
<td>-0.014</td>
<td>0.186*</td>
<td>-0.128</td>
<td>0.619**</td>
<td>0.457**</td>
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</tr>
<tr>
<td>11. MS information sharing</td>
<td>-0.021</td>
<td>0.032</td>
<td>0.087</td>
<td>0.128</td>
<td>0.355**</td>
<td>-0.042</td>
<td>-0.016</td>
<td>0.178*</td>
<td>-0.134</td>
<td>0.612**</td>
<td>0.454**</td>
<td>0.995**</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>12. MB information sharing</td>
<td>0.055</td>
<td>0.083</td>
<td>0.079</td>
<td>0.072</td>
<td>0.079</td>
<td>0.059</td>
<td>0.033</td>
<td>0.267**</td>
<td>-0.150</td>
<td>0.616**</td>
<td>0.345**</td>
<td>0.582**</td>
<td>0.569**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Operations capabilities</td>
<td>0.071</td>
<td>-0.001</td>
<td>0.033</td>
<td>-0.041</td>
<td>-0.046</td>
<td>-0.037</td>
<td>-0.014</td>
<td>0.184*</td>
<td>-0.114</td>
<td>0.613**</td>
<td>0.350**</td>
<td>0.598**</td>
<td>0.595**</td>
<td>0.850**</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>14. Market intelligence Generation</td>
<td>0.069</td>
<td>-0.001</td>
<td>-0.017</td>
<td>-0.027</td>
<td>-0.083</td>
<td>-0.017</td>
<td>-0.030</td>
<td>0.201*</td>
<td>-0.090</td>
<td>0.623**</td>
<td>0.372**</td>
<td>0.679**</td>
<td>0.676**</td>
<td>0.825**</td>
<td>0.860**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Market intelligence Dissimulation</td>
<td>0.045</td>
<td>-0.022</td>
<td>0.053</td>
<td>0.132</td>
<td>-0.262**</td>
<td>0.008</td>
<td>0.041</td>
<td>0.173*</td>
<td>-0.123</td>
<td>0.707**</td>
<td>0.437**</td>
<td>0.751**</td>
<td>0.749**</td>
<td>0.800**</td>
<td>0.870**</td>
<td>0.865**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Responsiveness</td>
<td>-0.097</td>
<td>0.054</td>
<td>0.115</td>
<td>0.294**</td>
<td>-0.376**</td>
<td>-0.073</td>
<td>0.279*</td>
<td>-0.223*</td>
<td>-0.022</td>
<td>0.534**</td>
<td>0.358**</td>
<td>0.548**</td>
<td>0.546**</td>
<td>0.577**</td>
<td>0.516**</td>
<td>0.550**</td>
<td>0.575**</td>
<td></td>
</tr>
<tr>
<td>17. Firm Performance</td>
<td>3.10</td>
<td>3.97</td>
<td>1.06</td>
<td>2.84</td>
<td>2.85</td>
<td>2.468</td>
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<td>0.7013</td>
<td>1.1039</td>
<td>4.6794</td>
<td>5.4702</td>
<td>5.0867</td>
<td>5.1208</td>
<td>5.2273</td>
<td>5.0675</td>
<td>5.2383</td>
<td>4.8695</td>
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<tr>
<td>Mean</td>
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<td>1.887</td>
<td>0.438</td>
<td>1.149</td>
<td>1.169</td>
<td>4.3253</td>
<td>4.7068</td>
<td>1.5259</td>
<td>2.0806</td>
<td>1.0200</td>
<td>1.2671</td>
<td>1.2278</td>
<td>1.2055</td>
<td>1.1050</td>
<td>1.3813</td>
<td>1.4791</td>
<td>1.3600</td>
<td>1.2837</td>
</tr>
</tbody>
</table>
5.2 The Mediating Results of Ordinary Capabilities

To test the mediation hypotheses, we used the popular causal steps approach (Baron & Kenny, 1986) instead of structural equation modeling since the latter requires a sample size of at least 200 (Quintana & Maxwell, 1999). In addition, the causal steps approach is regarded as the most common method for testing mediation (Mackinnon et al., 2002).

Hypothesis 1 predicts that ordinary capabilities (operations capabilities) mediate the relationships between both MS information sharing and MB information sharing and firm performance. According to Baron and Kenny (1986), the mediation is supported if three conditions are met: (1) The independent variables (i.e., MS information sharing and MB information sharing) are significantly related to the mediator (operations capabilities), (2) the independent variables are significantly related to the dependent variable (firm performance), and (3) the mediators are significantly related to the dependent variable with the independent variable (information sharing) controlled. If, in the third condition, the relationships between the independent variables and the dependent variable become non-significant, full mediation is
indicated and if the relationship is still significant but reduced significantly, partial mediation is indicated.

