
The Susceptibility of the Business Model to Changes - Empirical Analysis of Internal Determinants of Variability

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Abstract:

Purpose: The purpose of this paper is an evaluation of the susceptibility of business model to changes with regard to company's internal attributes as well as the parameters of the business model. Our goal is to find which companies, considering their size, age, legal form, type and range of operations, are more susceptible to change their business model as well as which business model elements determine changes in the model itself.

Design/Methodology/Approach: We collected the data using own survey research conducted among 104 companies registered in Poland with CAWI technique. We used nonparametric statistical testing as well as binary logistic regression models.

Findings: Our research showed that majority of companies change their business model and the changes are dependent on both the internal features (attributes) of the companies as well as most areas of the business model they use.

Practical Implications: This article attempts to identify a group of internal factors that more than other stimulate the volatility of business models.

Originality/value: Most of the research to date has focused on studying changes in the business model under the influence of external factors resulting from the macroeconomic or competitive environment, without special interest in influencing the attributes embedded in the business model itself and the organization of the company. The latter may constitute a barrier to change or increase the vulnerability of the business model to their implementation.

Keywords: Business model, internal determinants, business model variability, change.

JEL classification: D22, L22, M10, M21.

Paper Type: Research study.

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1. Introduction

Dynamic changes in the micro and macroeconomic environment of companies, in particular regarding technologies, management methods, resource availability or competition, can inspire and even impose changes in business models. It is no wonder then, that innovations introduced in business models are, next to product and process innovations, a direction of seeking competitive advantage (Amit and Zott, 2012), whose potential in the assessment of enterprises has been increasing significantly for years (Pohle and Chapman, 2006). What's more, innovations at the business model level are harder to copy than a new product or process, because implementing changes in this area covers the entire chain of activities and involves more stakeholders than other types of innovation (Snihur and Zott, 2013). According to Foss and Saebi (2017), these changes are a more holistic and innovative form of organizational transition. As a consequence, the return on their implementation may be higher, and the competitive advantage will last longer.

Many authors emphasize that the factors, processes and effects accompanying adaptations or innovations of business models are a challenge for both practitioners and scientists (Doz and Kosonen, 2010; Sosna *et al.*, 2010; Casadesus-Masanell and Zhu, 2013; Lambert and Davidson, 2013; Foss and Saebi, 2017). Degree of such adaptations and innovations affects the level of company competitiveness, perceived value of its services and economic efficiency of operations (Anthony, 2012; Amit and Zott, 2012; Casadesus-Masanell and Ricart, 2010; Osterwalder *et al.*, 2005), because how companies do their business is at least as important as what they do (Economist Intelligence Unit, 2005). Consequently, some types of business models can be considered more effective (Weill *et al.*, 2005; Zott and Amit, 2007) and more frequently copied (Chesbrough, 2010; Doz and Kosonen, 2010; Winter and Szulanski, 2001).

Observed heterogeneity of business models and their efficiency is explained by the theory of situational conditions, which is the starting point for our research. The diversity of organizational practices is seen in both external and intra-organizational factors (Otley, 2016). External conditions explain the scale of various changes in business models in response to expectations and limitations originating in the macroeconomic or competitive environment. Andries and Debackere (2007) and Wirtz *et al.* (2010) note that in the face of unpredictable external market conditions and significant changes in technology or customer requirements, companies face the need to adjust simultaneously many different elements of their business model. However, research also confirms that changes in the business model can also occur without exogenous changes. In fact, the level of variability of the business model may also be affected by tangible and intangible internal factors that determine the organization's ability to identify the need/opportunity to change the business model and to carry it out effectively.

While external factors remain outside the sphere of impact of the subject, and the

processes associated with them cannot be controlled, the entity may, however, affect internal contextual variables seeking to improve the company's performance. Schneider (2019) attempted to identify behavioral patterns when introducing business model innovations for companies exposed to high levels of exogenous changes and those operating in the absence of exogenous changes.

What seems to be lacking in the literature on the subject, is the identification and analysis of attributes embedded in the business model and the specifics of the company that increase the susceptibility of the business model to changes. Thus, research carried out in accordance with the contingency approach may indicate whether the type and scope of changes introduced in the business model differ depending on the individual characteristics of each entity (i.e., e.g. size, type and period of activity, key resources) or markets on which it works (i.e., e.g. operating range or customer segment).

