

# Market Orientation, Supply Chain Integration, and Marketing-Technical Integration: Antecedents of Competitive Advantage

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## Abstract

*The purpose of the study is to examine how knowledge-based dynamic capabilities contribute to firms' competitive advantage. The current study identifies essential supply chain management and marketing capabilities: market orientation, marketing-technical integration, and supply chain integration, as key knowledge-based dynamic capabilities and lays a theoretical foundation that connects these capabilities with competitive advantage. Employing a quantitative design, the study utilized multi-item scales to measure all constructs and collected data from the pharmaceutical industry of Pakistan. The study used partial least squares structural equation modeling for data analysis. The findings of the analysis indicate that market orientation creates the most significant influence on competitive advantage. Supply chain integration as well as marketing-technical integration also raises the development of competitive advantage. A fundamental requirement that allows the development of knowledge-based dynamic capabilities to sustain a competitive position is identified in the research study. It encourages the managers to discover the preferences of customers and closely monitor the activities of competitors. Furthermore, the study provides guidance on the possibility of collaborating with supply chain partners and cross-functional cooperation. The study fills gaps in the existing literature concerning such knowledge-based dynamic capabilities and thus positions these capabilities in an essential role for the achievement of competitive advantage.*

**Keywords:** Competitive advantage; market orientation; marketing-technical integration; supply chain integration; knowledge-based dynamic capabilities.

**JEL Classification:** M31, D41, D83

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## 1. Introduction

In the current era of the economic business environment, firms usually face more severe challenges that require creative thinking. Economic instability, fluctuations, and probable falls could have an important influence on corporate investment decisions (Hameed et al., 2021). Rapid technology shift requires organizations to change at all times to avoid being stuck in failure. Moreover, the expectations from customers are shifting in the direction of more experiential and a sense of urgency for delivery service. All this makes the firms competitive. Therefore, this complex scenario calls for a multi-functional approach that will strike a balance between short-term operational needs and long-term strategic vision (Baah et al., 2022). Many critical resources support the survival of a firm in a competitive environment, for example, an effective vision, strong strategic direction, knowledge about the needs of customers, and working efficiently. Also, operational efficiency is crucial as it streamlines the processes, reduces costs, and develops responsibility in a firm. The other essential factor is the workforce. Firms that concentrate on enhancing their employees can yield productive results (Bhardwaj et al., 2023). That is why, upon integrating these resources, a firm gets an easy guide to ensuring continuous business success (Zahra, 2021). Despite the effective strategies and efficient resource usage, failure events are witnessed. Even though a firm can be able to go successful in vision and operation efficiency, it fails because the product and the needs of customers are not in the proper direction. The rapid technological shift makes firms vulnerable to their competitors. Fluctuations in economic activity and unstable market conditions make difficult tasks for most firms. So, good resources cannot provide a guarantee of success.

Traditionally, knowledge has been considered to be one of the primary sources for the establishment of competitive advantage. Companies can depend on knowledge and can achieve a competitive position on their competitors. Developing an organizational learning culture helps firms to adapt faster to the changes. Knowledge sharing promotes teamwork and innovation, and innovations are a catalyst for success (Zhang et al., 2023). The dynamic capability view explains that resource is the basic building block of competitive advantage, but companies would need to have dynamic capabilities if they have to use resources in response to any change in the environment (Coppola et al., 2023). Strategic integration, learning, and customer evaluation are crucial determinants of firm competitiveness. Knowledge-based dynamic capabilities (KBDCs) are there to use the available resources in such a way as to efficiently facilitate the development of competitive advantage. Therefore, an important question arises: which of the firm's capabilities need to be treated as KBDCs? From the literature, it is evident that such capabilities are not properly defined. Knowledge-acquiring capability, knowledge-generating capability, and knowledge-combining capability are the major types of KBDCs that have arisen from the literature (Zheng et al., 2011).

The base pillars for developing customer value have been seen in marketing and supply chain management functions (Fianko et al., 2023). Recently, it has been found that the supply chain management-marketing interface has come under the consideration of researchers (Jahanbakhsh Javid & Amini, 2023). In this regard, awareness about the capabilities of a firm for managing marketing and supply chain management functions has prevailed (Salam & Bajaba, 2023). Even though a body of literature supports the integration of supply chain management with marketing, there is little attention to how different related capabilities connect with each other, according to (Freije et al., 2022). In this regard, there is a need for some empirical studies on the capability of supply chain and marketing.

