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How mobile technologies support business models: Case study-based empirical analysis

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Abstract

Mobile technologies have pushed the connectivity of IT systems to the limit, enabling people and things to connect to one another at all times. The amount of information companies have at their disposal has increased exponentially, thanks largely to geolocation and to the vast array of sensors that have been integrated into mobile devices. This information can be used to enhance business activities and processes, but it can also be used to create new business models. Focusing on business models, we analyze mobile technologies as enablers of activity changes. We consider the differentiating characteristics of mobile technologies and examine how these can support different business functions. A study based on fuzzy-set qualitative comparative analysis (fsQCA) of 30 cases across different industries allows us to identify mobile technology success factors for different core activities. The results show that several combinations of mobile technology initiatives provide a competitive advantage when these initiatives match the business model.

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Keywords: mobile technologies, business model, value creation, competitive advantage, fuzzy-set qualitative comparative analysis (fsQCA)

Résumé

Les technologies mobiles ont poussé la connectivité des systèmes informatiques à la limite, permettant aux personnes et aux objets de se connecter les uns aux autres à tout moment. La quantité d'informations dont disposent les entreprises a augmenté de façon exponentielle, en grande partie grâce à la géolocalisation et à la vaste gamme de capteurs intégrés dans les appareils mobiles. Ces informations peuvent être utilisées pour améliorer les activités et les processus métier, mais également pour créer de nouveaux modèles d'affaires. En nous concentrant sur les modèles d'affaires, nous analysons les technologies mobiles comme catalyseurs des changements d'activité. Nous examinons les caractéristiques distinctives des technologies mobiles et examinons comment celles-ci peuvent supporter différentes fonctions de l'entreprise. Une étude basée sur une analyse qualitative comparée d'ensemble floue (fsQCA) de 30 cas, de différents secteurs, a permis d'identifier les facteurs de succès de la technologie mobile pour différentes activités du cœur de métier des firmes. Les résultats montrent que plusieurs combinaisons de technologie mobile procurent un avantage concurrentiel lorsqu'elles correspondent au modèle d'affaire.

Mots-clés : technologies mobiles, modèle d'affaire, création de valeur, avantage concurrentiel, analyse qualitative comparée d'ensemble floue (fsQCA)

Introduction

Despite disagreement over whether the massive use of information is the primary characteristic of new business models (Tjaden, 1996; Arlotto et al., 2011), it nonetheless seems beyond doubt that today's businesses differ fundamentally from those of the industrial era. In the new economy, the very basis of competition is being transformed by the emergence of advanced information technology (IT) and public communication infrastructures (Sorescu, 2017). In this environment, the nature and focus of businesses have continued on their trajectory of radical change as information has taken centre stage.

Since the 1960s, successive waves of advances in IT have transformed business both internally and externally. Internal changes include early versions of the transaction processing system (TPS) in the 1960s, when computers began to perform the repetitive tasks previously carried out by office workers, and business process reengineering (BPR) in the 1980s. Examples of external changes include the transformation of communication between businesses and customer relations following the emergence of the Internet in the 1990s. The effect of the TPS on business models was negligible, although it did affect the internal organization of companies. It only allowed companies to reduce costs through the optimization and control of functions and processes. As such, it was not until the arrival of BPR that companies began to achieve flatter organizational structures and improve decision-making processes by supporting managerial functions. Connectivity was applied to the value chain, although its philosophy is fundamentally one of incremental improvement.

Undoubtedly, however, the most revolutionary change in terms of redefining business horizons is enhanced by the connectivity afforded by the Internet. Connectivity enables the flow of information across business activities, not only inside the company

but also beyond the boundaries of the organization, forging links with suppliers and customers. The Internet enables new forms of relationships between companies and customers, broadening the scope of industries and expanding the ways in which organizations can compete to gain competitive advantages. However, it also gives rise to completely new businesses and activities (Afuah & Tucci, 2003). Initially through intraorganizational communication and subsequently through interorganizational communication, connectivity provides a rich source of new business models. The emergence of the Internet has triggered new forms of businesses that include the end consumer in their communication processes. After 20 years of the Internet's existence, researchers analyzed and classified the types of business models that the Internet is capable of generating (Clemons, 2009; Witrz, Schilke, & Ullrich, 2010) and success factors for each business model (Kauffman & Wang, 2008; Sorescu, 2017).

