2019

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32ND BLED ECONFERENCE
HUMANIZING TECHNOLOGY FOR A SUSTAINABLE SOCIETY
JUNE 16 – 19, 2019, BLED, SLOVENIA, CONFERENCE PROCEEDINGS
A. Pucihar (ed. et al.)

University of Maribor Press

SMEs business model innovation: does enterprise size matter?

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Abstract This paper extends previous studies on micro, small, and medium-sized enterprises (SMEs) perspective on business model innovation (BMI) by analysing the differences in opinions between SMEs of different sizes regarding the drivers of BMI and the level of BMI. Based on the literature review the hypotheses were developed. Results demonstrate that there are significant differences in opinion in SMEs of different sizes about the importance of environment and innovation as BMI drivers, while there were no significant differences in opinion about the importance of technology as BMI driver. In addition, the results show that there are significant differences between SMEs of different sizes about the level of BMI.

Keywords: • Business Model Innovation • Drivers • Small and Medium Enterprise • Differences • SMEs •

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DOI https://doi.org/10.18690/978-961-286-280-0.53 ISBN 978-961-286-280-0
Dostopno na: http://press.um.si

1 Introduction

The rapid development of digital technologies is causing disruptive changes in business and our lives (Raskino & Waller, 2015). The exploitation of digital technologies leads enterprises to digital transformation. Digital transformation reflects the ability of the enterprise to redesign business activities, its competencies and business models (BM).

Business model innovation (BMI) is one of the key activities that has to be continuously undertaken in every enterprise to achieve competitiveness in the digital economy (Hanelt, Hildebrandt, & Polier, 2015). In such a disruptive environment no static business model can survive. Every enterprise has to continuously evaluate, re-think, re-design and innovate the way how value is created, captured and delivered (Amit & Zott, 2012; Florén & Agostini, 2015; Teece, 2010; C Zott & Amit, 2009).

BMs have started to raise the interest of researchers and practitioners in 1990s (Morris, Schindehutte, Richardson, & Allen, 2006). Since then, a lot of research has been carried out in the field of BM design and innovation. Several researchers have indicated that BMI contributes to business performance (Bouwman, Nikou, Molina-Castillo, & de Reuver, 2018; Casadesus-Masanell & Zhu, 2013). Nevertheless, many enterprises still lack the awareness and knowledge for a systematic approach towards business model design and innovation (Casadesus-Masanell & Ricart, 2010; Florén & Agostini, 2015; Giesen, Berman, Bell, & Blitz, 2007; Heikkilä, Bouwman, & Heikkilä, 2018).In the past, most of the research has been carried out and focused on large enterprises. Only recently more emphasis has been given to micro, small and medium-sized enterprises (SMEs), which represent 99% of the European marketplace and are key potential for economic growth, innovation and employment (European Commission, 2014).

Recent research indicates that most SMEs do not have a formal strategy when engaging in a BMI process (Lindgren, 2012) and typically experience BMI as a necessity to remain competitive (Laudien & Daxböck, 2017). Still, it is relatively unclear how SMEs actually innovate their BM (Carayannis, Sindakis, & Walter, 2014; Foss & Saebi, 2017) and how this improves business performance. Furthermore, the role of size when investigating BMI in SMEs has received less attention. While there are differences in behaviour towards innovation between

large enterprises and SMEs (Vaona & Pianta, 2008), there might also be differences between micro, small, and medium-sized enterprises, especially because innovation increases with enterprise size (De Mel, Mckenzie, & Woodruff, 2009; Forés & Camisón, 2016).

The purpose of the study was to investigate whether there are any significant differences in opinions between enterprises of different sizes (micro, small and medium-sized) about 1) drivers that influence BMI and 2) level of BMI. The study has been carried out in 71 SMEs in Slovenia, engaged with BMI, in the years 2016 and 2017.

The remaining of the paper is organized as follows. First, we present a literature review that led towards the formulation of hypotheses. Next, the research methodology is presented, which is followed by the presentation of research results. Finally, discussion and conclusion are presented.