Market orientation (MO) is identified as an important marketing capability (Ozsomer et al., 2023), through which firms relate to their environments and extract information about their customers (Aydin, 2021). Thus, MO can be seen as a knowledge-acquiring capability. Further, MO makes the firm informative and responsive at the whole organizational level (Crick, 2021), which in turn feeds the need for integrated capabilities beyond MO. Supply chain integration is a knowledge-generating capability since it generates knowledge that enhances the development and delivery process (El-Mokadem & Khalaf, 2023; Kamble et al., 2023). Marketing-technical integration is somehow different from this one in the sense that it results in initiating the combining of knowledge (Ghonim et al., 2022) therefore making it a knowledge-combining capability.

### **1.1 Research Objectives**

The current study seeks to fill the gap in the literature by identifying some unique capabilities of firms as KBDCs and examining how these capabilities contribute to competitiveness. By focusing on supply chain management and marketing functions, we aim to empirically assess MTI, SCI, and MO that enable firms to use their knowledge for competitive advantage. Through this exploration, we intend to enhance our understanding in the areas of supply chain management, marketing, and strategic management. Additionally, the study attempts to offer insights for practice by effective use of KBDCs.

The study analyzes the pharma industry operating in Pakistan. The firms are facing numerous challenges including intense competition, rapidly changing regulatory landscape, and limited access to innovative techniques. With an increase in healthcare needs, firms are under intense pressure to deliver high-quality products at low cost. The high reliance of firms on imported raw materials makes the situation more challenging. The loss of blockbuster products in the industry creates significant challenges for the firms. As a result, pharmaceutical companies allocate substantial budgets to research work (Kourtis et al., 2022). Therefore, KBDCs are crucial for the survival of these pharmaceutical firms.

## 2. Literature Review

### 2.1 *Theoretical Foundation*

KBDC, as a concept, arises from the integration of the knowledge-based view and dynamic capability view. Processes of knowledge are inherently dynamic and play a vital role in the reconfiguration and renewal of a firm's resources, and dynamic capabilities are based on knowledge (Robertson et al., 2023). The dynamic capability view describes the importance of dynamic capabilities in developing competitiveness (Tamirat & Amentie, 2023).

Dynamic capability is described as an ability to develop and modify competency to respond to changes in a firm's environment. This ability allows organizations to effectively reconfigure their resources and enables them to capitalize on new opportunities to address potential threats. The knowledge-based view emphasizes the central role of knowledge as knowledge is a fundamental resource that positions a firm's capabilities to create, integrate, and modify functions effectively. This perspective suggests that knowledge is a dynamic and evolving resource that can significantly enhance a firm's competitive advantage. (Cooper et al., 2023; Fernandes et al., 2022). The knowledge-based view highlights that the dynamic capabilities of a firm originate from its knowledge processes. These processes build KBDCs, which are antecedents of competitive advantage (Kaur, 2022).

The literature on KBDCs does not provide a clear definition. The conflicting interpretations of KBDCs hinder researchers from building a complete understanding of these capabilities. KBDCs are related to acquiring, generating, and combining knowledge effectively as knowledge is an important source to address any change in the environment (Robertson et al., 2023). Acquiring knowledge is possible when a firm gathers information from various sources, including market trends, and customer feedback. The knowledge generation process involves innovation and research, which makes firms create new insights through experimentation and collaboration. The knowledge-combining process refers to the integration of both internal and external knowledge, which enables firms to synthesize diverse information and perspectives into a cohesive strategy. By the use of these capabilities, organizations can respond better to dynamic market conditions. Firms can adapt to new challenges, and get emerging opportunities. Hence, firms should develop a clear understanding of KBDCs to enhance their adaptability and maintain a competitive advantage (Mubarik et al., 2022).