But now, the final frontier of IT relates to mobility. Providing functionalities that reach far beyond their initial role as telephones, mobile devices have been prominent for more than a decade. Their market penetration in terms of use and the sheer breadth of their functionalities is staggering. New mobile-technology-based services and business models appear every day. The new tools and applications that can be applied directly to traditional businesses are enormous: payment, ticketing, access control, content distribution, smart advertising, peer-to-peer data/money transfer, and so on (Vilmos, Kovacs, & Kutor, 2007). But mobile technologies are now so powerful that they have reshaped the ways in which individuals interact with businesses, government, and other people (Ngai & Gunasekaran, 2007; Aithal, 2015).

Practitioners and professionals are aware of the new businesses spawned by mobile technologies. Many articles propose classifications of business models based on

smartphones and other mobile devices, especially in terms of monetizing applications (apps). Woodbridge (2010), for example, lists nine types of revenue generated by apps.

But mobile technologies are not simply producing the trend of transferring from PC Internet to mobile Internet. Mobile technologies have been combined with other technologies such as collaborative web technologies, cloud computing, mash-ups and other practices including social networking and wikis. In their diverse forms, mobile technologies have caused an explosion in new, highly complex business models while enabling exchanges and transactions that were previously limited to the immediate environment, thereby boosting the sharing economy (Richter, Kraus, & Syrjä, 2015).

However, as Liang, Huang, and Yeh (2007) argue, despite the importance of mobile technologies and their widespread use for over a decade, while there is a general notion about how mobile technologies could be applied in business, very little has been done in assessing how to enhance business processes, what the implications of mobile technologies are, or what critical factors affect the success or failure of mobile technologies. The aim of this paper is to analyze the different business models enabled by mobile technologies and identify their success factors. To do this, first of all, the characteristics of mobile technologies and their differences with respect to static connectivity are described, then the concept of a business model is defined in a second step. Thirdly, a classification of business models based on mobile technologies is presented, and then the success factors for each model are identified. The results of an exploratory empirical study based on fuzzy-set qualitative comparative analysis (fsQCA) are presented in a fourth section. This method integrates techniques from case-oriented analysis and variable-oriented quantitative analysis. FsQCA enables analysis of a joint causal system, allowing for interaction effects among characteristics within a case

(Woodside & Zhang, 2012). Finally, conclusions are drawn and avenues for future research proposed.

Theoretical Background

Characteristics of Mobile Technologies

The term *mobile technologies* refers to the range of ITs that support the development of mobile devices. Herein, a mobile device is understood as being any small device with processing capabilities, a network connection, memory, and a specific design for a certain function despite being able to perform other more generic functions. Numerous mobile devices meet these specifications. These include audio players, global positioning system (GPS) navigation devices, games consoles, watches, and, of course, mobile telephones and tablets. Today's mobile devices have become extremely powerful, integrating touchscreens, cameras, media players, GPS, near-field communication (NFC), Bluetooth, sensors, web browsers, email, electronic messaging services, QR-code readers, and a virtually endless array of widgets and applications. The evolution of these devices has been possible thanks to the development and combination of different hardware and software technologies that have steadily been incorporated into these mobile handsets. The years 2007 and 2008 can be considered the beginning of the implacable technological revolution: this was the moment when the functionality of the personal computer was made available on our mobile devices and was first acknowledged and used by companies.

In most cases, mobile devices are miniature computers on which new software can be installed in the form of applications (apps). An awareness of the possible resources

and functionalities afforded by mobile devices is the first step to being able to envision their potential for business.

