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Determinants of Business Model Innovation Transformation – Research Results

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Abstract:

Purpose: *While different aspects and factors shaping BMI are increasingly exploited by researchers, there is still a lack of studies presenting application approaches that will ensure the effectiveness of a systematic implementation process for BMI. The aim of this article is to examine the determinants of the business model innovation in Polish enterprises.*
Design/Methodology/Approach: *The study was based on assessment importance of eight BMI elements, eleven types of resources and nine entities engaged in BMI transformation. Altogether, 20 individual items included in the studied variables were assessed using a five-point R. Likert scale. The research was carried out using the CAWI method and covered a total of 235 randomly selected Polish enterprises. The main method of analysis used was Spearman correlation and the results are statistically significant.*
Findings: *The results of the research on the determinants of BMI implementation have shown that the most important elements of BMI are: product, partners are buyers, the resource is technology.*
Originality/Value: *The analysis of primary data makes it possible to indicate the specificity of the mutual interdependencies of BMI implementation, which are presented in detail in the text. These results can serve as a valuable input for further research directions and practical application.*

Keywords: *Business model innovation, resources, relationships, determinants, synergy.*

JEL codes: *014, 030, O33, M10.*

Paper Type: *Research study.*

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1. Introduction

Innovations are one of the key factors that give a company competitive advantage (Dymitrowski and Mielcarek, 2021). But to sustain on the high level of innovativness in a disruptive and turbulent environment, it becomes increasingly challenging. When facing with rapid and profound changes in the environment managers face hard task how to secure a market position and build a long-lasting performance. Often a significant and complex change within their business model is needed.

However it is rather complex challenge that can renew how all of the company`s key components are related and operate. So to discover a fundamentally new business model and successfully implement it within the existing one is the essence of a business model innovation (BMI).

There are many different definitions of BMI. One of the mostly accepted has been proposed by Bocken *et al.* (2014) who calim that BMI refers to "changes in the way the organization and its value-network create, deliver value and capture value /…/ or change their value propositions". Such a statement move value towards the center of interest as the crucial element, which not only constitutes the innovativeness of a business model but also will determine company`s performance and profit.

The phenomenon of BMI, due to the development and utilization of new technology, is more relevant and complex than ever before. According to Christensen (1997) companies can achieve BMI by adopting a technology-push and incorporating a technological breakthrough which, in effect, would make them first movers in the industry. However some researches show that BMI is not always beneficial (Halecker *et al.,* 2014).

Therfore a successful implementation of BMI requires much broader perspective. Because only few studies „have addressed BMI, technological innovation, and their interplay towards a company's business performance, especially with empirical evidence" (Smajlović *et al.,* 2019, p. 68).

This leads to formulating a series of questions that can address above mentioned phenomenon:

- What are the key BMI elements?
- Which resources are crucial for BMI transformation?
- Which actors play a key role in BMI transformation?

These questions cannot be fully answered in current state literature. With this research gap in mind, the aim of the article is to examine the determinants of the business model innovation transformation in Polish enterprises.

2. Theoretical Background

2.1 BMI's Key Elements

An important issue when it comes to the use of resources in BMI is the scope of new technologies. In SMEs, technology, resourcefulness strengthens the ability to mitigate the limitations of size and improve the company`s agility (Arbussa *et al.*, 2017). In larger entities the ERP system which creates its core technology by supporting the capabilities of a firm`s processes and information tools (Bendoly and Schoenherr, 2005) plays an important role. Another challenge and opportunity for the development of BMI is the Internet of Things (IoT). Companies need to be connected with other entities (e.g., suppliers and customers) to support reciprocal communication and systems' integration (i.e., ERP), that can strengthen relationships between organizations and execution of transactions (Lichtenthaler and Lichtenthaler, 2009).

When taking into consideration the cloud in recent literature it is still underlined that: "current research offers very limited insights on the /…/ use of cloud sourcing might trigger and push the development of business model innovation and affect the competitive advantage of a firm" (Muhic and Bengtsson, 2021, p. 34). The same situation occurs also in the case of other relatively well-studied aspects of BMI, e.g., Big Data. As stated by Minatogawa *et al.* (2020) BMI, Big Data and competitive advantage are still poorly explored.

Undoubtedly it takes time for BMI to utilize the technological possibilities, partly because developing a business model is more context-dependent than managing technology (Teece, 2018). The adaptation of new technologies offers an opportunity for business model renewal, but a profound change in the business model also disrupts previous configurations of resources and can diminish a company`s performance (Sosna, Trevinyo-Rodríguez, and Velamuri, 2010).

