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Organisational capabilities and the effectiveness of digital product innovations

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Abstract
This paper aims to analyse what specific high-level capabilities are considered by scholars to be the most important for the organisation to develop in order to facilitate innovation. Precisely, the paper explores what is the perceived effect of these capabilities on digital product innovation metrics 'time-to-market' and return on invested capital. The statistical method used in the research is PLS-SEM, with data gathered from middle and top management of Russian companies in different industries using a 5-point Likert-type questionnaire. The results showed a significant and relatively large effect of seizing and transformation capabilities on such metrics as time-to-market and return on investment, whereas the sensing capability only showed a considerable effect on the time-to-market metrics and a moderately small effect on the second metric.
Keywords: firm resources and capabilities, dynamic capabilities, product innovations, digital transformation, strategic analysis, PLS-SEM

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Способности организации и эффективность цифровых продуктовых инноваций

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Аннотация
Цель статьи – проанализировать, какие конкретные способности высокого уровня наиболее важны для развития в организации, чтобы способствовать внедрению инноваций. В статье исследуется предполагаемое влияние этих способностей на показатели цифровых продуктовых инноваций – «время вывода на рынок» и рентабельность инвестированного капитала. В исследовании использовался статистический метод PLS-SEM с использованием данных, собранных от руководителей среднего и высшего звена российских компаний из разных отраслей с использованием 5-балльной анкеты Лайкерта. Результаты показали значимое и относительно большое влияние «способности к захвату возможностей» (seizing capability) и трансформации (transformation capability) на такие показатели, как время выхода на рынок и рентабельность инвестированного капитала, в то время как «сенсорные способности» (sensing capability) показали заметное влияние только на показатель времени выхода на рынок и умеренно низкое влияние на второй показатель.
Ключевые слова: ресурсы и способности организации, динамические способности, цифровая трансформация, стратегический анализ, PLS-SEM

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组织能力与数字产品创新的效率

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简介

本文旨在分析在组织中推动创新实施所需的高水平能力中哪些具体能力最为关键。 文章探讨高阶组织能力对数字产品创新绩效的影响，聚焦以下两项核心指标：市场推出时间和投资资本回报率。 该研究采用偏最小二乘结构方程模型（PLS-SEM），基于对俄罗斯多行业企业中高层管理者的问卷调查数据进行分析。数据采集工具为5点李克特量表（Likert Scale），覆盖企业数字化转型、组织能力等核心变量。 研究结果表明，"机会捕捉能力"（seizing capability）和转型能力（transformation capability）对产品上市时间和投资资本回报率这两个指标均产生了显著且相对较大的影响。相比之下，"感知能力"（sensing capability）仅对产品上市时间这一指标表现出明显影响，而对第二个指标（投资资本回报率）的影响则相对较弱。

关键词: 资源与组织能力、 动态能力、数字化转型、 战略分析、 PLS-SEM

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Introduction

The study of issues related to building capabilities and implementing digital product innovations is highly relevant for both business and society as a whole.

It opens up opportunities for sustainable growth, strengthens market positions, and meets current consumer needs. The ability to create and successfully launch innovative products has become a cruchial factor for success in today's market. Those companies that are the first to come up with unique solutions gain a significant advantage over their competitors. They capture market share, build a loyal customer base, and set high quality standards. Certain capabilities help companies organise their innovation processes in a way that makes them as efficient and sustainable as possible.

Today, research into organisational capabilities is quite extensive. Thus, the most modern discourse is the concept of dynamic capabilities. The dynamic capabilities concept is very suitable for the context of product innovation, since the process of creating new products and services is driven by changes in the environment and market. Therefore, it is crucial to identify specific capabilities that can help to increase the effectiveness of digital product innovations.

Originally, the capabilities theory originated from the 'Resource-based view (RBV)' and the 'core competences' theory [Hamel, Prahalad, 1989; Barney, 1991]. The theory of dynamic abilities does not contradict the classical theories, but rather builds upon them. Identifying the company's ability to adapt its 'core competencies' to the current business environment and economic conditions is the next step the dynamic capabilities theory aims to achieve. In 1997, D. Teece defined dynamic capabilities as a company's ability to adapt, integrate, and reconfigure its internal and external organisational skills, resources and functional competencies according to changes in the business environment and economic conditions [Teece et al., 1997]. However, there are certain limitations to the original concept of Teece. One of the main drawbacks is that it was not practical from the beginning and it did not provide a clear path for how to implement it.