From a management perspective, mobile technologies and mobile devices are a specific type of IT. From a business viewpoint, all the value generated by these technologies derives from the collection, storage, processing, and dissemination of information. Information is a vital asset of any company, but it can also be considered a strategic factor because of the need for increasingly detailed information in business activities to respond to greater complexity in the environment and competition. The information provided by mobile devices is closely linked to geolocation systems such as GPS, as well as the constant monitoring of mobile sensors associated with people or things. For instance, in the case of m-commerce, the economic value of mobile technologies resides in product and service localization, personalization, ubiquity enhancement, instant connectivity, and convenience (Liang et al., 2007), functionalities that e-commerce cannot afford.

But mobile technologies can go far beyond the improvement of activities already established. The Internet of things creates multiple opportunities to connect objects (European Parliament, 2010): it is in itself a new revolution (Palattella et al., 2016). Mobile technologies have not only changed how employees communicate within business environments and how citizens interact with other citizens or institutions, but have also created new sources of information and ways of disseminating it (Comber & Vivek, 2017).

The Business Value of Mobile Technologies

The value that mobile technologies bring to business is difficult to assess. According to Liang et al. (2007), mobile technologies may create two kinds of impact on

business operations. The first is to facilitate communication among employees, customers, and suppliers. The second is to revitalize business processes by changing data access patterns.

Theoretically, mobile technologies are ITs, and their value must be evaluated in terms of the resource they manage: information. According to the management literature, information provides value to businesses in three principal areas: information as a coordinating factor, information in decision-making, and information in knowledge and learning management.

Information as a coordinating factor. An organization's value system is a set of interdependent activities that are connected by linkages (Porter, 2001). The aforementioned linkages require the coordination of activities. For example, timely delivery requires operations, outbound logistics, and service activities to function smoothly together. The coordination of activities is a success factor when there is high information content in the product or service.

Information in decision-making. One of the principal management activities is to convert available information into action, acting together in the decision-making process. Efficient decision-making requires that managers select a course of action in a timely, cost-effective manner (Eisenhardt, 1989). In the case of mobile technologies, the information handsets provide about customers is extremely rich when combined with the information provided by their personal big data (Gurrin, Smeaton, & Doherty, 2014).

Information in knowledge and learning management. According to Davenport and Prusak (1998), knowledge is derived from information. They argue that knowledge is a mixture of experience, values, information, and know-how that forms a basis for incorporating new experiences and information and thus proves useful for taking action. Information management is therefore an essential component of knowledge management.

This aspect of knowledge management has also been acknowledged in studies of mobile technology (for instance Ehrenhard, Wijnhoven, van den Broek, & Stagno, 2017).

The generic classification of value creation for IT can be directly applied to mobile technologies. Prior research has identified three primary strategic implications of mobile technology for businesses: it improves working processes, it increases internal communication and knowledge sharing, and it enhances sales and marketing effectiveness (Sheng, Fui-Hoon Nah, & Siau, 2005). When dealing with business models, it is natural to decompose the value chain into primary activities and support activities and to analyze the benefits of mobile technologies separately within these activities. Primary activities include inbound/outbound logistics, operations, marketing, and sales and service. Support activities include company infrastructure, human- resource management, technology development, and procurement. Adopting this perspective, Coursaris, Hassanein, and Head (2006) group the main benefits of using mobile technologies in organizations into three categories: effective asset tracking, improved data access, and improved customer relations.

Other scholars (Ehrenhard et al., 2017) have adopted a value-chain perspective to classify IT business value, dividing IT value into upstream, internal, and downstream. Upstream value creation is primarily generated by the improvement of connectivity with providers and relates to cost savings and efficiency. Internal value is generated by efficiency and flexibility of employees and management. Downstream value is generated by facilitation of sales, customer-driven innovation, and improvement of customer service. In addition to this classification, Ehrenhard et al. (2017, p. 28) define the “app-enabled business value” construct. This construct has four dimensions: strategic value, informational value, automational value, and infrastructural value.

Drawing upon this research and the professional literature, we can identify four key areas in which mobile technologies can create business value: inbound/outbound logistics, marketing, administration and management, and knowledge management and learning. At the same time, we can further decompose inbound/outbound logistics benefits into benefits produced in the warehouse, on the road, and with the consumer (Hübner, Kuhn, & Wollenburg, 2016). The marketing dimension is divided into sales force and consumers. Appendix A presents the different areas of value creation of mobile technologies and the list of applications in each area. Appendix A also presents items for measuring the results of mobile technology initiatives.