2.2 BMI and Resources

By applying the resource-based view (RBV) into BMI analysis numerous research fields can be outlined. For instance, the dynamic capability perspective underlines the importance of agility in quickly sensing and reacting to changes in the behaviour and preferences of customers, as well as the actions of the competition (Teece, Peteraf, and Leih, 2016). This dynamic aspect of the business model can help to understand how provided information, products and / or services are transformed using a value added component. Therefore, in order to achieve competitive advantage, it is crucial to consider and match value creation architecture with strategic elements related to customers and markets (Lukovszki, Rideg, and Sipos, 2020).

At the same time, apart from focusing only on the selection and configuration of resources, the method of organizing them is also important and can provide additional value for the business, its strategy execution and a company`s performance. By leaning towards open innovation, the organization can improve to timely recognize opportunities in its environment, establish relations with other firms or exchange resources with partners and customers (Cassiman and Valentini, 2016).

Thus, acquiring a certain set of resources is of itself not sufficient, but the proper mobilization and development of these can give the organization the right leverage (Hadjimanolis, 2000). Furthermore, many firms hesitate to allocate resources to BMI and this organizational inertia can lead to a lock-in of business model development. It is therefore crucial to recognize which resources and authority must be assigned for exploration and innovation of new business models to reduce uncertainty and support decision-makers (Björkdahl and Holmén, 2013).

2.3 BMI - Relationships with Various Types of Entities

The nature of BMI requires from a company the use of not only internal resources, but also the ones in possession of external entities. According to Schneider and Spieth BMI process is about utilizing a company's internal assets for benefiting from external opportunities (2013). An approach where companies take advantage of links with external entities in order to accomplish innovation refers to Chesbrough's (2006) concept of open innovation. According to this author, BMI is the essential element of open innovation (Huang *et al.*, 2013).

Relationships developed by a BMI can be described by scope of influence which refers to many types of entities. There are some specific types of entities which are believed to be of outmost importance for innovation purposes, namely, customers, conferences, fairs, exhibitions, supplier and competitor (Mielcarek, 2016).

However, there are just a few research studies which touch on business relationships and BMI in general (Laudien and Daxböck, 2015; Velu, 2016). When it comes to the buyer its role is to provide information about the market. Taking into consideration information extracted from the buyer a company can implement necessary changes into its business model which would meet the requirements of demand.

Therefore, the buyer can be perceived as an entity providing incentives for BMI (Velu, 2016). In the context of BMI a supplier can be engaged into the innovation process and contribute to generating value. As far as competitors are considered, they can trigger the BMI process (Laudien and Daxböck, 2015). Additionally, companies need to take their competitors' actions into consideration in order to maintain competitive advantage. Therefore, they can use benchmarking to identify competitors' actions and, based on that, implement their own solutions.

3. Research Methodology

In this paper quantitative method was applied based on gathered primary data that were collected by CAWI surveys. The research questionnaire contains 22 questions. A five-point R. Likert scale was adopted. The research covers 2021-2022 time period. Respondents of this research were enterprises employees especially middle-level managers coping with innovation and strategic management as well as specialists in this subject. The gathered data were coded and analys with the Sperman correlation coefficient. All calculations were done with MiniTab 2017 software.

As the significance threshold for statistical analysis the adopted p-value is <0.05. All of obtained calculations and research results are statistically significant and representative. A total of 278 responses form Polish comapnies were collected, of which 235 entities were transforming into IMB and therfore were included for further analysis.

The survey structure of responders (employment scale, scope and period of activity and ownership form of entities) is presented in Table 1.

Table 1. *Characteristics of the research sample n=235*

Employment size	1-9 employees – 12,8%	10-49 employees – 22,6%	50-249 employees – 23,4%	250 employees and more – 41,2%
Dominant scope of activity	Transport and warehouse management – 33,6%	Industrial processing – 15,7%	Other service activities - 11,4%	Wholesale and retail trade – 11,1%
Period of operation	1-3 years– 15,7%	4-9 years – 17,5%	10-19 years – 25,5%	20 years and more – 41,3%
Subject ownership	National – 42,1%	International under foreign control – 35,3%	International under Polish control – 22,6%	

Source: *Own preparation based on research results.*

Studied variables in this research are, elements of BMI (products, services, automatization, digitization, robotization, Internet of Things, Big Data and artificial intelligence), as well as nine resources types (employees, organizational culture, technology, infrastructure, know-how, knowledge, data, financial resourcesm dynamic capabilities).