Responding to critics of the original concept of dynamic capabilities, Teece clarifies his theory for practical purposes. At this stage of the development of the concept of dynamic capabilities, three main categories of organisational abilities are identified: 'sensing', 'seizing' and 'transforming' [Teece, 2007]. These are essential activities for organisations and management if they want to understand where markets and technologies are going, develop strategies to take advantage of this, and transform the organisation to achieve their goals. Additional clarifications that have taken place regarding the concept of dynamic capabilities include clarifications about the role of managers in companies and their 'entrepreneurial' actions and qualities. To have strong dynamic capabilities, leadership must be entrepreneurial. This means that managers need to be involved in the process of developing and verifying assumptions about new technological and market trends, creating and improving new business models, and managing the necessary resources within the organisation [Teece, 2007].

We highlight the introduction of these high-level organisational capabilities in the context of digital transformation as the most advanced stage in the development of dynamic capabilities. According to one definition, digital transformation is the process of creating digital products that provide a platform for seller and buyer to interact. Regardless of whether the transformation is based on a platform, one of the main goals is to develop and implement a new business model. A business model, according to D. Teece's definition, should include a comprehensive process of creating value, delivering it to consumers, and generating revenue from this model.

The process of creating a new business model starts with 'sensing' and identifying opportunities related to new or emerging technologies and how they can meet customer needs. Digital technologies allow for quick and inexpensive testing and adjustment of hypotheses about customers and technologies, which is essential for the process of product innovation.

The ability of a company to 'seize an opportunity' is crucial for the creation of a profitable business model. A sustainable

business model should have a digital solution that meets customer needs, while maintaining a price that covers costs and generates profits that will allow the company to grow. This 'seizing' capability also involves sharing and communicating knowledge within the organisation, as well as implementing digital transformation.

Eventually, the 'transformation' capability is activated, which is essential for the implementation of digital product solutions and innovations, as well as for making key strategic decisions. This ability to transform allows us to identify gaps in other company's abilities that can be filled through internal development, acquisition of other companies, or creation of partnerships.

In today's digital transformation context, we see capabilities not as processes, operations or routines within an organisation. Instead, we view them as higher-level abilities that are defined by management and permeate throughout the organisation's human resources. These abilities enable rapid and effective innovation in the company's digital products.

To improve the practicality of these top-level capabilities, we need to take a closer look at their impact on innovation effectiveness, particularly product innovation. As previously defined, innovation is the application of knowledge to create new knowledge [Drucker, 1993]. Furthermore, since this paper discusses digital transformation, a category of technological innovations has been identified. Therefore, the definition of a digital product innovation involves the creation or development of technological products and/or platforms.

However, there is a lack of empirical research on the mechanisms used to implement the necessary capabilities and increase the effectiveness of product innovation. Furthermore, various hypotheses have been proposed and tested in an effort to fill this gap.

1. Hypothesis development

To establish the hypothesis regarding the impact of high-level organisational skills on the success of product innovation, let's discuss these skills in more detail to gain a better understanding of their significance.

1.1. Sensing capability

The activities defined by Teece as a sensing capability are scanning, searching, and exploring opportunities for innovation [Teece, 2007]. It involves investment in research and exploration of technological possibilities. Previous studies have identified that information and resources available externally influence innovation activities and the development of a company [Yam et al., 2011]. Additionally, studies have shown that experienced organisations are likely to have search tactics to improve organisational innovation [Nelson, Winter, 1982]. Sensing also involves understanding demand, the evolution of markets, and the responses of competitors. Therefore, when opportunities arise, companies with sensing capabilities can understand which technologies to explore and which market segments to target [Teece et al., 1997]. Therefore, based on this reasoning, it is possible that a stronger sensing capability possibly could lead to more effective product innovations. This is the hypothesis that needs to be tested.