The Business Model Concept

Controversy over the business-model concept is epitomized by the words of Porter (2001, p. 73), who considers a business model to be a loose conception of how a company does business and generates revenue, producing faulty thinking and self-delusion. Despite this controversy, scholars and managers have paid more and more attention to how to tackle new forms of generating business, and the business-model approach offers a valuable tool with which to do so.

Business models are schematic models that describe the ways in which companies create and produce value for their customers, and the rewards that companies obtain from this value. The business model defines what products and services a company sells in terms of customer needs and the value perceived, how to produce these products and services, and how income is generated. The business-model concept is based on the idea of value creation (Al-Debei & Avison, 2010).

Linking the strategic activities of the business model and the support offered by mobile technologies is a sound strategy for measuring the effects of mobile technologies on organizational performance (Sahut et al., 2013).

The IT revolution, especially the connectivity afforded by the Internet, and the global economy have encouraged new ways of competing and creating value for consumers, and mobile technologies have expanded and enriched these new forms of value creation, even adding new ones in their own right.

Mobile Technologies and Business Models

Many researchers have suggested that the impact of IT use should be measured in terms of an organization's processes or specific activities (Ray, Barney, & Muhanna, 2004, Melville, Kraemer, & Gurbaxani, 2004). Piccoli and Ives (2005, p.749) call for studies of the value of IT using "individual strategic initiatives" as the unit of analysis. Depending on its strategy, a company will place greater emphasis on one type of process or another. Thus, depending on the company's chosen strategy, certain processes in the value chain will be more important than others. This argument implies that the business value of mobile technologies will primarily lie in these processes (Tallon, 2007; Martinez-Simarro, Devece, & Llopis-Albert, 2015).

If mobile technologies are implemented to support specific processes, the impact of those systems must be analyzed where their first-order effects are expected to occur. Thus, to analyze the effect of mobile technologies on organizations, we propose an analysis of their effects on core activities and success factors. These activities and factors depend on the company's chosen business model. This approach is consistent with the contingency approach and implies the need to consider other variables that may mediate

or moderate the effects of mobile technologies on competitive advantage and performance.

The key question addressed by this study is what value do mobile technologies bring to companies? From a business-model perspective, answering this question involves analyzing the value that mobile technologies create for clients and then assessing the income this is expected to generate. From a business perspective, the reasons for introducing business-model innovations are to increase profitability, improve strategic positioning, and attract customers (Comberg & Velamuri, 2017). Therefore, the results of applying mobile technologies must be assessed in these terms. In this study, mobile technology initiatives are assessed in terms of cost and customer satisfaction.

Methodology

To identify combinations of causal conditions that explain how mobile technology can support business models, a multiple-step approach to fsQCA (Ragin, 2008) was used.

The fsQCA is a qualitative method suitable for modelling asymmetric relationships and reporting conditions that are sufficient but not necessary to cause an outcome condition (Woodside, 2010). The great advantage of this method is that it enables the assessment of different combinations of conditions that can lead to a desired outcome. When company-specific and industry-related factors act as metrics for choosing among different business models, the contingency approach is the underpinning measurement (Pateli & Gliaglis, 2005). In these cases, the individual success factors of a business model configure the contingent application of mobile technologies. This methodology is primarily useful in cases in which a strategic manager wishes to assess

not one totally new business model but a set of characteristics that reflect alternative configurations for its current business-model evolution (Pateli & Giaglis, 2005).

We analyzed 30 companies with different value streams and business models. The approach and intensity of the mobile technology was analyzed for each company. FsQCA has five stages: modelling of causal configurations and potential outcome effects; calibration of causal conditions and the outcome; construction and refinement of the truth table; analysis of the truth table; and evaluation and interpretation of results.

Sample and Data

The 30 cases were studied using structured interviews with managers. Face-to-face interviews offered a convenient data collection method to ensure a thorough understanding and objective assessment of the concepts considered in the study.