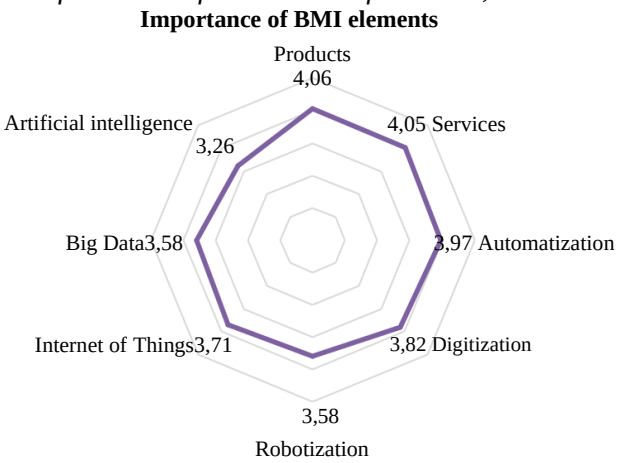
In terms of contractors suppliers, buyers, competitors, internal departments of the company, other entities belonging to the company, universities / research units, financing entities (e.g., government agencies, banks), and administration were analyzed.

4. Research Results

The results of research in Polish enterprises in the years 2021-2022 show what factors played an important role in the process of implementing innovative business models (BMI).

When analyzing various aspects of this process, general attention was drawn to the key elements that have been changed after the introduction of BMI. Figure 1 shows the elements assessed by the surveyed companies. It turns out that the most important elements after changing the business model are products and services - their importance was assessed at the level of 4.05. Two other elements, namely automation and digitization, scored slightly lower. These factors were rated at a level slightly below 4 points. The Internet of Things and big data come next with a score of just over 3.5 points. Among the assessed elements, artificial intelligence was ranked the lowest. Its score was 3.26 points.

Figure 1. *Importance of elements after BMI transformation, n=235*



Source: *Own preparation based on research results.*

The above elements were also analyzed in terms of their mutual dependencies. Table 2 shows the correlation indicators of the above-mentioned elements. Relying on the research results, a significant interdependence between the level of automation and robotization was noticed. In this case, the Spearman correlation coefficient was 0.584. A statistically significant relationship was also found between automation and digitization (Spearman's coefficient at the level of 0.574). Research results also indicate that there is a relatively strong relationship between robotization and

digitization. It can be assumed that the three elements highlighted above, digitization, automation and robotization are characterized by a relatively strong interdependence.

Another aspect that was analyzed was the relevance of resources after introducing changes to the innovative business model. The radar chart (Figure 2) shows those resources that were assessed as key after changing the model. The companies awarded the highest rating of 4.29 to technology. So, technology is a key resource that allows for effective transformation and functioning within a new business model. Employees (4.19) and financial resources (4.14) were rated at a slightly lower level among the key resources.

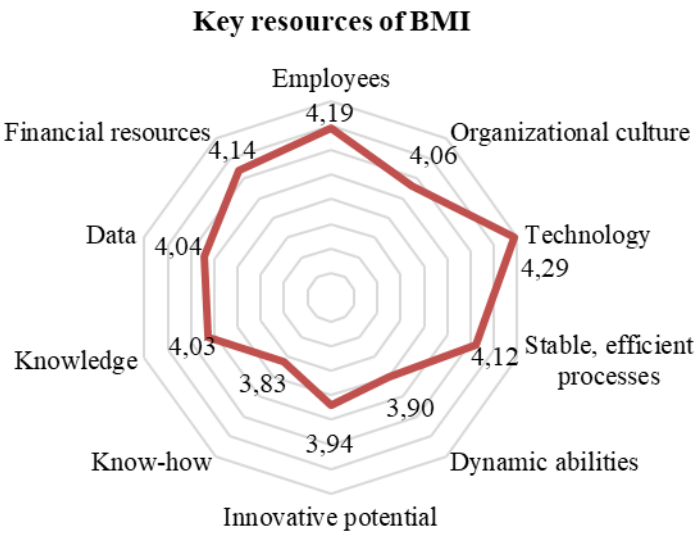
Table 2. *Correlation coefficient of key elements after BMI transformation, n=235*

		1.	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**
1.	*r*		0.472	0.218	0.106	0.014	0.119	0.158	0.075
	p-value		0.000	0.001	0.106	0.827	0.069	0.016	0.255
2.	*r*			0.309	0.323	0.121	0.222	0.164	0.163
	p-value			0.000	0.000	0.065	0.001	0.012	0.012
3.	*r*				0.574	0.584	0.357	0.340	0.335
	p-value				0.000	0.000	0.000	0.000	0.000
4.	*r*					0.541	0.430	0.390	0.393
	p-value					0.000	0.000	0.000	0.000
5.	*r*						0.447	0,389	0.512
	p-value						0.000	0.000	0.000
6.	*r*							0.526	0.451
	p-value							0.000	0.000
7.	*r*								0.512
	p-value								0.000
8.	*r*								
	p-value								