Table 8 presents the results. Consistent with the mediating hypotheses, the results indicated that (1) MS information sharing ($\beta=.225$, $P<0.01$, Model 1) was positively related to operations capabilities, (2) MS information sharing was positively related to firm performance ($\beta=.309$, $P<0.01$, Model 4), and (3) operations capabilities was positively related to firm performance ($\beta=.427$, $P<0.001$, Model 5). After entering the operations capabilities, the effects of MS information sharing on firm performance became non-significant ($\beta=.213$, n.s., Model 5), which indicates that operations capabilities fully mediate the relationship between MS information sharing and firm performance. Hence H1a was fully supported.

Following the same procedure, we found (1) MB information sharing ($\beta=.213$, $P<0.01$, Model 2) was positively related to operations capabilities, (2) MB information sharing was positively related to firm performance ($\beta=.296$, $P<0.01$, Model 6), and (3) operations capabilities were positively related to firm
performance ($\beta=.428$, $P<0.001$, Model 7). After operations capabilities were entered, the effects of MB information sharing on firm performance became non-significant ($\beta=.205$, n.s., Model 7), indicating that operations capabilities fully mediate the relationship between MB information sharing and firm performance. Hence H1b was supported.
Table 8 Results of the Mediations Effects: Information Sharing, Ordinary Capabilities and Firm Performance

<table>
<thead>
<tr>
<th></th>
<th>Operations capabilities</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
</tr>
<tr>
<td><strong>Control Variables</strong></td>
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<tr>
<td>Firm Age</td>
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<td>.100</td>
</tr>
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<td>Firm Size</td>
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<td>.064</td>
</tr>
<tr>
<td>Ownership</td>
<td>.075</td>
<td>.075</td>
</tr>
<tr>
<td>Firm Revenue</td>
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<td>-.274**</td>
</tr>
<tr>
<td>Firm Profit</td>
<td>-.016</td>
<td>.000</td>
</tr>
<tr>
<td>Food/Drink</td>
<td>.158*</td>
<td>.159*</td>
</tr>
<tr>
<td>Textile/ Clothing</td>
<td>-.007</td>
<td>-.006</td>
</tr>
<tr>
<td>Mental</td>
<td>.131</td>
<td>.133</td>
</tr>
<tr>
<td>Automotive/Machinery</td>
<td>.096</td>
<td>.097</td>
</tr>
<tr>
<td>Environmental Turbulence</td>
<td>.522***</td>
<td>.531***</td>
</tr>
<tr>
<td>Familiarity</td>
<td>.120</td>
<td>.123</td>
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<tr>
<td><strong>Independent Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS information sharing</td>
<td>.225**</td>
<td>.309**</td>
</tr>
<tr>
<td>MB information sharing</td>
<td>.213**</td>
<td></td>
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<td><strong>Mediators</strong></td>
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<td>Operations capabilities</td>
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<td></td>
</tr>
<tr>
<td>R²</td>
<td>.552</td>
<td>.552</td>
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<tr>
<td>Δ R²</td>
<td>.514</td>
<td>.514</td>
</tr>
</tbody>
</table>

Notes: N=154;  *P<0.05, **P<0.01, ***P<0.001
Due to the criticism of Baron and Kenny’s causal steps approach (Preacher & Hayes, 2004; Preacher & Hayes, 2008; Zhao et al., 2010), we used PROCESS in SPSS 18.0 to revalidate the results of the indirect effects of information sharing on firm performance via the bootstrapping approach. To obtain bootstrap confidence intervals for these indirect effects, we selected 5,000 bootstrap samples (Preacher & Hayes, 2008). To test hypothesis 1, operations capabilities were entered in the bootstrap model together with the control variables and with MS information sharing and MB information sharing as independent variables and performance as a dependent variable. The results showed that the indirect effect of MS information sharing on performance through the operations capabilities had a point estimate of 0.1178 and a 95% bias-corrected (BC) bootstrap confidence interval (CI) of 0.0382 (Lower Limit, LL) to 0.2343 (Upper Limit, UL). Because this interval does not contain zero, one can conclude that the total indirect effect is significant. Therefore, operations capabilities do mediate the effective of MS information sharing on firm performance. Hence, H1a was supported.

Repeating the steps above, we also tested the mediating roles of operations
capabilities in the MB information sharing-performance link. The results showed that the indirect effect of MS information sharing on performance through operation capabilities has a point estimate of 0.1133 and a 95% bootstrap BC CI of {0.0388, 0.2259}. Since zero does not occur in this interval, the indirect effect is significant. Therefore, H1b was supported.