In particular, it is interesting to determine whether companies with given institutional features or operating within a specific business model are more prone to changes (they want or are forced to introduce them), and if so – what factors are responsible for it. It is also important to indicate whether individual company attributes favor key changes (Business Model Innovation – BMI) or rather minor modifications to the business model? The need for research in this area is indicated, among others, by Foss and Saebi (2017) and Demil *et al.* (2015).

Considering the research gap described above, we decided to evaluate if internal factors (attributes) as well as elements of the business model may determine the change of the business model. Therefore, we put forward two hypotheses:

H1: The susceptibility of business model to changes is associated with individual attributes of companies.

H2: The susceptibility of business model to changes is conditioned by key elements of the model.

2. Business Model as a Subject of a Change

The structure of the organization's operating model reflects the company's embedding in a network of systems, resources, partners, internal and external relationships (Adner and Kapoor, 2010; Amit and Zott, 2014). It is, as justified by Casadesus-Masanell and Ricart (2010); Casadesus-Masanell and Ricart (2011), the effect of choosing a combination of assets, policies and management, the consequences of which, as one of the fundamental strategic choices, determine the success or failure of the business (Baden-Fuller and Haefliger, 2013; Brea-Solís *et al.*, 2015). It is emphasized that the basis of the changes introduced in the business model is the company's effort to create a new way of creating and recognizing the value (Markides, 2006; Teece, 2010; Casadesus-Masanell and Zhu, 2013). It should be noted, however, that not individual elements of the business model, but their

appropriate combination ensures the uniqueness of the business model and reflects the philosophy of doing business (Ciechan-Kujawa, 2020).

The literature related to changes of the business model lacks presentation of broader empirical research in this field. Individual cases of business model change and the consequences of these changes are rather analyzed (Matzler *et al.*, 2013; Aspara *et al.*, 2011; Siggelkow, 2002; Sosna *et al.*, 2010). Some publications present the functioning of a specific type of business model (Anderson and Kupp, 2008; Yunus *et al.*, 2010; Richter, 2013) or new solutions for a specific industries (Abdelkafi *et al.*, 2013; Holm *et al.*, 2013; Karimi and Zhiping, 2016; Souto, 2015; Sorescu *et al.*, 2011; Casadesus-Masanell and Ricart, 2011; Gilbert *et al.*, 2012; Desyllas and Sako, 2013). However, it can be difficult to generalize conclusions from their research.

Schneider (2019) research results show that exogenous factors can influence companies' approach to the model change. Companies exposed to high levels of exogenous factors, perceive the changes as opportunities for their organization. They are focused on proactive detection of signals from the environment and introducing changes by trial and error. Moreover, Saebi *et al.* (2016) found that a serious external threat increases the likelihood of companies being involved in adapting the business model. However, changes in the business model are also introduced by organizations operating in an environment of absence of exogenous factors and external variability. According to Schneider (2019), these companies primarily look for opportunities for innovation in their core competences, focus on minimizing the risk and tend to adjust uniquely the business model to the market needs.

3. Research Methodology

In our work, we studied the literature and then we prepared and conducted a survey research based on a questionnaire sent by emails (CAWI). We started the survey in the third quarter of 2017 and completed the database in 2018. Our research model was built on the basis of the recognized and widely presented approach of Osterwalder and Pigneur (2010). Empirical analysis was performed based on the nine fundamental elements of the business model describing the logic of earning money, i.e.: customer segments, value propositions, distribution channels, customer relations, revenue streams, key activities, key resources, key partners and cost structure.

The results were compiled on the basis of 104 companies conducting business activity in Poland, which constituted approx. 14 percent of 750 units invited to the study and randomly selected from nationwide database. The research sample can be characterized according to the parameters of the companies participating in the survey, such as: size, legal form, age, type of activity and range of conducted activity (Table 1).