Zheng et al. (2011) have efficiently categorized KBDCs into three key types. The first type is knowledge-acquiring capabilities, which enable the systematic search in organizations and assimilate new information from a variety of sources, such as market trends, and customer feedback. These capabilities help in identifying relevant data and integrating it into existing

practices. This allows firms to stay informed and responsive to changes in their environment (Idrees et al., 2022). The second type is knowledge-generating capabilities, which focus on the internal processes. These capabilities cause creativity, and innovation, and encourage research and collaboration among different departments. So, firms can develop new products and services. This type of KBDC is crucial for innovation. It transforms ideas and insights into tangible outcomes. A supportive culture is created in firms that value experimentation and learning to generate new knowledge (Enninga & Yonk, 2023). The third type is knowledge combining capabilities, these capabilities synthesize a diverse piece of knowledge to form cohesive, and actionable strategies. These capabilities bring together different types of information and ensure their alignment with the firm's goals (Zheng et al., 2011). By the effective combination of knowledge, firms create comprehensive solutions to their problems and address complex challenges. All this leads to improved decision-making (Gonzalez, 2022). These types of KBDCs create a dynamic framework that makes it possible to adapt to rapidly changing environments. This supports continuous learning which is critical for the development of competitive advantage (Robertson et al., 2023).

## 2.2 *Market Orientation*

MO is an important marketing capability that has an outward-looking focus. It connects organizations with their external environment. MO always involves the understanding of customer needs that is required for appropriate response. It also includes the monitoring of competitors' actions that helps to identify emerging threats in the market (Aydin, 2021). The market information gathered from various sources, including customer feedback, market research, and competitive analysis is disseminated throughout the organization. So, MO ensures that all departments are aligned and informed. MO helps firms in effective use of the information that enables them to develop strategic responses to meet customer demands (Crick, 2021). Thus, MO is a knowledge-acquiring capability that establishes its direct link to competitive advantage.

*H1*: MO directly affects competitive advantage.

## 2.3 *Supply Chain Integration*

SCI describes the formation of a network with various partners throughout the supply chain. Particularly suppliers and customers are important (Siagian et al., 2021; Ganbold et al., 2021). Suppliers play a critical role in the exchange of essential information. The information is related to their expertise like production schedules. This integration develops a collaborative environment in the firms. The firms can utilize suppliers' insights to create new knowledge (El-Mokadem & Khalaf, 2023). Customers always serve as a vital source of information. They can provide insights into their preferences for products. This customer-driven information is always valuable for firms. The information supports decisions on

product design, packaging, and marketing strategies. In this way, firms can better align their offerings with market demands. The integration of customer feedback into the supply chain leads to enhanced product development (Kamble et al., 2023). Through the effective use of SCI, organizations generate new knowledge. This knowledge directly influences product design and delivery performance. So, SCI builds a knowledge-rich environment. So, we identify SCI as a knowledge-generating capability that has a direct impact on competitive advantage.

*H2*: SCI directly affects competitive advantage.

#### 2.4 Marketing-Technical Integration

MTI serves as a vital cross-functional capability within an organization. It reflects the cooperation of marketing with technical staff in enhancing overall performance. Robson et al. (2023) noticed that this integration can develop an efficient combination of information from both sides. MTI also develops an ability in the firms to create a comprehensive understanding of trends in the market. By its major focus on communication and collaboration, MTI has enabled marketing professionals to share valuable customer insights with technical experts who can apply this information to product development and innovation. As MO is directly involved in the sharing of critical data between the two important groups of the firm, it ensures that business decisions are well-informed and aligned with both market demands and technical feasibility (Ghonim et al., 2022). The current study considers MTI as a knowledge-combining capability directly involved in developing competitive advantage.

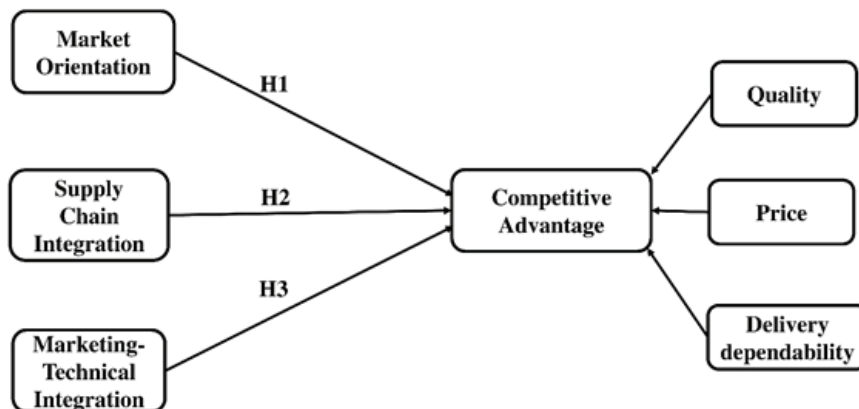


Figure 1: Research Model

### 3. Methodology

We designed the study by developing a conceptual framework with a very strong theoretical foundation (Figure 1). Survey-based design is one of the most effective ways to use in research. We employed this design in our research for collecting data from a vast and diversified population of participants. This large-scale data helped to understand the constructs in much greater detail.