2 Literature review and hypotheses

In general, BM refers to a representation of firm's logic to create, distribute and capture value for its stakeholders (Bouwman, Zhengjia, Duin, & Limonard, 2008; Chesbrough & Rosenbloom, 2002). In this paper, we define BM as a description of how an enterprise or network of enterprises intends to create and capture value for both, (networked) enterprises and the customers (Bouwman, Vos, & Haaker, 2008). The BMI is defined as the activity-based perspective of BM, resulting in a change in an enterprise's BM that is new to the world or just new to the enterprises under analysis (Christoph Zott & Amit, 2010).

2.1 External and internal drivers

Drivers influencing BMI have been discussed in several studies. According to Foss & Saebi (2017) and Andreini & Bettinelli (2017), drivers of the BMI can be internal as well as external.

Among the external drivers, environment and technology were investigated several times in recent studies. Environment, consisting of competitive intensity (Jaworski & Kohli, 1993) and market turbulence (Jaworski & Kohli, 1993) was identified as an important component that drives BMI. Furthermore, rapid

development of technology in recent years has also been identified to have a profound impact on business. For example, Bouwman et al. (2018) pointed out that technology turbulence has a direct impact on BMI, which influences the overall performance.

Innovation is an organizational driver that defines enterprises' ability or capacity to introduce new processes or new products/services in the enterprise (Hult, Hurley, & Knight, 2004). A positive relationship between innovation activity and BMI was already indicated by Bouwman et al. (2018).

2.2 Level of BMI

Several authors have provided different BM ontologies e.g. BM Canvas (Osterwalder & Pigneur, 2010), STOF (Bouwman, Faber, Haaker, Kijl, & De Reuver, 2008), and VISOR (El Sawy & Pereira, 2013) to name a few. The most widely known BM ontology is the BM canvas (Osterwalder & Pigneur, 2010). This ontology consists of nine building blocks, including value proposition, key partners, key resources, key activities, customer relationship, communication and distribution channels, customer segmentation, revenue streams, and cost structure. These components or at least some of them have been studied many times in the different contexts of BMI (Haaker, Bouwman, Janssen, & de Reuver, 2017; Hartmann, Zaki, Feldmann, & Neely, 2016). Some of the results have shown that BMI causes changes in BM components (e.g. Lambert & Davidson, 2013; C. Zott, Amit, & Massa, 2011).

Level of BMI has been measured in various ways. For instance, Clauss (2017) provided a hierarchical tree-level scale for measuring BMI. Another valuable conceptualisation is provided by Foss & Saebi (2017), who considered two different perspectives of BMI: scope and novelty. The scope dimension is characterized by architectural and modular changes of BM while novelty dimension describes BM changes as novel to an enterprise or an industry. The novelty dimension seems to play an important role as the existing literature on BMI argue that enterprises can become successful by introducing new business models (Teece, 2010; Christoph Zott & Amit, 2007).

2.3 SMEs and size

SMEs play a major role in the European economy and operate in almost every industry sector. There are different definitions of SMEs. According to OECD (2005), SMEs are non-subsidiary, independent enterprises which employ up to 250 employees in the European Union. In other countries like Australia threshold is at 200 employees, while the United States threshold is 500 employees (OECD, 2005). Besides the number of employees, annual sales turnover, and balance sheet total are commonly used to distinguish SMEs and large enterprises (Ayyagari, Beck, & Demirguc-Kunt, 2007). For instance, according to the European Commission, SMEs are defined by a number of employees and/or turnover or balance sheet total (million €). While the turnover or balance sheet total criteria are frequently treated as confidential by enterprises this can result in misleading classification (Grandon & Pearson, 2004). Therefore, this study will define SMEs as an enterprise with fewer than 250 persons employed.

Enterprise size has long been considered as one of the most important influential variables (Chelliah, Pandian, Sulaiman, & Munusamy, 2010) as it reflects the different characteristics and capabilities of enterprises. In recent studies, size was usually used as an independent variable (e.g. Shefer & Frenkel, (2005)) or as variable that moderates the relationship between different constructs (e.g. Leal-Rodríguez, Eldridge, Roldán, Leal-Millán, & Ortega-Gutiérrez, (2015); Uhlaner, van Stel, Duplat, & Zhou, (2013)).