Researchers at each company identified key informants who could discuss how mobile technologies were used in their organizations. In five companies there were two informants to verify consistency between the answers of two respondents for the same company. Key informants included general managers, operations managers, and information systems managers. In all, 35 in-depth, semi-structured interviews were conducted. Interviews lasted between 25 and 40 minutes and were carried out between September and December 2017.

All conditions (use of mobile technologies in different business activities) were assessed using dichotomous variables (see Appendix A), then the dichotomous variables belonging to the same value activity were added and standardized on a 10-point scale. The outcomes (benefits of mobile technology use) were assessed using a seven-point Likert scale. Table 1 shows the correlations between the conditions and outcomes.

The companies used as case studies were from Spain (six cases), Germany (seven), France (eight), and the US (nine). The sample covered the following industries: higher education, consulting, engineering, transport, industrial equipment rental, automobile manufacturing, wholesale, building, home installations, and tile manufacturing. Most cases were SMEs except for five large international companies.

Three benchmarks were used to transform the original ratio or interval-scale values into fuzzy membership scores (Woodside, 2010), using transformations based on the log odds of full membership (full membership > 0.95; full non-membership < 0.05; crossover point = 0.5). This research method is suitable for explaining the alternative multiple combinations of conditions necessary to occur (that is, path A versus path B and versus path Z) in order to reach either positive or negative outcomes alone. Although comparative case analysis is applicable for assessing both positive and negative outcomes, this study examines only positive outcomes.

[Insert Table 1]

Analysis and Results

Qualitative comparative analysis (QCA) was used to analyze the configurations (mobile technology applications) that produce the best outcomes, taking the industry and business model into account. The correlations (Table 1) show that each industry requires a different combination of mobile technology initiatives. Nevertheless, two mobile technology initiatives have cross-industrial value. Only *marketing* (sales force and client) and *administration and management* have significant correlations at a 99% level for nearly all outcomes. QCA enabled the detection of configurations (combinations of conditions) that are necessary or sufficient to cause the outcome (Woodside, 2013).

The necessary conditions for each outcome are shown in Table 2. The consistency values for the conditions are below the minimum threshold of 0.9 (Schneider, Schulze-Bentrop, & Paunescu, 2010) for each outcome. Accordingly, no condition can be considered necessary (Table 2). However, client marketing has a high consistency (.86) for the marketing outcome.

[Insert Table 2]

The truth table showing all possible combinations of mobile technology initiatives (configurations) showed several consistent configurations following a reduction of rows using the Quine–McCluskey algorithm (Table 3).

[Insert Table 3]

The results presented in Table 3 show three consistent paths to success for three different results (costs, marketing, and change and innovation). Path 1 shows a competitive advantage in cost through mobile technology initiatives in logistics, on the condition that it is supported by integration into the company's general IT system (administration and management of mobile technology initiatives). This path is linked to companies in the transport, industrial equipment rental, and home installations industries. The second path is the most industry-inclusive solution: mobile technology initiatives relating to clients enables marketing differentiation. These mobile technology initiatives vis-a-vis clients must be supported by administrative and management initiatives (especially back-end information analysis and ERP connectivity) in order to obtain a consistent solution. Path 3 is not consistent enough to be considered a universal solution.

Nevertheless, the consistency (0.86) is close to the threshold of 0.9. Path 3 is an interesting combination supported by the theoretical framework. Mobile technology initiatives that enable the acquisition of important data about customer preferences and behaviour, when combined with knowledge management and organizational learning initiatives, result in greater change and innovation capabilities. This path is present in consulting and engineering companies and manufacturing companies.

The reduced number of cases and industries included in this study, however, mean that the three paths obtained in the results may not cover all possible combinations valid in different companies and across industries.

Conclusion

Today, mobile devices form a highly non-uniform group, and they can be applied to almost any business function. Mobile technology is ubiquitous and is emerging as a new paradigm. This new paradigm has pushed connectivity between people and things to the limit. As a consequence of this change, many enterprises have to reshape and enhance the way they create value for their customers. Mobile technologies can expand and diversify the information flow and, in some cases, become a source of competitive advantage.