#### 3.1 Instrument

The study employed a self-administered questionnaire, which was designed based on established and validated measures, as outlined in Table 1. The approach ensured that the questions were grounded in reliable frameworks, enhancing the credibility of the data collected. To further refine the instrument and adjustments we consulted with experts in the relevant fields. Their insights helped to clarify the language and context of the questions. Each item in the questionnaire was evaluated using a five-point Likert scale. A score of 1 represented strong disagreement, while a score of 5 indicated strong agreement.

Table 1  
*Detail of Instrument*

Constructs	Number of items	Reference
Competitive Advantage	9	(Liao et al., 2017)
Market Orientation	12	(Lukas & Ferrell, 2000)
Marketing-Technical Integration	3	(Roach, 2011)
Supply Chain Integration	9	(Tseng & Liao, 2015)

#### 3.2 Data Collection

The population of the current study was comprised of 625 pharma firms working in Pakistan (Ahmad et al., 2023). Rather than drawing a sample, the entire population was selected for analysis. Postal mail service was used to distribute the questionnaires. 271 responses were found suitable for the study, so the response rate was 43.3%.

#### 3.3 Analysis Techniques

Partial least squares structural equation modeling by Smart PLS was performed. Smart PLS was preferred for the study due to the small number of observations as it can analyze small samples without compromising the results' accuracy.

## 4. Analysis and Result

### 4.1 Construct Validity and Reliability

Factors cross-loading assessment analysis was performed and indicators having loadings 0.7 or more were selected for further analysis (Table 2).

Table 2  
*Cross Loading Assessment*

Items	Competitive Advantage	Market Orientation	Marketing-Technical Integration	Supply Chain Integration
CA1	0.784	0.367	0.282	0.473
CA2	0.755	0.435	0.242	0.415
CA3	0.713	0.390	0.184	0.323
CA4	0.787	0.385	0.303	0.479
CA5	0.738	0.344	0.225	0.340
CA6	0.786	0.382	0.181	0.373
CA7	0.734	0.407	0.220	0.311
CA8	0.719	0.345	0.110	0.251
CA9	0.753	0.415	0.179	0.336
MO2	0.424	0.710	0.205	0.412
MO3	0.386	0.849	0.097	0.381
MO4	0.421	0.765	0.067	0.329
MO5	0.463	0.846	0.127	0.375
MO6	0.429	0.808	0.139	0.329
MO7	0.334	0.787	0.146	0.329
MO8	0.350	0.767	0.107	0.367
MTI1	0.212	0.158	0.753	0.235
MTI2	0.244	0.080	0.786	0.254
MTI3	0.221	0.129	0.779	0.324
SCI1	0.415	0.428	0.352	0.706
SCI4	0.272	0.412	0.155	0.712
SCI5	0.365	0.387	0.294	0.798
SCI6	0.314	0.339	0.266	0.740
SCI7	0.343	0.250	0.205	0.736
SCI8	0.425	0.271	0.236	0.743
SCI9	0.417	0.306	0.274	0.781

To establish the reliability and stability of the constructs in the study, Cronbach's alpha and composite reliability values were determined. The value of the composite reliability over 0.70 is generally regarded as being good reliability. Further, the value of Cronbach's



alpha greater than this number also indicates the degree of reliability of the constructs. Both values were above 0.70, meaning that the outcome of the study was satisfactory (Kalkbrenner, 2023). Besides measuring reliability, the study had converged validity that was measured by AVE. For each construct, AVE values were higher than the minimum threshold value of 0.5 proposed by Fornell and Larcker (1981) (Table 3).A

Table 3  
*Validity and Reliability Analysis*

<b>Constructs</b>	<b>CA</b>	<b>CR</b>	<b>AVE</b>
Competitive Advantage	0.907	0.923	0.572
Market Orientation	0.901	0.922	0.629
Supply Chain Integration	0.866	0.897	0.555
Market-technical Integration	0.770	0.819	0.602