2.4 Hypotheses

External drivers, such as technological development (Henry Chesbrough, 2010) or competitive imitation (Casadesus-Masanell & Zhu, 2013), have an effect on BMI. This external conditions may provide extra challenges for micro-enterprises, which do not have as many resources as small and medium-sized enterprises. Following the logic of the size differences, the following hypotheses were formulated:

H1: There are significant differences in opinion about the importance of environment as a BMI driver according to the SMEs size.

H2: There are significant differences in opinion about the importance of technology as a BMI driver according to the SMEs size.

Innovation is another driver that has been identified to have an effect on the level of BMI (Bouwman et al., 2018). Larger enterprises are likely to have more available human resources, which results in a greater management capacity, while in smaller enterprises the owners/managers have more influence on the staff which enables enterprises to react to the market demands faster (Uhlaner et al., 2013). Following that logic, the following hypothesis was formulated:

> *H3: There are significant differences in opinion about the importance of innovation as a BMI driver according to the SMEs size.*

Internal and external BM drivers are constantly changing, resulting in either incremental or radical changes (Bucherer, Eisert, & Gassmann, 2012). There are mixed result regarding how the enterprise size effects radical and incremental innovation (Forés & Camisón, 2016). Nevertheless, the majority of research (e.g. Forsman & Annala, (2011); Laforet, (2013)) state that there are differences between enterprises of different sizes. Following the logic of the size differences, the following hypothesis was formulated:

> *H4: There are significant differences in opinion about the importance of BMI level according to the SMEs size.*

3 Methodology

The empirical data for this paper were collected by a questionnaire in the scope of Horizon 2020 ENVISION project. The questionnaire consisted of several questions regarding BM and BMI, including BMI drivers, type of innovations, changes of BM, methods, and tools used for BM, and BMI outcomes. Data were collected through a professional research agency based in the Netherlands. The survey has been conducted in 11 countries (Netherlands, France, Finland, Austria, Italy, Lithuania, Poland, Portugal, Slovenia, Spain, Sweden). The SMEs were randomly selected from the Dun and Bradstreet database that collects data on enterprises on a regular basis from Chambers of commerce and other organizations. Respondents were collected in 2016 and 2017 from owners or managers who are involved in BMI, innovation or business development. A seven-point Likert-type scale (1 = totally disagree, 7 = totally agree) was used to measure the enterprise's level of agreement with a given statement. Every surveyed enterprise was categorized according to a number of employees into

one of the following categories: micro enterprises (1 – 10 employees), small enterprises (11 - 50) and medium enterprises (51 to 249 employees).

In this paper, only the data from SMEs in Slovenia that were already engaged in BMI were considered. 71 valid responses were utilized for the statistical analysis using SPSS software. Based on the initial research model proposed by Marolt, Lenart, Kljajić Borštnar, Vidmar, & Pucihar (2018) we calculated means for all components of model variables to form constructs for further analysis of differences among groups of different size SMEs by using one way ANOVA analysis with Tukey post hoc test. All statistical tests were calculated with .05 confidence interval for statistically significant differences.

4 Results

In total 71 valid responses from SMEs in Slovenia were analysed, from which 28 were micro enterprises, 26 small enterprises, and 17 medium enterprises. The basic descriptive statistics are presented in Table 1 and Table 2.

Table 1: Descriptive statistics of model components by the enterprise size

	Micro (N=28)		Small (N=26)		Medium(N=17)	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Environment						
Competitors offer similar products/services	3.68	2.038	3.58	1.880	4.76	1.562
Competitor's reactions to your enterprise initiatives	3.32	1.806	4.00	1.575	4.76	1.888
Frequently changing customer preferences	3.29	1.941	3.69	1.668	4.35	1.539
Technology						
Rapid changing technology	3.64	1.890	4.04	1.637	4.47	1.546
Rapid increasing technological development	3.82	1.945	3.73	1.458	4.47	1.281
Innovation						
Corporate culture is focused on constant innovation	4.61	1.750	4.69	1.644	4.82	1.131
Enterprise aims to create multiple innovations annually	4.11	2.025	4.04	1.732	4.94	1.345
Enterprise introduce innovations that are completely new to the market	3.36	2.094	2.38	1.388	4.47	1.463
Creating more than one innovation at the same time is common practice in enterprise	3.11	1.771	3.38	1.941	4.06	1.435
Enterprise is one of the first to introduce innovations	2.79	1.853	2.96	1.755	4.12	1.833
Level of BMI						
Enterprise made changes in your business model that were new to their industry	2.96	1.953	2.85	1.461	4.88	1.616