Table 1. Characteristics of enterprises participating in the survey

Feature	Number	Share	Share cum.	Code
SIZE				
Small (10-49 people)	60	57.7	57.7	1
Medium (50-249 people)	29	27.9	85.6	2
Large (over 250 people)	15	14.4	100.0	3
LEGAL FORM				
Natural person & other	46	44.2	44.2	1
General partnership	9	8.7	52.9	2
Limited liability company	35	33.6	86.5	3
Joint-stock company	14	13.5	100.0	4
AGE				
<2 Yrs	23	22.1	22.1	1
2-5 Yrs	21	20.2	42.3	2
6-10 Yrs	16	15.4	57.7	3
>10 Yrs	44	42.3	100.0	4
TYPE				
Production	24	23.1	23.1	1
Trade	19	18.2	41.3	2
Service	61	58.7	100.0	3
RANGE				
Local	39	37.5	37.5	1
Domestic	36	34.6	72.1	2
International	29	27.9	100.0	3

Source: Own work.

In our study we used statistical testing and modeling with IBM SPSS Statistics 25 at significance level of $\alpha=0.05$ and $\alpha=0.1$ (multiple binary logistic regression models).

4. Results Presentation

4.1 Characteristics of Enterprises Changing the Business Model

Among 104 entities participating in the study, 64 declared changing business model, which constituted 61.5% of the research sample units. At $\alpha=0.05$ and $p=0.019$ this result present statistically significant difference between entities changing and not changing the business model.

Using nonparametric χ^2 test of association and Pearson's coefficient of contingency (C) at $\alpha=0.05$ we verified statistical hypothesis about identical distribution of the number of entities that changed business model versus those not changing with respect to their size, legal form, age, type of activity, and range of operations (Table 2).

Table 2. Association between internal characteristics of companies and the change of business model

SIZE	LEGAL F.	AGE	TYPE	RANGE
0.404***	0.397***	0.361***	0.195	0.279*

Note: *** p -value < 0.001 , * p -value < 0.05

Source: Own work, $N=104$.

Based on statistical testing a significant relationship was confirmed between change of the business model and all variables except the type of business activity ($p > 0.05$).

To examine in more details the relationship between the change of the business model and the internal characteristics (attributes) of the companies participating in the study, we used column proportions test. The test confirmed that proportionally companies changing their business model are medium or large, limited liability or joint-stock companies, units being on the market over 10 years and having international range of operations. On the other hand, entities that do not change the business model are mainly small companies, operating as natural persons, with age of functioning of less than 2 years and from 2 to 5, operating on local market (Table 3).

Table 3. Test of proportion of columns for units that change/do not change business model³

SIZE	(1)	(2)	(3)	(4)
Change (No)	(2)*** (3)*			-
Change (Yes)		(1)***	(1)*	-
LEGAL F.	(1)	(2)	(3)	(4)
Change (No)	(3)** (4)*	Nd		
Change (Yes)		Nd	(1)**	(1)*
AGE	(1)	(2)	(3)	(4)
Change (No)	(4)**	(4)**		
Change (Yes)				(1)** (2)**
TYPE	(1)	(2)	(3)	
Change (No)				-
Change (Yes)				-
RANGE	(1)	(2)	(3)	
Change (No)	(3)*			-
Change (Yes)			(1)*	-

Note: *** p -value < 0.001 , ** p -value < 0.01 , * p -value < 0.05 , $\alpha=0.05$

Source: Own work, $N=104$.

In order to evaluate the functional relationship between internal characteristics (attributes) of companies and the change of business model we used multi-dimensional binary logistic regression model determined by the formula⁴ (1).

³The coding of classes of variables 1, 2, 3, 4 is presented in Table 1.

⁴In our paper we denote change of the business model as 1 and lack of change as 0. All the variables are qualitative.

$$(1) \quad \text{Logit } P(Y = 1 | \text{CHANGE}) = \beta_0 + \beta_1 \cdot \text{SIZE} + \beta_2 \cdot \text{LEGAL FORM} + \beta_3 \cdot \text{AGE} + \beta_4 \cdot \text{TYPE} + \beta_5 \cdot \text{RANGE}$$

The estimation of parameters at $\alpha=0.1$ assuming fit of the model with Wald's backward elimination is presented in Table 4⁵.

Table 4. Logistic regression estimations (company attributes) with backward elimination

Variable	β	SE	OR	- 95%	+ 95%
SIZE SMALL	0		1		
SIZE MEDIUM	2.428***	0.663	11.333	3.090	41.569
SIZE LARGE	1.655*	0.696	5.231	1.337	20.468
Intercept	-0.268	0.261	0.765		

Note: H-L Test p -value = 1.000, R^2 Cox Snell = 0.192, R^2 Nagelkerke = 0.261, $\alpha=0.1$

*** p -value < 0.001, * p -value < 0.05

Source: Own work, $N=104$.