Note: CA is Cronbach's alpha; CR is composite reliability; AVE is average variance extracted

To test discriminant validity, the criterion by Fornell and Larcker (1981) was utilized because it is one of the most accepted approaches in testing the appropriateness of a construct to differ from another. It states that the square root of the AVE for every construct should be greater than the correlation coefficients for every pair of constructs. As analysis results, this requirement is satisfied since the square root of the AVE of each construct is set above the correlations of such constructs with other variables. Thus, the finding confirms that constructs are marked with satisfactory discriminant validity (Table 4). Apart from the Fornell-Larcker criterion, we used the heterotrait-monotrait ratio (HTMT) in order to test discriminant validity. From the above analysis, as presented in Table 5, HTMT values are less than 0.90 (Panzeri et al., 2024) which shows good discriminant validity.

Table 4  
*Fornell-Larcker's Criterion*

	<b>CA</b>	<b>MO</b>	<b>SCI</b>	<b>MTI</b>
Competitive Advantage	<b>0.755</b>			
Market Orientation	0.512	<b>0.794</b>		
Market-technical Integration	0.290	0.160	<b>0.775</b>	
Supply Chain Integration	0.497	0.459	0.349	<b>0.746</b>

Table 5  
*Heterotrait-Monotrait Ratio*

	<b>CA</b>	<b>MO</b>	<b>SCI</b>	<b>MTI</b>
Competitive Advantage				
Market Orientation	0.558			
Market-technical Integration	0.363	0.209		
Supply Chain Integration	0.540	0.518	0.449	

## 4.2 Common Method Bias

Common method bias creates the possibility of biased results. Common method bias is considered a major problem of research concern due to the possibility of interfering with the real relationship of variables. To identify if there existed a common method bias, the authors utilized the single-factor test by Harman. This form of test points out whether the application of a single factor covers most of the variance in data under analysis. In this case, the result pointed to the fact that maximum variance accounted by a single factor stood at 34% and this means a common method bias did not affect the results of the study conducted (El-Baz & Ruel, 2021). Additionally, the VIF values obtained were all below 3.3 (Kariya et al., 2024) which further supported the findings.

## 4.3 Structure Model

The fit of the structural model was assessed using an appropriate, systematic procedure. In this process, the model fit is checked by the standardized root mean square residual, one of the most suggested metrics to measure how well a developed model could explain the observed data (Lee, 2021). For this research, the computed value of 0.073 was found as SRMR that falls under the threshold of 0.08 (Shi et al., 2022). This implies that a good model fit can be exhibited by the result found. All the findings from the hypothesis test are accepted (Table 6). The first hypothesis that MO directly affects competitive advantage, is accepted ( $\beta = 0.359$ ,  $t = 4.996$ ). The second hypothesis stating that SCI directly influences competitive advantage, is accepted ( $\beta = 0.287$ ,  $t = 4.365$ ). The third hypothesis stating MTI has a direct influence on competitive advantage, is also accepted ( $\beta = 0.132$ ,  $t = 2.773$ ). The result offers great empirical evidence for the claim that MO, SCI, and MTI each have positive relationships with competitive advantage.

Table 6  
*Hypotheses Test Results*

Effects	Relationships	$\beta$ -value	t-value	p-value	Decision
H1	Market Orientation → Competitive Advantage	0.359	4.996	0.000	Accepted
H2	Supply Chain I ntegration → Competitive Advantage	0.287	4.365	0.000	Accepted
H3	Marketing-technical I ntegration → Competitive Advantage	0.132	2.773	0.006	Accepted