The results of this study provide several theoretical and practical contributions. The most significant managerial implication is that managers need to consider the core activities of their business in terms of information in order to identify the areas in which mobile technology can provide a competitive advantage. Organizations have to constantly improve and reshape their business models to be competitive in a dynamic environment. The forces that make an environment turbulent can be changes in customer needs and

market requirements, globalization of labour and resources, strong rivalry, and technological innovations (Sharma & Gutiérrez, 2010). Mobile technologies, as a technological innovation, can profoundly affect several core activities of any business, product or service, logistics, the relationship with customers, the distribution channel, or the business model itself.

The business-model perspective enables analysis of the activities for which mobile technologies can become essential. From a theoretical perspective, three main areas are considered in this study: activity coordination, decision-making, and knowledge management and learning. The coordinated use of mobile technologies is crucial in outbound logistics and in interacting with customers in service industries. Decision-making is essential in marketing activities. Although knowledge management and learning can be applied in any company, it is less important. The case studies confirm these theory-driven predictions.

The results show that several combinations of mobile technology initiatives provide competitive advantage when these initiatives match the business model. Mobile technology can bring competitive advantage to organizations when the main value creation resides in marketing effectiveness. In these cases, information about client behaviour and needs is the key factor. The Internet of things and the monitoring of service delivery to the end customer is a potential way to obtain cost reductions in operational processes in outbound logistics.

The most obvious use of mobile technologies for any business model is in direct interaction with clients. This is reflected in better marketing results, both in promotion and advertising and in market knowledge. It is in itself a basic condition for obtaining marketing advantages. But even in this case, it requires integration with other management and administration tools.

The importance of customer information obtained through mobile technologies makes such information a key resource in knowledge-intensive service companies, although more complex combinations of knowledge management and organizational learning initiatives are necessary in order to exploit the advantages of any information extracted.

When managers consider that the success factors of their business models belong to any of the categories mentioned above, they unhesitatingly bid for mobile technologies. But this is a two-way street. Identifying new ways to deliver value to their customers, managers can modify and improve their business models (Ngai & Gunasekaran, 2007). However, the disruptive nature of these changes can be a source of failure (Palattella et al., 2016).

Nevertheless, this study is not without limitations, including the fact of analyzing mobile technologies on their own. Mobile technologies complement and are complemented by other technological breakthroughs such as cloud and social technologies, which have expanded the use of the Internet into nearly all traditional value chains, digitizing many transactions and creating new business models (Sorescu, 2017). This paper focuses on the implementation of standardized mobile application technology by non-technological companies. Disruptive aspects of mobile technologies have not been addressed, such as scalability, the simultaneous arrival of two technologies, or the evolution of an application in its early stages (Sang Un Chae & Hedman, 2015). These issues can be developed in future research.

Other limitations of this study are linked to the case-study method, through which only 30 companies were analyzed. Calibration of the conditions and outcomes in the fsQCA was also complex due to the variety of questions used to measure each condition.

But the main advantage of our approach is its ability to produce convergent results from causally heterogeneous factors (Mello, 2012).

JEL classification: L21, L26, M13

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Appendix A

Inbound/outbound logistics	No	Yes
In the warehouse		
Create supply records		
Track goods shipped in and shipped out		
Pick lists		
Sync data across multiple devices		
Scan barcodes		
On the Road		
Track mileage		
Manage fuel consumption		
Manage reusable containers		
Manage scheduling and routing		
Perform engine diagnostics		
Monitor using trailer sensors		
Monitor employee hours and activity		
Use GIS data (delivery and route optimization)		
With the consumer		
Tracking system		
Real-time item tracking		
Capturing consignee signature at point of delivery		
Identifying over, short, damage (OS&D) situations, and initiating-claims process		
Scanning product off the vehicle to eliminate delivery failures		
Codification and standardization of communications to enable reporting and analysis		
Management of regulatory compliance		
Marketing	**No**	**Yes**
Sales force		
Set up new customer account		
Access existing customer records		
Check prices and stock availability		
Place an order online		
Client		
Advertising		
Branded content		
Direct marketing		
Market research		
Customer service		
Mobile commerce		
Mobile community		