1.2. Seizing capability

This capability focuses on the efficient and effective transfer of knowledge among employees within an organisation engaged in technological innovation. It provides opportunities for learning and sharing best practicies and expertise [Teece, 2014]. The seizing capability involves not only internal communication, but also the ability to integrate external resources. For example, external seizing activities involve integrating customer and/or market knowledge, as well as knowledge of emerging technologies, etc. [Iansiti, Clark, 1994]. In a way, seizing allows for the conversion of resources and knowledge into innovation [Dutta et al., 2005]. Research has found that the effective integration of internal and external knowledge about technology and the market increases a company's chances of incorporating successful features into new products [Marsh, Stock, 2006]. Based on this, good seizing capabilities allow for effective product innovation – the second hypothesis to be tested.

1.3. Transformation capability

The transformation capability helps an organisation maintain its fitness over time and provides the opportunity to avoid unfavorable path dependencies, if necessary [Teece, 2007]. It includes activities through which companies acquire, merge or sell resources or business units [Karim, Capron, 2016]. Considering technological innovation, internal organisational knowledge exchange could be stimulated and distributed in the firm if human resources were properly redeployed and business units were restructured [Nonaka, 1994]. Those employees who hold key knowledge but are not appropriately deployed may be hesitant to make necessary decisions and contribute to the company's progress [Wang et al., 2007]. Therefore, the resource of loyal and engaged personnel is crucial, as well as the ability to grant some level of autonomy to business units in their decision-making process during innovation. The third hypothesis to be tested is that transformation capability also enhances the effectiveness of digital product innovation.

2. Methodology

2.1. Measurement

For this study, all of the variables were measured using a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). As [Daneels, 2016] pointed out, 'as a relatively new area of strategic management research, there are currently no generally accepted approaches for measuring in the field of dynamic capabilities.' To identify relevant items, an extensive search of the literature was conducted. Therefore, Teece's and other researchers' microfoundations of the described capabilities were used as items to ensure content validity.

To measure the sensing capability the items chosen were adopted from [Teece, 2007; O'Reilly, Tushman, 2008]. The items are: research on technological solutions (sen_1), research on customer needs and demands (sen_2), and investigation of customer segments (sen_3). The measurement of the seizing capability consisted of several factors, including: processes for sharing and communicating knowledge within the organisation (seize_1), efforts to implement new technological solutions for product innovation (seize_2), and the selection of target market

segments that the company can or cannot reach with the product (seize_3). These items were adopted from previous research of [Zollo, Winter, 2002; Teece, 2007]. Finally, the transformation capability measurement items were also adopted from [Teece, 2007] and include: autonomy and decentralisation of product innovation teams (tr_1), involvement and loyalty of key employees (tr_2), and building innovation partnerships (tr_3).

To measure the effectiveness of product management, two dependent variables were used: time-to-market and Return on Invested Capital (ROIC). Time-to-market is the speed at which an innovation moves from the idea stage to becoming available to real clients. ROIC represents the ratio of returns gained from the commercialisation of a product compared to the costs spent on its discovery, development, and deployment.

Following the research practice, an analysis was conducted controlling for firm size. According to [Schumpeter, 1942], firm size can influence innovation activities. Therefore, data were collected from companies with similar sizes, measured by the number of employees.

2.2. Data collection

Standard questionnaires were used to collect data for the research. Data was collected from various companies in Russia, mainly located in Moscow and Tyumen. The business sectors in which these companies operate were chosen based on the the industry's susceptibility to rapidly changing business conditions. Thus, the industries covered in the data include commercial civil aviation, telecommunications, software development, and daily banking and brokerage (investments). In each company, questionnaires were distributed to middle and top management who are directly or indirectly involved in product innovation activities. The most common roles represented were product and project managers, financial planners, marketing managers, market and customer researchers, and vice-presidents of commerce and product development. In some companies, data was gathered from CEOs. A total of 197 completed questionnaires were collected, excluding those with incomplete data.

To avoid common method bias, we used an approach of reversing some questions to reduce the possibility of respondents anticipating the connection between them. Additionally, since using a single respondent as the source of data for both independent and dependent variables can lead to common method bias [Podsakoff et al., 2003], we obtained data for the variables from different sources to prevent self-report bias, consistency effects, and illusory correlation problems. This means that two or more respondents from each company answered only questions related to the dependent variables or only questions about the independent variable. Additionally, all respondents were reassured that the purpose of the study was purely academic and that there were no 'right' or 'wrong' answers. The intention was for respondents to give honest answers without worrying about what they perceived as the best answer.