The use of the logistic regression model indicated that increasing size of the company substantially increases the chance to change business model. The transition from a group of small to medium companies causes on average a 11-fold increase of chances to change the business model, and a change from small to large company increases 5 times opportunities for a change.

4.2 Changing the Business Model and the Type of Model Used

Subsequently we analyzed the relationships between change of the business model and latent variables belonging to 9 business model elements: i.e.: 1) Type of customers served⁶, 2) The way customer's value is built⁷, 3) The way of distribution of products and services⁸, 4) Type of supplier-customer relationship⁹, 5) Main source

⁵We found lack of collinearity between the covariates from formula (1) using Variance Inflation Factor (VIF). All VIF values were within the range 1,27 - 1,89.

⁶Variables: mass customers (CUST1), niche customers (CUST2), specific customer segments (separated e.g. by age, gender, education) (CUST3), various diversified segments (CUST4), multilateral exchange platform (CUST5) and other types of customers (CUST6).

⁷Variables: attractive price (VALUE1), novelty on the market (VALUE2), originality of the product (VALUE3), adaptation to customer needs (VALUE4), lower risk of purchase, use or owing (VALUE5), availability (VALUE6), innovative design (VALUE7), lower costs of use /production (VALUE8), higher production efficiency (VALUE9), recognizable brand (VALUE10), convenience and usability (VALUE11), other values (VALUE12)

⁸Variables: sales in the company's headquarters (DIST1), own retail stores (DIST2), other retail stores (DIST3), wholesalers (DIST4), through external intermediaries (DIST5), online platforms (DIST6), other forms (DIST7).

⁹Variables: personal support (REL1), dedicated customer account manager (REL2), self-service system (REL3), product or service co-creation (REL4), social media relations (REL5), other types (REL6).

of revenues¹⁰, 6) Key resources¹¹, 7) Key costs¹², 8) Key operations¹³ and 9) Use of outsourcing. To find dependencies, we used 9 individual models of multidimensional binomial logistic regression with backward elimination, representing each element of the business model.

The equation for the set of models is given by the formula 2.

$$(2) \quad \text{Logit } P(Y_j = 1 | X_j) = \beta_{0j} + \sum_{i=1}^{N_j} \beta_{ij} \cdot X_{ij}$$

Where j (number of model) = 1, ..., 9

The estimation of parameters at $\alpha=0.1$ assuming fit of the model with Wald's backward elimination is presented in Table 5.

The estimation of the parameters of the model 1 (TYPE OF CUSTOMER) indicated the only statistically significant relationship between mass customer service and the change of the model. Companies serving mass customer represent about 2.5 times greater chance to change the business model compared to entities not serving mass customer. Additionally, we checked the association between the range of customers served (number of different categories of customers served) and the change of business model but it turned out to be statistically insignificant ($p = 0.482$). The analysis of the model 2 (CREATING VALUE FOR CUSTOMER) indicates that several types of the value provided to customers are statistically significant and determining change of the business model. Of the variables examined, the highest impact for the value creation was represented by lower costs of use or production. Among companies declaring this type of approach in creating value for customers, the chance of changing the business model was over 40 times greater than companies not using the considered approach. Also noteworthy is building value on new products on the market availability and a recognizable brand. On the other hand, it should be pointed that there is 10 times greater chance of not changing the business model among companies providing value in form of high production efficiency.

¹⁰Variables: sales of standard products (REV1), sales of tailor-made products (REV2), sales of company's assets (REV3), fees (REV4), subscriptions (REV5), rental and leasing (REV6), licensing (REV7), brokerage commissions (REV8), advertising (REV9), financial income (REV10), other income (REV11).

¹¹Variables: real estate (RES1), machinery and equipment (RES2), means of transport (RES3), intangible assets (RES4), human resources (RES5), customer relations (RES6), internal organization (RES7), brand and image (RES8), financial resources (RES9).

¹²Variables: total costs (COST1), variable costs (COST2), production costs (COST3), costs of activities (COST4), target costs (COST5), costs of continuous improvement (COST6), quality costs (COST7), other costs (COST8).