## 5. Discussion

MO, SCI, and MTI all have positive impacts on the competitive advantage. MO is an important capability related to the generation of knowledge so that firms may collect

and actively evaluate the information brought forward by the customer. It refers not only to collecting information regarding customer preferences and needs but also to the communication among different departments so that the organization can be aligned with the market insights (Aydin, 2021). Considering these elements, MO promotes an accumulation and dissemination way of information to make the right responses toward shifting market demands and thereby assures competitiveness (Crick, 2021). In addition, MO ensures that customer insights are implemented in all business operations for corporate performance (Mathafena & Msimango-Galawe, 2023). Through integration, the cumulative effect points toward the creation of a knowledge base that serves as a strategic asset for the firm. This means that the MO lies at the heart of the competitive advantage (Mohammad-Shafiee et al., 2024). SCI is an important knowledge-generating capability that is an important need for collaboration between firms and their external partners, such as suppliers, distributors, and customers (Ganbold et al., 2021). The collaborative actions cause interactive knowledge sharing (El-Mokadem & Khalaf, 2023). The knowledge flows are always required by firms to achieve awareness regarding the latest alterations in technology and innovation that may cause organizations to alter productivity and efficiency (Zhu et al., 2022). Effective use of SCI forces firms to develop new competencies or types of expertise within the firm to help the firm discover ways to solve issues concerning business operations (Tiwari, 2021).

MTI develops a collaborative culture that enables teamwork in solving the complex problems identified (Robson et al., 2023). The collaborative approach motivates innovative practices which make the firms successful. It gives them a competitive advantage in their adaptation to the ever-evolving customer needs and technological evolutions (Ghonim et al., 2022). MO, SCI, and MTI are like the implementing tools through which business systems can eventually excel in achieving competitive advantage. Firms' engagement with customers mainly gives them deep insights into developing the products and efficient usage of resources. Advanced integration of marketing and technical functions bridges consumers' expectations with technical capabilities. The study clearly identifies that firms survive and grow in a competitive environment under the critical necessity of a knowledge-based approach. Innovative usage of knowledge by firms helps them find innovative solutions and sustainable leadership positions in their respective markets. These findings are consistent with the knowledge-based view in the way that knowledge is an asset for strategic use. More broadly, findings support the significant roles of KBDCs in organizations since these capabilities are crucial for competitive advantage.

### **5.1 Theoretical Implications**

This current study is an important integration of the dynamic capability view with the knowledge-based view and completely explores how firms can create competitive advantages through their capabilities. In addition, research ascertains the most significant marketing and supply chain management capabilities, thus upgrading the existing literature

concerning KBDCs, and indicates that such capabilities directly influence a firm's ability to compete in the marketplace. The empirical evidence from this study has proved that such KBDCs undertake a key role in achieving competitiveness advantage. This study contributes towards a deeper understanding of mechanisms that operate with theory. It explains how these capabilities can be effectively used by firms to perform better.

## **5.2 *Practical Implications***

The study offers insights for managers who want to improve the competitive position of their firms. Specifically, the study guides the managers on the critical role that MO plays in gathering information regarding the needs of the customers. A deep understanding of these needs is crucial to build customer loyalty and to promote sales in a highly competitive environment. From the research study, more guidance on integrated supply chain operations can be produced. Coordination of all parts of the supply chain properly enhances efficiency. The adoption of MTI bridges the gap between marketing and technical functions. As a whole, it has been realized in this research that the development of KBDCs is necessary for business performance. KBDCs can empower firms to adapt and respond dynamically to changing market conditions.

## **5.3 *Future Research Directions***

Although the current study has made tremendous contributions, it has limitations. The research was constrained to only one industry, and thus generalization of findings toward other industries is required. Every industry goes to exhibit some variance in terms of dynamics, competitive forces, and ways of working. In future studies, data from many industries could be included. Using the question-based data, the information was somehow limited, which added some sort of constraint to the understanding of the phenomena. Though questionnaires are very effective in collecting quantitative data, they lack information. Thus, the interviews-based methodology may be employed in further studies to explore the experiences and views of the participants. More research can be provided in further studies with a more radical look at KBDCs. The rich interactions cannot explained by further studies with the mediating roles of variables.

## **6. Conclusion**

The business environment is based on fast-changing knowledge. It allows an organization to achieve and sustain a competitive advantage through knowledge-based dynamic capability. Some of the important ones are market orientation, supply chain integration, and marketing technical integration. Market orientation provides an organization with the possibility of an active approach in responding to market demand. Supply chain integration is an essential factor in raising organizational flexibility and responsiveness. By

such integration, it becomes easier to collaborate with other partners in the supply chain. In this way, firms may streamline the processes and increase their operational efficiencies. The marketing-technical integration enhances innovative products and services. All these capabilities enable firms to continue learning, to stay successful in the long run in the competitive market.

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