5.3 The Moderating Results of Market Orientation

H2a, H3a, and H4a suggest that three dimensions of market orientation moderate the effects of MS information sharing on operations capabilities. A moderated regression analysis is the appropriate approach to test for interaction effects (Aiken & West, 1991). To deal with possible multicollinearity between the interaction terms and their components, we mean-centered each scale constituting an interaction term and then created the interaction terms by multiplying the relevant mean-centered scales (Aiken & West, 1991). The results are reported in Table 9. Consistent with our prediction, the interaction terms of MS information sharing and market intelligence generation (β= .169, P<0.05, Model 3), of MS information sharing and market intelligence dissemination (β= .219, P< 0.05, Model 3), and of MS information sharing and responsiveness
(β= .378, P< 0.001, Model 3) were positively associated with operations capabilities. Therefore, H2a, H3a, and H4a were all supported.

H2a, H3a, and H4a propose that three dimensions of market orientation moderate the effects of MB information sharing on operations capabilities. The results are reported in Table 9. By following the steps above, we found that the interaction terms of MS information sharing and market intelligence dissemination (β= .223, P< 0.05, Model 6), and of MS information sharing and responsiveness (β= .503, P< 0.01, Model 6), were positively associated with operations capabilities. However, the interaction term of MS information sharing and market intelligence generation (β= .112, n.s., Model 6) was insignificant. Therefore, H2a was rejected, but H3a and H4a were supported. Last, we summarized the results of all hypotheses in Table 10.
Table 9 Results of Moderation Effects of Marketing Orientation on MS Information Sharing – Operations Capabilities Link

<table>
<thead>
<tr>
<th>Control Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
</tr>
</thead>
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<td>.049</td>
<td>.105</td>
<td>.039</td>
<td>.021</td>
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<td>.024</td>
<td>.052</td>
<td>.069</td>
<td>.036</td>
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<td>.078</td>
<td>.079*</td>
<td>.108</td>
<td>.079</td>
<td>.086*</td>
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<td>Firm Revenu</td>
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<td>-.195**</td>
<td>-.112</td>
<td>-.359***</td>
<td>-.188**</td>
<td>-.138*</td>
</tr>
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<td>Firm Profit</td>
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<td>.150*</td>
<td>.055</td>
<td>.086</td>
<td>.147*</td>
<td>.076</td>
</tr>
<tr>
<td>Food/Drink</td>
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<td>.055</td>
<td>.047</td>
<td>.170*</td>
<td>.054</td>
<td>.055</td>
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<tr>
<td>Textile/Clothing</td>
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<td>-.010</td>
<td>-.016</td>
<td>-.002</td>
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<td>Mental</td>
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<td>.104*</td>
<td>.134</td>
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<td>.080</td>
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<td>.093</td>
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<td>.071</td>
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<td>.051</td>
<td>.175**</td>
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<thead>
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<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
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<td>-.264***</td>
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<th>Model 5</th>
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<td>.213*</td>
<td></td>
<td>.432*</td>
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<td>.166</td>
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<td>Marketing Intelligence Dissimilation</td>
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<td>.416***</td>
<td></td>
<td>.321*</td>
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<td>.394***</td>
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<tr>
<td>Responsiveness</td>
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<td>.228</td>
<td></td>
<td>.095</td>
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<td>.473**</td>
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<th>Model 5</th>
<th>Model 6</th>
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<tbody>
<tr>
<td>MSIS *MIG</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
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<td>.797</td>
<td>.827</td>
<td>.530</td>
<td>.798</td>
<td>.823</td>
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<th>Model 3</th>
<th>Model 4</th>
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<th>Model 6</th>
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<td>.775</td>
<td>.804</td>
<td>.494</td>
<td>.776</td>
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<th>F</th>
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<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.585***</td>
<td>36.072***</td>
<td>35.801***</td>
<td>14.585***</td>
<td>36.273***</td>
<td>34.764***</td>
<td></td>
</tr>
</tbody>
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Notes:  N=154;  *P<0.05, **P<0.01, ***P<0.001
Table 10 Summary of the Results