¹³Variables: planning, production, delivery of products and services (OPR1), problem solving by creating new solutions for the customers (OPR2), using a platform or network to popularize the brand, or acquire new customers (OPR3).

Table 5. Logistic regression estimations (business model areas) with backward elimination

Variable	β	SE	OR	- 95%	+ 95%
Model 1 TYPE OF CUSTOMER					
CUST1 (mass customers)	0.785*	0.411	2.192	0.980	4.906
Intercept	0.080	0.283	1.083		
H-L Test p-value = n.a., R ² Cox Snell = 0.035, R ² Nagelkerke = 0.048, $\alpha=0.1$					
Model 2 CREATING VALUE FOR CUSTOMER					
VALUE2 (novelty on the market)	1.669*	0.659	5.308	1.460	19.300
VALUE4 (adaptation to cust. needs)	-1.067*	0.560	0.344	0.115	1.031
VALUE6 (availability)	1.579**	0.539	4.849	1.685	13.960
VALUE8 (lower costs of use/prod.)	3.711**	1.317	40.881	3.091	540.658
VALUE9 (higher prod. efficiency)	-2.394*	1.126	0.091	0.010	0.829
VALUE10 (recognizable brand)	1.100*	0.552	3.004	1.018	8.861
Intercept	-0.491	0.438	0.612		
H-L Test p-value = 0.788, R ² Cox Snell = 0.276, R ² Nagelkerke = 0.374, $\alpha=0.1$					
Model 3 DISTRIBUTION					
DIST3 (other retail stores)	1.134*	0.645	3.109	0.878	11.010
DIST5 (external indep. intermed.)	1.000*	0.496	2.718	1.027	7.190
DIST6 (online platform)	1.034*	0.475	2.813	1.110	7.130
DIST7 (other forms)	1.559*	0.867	4.755	0.869	26.004
Intercept	-0.481	0.332	0.618		
H-L Test p-value = 0.712, R ² Cox Snell = 0.133, R ² Nagelkerke = 0.180, $\alpha=0.1$					
Model 4 SUPPLIER-CUSTOMER RELATIONSHIP					
REL2 (dedicated account manager)	1.613**	0.486	5.018	1.938	12.997
Intercept	-0.063	0.250	0.939		
H-L Test p-value = n.a., R ² Cox Snell = 0.116, R ² Nagelkerke = 0.158, $\alpha=0.1$					
Model 5 MAIN REVENUE					
REV1 (sales of standard products)	1.941**	0.612	6.966	2.099	23.110
REV2 (sales of pr. on indiv. orders)	2.062**	0.608	7.864	2.390	25.879
Intercept	-0.941**	0.670	0.144		
H-L Test p-value = 0.700, R ² Cox Snell = 0.172, R ² Nagelkerke = 0.233, $\alpha=0.1$					
Model 6 KEY TANGIBLE AND NON-TANGIBLE RESOURCES					
RES1 (real estate)	0.944*	0.505	2.569	0.955	6.914
RES4 (intangible assets)	0.718*	0.432	2.049	0.879	4.779
Intercept	-0.047	0.297	0.954		
H-L Test p-value = 0.849, R ² Cox Snell = 0.055, R ² Nagelkerke = 0.075, $\alpha=0.1$					
Model 7 KEY COSTS					
COST ₁ (total costs)	2.804*	1.103	16.508	1.899	143.537
COST ₂ (variable costs)	2.507*	1.058	12.274	1.543	97.612
Intercept	-2.521*	1.128	0.080		
H-L Test p-value = 0.957, R ² Cox Snell = 0.129, R ² Nagelkerke = 0.176, $\alpha=0.1$					
Model 8 KEY OPERATIONS					
-	-	-	-	-	-
Model 9 OUTSOURCING					
USE OUT (outsourcing)	1,157	0.434**	3.182	1.359	7.450
Intercept	0.000	0.263	1.000		
H-L Test p-value = n.a., R ² Cox Snell = 0.070, R ² Nagelkerke = 0.095, $\alpha=0.1$					

Source: Own work, N=104.