Enterprise made changes in your business model that have never been implemented by competitors before	2.21	1.686	2.12	1.862	3.12	1.453
Enterprise made changes in your business model that cannot be found in their industry	2.75	1.818	3.73	2.308	3.76	1.640

Table 2: Descriptive statistics of model variables by the enterprise size

		N	Mean	Std. Dev.	Std. Error
Environment	Micro	28	3.43	1.512	0.286
	Small	26	3.76	1.291	0.253
	Medium	17	4.63	1.269	0.308
	Total	71	3.84	1.437	0.171
Technology	Micro	28	3.73	1.853	0.350
	Small	26	3.88	1.451	0.285
	Medium	17	4.47	1.293	0.314
	Total	71	3.96	1.595	0.189
Innovation	Micro	28	3.59	1.502	0.284
	Small	26	3.49	1.137	0.223
	Medium	17	4.48	1.003	0.243
	Total	71	3.77	1.314	0.156
Level of BMI	Micro	28	2.64	1.463	0.276
	Small	26	2.90	1.546	0.303
	Medium	17	3.92	1.239	0.301
	Total	71	3.04	1.513	0.180

Results in Figure 1 show that medium-sized enterprises have generally higher positive opinion on all examined model variables. Furthermore, the examined variables do not substantially differ between micro and small enterprises.

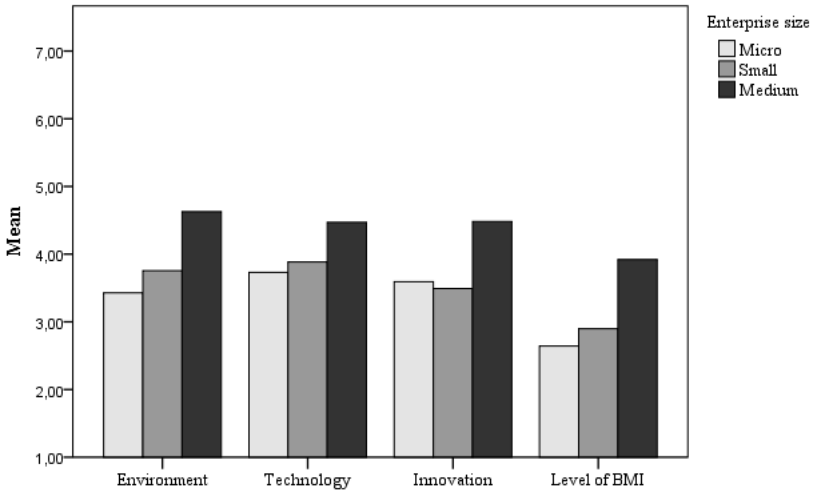

Figure 7: Average mean value of variables by the enterprise size

A one-way ANOVA was conducted to identify the differences in opinions of the enterprises of different sizes on analysed BMI drivers and level of BMI. The results showed that there are significant differences in opinions between enterprises of different sizes on the environment as BMI driver at the $p<0.05$ level [$F(2.68) =4.069$, $p =0.021$]. Furthermore, results showed that there are also significant differences in opinion of enterprises of different size on innovation as BMI driver at the $p<0.05$ level [$F(2.68) =3.579$, $p =0.033$] and on the level of BMI at the $p<0.05$ level [$F(2.68) =4.346$, $p =0.170$].

The results have supported three out of four hypotheses:

H1: There are significant differences in opinion about the importance of environment as a BMI driver according to the SMEs size – supported.
H2: There are significant differences in opinion about the importance of technology as a BMI driver according to the SMEs size. – not supported.
H3: There are significant differences in opinion about the importance of innovation as a BMI driver according to the SMEs size – supported.
H4: There are significant differences in opinion about the importance of BMI level according to the SMEs size – supported.

Furthermore, differences in opinion of enterprises of different sizes were analysed with Tukey post hoc test. Results are presented in Table 3.

The Tukey test indicated that the mean value of the importance of environment as BMI driver for micro enterprises (M = 3.43, SD = 1.512) was significantly lower than in medium-sized enterprises (M = 4.63, SD =1.269). However, the mean value of the importance of environment as a BMI driver in small enterprises (M = 3.76, SD = 1.291) did not significantly differ from the micro or medium enterprises.