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Results</th>
</tr>
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<tr>
<td><strong>Mediating Effects of Ordinary Capabilities</strong></td>
<td></td>
</tr>
<tr>
<td>H1a Operations capabilities positively mediate the effects of MS information sharing on firm performance.</td>
<td>Full Mediation</td>
</tr>
<tr>
<td>H1b Operations capabilities positively mediate the effects of MB information sharing and firm performance.</td>
<td>Full Mediation</td>
</tr>
<tr>
<td><strong>Moderating Effects of Marketing Orientation</strong></td>
<td></td>
</tr>
<tr>
<td>H2a Market intelligence generation positively moderates the impact of MS information sharing on operations capabilities.</td>
<td>Supported</td>
</tr>
<tr>
<td>H2b Market intelligence generation positively moderates the impact of MB information sharing on operations capabilities.</td>
<td>Not Supported</td>
</tr>
<tr>
<td>H3a Market intelligence dissemination positively moderates the impact of MS information sharing on operations capabilities.</td>
<td>Supported</td>
</tr>
<tr>
<td>H3b Market intelligence dissemination positively moderates the impact of MB information sharing on operations capabilities.</td>
<td>Supported</td>
</tr>
<tr>
<td>H4a Responsiveness positively moderates the impact of MS information sharing on operations capabilities.</td>
<td>Supported</td>
</tr>
<tr>
<td>H4b Responsiveness positively moderates the impact of MB information sharing on operations capabilities.</td>
<td>Supported</td>
</tr>
</tbody>
</table>
CHAPTER 6 DISCUSSION

6.1 Review of the Research Findings

This study set out to unpack the black box of the information sharing-performance link and to explore the boundary conditions of this important link by examining the moderating role of market orientation in the relationship between information sharing and ordinary capabilities. Drawing on the dynamic capabilities perspective (Teece et al., 1997; Teece, 2007; Eisenhardt & Martin, 2000), we argued that information sharing as a key dynamic capability contributes to firm performance via sensing, seizing external changes, and reconfiguring the firm's ordinary capabilities. More specifically, we divided information sharing into manufacturer-key suppliers (MS) information sharing and manufacturer-key buyers (MB) information sharing, which are two primary types of information sharing (Swink et al., 2007; Rosenzweig et al., 2003), to explore whether ordinary capabilities can expropriate the benefits of both MS information sharing and MB information sharing and then contribute to superior firm performance.
Most of the key hypotheses have been supported except one hypothesis. We found that operations capabilities fully mediate the relationships between both types of information sharing and firm performance, offering an alternative explanation to the divergent empirical results on the information sharing-performance link. Moreover, the three dimensions of market orientation moderate the relationship between both types of information sharing and operations capabilities except for the impact of MB information sharing on operations capabilities. We found that market intelligence generation did not significantly moderate the link.

6.2 Theoretical Implications

Our findings contribute to the existing literature in four ways. First, our study contributes to the unpacking of the black box of the relationship between information sharing and performance in the supply chain context. Though many existing studies have explored this important relationship (Ingram & Simons, 2002; Kulp et al., 2004; Wu, 2008; Swink et al., 2007), the empirical results remain largely inconclusive, ranging from a positive relationship (Kulp et al., 2004; Wu, 2008) to a negative relationship (Swink et al., 2007; Das et al., 2006).
Our study found an indirect relationship between information sharing and firm performance with ordinary capabilities (manifested by operations capabilities) as the mediator. Thus, our study offers an alternative explanation for the inconclusive empirical results and supports our proposition that information sharing is a necessary but insufficient condition to improve firm performance, and ordinary capabilities (operations capabilities) that are extended, modified, changed, and/or created by the use of information sharing determine the firm’s market position, transforming the potential benefits of information sharing into superior firm performance. In addition to investigation of the mediating roles of ordinary capabilities between information sharing and performance, we go one step further by looking at the individual impact of two types of information sharing (MS information sharing and MB information sharing) on both ordinary capabilities and firm performance. Thus, our findings add value to the existing research by revealing that ordinary capabilities (operations capabilities) mediate both types of information sharing on firm performance, hence offering further support to the proposed mediation model.

Second, this study contributes to the ordinary capabilities, market orientation
and performance relationship literature by revealing that all three dimensions of market orientation moderate the relationships between both types of information sharing and ordinary capabilities, except for the market intelligence generation dimension. One plausible explanation is that MB information sharing and market intelligence generation have overlapping functions, such as collecting customer-related information. Market intelligence generation is largely concerned with end user-related information, such as customer feedback on product quality or innovation. In contrast, MB information sharing collects not only customer feedback, but also strategic information of distributors or retailers, such as their production and promotion plans. Hence, MB information sharing can provide the same depth of market intelligence as market intelligence generation. Therefore, overall, market intelligence generation may not add too much value to the effects of MB information sharing on operations capabilities. The existing literature is largely preoccupied with investigation of the moderating effect of market orientation on the relationship between ordinary capabilities and firm performance (Morgen et al., 2009). However, based on our proposed mediation model of information sharing and performance via ordinary capabilities, we have further explored the moderating
role of market orientation in the relationship between information sharing (a dynamic capability) and ordinary capabilities. Therefore, our study has taken one step further the existing studies on the interactive effects between marketing capabilities and marketing orientation on firm performance by demonstrating that it is the interactive effects between dynamic capabilities (information sharing) and market orientation on the development of ordinary capabilities (operations capabilities) that may really matter to a firm’s sustained performance supremacy in the long term. Moreover, our study also contributes to the market orientation literature, as it demonstrates that market orientation as a moderator strengthens the benefits of information sharing in the development of ordinary capabilities, thus offering an extremely important theoretical extension that market orientation may have an equally pivotal effect on the dynamic capabilities-ordinary capabilities link.