The relationship between the change of the business model and the range (number) of values on which the company bases its activity turned out to be statistically

significant ($C = 0.392$, $p = 0.016$). Model 3 (DISTRIBUTION) proved that relationship between change of the business model and distribution through external retail stores, external intermediaries and internet platform as well as other forms turned out to be statistically significant, where in the above-mentioned sales cases we could find from 2.7 to approx. 4.8 more chances to change the business model compared to entities not using such forms of distribution. The other forms represented the strongest influence. The relationship between the range (number) of distribution methods and the change in the business model turned out to be statistically significant ($C = 0.330$, $p = 0.013$). Estimation of the parameters of the model 4 (SUPPLIER-CUSTOMER RELATIONSHIP) similarly to the area of customers served, pointed the only one statistically significant variable, i.e. dedicated customer account manager. In the case of dedicated account manager, we found statistically significant odds ratio of 5.018 which means that the entities that rely on the above-mentioned relationship model have about 5 times greater chance to change the business model against the background of entities not using this type of relationship. The relationship between change in the business model and the range (number) of types of supplier-customer relationships turned out to be statistically insignificant ($p=0.092$). In the model 5 (MAIN REVENUES), among the variables significantly affecting change of business model were the sale of standard products and products for individual order. In the case of their conduct, the chance of changing the business model was about 7 or 8 times greater compared to the entity not using this type of sales. At the same time, it was found that the relationship between the change in business model and the scope (number) of types of revenues generated by the enterprise turned out to be statistically insignificant ($p = 0.057$).

Among nine key resource types representing model 6 (KEY RESOURCES), only two turned out to affect change of business model, i.e. real estate and intangible assets - know how, licenses, patents. In the case of companies declaring them as key resources, the chance of changing the business model was 2.5 and 2 times higher compared to other entities. Additionally, the relationship between change in the business model and the range (number) of key resources on which the enterprise relies ($p = 0.625$) was statistically insignificant. In case of type of key costs accounts declared by the companies, the results of the model 7 (KEY COSTS) indicate that companies indicating total costs accounts as significant for their operations are 16 times more susceptible to change the business model compared to other units. In case of entities for which variable costs are key ones, this relationship is at the level of over 12 times. The relationship between the range (number) of key costs accounts used by the companies and the change in the business model turned out to be statistically significant ($C = 0.276$, $p = 0.014$). The next area that we studied in model 8 (KEY OPERATIONS) was the influence of the key operations taken by the company onto change of the business model.

Following the estimation of model parameters of key actions taken by the company, none of the variables in this area nor their range (number) proved to have a statistically significant effect on changing the business model. As part of business

models susceptibility to changes, the impact of using outsourcing among companies was also examined in model 9 (OUTSOURCING). The results indicate statistically significant relationship between the use of external partners for implementation key business processes and the change of business model. In this case, the use of outsourcing is associated with more than 3 times greater chance of changing the model against units that do not use outsourcing.

5. Discussion

The research conducted by us confirmed that changing the business model is a phenomenon commonly encountered and companies, regardless of their size, legal form, type and scope of business, are frequently deal with it. Considering the susceptibility of the business model to change, the statistically significant parameters were the size, legal form, age of the company, as well as range of operations.

When comparing our results to other research, we find that the size of the company matters for the adaptation of the business model change (Low *et al.*, 2011). Both test of proportions of columns and binary logistic regression model show that medium or large entities more often introduce changes to their business models comparing to small units. Similarly, Halecker *et al.* (2014) note that the significance of introducing innovation in the business model depends on the size of the company. Their significance is noticed in particular by large (but not very large) companies. In turn, Foss and Saebi (2017) indicate that the organization's life cycle, apart from factors such as the degree of entrepreneurship and technological advancement, may differ both in the determinants of introducing business model changes and their consequences.

However, so far little research compares business models between companies with different characteristics (attributes), e.g. between companies operating on the market for a long time and start-ups. The authors usually focus on one segment, e.g. start-ups (Zott and Amit, 2008; Andries and Debackere, 2007; Bhide, 2003; Parker *et al.*, 2010) or mature companies (Demil and Lecocq, 2010; Doz and Kosonen, 2010; Dunford *et al.*, 2010; Sosna *et al.*, 2010; Bock *et al.*, 2012). Tripsas and Gavetti (2000) and Chesbrough (2010) argue that in mature companies some inertia is observed in implementing changes in business model. Their ability to implement a new solution is determined by the current business model and its cognitive limitations (Chesbrough and Rosebloom, 2002), as well as extensive organizational structures, network of stakeholders (Demil and Lecocq, 2010; Tripsas and Gavetti, 2000) and existing resources (Bonaccorsi *et al.*, 2006). Possible changes are frequently a response to the verification of initial unrealized business assumptions or significant changes in the environment (Amit and Zott, 2001; Andries and Debackere, 2007; Zott and Amit, 2007; Zott and Amit 2008).