Note: *1. Products, 2.Services, 3.Automatization, 4. Digitization, 5. Robotization, 6. Internet of Things, 7.Big Data, 8.Artificial intelligence*
r - Spearman correlation; p-value is significant <0.05.
Source: *Own preparation based on research results.*

On the other hand, the assessment that enterprises assigned to dynamic abilities (3.90) may be surprising at first, but it should be noted that the surveyed enterprises had already changed their business model, which is probably why, at this stage in their development, this resource is currently not of key importance.

Figure 2. *Importance of key resources after BMI transformation, n=235*



Source: *Own preparation based on research results.*

The obtained data were also measured using the Spearman correlation coefficient (Table 3). It turned out that the strongest correlation is between employees and organizational culture. This correlation was assessed at the level of 0.656. A significant correlation was also observed between technology and stable and effective processes. In this case, the Spearman correlation coefficient was 0.597.

The dynamic abilities are also mutually correlated with the innovative potential of enterprises (coefficient at the level of 0.531). The correlation between the variables was also observed in the case of knowledge and dynamic processes of enterprises. There is also a significant correlation between the dynamic abilities of companies and their acquired levels of know-how and data.

The results of the research of key importance entities after changing the business model present Figure 3. As a consequence of BM change, the most important was the cooperation with buyers, assessed at the level of 4.34 points. The cooperation

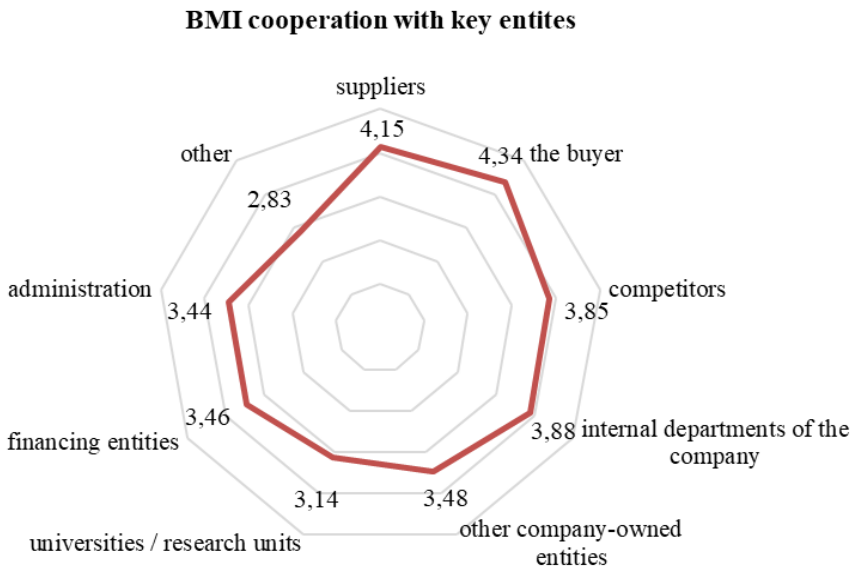
with suppliers was assessed very similarly (4.15). On the other hand, competitors, internal departments of the company and administration scored slightly lower, between 3.88 and 3.44.

Table 3. *Correlation coefficient of key resources after BMI transformation, n=235*

		1.	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**	**9.**	**10.**
1.	*r*		0.656	0.372	0.487	0.308	0.316	0.182	0.428	0.31	0.329
	p-value		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2.	*r*			0.381	0.407	0.342	0.406	0.211	0.417	0.344	0.301
	p-value			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3.	*r*				0.597	0.425	0.493	0.425	0.466	0.474	0.364
	p-value				0.000	0.000	0.000	0.000	0.000	0.000	0.000
4.	*r*					0.485	0.497	0.42	0.459	0.44	0.289
	p-value					0.000	0.000	0.000	0.000	0.000	0.000
5.	*r*						0.531	0.434	0.528	0.438	0.327
	p-value						0.000	0.000	0.000	0.000	0.000
6.	*r*							0.527	0.509	0.543	0.419
	p-value							0.000	0.000	0.000	0.000
7.	*r*								0.565	0.486	0.263
	p-value								0.000	0.000	0.000
8.	*r*									0.559	0.401
	p-value									0.000	0.000
9.	*r*										0.391
	p-value										0.000
10.	*r*										
	p-value										