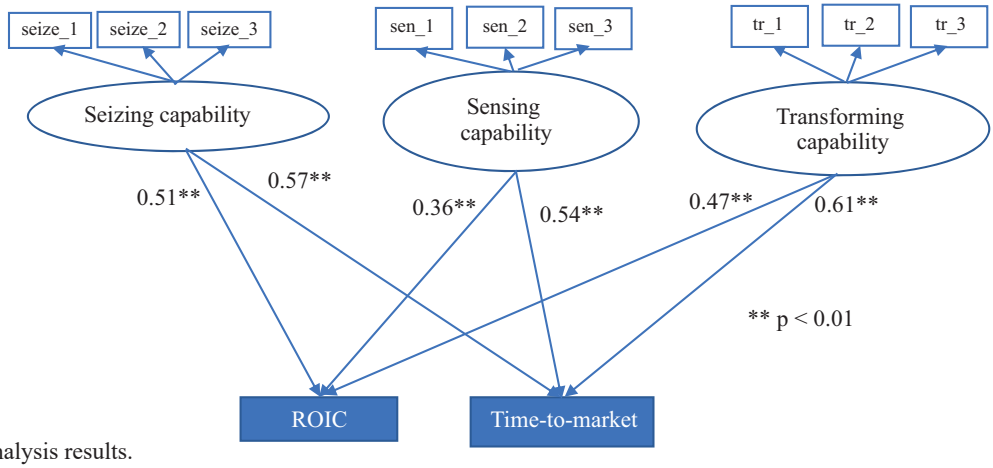
2.3. Data analysis

For the analysis the method of Possible Least Squares Structural Equation Modeling (PLS-SEM) was used. It allows for the analysis of multiple variables and equations simultaneously. PLS estimation process is an ordinary least squares regression-based method that works well with small sample sizes (up to 200). It does not make any assumptions about the underlying data [Hair et al., 2011]. All of the variables in the dataset had multiple items, as described in part 2.1. PLS can weight the item loadings for a variable within the context of a theoretical model.

To ensure the validity and reliability of our theoretical framework, we evaluated the criteria for internal consistency, indicator reliability, convergent validity, and discriminant validity for the variables. All of the Cronbach's α values for internal consistency were greater than 0.8 for all the variables ('sensin', 'seizing', and 'transformation'). Good indicator reliability was also achieved, as all indicator loadings were greater than 0.7. All AVE (average variance extracted) scores were > 0.6, so the convergent validity was achieved. All variables showed good discriminant validity, as the outer loadings of the indicators on their own items were higher than the cross loadings with other items. The square root of the AVE for each construct was higher than its highest correlation with any other construct in the model, indicating good discriminant validity [Fornell, Larcker, 1981].

To evaluate the structural model of the theoretical framework, we conducted an examination of collinearity and calculated the determination coefficient (R^2). We also determined the significance of path coefficients and direct effects. All of the

Fig. Theoretical framework and analysis results



Source: author analysis results.

R^2 scores were above the required 0.1 threshold. For variable collinearity, all of the variance inflation factors (VIF) were below 5, as expexted. This indicates that multicollinearity is not an issue in the data set. A bootstrapping method was used to calculate the significance of the path coefficients in a two-tailed test. Finally, the results and significance values can be seen in Figure.

3. Results and discussion

In total, six flow paths were analysed: (1) from seizing capability to time-to-market, (2) from seizing capability to return on invested capital, (3) from sensing capability to time-to-market, (4) from sensing capability to return on invested capital, (5) from transforming capability to time-to-market, (6) from transforming capability to return on invested capital. The direct relationships between all the independent variables and the metrics of product innovation efficiency were significant. The standardised regression weights for the flow paths can be seen in Figure 1 again.