Using test of proportion of columns we found that young companies had lower susceptibility to changes in the business model. That result was opposite to the

research of Parker *et al.* (2010) who argue that the increase in the ability to evaluate the requirements of the external market forces young companies to optimize their business model. Young organizations have great flexibility in implementing new business models due to the thin organizational structure or low efficiency of the current business model (Chesbrough and Rosenbloom, 2002), but they also encounter barriers resulting from the lack of fixed procedures, insufficient resources (Zott and Amit, 2008), inability to manage complex changes (Rerup and Feldman, 2011) or transition (Markides and Charitou, 2004) as well as lack of acceptance of changes by the company founders (Cardon *et al.*, 2009).

Studies of 163 portfolio companies have also shown that the ability of young businesses to change business models can be affected by the characteristics of external stakeholders, such as VCs and external CEOs. (Gerasymenko *et al.*, 2015). Younger companies, more often than the old ones, point out the importance of innovation in the business model (Halecker *et al.*, 2014). The same research indicates that innovations in the business model are currently behind product innovations in terms of importance for the company, but they are ahead of process innovations and are more suitable for service companies than in manufacturing. In our study we identified entities operating on international markets and more aged (regardless of the type business) as more susceptible to the business model change.

Our research also found that some business model configurations are more susceptible to change than others. Therefore, we believe that the frequency and scope of introduced modifications may result from the specifics of a given model. Few previous studies have analyzed the relationships between components of specific business models and their susceptibility to adapt specific solutions. Various authors evaluated technological, organizational and environmental factors (legal regulations, social expectations) (Low *et al.*, 2011). Bogataj and Pucihar (2017) investigated the importance of the business model for the cloud computing.

It seems important to link our results with the conclusions of other authors. Zott and Amit (2007) on the basis of research conducted upon 190 companies listed on American and European stock exchanges noticed a positive relationship between novel-oriented business models and companies' results. At the same time, the results of their research indicate that the attempts to use a hybrid solution in business models, in which the approach is focused on both effectiveness and novelty, can have the opposite effect.

Similar conclusions were obtained by Wei *et al.* (2014) who conducted research on 176 entities operating in China. They showed that the business model focused on novelty weakens the negative impact of exploitative innovations. At the same time, the business model's orientation on efficiency strengthens the negative effect of exploitative innovations and weakens the positive effect of exploratory innovations. Therefore, it can be assumed that business models based on new products require more frequent changes to provide their customers with freshness, surprise and

uniqueness. As more flexible, they enable the use of differentiation strategies, which positively affects the achieved financial results and allows to maintain a competitive advantage.

Another finding of our research is that business models built on external distribution channels for products and services or the use of online sales are more susceptible to changes. In the first case, we deal with the interrelationship and impact of business models of supply chain participants, which may directly or indirectly have the implications of change throughout the entire chain. Zarazua de Rubens *et al.* (2020) describe these relationships on the example of the automotive industry, pointing out the need to adopt new models, practices and methods of conducting business after the introduction of electric vehicles. Similarly, if the model is based on online sales, external changes strongly influence the need to modify the business model. For example, mobile payment as a new service has significantly influenced changes in models of mass service providers (financial institutions, telephone operators, etc.) (Liébana-Cabanillas *et al.*, 2018).

Based on our research, we find that generally business models of enterprises providing products or services to the mass market, show greater susceptibility to modifications. Similar phenomenon is noted in case of concepts based on traditional sources of revenue (sale of standard products and on individual orders). Gilibert and Ribas (2019) note such trend in the automotive industry, where decrease in sales influenced decisions of car manufacturers (Daimler, Volkswagen, Toyota, Ford or General Motors) to invest and cooperate with mobility service providers and creating their own mobility ecosystems.

An additional factor differentiating the susceptibility of business models to changes may be the life cycle of cooperation with the customer, which is potentially shorter in case of the revenue model obtained from mass one-off sale than in case of such forms as: subscription, leasing, licenses or brokerage commissions. Moreover, noteworthy is also maintaining customer relations. Close contact with the client through an account manager results in a greater susceptibility of the business model to changes. It seems that this situation, as a consequence of the exchange of knowledge about the client's needs and strategic plans and market development directions, may be conducive to both innovations and model adjustments.