Last, but not least, our findings indicate that ordinary capabilities (operations capabilities) fully mediated the effects of information sharing on firm performance, contributing to the current debate on whether there is an indirect relationship between dynamic capabilities and firm performance by
substantiating the theoretical position that firm performance relies on ordinary capabilities that are extended, modified, changed, and created by using dynamic capabilities, not on the dynamic capabilities themselves (Zott, 2003; Winter, 2003; Zahra et al., 2006). Dynamic capabilities are seen as higher order capabilities that help a firm extend, modify, or improve its ordinary capabilities that are relevant to managing any given task. Our study suggests that information sharing as a higher order dynamic capability (Teece, 2007) allows a firm to reconfigure its ordinary capabilities (operations capabilities), which in turn, lead to performance improvement.

6.3 Managerial Implications

The findings offer valuable managerial implications for practicing managers. The findings suggest that managers need to ensure there is frequent information sharing between the firm and its key suppliers and buyers and effectively utilize acquired valuable information to strengthen the firm’s operations capabilities. For example, managers should more astutely utilize customer information, such as customer feedback on product quality and requirements for production volume and product mix, to better organize and control production and avoid
unnecessary production changes and errors, thereby improving the effectiveness and efficiency of their production. Moreover, the firm should communicate more detailed and specific component requirements to key suppliers through MS information sharing. For example, they can have a face-to-face discussion with suppliers about end-users’ needs and consider how they can collaborate to satisfy customer needs optimally, which will enhance the manufacturer’s operations capabilities. In addition, firms should maintain a balance in their information sharing with key suppliers and buyers rather than merely focusing on their information sharing with either key suppliers or key buyers, as both types of information sharing can deliver benefits to firm performance by enhancing operations capabilities. Hence, managers must become more adept in managing both MB information sharing and MS information sharing and make deliberate investments in resources that build integrative competencies.

Another managerial implication is that manufacturers should instill a culture of market orientation such as dissemination and responsiveness of market intelligence to enable the manufacturer to exploit MS and MB information sharing more effectively in the rebuilding and reconfiguring of its operations.
capabilities to earn superior market position and firm performance. For example, senior managers must be convinced of the value of a market orientation and communicate their commitment to junior employees to remind them of the importance of being sensitive and responsive to market developments. Also, managers should use inexpensive methods to improve interdepartmental connectedness, such as interdepartmental lunches and sports leagues that require mixed department teams. The senior managers can help foster responsiveness by changing reward systems from being completely finance based (e.g., sales, profits) to being at least partly market based (e.g., customer satisfaction).

6.4 Limitations and Future Study

This research, like any other, has some limitations that future work should address. First, since mediating effects were investigated in this model, it is imperative that we should have used a longitudinal design to solve this problem. However, we did not use this approach due to time and funding constraints. Therefore, future studies should use a longitudinal approach to better allow for time lags and determine the true direction of causality. It would be ideal if firm performance data could be collected from multiple sources in the future or
directly use objective data to measure firm performance (e.g., return on assets).

Second, all the above findings were derived from the data collected from the northwest of China. This may leave opportunities for future research to explore whether the model in this study can be applied to other geographical regions of China or even to other emerging economies.

There are several areas for future study. First, more mediators, such as marketing capabilities and managerial capabilities, should be investigated to further verify the robustness of the proposed model. Second, more predictors such as knowledge transfer and knowledge acquisition can be tested to see whether they can also play a similar role as a dynamic capability in contributing to firm performance supremacy through rebuilding and reconfiguring the ordinary capabilities. Third, it is quite important to explore other contingencies on this important link, such as absorptive capacity, to see whether they can strengthen the impact of information sharing on operations capabilities. Finally, it is also worth applying this model in different research contexts, such as multinational companies and international joint ventures, to further test the mediation model.
CHAPTER 7 CONCLUSION

This study advanced the existing literature on the information sharing-performance link by examining the mediating role of ordinary capabilities (operations capabilities). By drawing on the dynamic capabilities view, we proposed and validated that information sharing as a dynamic capability deploys and reconfigures existing resources and builds new ordinary capabilities, which in turn lead to superior firm performance.