	Mobile payments		
	Machine-to-machine services		
	Positioning of premises (e.g. Google Maps)		
Administration and management		No	Yes
	Back-end information analysis (exception management/data accessibility/ planning/reporting/analytics)		
	Enterprise resource planning (ERP) connectivity		
	Accounting and invoicing		
	Scheduling and time management		
	Mobile banking		
	Routine tasks (filing, scanning, form filling, etc.)		
Knowledge management and learning		No	Yes
	Best practices		
	Events		
	Internal communications		
	News		
	Cloud collaboration		
	Group discussion		
	Team games and tournaments		
	Shared writing and composition		
Results of mobile technology initiatives		7-point Likert scale	
	Service/product cost		
	Labour force cost		
	Product/service quality		
	Labour force flexibility		
	Quality of data		
	Delivery time		
	Customer service		
	Customer communication		
	Publicity		
	Decision-making		
	Market and customer knowledge		
	Products and services knowledge		
	Organizational learning		
	Customer satisfaction		

Table 1
Correlations Between Conditions and Outcomes

Conditions (mobile technology initiatives)	*M*	*S.D.*	1	2	3	4	5	6	7	8	9	10	11
1. Warehouse Logistics	.19	.32											
2. On Road Logistics	.25	.35	.44*										
3. Costumer Logistics	.24	.33	.09	.75**									
4. Sales Force Mark	.35	.32	-.05	-.03	.01								
5. Client Marketing	.45	.32	.05	-.21	-.32	-.06							
6.Adm/management	.48	.31	-.18	-.10	-.06	.50**	.27						
7. KM and Learning	.38	.39	-.01	-.24	-.17	.23	.28	.30					
Outcomes (Results)													
8. Cost competitiveness	.55	.22	.36	.54**	.18	.32	-.03	.44*	.04				
9. Product/service differentiation	.68	.26	-.07	-.13	.16	.44*	.32	.58**	.27	.35			
10. Marketing	.50	.25	.15	-.02	-.05	.61**	.44*	.65**	.50**	.44*	.65**		
11. Knowledge for change and innov.	.63	.30	-.12	-.24	-.17	.57**	.38*	.64**	.68**	.29	.56**	.81**	
12. Customer Satisfaction	.63	.15	.14	.08	.08	.20	.24	.13	.16	.23	.32	.46*	.33

Note. * $p < 0.05$; ** $p < 0.01$ (2-tailed).

Table 2
Analysis of Necessary Conditions

	Cost competitiveness		Product/service differentiation		Marketing		Knowledge for change and innov.		Customer Satisfaction	
Conditions	Cons.	Cov.	Cons.	Cov.	Cons.	Cov.	Cons.	Cov	Cons.	Cov.
Warehouse Logistics	0.15	0.33	0.32	0.42	0.24	0.57	0.27	0.57	00.19	0.24
On Road Logistics	0.15	0.23	0.41	0.41	0.33	0.61	0.33	0.52	0.42	0.39
Costumer Logistics	0.23	0.38	0.24	0.25	0.32	0.61	0.29	0.48	0.41	0.39
Sales Force Mark	0.34	0.40	0.24	0.17	0.23	0.30	0.21	0.24	0.50	0.33
Client Marketing	0.61	0.54	0.45	0.25	0.86	0.76	0.46	0.40	0.67	0.34
Admin./management	0.48	0.40	0.46	0.23	0.28	0.34	0.38	0.31	0.80	0.38
KM and Learning	0.40	0.44	0.32	0.21	0.43	0.41	0.28	0.30	0.44	0.27

Table 3
FsQCA: Antecedent Configurations Leading to Positive Outcomes

Sol.	Path	Raw coverage	Unique coverage	Consistency
1	On Road Logistics * Costumer Logistics* Admin./management ⟶ Cost competitiveness	0.28	0.19	0.94
2	Client Marketing * Admin./management ⟶ Marketing	0.63	.53	0.91
3	Client Marketing * KM and Learning ⟶ Knowledge for change and innov.	0.34	0.26	0.86