Note: *1. Employees, 2. Organizational culture, 3. Technology, 4. Stable, effective processes, 5. Dynamic capabilities, 6. Innovation potential, 7. Know-how, 8. Knowledge, 9. Data, 10. Financial resources; r - Spearman correlation; p-value is significant <0.05.*
Source: *own preparation based on research results.*

Figure 3. *Importance of cooperation with entities after BMI transformation, n=235*



Source: *Own preparation based on research results.*

In result of analysis of importance of entities cooperation after BMI transformation the greatest correlation was noted between suppliers and recipients (Spearman's coefficient at the level of 0.589). There are also significant dependencies between internal departments of companies and their other entities (coefficient 0.472). Statistical dependencies were also noticed between financing entities and administration (0.403) and other entities of companies and financing entities, universities and research and development departments (0.433 / 0.421 / 0.439).

5. Conclusions

The aim of this paper was to examine the determinants of the process for implementing business model innovation in Polish enterprises. Based on the conducted research several observation can be formulated:

1) Importance of product as a key element of BMI is well known in the literature (Amit and Zott, 2012). However, despite many similarities between BMI and product management, such as organizational implementation and anchoring or analogical approach to innovation process, still there are some distinguishing features that need to be included, especially broader context of BMI transformation or higher level of top management commitment (Bucherer, Eisert and Gassmann, 2012).

Moreover, research results indicate that utilization of automization, robotization, digitalization, IoT, Big Data ad AI is interconnected and can create synergy in terms of BMI implementation. So, use of new technologies for BMI transformation works on the principle of the "domino effect". This is especially important because BMI, especially those based on new technologies, have a positive impact on a company's competitive advantage (Dymitrowski and Mielcarek, 2021).

2) Another interesting context of BMI transformation is based on the foundation of interactions between employees and the adopted organizational culture (correlation coefficient r=0.656). The characteristics of employees, especially in the field of skills, human capital, and psychology (their engagement, motivation and so on) can shape the way in which a business model is innovated, and at the same time creates a link between BMI and company performance (Foss and Saebi, 2017).

Furthermore, employee commitment is a key factor supporting value-creation processes in addition to an orientation toward experimentation, a balanced way of using resources, clear leadership and strong organizational culture (Achtenhagen *et al.,* 2013). This process can be enhanced by developed informal organization, that supports stability when facing fundamental reorganization. Moreover, a creative organizational culture improves the strategic flexibility of BMI by cleansing it of bureaucratic procedures, resistance to organizational change, or influence of political coalitions (Bock *et al.,* 2011).

3) The next conclusion refers to the rather strong dependency of BMI's innovation potential on know-how, knowledge and data. To innovate, organizations must search for new knowledge or for ways to recombine existing knowledge in novel ways (Li *et al.,* 2013). BMI enhances its knowledge base by the interplay of external and internal knowledge that allows experiments with alternative business models (von Delft *et al.,* 2019).

4) Although dynamic capabilities were assessed as less important after BMI transformation, they do play a crucial role in the preceding steps and providing profitability because they can enable a company to improve both its own usual capabilities, and those of their partners, and channel them into high-profit ventures. This requires that the resources of the company (and partner companies) must be developed and coordinated or "orchestrated" to adapt and even transform the business environment or reshape its market (Teece, 2018).

5) One of the key sources of innovativeness in a company's environment are the customers and the suppliers (Mielcarek, 2016). Moreover there is strong interdependence regarding concurrent cooperation between those two entities in terms of BMI transformation (correlation coefficient r=0.589). This is confirmed by observations in some of the literature. By experimenting with different business models, based on joint internal and external knowledge, and acquiring feedback

from its supply chain to validate this process, companies "adopt an active stance to learning about the environment" (Andries *et al.,* 2013).

Based on the above conclusions and research results, practical implication can be indicated in terms of focusing on crucial elements and interdependencies building synergy effects in BMI transformation. This can help managers to raise efficiency, shorten the time, reduce cost and risk of a whole process and ensure better resource allocation.

The presented survey is not free from some limitations. First of which is the limited scope of the research. It would be interesting to add a more detailed list of key BMI elements, resources and partners and other important elements that can supplement this survey. A second area of concern would be to take into account and extend the research population to cover foreign companies, where the results would present more valid proposals and inferences. The third postulate is about the need for showing detailed patterns of results depending on the size of companies, industry, level of innovation or other key variables.

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