Additionally, we looked at two types of information sharing: MS information sharing and MB information sharing and examined whether the ordinary capabilities act as an underlying mechanism that transforms the potential benefits of MS information sharing and MB information sharing into superior firm performance. The data supported our hypotheses by demonstrating that ordinary capabilities (operations capabilities) fully mediate the effects of both MB and MS information sharing on firm performance. Finally, this study drew specific attention to the moderating role of market orientation in the relationship between information sharing and ordinary capabilities. We found
that the two dimensions of market orientation (dissemination, and responsiveness) positively moderate the effects of both MS and MB information sharing on operations capabilities, except for the third market intelligence generation dimension in the relationship between MB information sharing and operations capabilities.

Several theoretical and practical implications are envisaged. First, our findings largely indicated that ordinary capabilities (operations capabilities) fully mediate the effects of both MS and MB information sharing on firm performance, thus contributing to the unpacking of the black box of the relationship between information sharing and performance in the supply chain context. The study offers an alternative explanation for the inconclusive empirical results regarding the relationship between information sharing and firm performance. The findings largely support our theoretical proposition that information sharing is a necessary but insufficient condition to improve firm performance and that ordinary capabilities (operations capabilities) that are extended, modified, changed, and/or created by using information sharing determine a firm’s market position, which in turn transform the potential
benefits of information sharing into superior firm performance. Second, our study took one step further the existing research on the interactive effects between marketing capabilities and marketing orientation on firm performance by demonstrating that it is the interactive effects between dynamic capabilities (information sharing) and market orientation on the development of ordinary capabilities (operations capabilities) that really matter to a firm’s sustained performance supremacy in the long term.

The practical implication is that managers need to invest more to develop and maintain frequent information sharing. They must effectively utilize valuable external information to organize and control production more accurately and to avoid unnecessary production changes and errors, thereby improving the effectiveness and efficiency of production. Another practical implication is that manufacturers should invest more in the dissemination and responsiveness of market intelligence, allowing the manufacturer to better utilize MS and MB information sharing to rebuild and reconfigure its operations capabilities, which in turn earn superior market position and firm performance.
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Combs, J. G., & Ketchen, D. J. (1999). Explaining interfirm cooperation and


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APPENDIX A

Questionnaires (Chinese)

调查问卷

致受访者：

感谢您在百忙之中抽出时间填写本问卷。本问卷旨在收集有关制造商分别与主要供应商（对公司销售量有重大影响的那些供应商）和主要客户（对公司销售量有重大影响的那些零售商或分销商）之间的信息共享的相关数据。答案并无对错之分。我们会对所收集的数据高度的保密，不会公开特定公司的特定信息，只会在学术文章中报告一些总结性的信息。如果您需要此项调查的总结报告，请在问卷最后提供您的联系方式。非常感谢您的合作！

香港浸会大学，商学院

I. 公司基本信息：
1. 公司创立的时间____________________________
2. 公司去年的员工总数____________________________
3. 公司所在的位置（省）__________________________（市）____________________
4. 公司所在的主要行业____________________________
5. 请圈出贵公司的所有制类型：
   (1)民营  (2)国有  (3)集体所有  (4)中外合资  (5)外商独资
6. 请圈出在过去三年贵公司的总收入的平均增长比率：
   (1)0%   (2)1%-10%   (3)11%-20%   (4)21%-30%   (5)31%-40%
   (6)41%-50%   (7)>50%
7. 请圈出在过去三年贵公司的总利润的平均增长比率：
   (1)0%   (2)1%-10%   (3)11%-20%   (4)21%-30%   (5)31%-40%
   (6)41%-50%   (7)>50%
8. 请圈出在过去三年贵公司的新产品销售额的平均增长比率：
   (1)0%   (2)1%-5%   (3)6%-10%   (4)11%-15%   (5)15%-20%
   (6)21%-25%   (7)>25%
9. 请圈出在过去三年贵公司来自新产品的销售收入占公司总收入的平均百分比：
   (1)0%   (2)1%-5%   (3)6%-10%   (4)11%-15%   (5)15%-20%
10. 请圈出在过去三年贵公司用于研发的支出占公司总资产的平均百分比：
(1)0%   (2)1%-5%   (3)6%-10%   (4)11%-15%   (5)15%-20%
(6)21%-25%   (7)>25%

请评价您对贵公司下列事项的熟悉程度：(1=非常不熟悉; 7=非常熟悉)