Table 3: Post hoc Tukey HSD analysis of differences between enterprise size

Model Variable	(I) Company size	(J) Company size	(I-J) Mean Diff.	Std. Error	Sig.
Environment	Micro	Small	-0.33	0.375	0.659
		Medium	-1.19*	0.424	0.017
	Small	Micro	0.33	0.375	0.659
		Medium	-0.87	0.430	0.114
	Medium	Micro	1.19*	0.424	0.017
		Small	0.87	0.430	0.114
Technology	Micro	Small	-0.15	0.433	0.934
		Medium	-0.74	0.489	0.293
	Small	Micro	0.15	0.433	0.934
		Medium	-0.59	0.496	0.469
	Medium	Micro	0.74	0.489	0.293
		Small	0.59	0.496	0.469
Innovation	Micro	Small	0.10	0.345	0.954
		Medium	-0.89	0.390	0.065
	Small	Micro	-0.10	0.345	0.954
		Medium	-.99*	0.396	0.039
	Medium	Micro	0.89	0.390	0.065
		Small	.99*	0.396	0.039
Level of BMI	Micro	Small	-0.25	0.394	0.795
		Medium	-1.28*	0.444	0.015
	Small	Micro	0.25	0.394	0.795
		Medium	-1.02	0.451	0.067
	Medium	Micro	1.28*	0.444	0.015
		Small	1.02	0.451	0.067

The mean value of the importance of technology as a BMI driver did not significantly differ among groups of enterprises. Furthermore, the mean value of importance of innovation as BMI driver for small enterprises (M = 3.49, SD =

1.137) was significantly lower than in medium-sized enterprises (M = 4.48, SD =1.003). However, the innovation as BMI driver in micro enterprises (M = 3.59, SD = 1.502) did not significantly differ from small or medium enterprises. Largest differences for all examined model variables were revealed by comparing opinions about the level of BMI in micro enterprises (M = 2.64, SD = 1.463) against medium-sized enterprises (M = 3.92, SD =1.239).

5 Discussion and conclusions

The results of our study show that there are significant differences in opinions of enterprises of different sizes about the drivers for BMI and level of BMI. In average medium-sized enterprises estimate the importance of environmental, technological and innovation drivers for BMI as more important than small and micro-enterprises.

Significant differences were found in opinions of micro and medium-sized enterprises for environmental drivers and between small and medium-sized enterprises for innovation drivers. Medium sized enterprises perceive environment factors as more important (4.63) compared to micro enterprises (3.43). As SMEs are dependent on inter-organizational relationships (Brunswicker & Vanhaverbeke, 2015) we can emphasize that smaller enterprises are more dependent on their value networks and as such has fewer needs and possibilities to experiment with BMI. Results have shown that medium-sized enterprises perceive innovation factors as more important (4.48) compared to small enterprises (3.49). These results are aligned with expectations. Smaller enterprises in most cases have less available resources to focus on additional activities besides their core business, which is also the case of BMI activities. Concerning the level of BMI, there were significant differences in opinions of micro enterprises (2.64) compared to medium-sized enterprises (3.90). These results are also related to limited capabilities and resources to support BMI activities in micro and small enterprises. It is interesting that there were no significant differences in opinions found for the technology driver, although medium-sized enterprises estimate technology as a more important driver (4.47) compared to small (3.88) and micro enterprises (3.73). However, although technology has an important role in BMI activities as enabler and supporter, without a proper strategy, systematic approaches, appropriate methods and tools used, there will be no significant results.

Although the study has confirmed the significant impact of enterprises size on the importance of environment and innovation BMI drivers and BMI level, it also has its limitations, which suggest directions for further research. For a better understanding of the impact of enterprise size on BMI drivers, further analysis should be done on the level of individual factors. Since only 71 enterprises with previous BMI experiences were included, further research should obtain larger data sets to obtain more reliable results with greater precision. Furthermore, it would also be interesting to combine the study with in-depth interviews, which would offer more understandings of BMI practices in successful SMEs.

Acknowledgments

The work leading to these results has received funding from the European Community's Horizon 2020 Program (2014-2020) under grant agreement 645791.

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