It is interesting to note that the theory was strongly supported by the analysis. The seizing capability had a significant impact on both tested metrics, which makes sense considering the nature of the construct. As we discussed previously, activities such as knowledge sharing within an organisation and finding ways to implement modern technological solutions in product innovations have an effect on a logical level on the speed at wich a product reaches the commercialisation phase and the return on investment. Additionally, it should be noted that the transformation capability has a significant impact on time-to-market. Innovation parterships, the autonomy of product teams, and the loyalty of key employees all contributr to the effectiveness of product innovation as part of the transformation capability.

In summary, this study contributes to literature on capabilities and innovation. This paper provides a more nuanced understanding of how certain capabilities, specifically dynamic capabilities, influence corporate innovation, and specifically, digital product innovation.

Although, this piece does not cover dynamic capabilities as a whole, it rather breaks them down into more specific capabilities in order to help practitioners better understand them. Having discussed the components, activities, and resources that make up the capabilities of sensing, seizing, and transforming, managers involved in product innovation within their companies can gain an insight into what to focus on.

The issue of whether dynamic capabilities influence company performance in innovation as a whole is still a subject of debate and research. This article proposes an approach to measuring certain impacts empirically, drawing on insights from marketing research. The most obvious next step in the presented research would be to add more testable metrics to the study, in addition to those already included. For example, the author could measure customer base growth and market share changes. He hopes that this paper will inspire further empirical studies on dynamic capabilities and their impact on organisational innovation.

References

Barney J.B. (1991). Firm resources and sustained competitive advantage. *Journal of Management,* 17(1): 99-120.

Danneels E. (2016). Survey measures of first- and second-order competences. *Strategic Management Journal,* 37(10): 2174-2188.

Drucker P.F. (1993). *Concept of the corporation.* New York, Transaction.

Dutta S., Narasimhan O., Rajiv S. (2005). Conceptualizing and measuring capabilities: Methodology and empirical application. *Strategic Management Journal,* 26(3), 277-285.

Fornell C., Larcker D.F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research,* 18(3): 382-388.

Hair J.F., Ringle C.M., Sarstedt M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice,* 19(2): 139-152.

Hamel G., Prahalad C.K. (1989). Strategic Intent. *Harvard Business Review,* May/June: 63-77.

Iansiti M., Clark K.B. (1994). Integration and dynamic capability: Evidence from product development in automobiles and mainframe computers. *Industrial and Corporate Change,* 3(3): 557-605.

Karim S., Capron L. (2016). Adding, redeploying, recombining and divesting resources and business units. *Strategic Management Journal,* 37(13): 54-62.

Marsh S.J., Stock G.N. (2006). Creating dynamic capability: The role of intertemporal integration, knowledge retention, and interpretation. *Journal of Product Innovation Management,* 23(5): 422-436.

Nelson R.R., Winter S.G. (1982). *An evolutionary theory of economic change.* Cambridge, MA, Harvard Business School Press.

Nonaka I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science,* 5(1): 14-37.

O'Reilly C.A., Tushman M.L. (2008). Ambidexterity as a dynamic capability: Resolving the innovator's dilemma. *Research in Organizational Behavior,* 28: 185-206.

Podsakoff P.M., MacKenzie S.B., Lee J.-Y., Podsakoff N.P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology,* 88(5): 879-903.

Schumpeter J.A. (1942). *Capitalism, socialism, and democracy.* New York, NY, Harper & Brothers.

Teece D.J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal,* 28(13): 1319-1350.

Teece D.J. (2014). The foundations of enterprise performance: Dynamic and ordinary capabilities in an (economic) theory of firms. *The Academy of Management Perspectives,* 28(4): 328-352.

Teece D.J., Pisano G., Shuen A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal,* 18(7): 509-533.

Wang H.C., He J., Mahoney J.T. (2009). Firm-specific knowledge resources and competitive advantage: The roles of economic- and relationship-based employee governance mechanisms. *Strategic Management Journal,* 30(12): 1265-1285.

Yam R.C.M., Lo W., Tang E.P.Y., Lau A.K.W. (2011). Analysis of sources of innovation, technological innovation capabilities, and performance: An empirical study of Hong Kong manufacturing industries. *Research Policy,* 40(3): 391-402.

Zollo M., Winter S.G. (2002). Deliberate learning and the evolution of dynamic capabilities. *Organization Science,* 13(3): 339-351.

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