The literature on managing change in the organization provides evidence that the key factor of success or failure in the process of implementing change is the company's resources. Maintaining their proper configuration (quantitative and qualitative) determines the effective functioning of the business model on the revenue side (providing value to the customer, maintaining relationships with him, handling distribution channels), but it is an organizational and financial effort for the company. Many authors indicate that intangible resources that reflect the most important competences of the company, are of key importance for creating company's value (Andreou and Bontis, 2007; Battagello *et al.*, 2014). Battagello *et*

al. (2019) emphasize that optimizing business and organizational performance requires determining which assets are strategic and critical to the value creation process. Our research presented that enterprises relying on intangible assets are more susceptible to model changes. The asset that is going to be considered as essential for building a sustainable competitive advantage, should be valuable, rare, inimitable, non-substitutable and organized. Certainly, intellectual value resources, such as patents, can be regarded as such. As Johnson (2008) emphasizes, their uniqueness and the time needed for competitors to acquire the knowledge necessary to imitate them is relatively long. The core competences located in these areas can give a base for development and create changes in other components of the business model.

According to Lamberti *et al.* (2016) they can also be a starting point for introducing open innovations and generating value in this model. On the other hand, our study showed vulnerability to changes in the business model of a resource-based organization in the form of real estate. In this case, the justification for susceptibility to changes may be the fact that real estate is a common resource in traditional industries and production units, which nowadays increasingly come into contact with new competitors, start-ups or companies operating on the basis of novel business concepts. The justification for the model changes undertaken may also be following the changing customer preferences and ICT changes.

Comparing our investigation to the study by Bogataj and Pucihar (2017), we identified cooperation with external partners as an important parameter of model variability (outsourcing of key processes). The decision to internalize or externalize key processes or resources directly affects the course and organization of operations. Malhotra and Uslay (2018) report that the optimal number of major suppliers is due to the complexity and maturity of the supply chain, as well as the industry life cycle, regulation and technology. Beregszaszi and Hack-Polay (2015) research identifies differences in the approach to outsourcing key resources and point their dependence on the company's size. They also indicate the factors related to the change, among which one can find elements of the business model such as modifications of the cost structure or acquisition of new technologies and specialist knowledge.

6. Conclusions and Limitations

The survey on a group of 104 randomly selected enterprises, followed by statistical analysis of the collected data confirmed that the change in the business model covers the majority of business entities and is essentially related to the company's internal features (attributes), i.e. size, legal form, age of operation and range of activity. In this regard, the H1 hypothesis from the introduction to the manuscript has been positively verified. The area that turned out not to affect the change in the model was the type of business. This means, that regardless of the nature of the business (production, trade, service), business models of enterprises are subject to change to the same extent. Based on statistical research, we also found that the change of the

business model is in general conditioned by various individual segments belonging to eight out of nine elements of the business model (type of customers served, method of product or service value creation for the customer, distribution method, type of supplier-customer relations created, type of main revenue source, type key resources, type of key costs, outsourcing). That positively confirms hypothesis H2.

Only one of the eight areas of the business model – i.e. key activity on which the company is focusing, turned out to be not influencing the changes. The change in the model was most often associated with the types of value created for the customer, in which the strongest effect was caused by the value created by lower costs of use or producing. A strong impact in scope of changing the business model has also been noticed in relation to key costs, including full costs and variable costs, as well as revenues from sales of standard products and on individual orders. In our study we found that the susceptibility of the business model to the change was partially associated with the range (number) of segments belonging to 9 key elements of the business model in which the companies run their operations. The change turned out to be statistically significant just in case of range of segments belonging to methods of value creation for customers, methods of distribution, key costs and outsourcing with the strongest relation observed for the first element.

As in the case of technical (product and process) changes, also in the case of changes in business models, internal cultural, economic, financial, technological, personal and cultural conditions may influence their undertaking and final efficiency. These factors were not directly covered by our study. Our study also focused only on internal aspects, i.e. attributes of enterprises and elements of the business model. For organizational reasons, the impact of factors from the close and distant environment of enterprises was omitted here.

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