<table>
<thead>
<tr>
<th>事项</th>
<th>非常不熟悉</th>
<th>非常熟悉</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. 公司知识管理过程的熟悉程度</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>12. 公司业绩的熟悉程度</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>13. 公司客户的熟悉程度</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>14. 公司供应商的熟悉程度</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>

相对于本行业的主要竞争对手，贵公司过去三年在下列方面的业绩如何？

<table>
<thead>
<tr>
<th>财务和市场业绩</th>
<th>更差</th>
<th>更好</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. 整体业绩</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>16. 市场份额增长</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>17. 销售增长率</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>18. 利润增长率</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>19. 投资回报率</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>

II. 公司同主要供应商的信息共享

请评价您公司是否与主要供应商（对公司销售量有重大影响的那些）分享下列信息：

<table>
<thead>
<tr>
<th>信息共享</th>
<th>不分享</th>
<th>经常分享</th>
</tr>
</thead>
<tbody>
<tr>
<td>20. 有关产品或服务新的改变的信息。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>21. 促销和营销的未来计划。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>22. 长期的生产计划。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>23. 资本投资的未来计划。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>24. 生产能力的利用计划。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>25. 市场需求趋势和预测的信息。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>26. 需求变化和客户喜好的转变的信息。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>27. 主打产品技术的变化的信息。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>28. 迅速地分享任何意料之外的问题的信息。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>29. 分享双方战略和政策改变的信息。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>30. 这些主要供应商和公司分享双方都敏感的信息，如财务业绩和公司的技术知识。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>
III. 公司同主要客户的信息共享

请评价您公司是否与主要零售商或分销商（对公司销售量有重大影响的那些）分享下列信息：

<table>
<thead>
<tr>
<th>信息共享</th>
<th>不分享</th>
<th>经常分享</th>
</tr>
</thead>
<tbody>
<tr>
<td>31. 消费者对主打产品创新的反馈。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>32. 消费者对送货系统重大改变的反馈。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>33. 消费者对产品质量所需要的提升的反馈。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>34. 公司竞争对手对于破产的信息。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>35. 公司竞争对手增加竞争的信息。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>36. 公司竞争对手产品创新的信息。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>37. 公司竞争对手新价格战略的信息。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>38. 公司竞争对手对于服务的改善的信息。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>39. 这些主要零售商或分销商的库存水平的长远计划。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>40. 这些主要零售商或分销商的价格战略的长远计划。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>41. 这些主要零售商或分销商的利润空间的长远计划。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>42. 这些主要零售商或分销商的主要市场细分的长远计划。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>43. 这些主要零售商或分销商的新服务的长远计划。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>44. 这些主要零售商或分销商的重要消费者的长远计划。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>

IV. 公司能力

<table>
<thead>
<tr>
<th>运营能力</th>
<th>差</th>
<th>好很多</th>
</tr>
</thead>
<tbody>
<tr>
<td>相较于贵公司的主要竞争对手，请评价贵公司的运营能力。</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45. 减少库存。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>46. 提高生产能力的利用。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>47. 降低生产成本。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>48. 提高劳动生产率。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>49. 提供高性能的产品。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>50. 提供稳定、可靠的质量。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>51. 更加符合设计规格。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>52. 实现快速送货。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>53. 履行送货承诺。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>54. 缩短生产前置时间。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>55. 迅速的修改产品设计。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>56. 迅速的调整生产能力。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>
57. 迅速的调整生产量。 1 2 3 4 5 6 7
58. 提供大量的产品功能。 1 2 3 4 5 6 7
59. 提供多样的产品种类。 1 2 3 4 5 6 7
60. 调整产品结构。 1 2 3 4 5 6 7

**V. 市场导向**

您在多大程度上认可下列描述:

<table>
<thead>
<tr>
<th>情报收集</th>
<th>非常不同意</th>
<th>非常同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>61. 为了了解客户未来所需要的产品或服务，公司每年至少与客户交谈一次。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>62. 为了学习如何更好地服务客户，公司制造部门的人员会直接与客户沟通。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>63. 公司会经常登门进行市场调查。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>64. 公司对客户产品偏好的改变察觉很慢。 (反向)</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>65. 公司每年至少一次，请消费者评价公司的产品或服务质量。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>66. 公司会经常同那些影响本公司消费者的购买决策的公司进行交流或调研（如零售商，分销商等）。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>67. 公司会通过非正式的渠道收集本行业信息（如，与业界朋友吃饭，与贸易伙伴聊天等）。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>68. 公司竞争对手的情报是各部门独立收集的。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>69. 公司对本行业的重大变动（如，竞争、技术和规则等）的察觉很慢。 (反向)</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>70. 公司定期审视商业环境的变化（如，规则等）对客户可能产生的影响。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>情报传播</th>
<th>非常不同意</th>
<th>非常同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>71. 关于竞争对手的战略或战术，公司内有很多非正式的讨论。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>72. 为了讨论市场的发展趋势，公司每季度至少举行一次跨部门的会议。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>73. 公司的营销人员会花时间与其他职能部门的人员一起讨论客户未来的需求。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>74. 公司会定期传阅有关客户信息的文件（如报告，时事通讯等）。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>75. 当公司的重要客户和市场有重大事件发生时，整个公司会在短期内知道。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>76. 公司会定期分发有关客户满意度的资料到每一层级。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>77. 公司的市场部门和生产部门很少就市场发展进行交流。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>流。 (反向)</td>
<td>反应设计</td>
<td>非常不同意</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>78. 当公司的某一部门发现竞争对手的某些重要信息时，其通知公司其他部门的速度很慢。 (反向)</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>应用设计</td>
<td>非常不同意</td>
<td>非常同意</td>
</tr>
<tr>
<td>79. 公司用很长时间也决定不了如何应对竞争对手的价格变动。 (反向)</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>80. 公司市场细分的原则驱使公司尝试新产品的开发。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>81. 由于种种原因，公司往往容易忽视客户对本公司的产品或服务需求的改变。 (反向)</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>82. 为了确保新产品能够满足客户的需求，公司会定期审查新产品开发的尝试。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>83. 公司的商业计划更多地受技术进步而非市场调查驱使。 (反向)</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>84. 公司的一些部门会定期一起规划如何应对企业环境的变化。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>85. 公司销售的产品更多的取决于内部政治斗争而非实际的市场需求。 (反向)</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>反应实施</td>
<td>非常不同意</td>
<td>非常同意</td>
</tr>
<tr>
<td>86. 如果主要竞争对手针对公司的客户展开了强势的活动，公司会立即做出反应。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>87. 公司能很好的协调各部门的活动。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>88. 公司不会理会客户的抱怨。 (反向)</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>89. 即使公司想到一个很好的营销计划，也可能无法被及时地执行。 (反向)</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>90. 公司会对竞争对手的价格结构的重大改变做出迅速地反应。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>91. 当公司发现客户对服务质量不满意时，会迅速改正。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>92. 当公司发现客户希望修改产品或服务时，所有相关部门会齐心协力地努力做到。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>

### VI. 行业环境

对贵公司所在的主要行业，您在多大程度上认可下列描述：

<table>
<thead>
<tr>
<th>技术动荡</th>
<th>非常不同意</th>
<th>非常同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>93. 技术在迅速变化着。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>94. 技术发展是非常小的。 (反向)</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>95. 技术变化提供了巨大的机会。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>96. 技术突破使大量的新产品成为可能。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>市场动荡</td>
<td>非常不同意</td>
<td>非常同意</td>
</tr>
<tr>
<td>97. 客户的产品偏好随着时间的推移而改变很多。</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>
98. 公司的客户总是倾向于去寻找新产品。 | 1 | 2 | 3 | 4 | 5 | 6 | 7
99. 公司正在亲眼目睹那些从来不购买本公司产品和服务的客户，现在对本公司的产品和服务产生了需求。 | 1 | 2 | 3 | 4 | 5 | 6 | 7
100. 新客户往往倾向于拥有与现有客户不同的产品需求。 | 1 | 2 | 3 | 4 | 5 | 6 | 7

| 侵权风险 | 非常不同意 | 非常同意 |
|-----------------------------|-------------|
101. 在公司所在的主要行业的市场中，不合法的竞争行为，例如仿造新产品的不合法行为是非常常见的。 | 1 | 2 | 3 | 4 | 5 | 6 | 7
102. 公司有被别的公司假冒本公司的新产品的经历。 | 1 | 2 | 3 | 4 | 5 | 6 | 7
103. 没有有效的市场竞争法律去保护公司的知识产权。 | 1 | 2 | 3 | 4 | 5 | 6 | 7
104. 公司有这样的经历：本行业的其他公司不公平的竞争行为增加。 | 1 | 2 | 3 | 4 | 5 | 6 | 7

VII. 受访者的基本信息

105. 您在公司的职位：____________________
106. 您在本行业工作了多久？____________________
107. 您在贵公司工作了多久？____________________
108. 您在贵公司您目前所在的职位上工作了多久？____________________
109. 您的月收入：____________________
110. 年龄：____________________
111. 性别： 男（ ） 女（ ）
112. 最高的教育水平 (1) 小学/中学 (2) 学院/大学 (3) 硕士/博士
113. 联系电话（区号+电话）：____________________
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