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## Article

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## Proposal and Simulation of a Business Process Model of Strategic Management in E-commerce<sup>1</sup>

Veronika SVATOŠOVÁ\*

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### Abstract

*This paper focuses on evaluating the importance of strategic management in the long-term development of SMEs primarily trading electronically. The main output is to propose a business process model of strategic management that could strengthen the existing strategic position of SMEs with a focus on e-commerce. The main purpose is fulfilled through a research study conducted in several phases between the selected sample of enterprises primarily oriented on e-commerce. The empirical research methods are used: methods of personal interviewing, financial analysis, situational analysis, case studies, methods of statistical induction and descriptive statistics, modelling, and simulation. The process model is then simulated and verified in practice on the selected enterprise within a help of Vensim software. The contribution of the paper is based on the procedure for the creation and implementation of the strategic management of SMEs primarily oriented on e-commerce, which could strengthen their existing strategic position and whose validity is verified in practice.*

**Keywords:** e-commerce, strategic management, business process model, the program Vensim, small and medium-sized enterprises

**JEL Classification:** M00, M10

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### Introduction

The area of SME is emerging and gaining popularity with its increasing importance across the whole spectrum of business and the economy (Cravo, Becker and Gourūay, 2015). These firms are more likely to be affected by financing

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constraints than large, listed firms (Lamont, Polk and Saá-Requejo, 2001). The research (Andries et al., 2016) has revealed that credit supply factors played the most important role in credit availability to small firms. According to Durgulu et al. (2016), SMEs are increasingly compelled to develop strategies to increase their effectiveness and sustainability, to gain financial and performance goals. SMEs primarily focused on e-commerce reflect the same characteristics as the general level of small and medium-sized enterprises (Kunešová and Eger, 2017). These enterprises are exciting as many are highly entrepreneurial and are often involved in exploiting new innovations (Anvari and Norouzi, 2016).

SMEs in e-commerce do not typically have a specific strategy defined for e-commerce and lack a conceptual and strategic approach to business development in the virtual environment (Grandon and Pearson, 2004; Grandon, Nasco and Mykytyn, 2011). E-commerce has been expanded in the short term, and new e-commerce businesses are emerging as well (Tu, 2016). SMEs are known to face a much easier market failure than large enterprises in obtaining and processing the information needed to define their goals and strategies (Broome, 2016; Zhang, 2016). SME managers have realized that e-commerce allows them to bring innovations to the market and to increase their competitive advantage more effectively (Villa et al., 2018). There are three barriers to the development of e-commerce in SME: high IT costs, a lack of financial resources and limited technical knowledge in enterprises (Choshin and Ghaffari, 2017). E-commerce will not succeed if people lack the required knowledge, fail to understand IT and e-commerce and lack the necessary standards, ideas and labels (Leung et al., 2018).

The paper focuses on the modelling of strategic management process for SMEs in e-commerce. However, no previous research has addressed a comprehensive form of modeling the strategic management process in e-commerce. Modelling and simulation of such proposed process business model is therefore unique and original in the area examined and therefore it cannot be compared to the other similar models in e-commerce. The paper therefore aimed to fill this research gap in the field of e-commerce. The further theoretical background therefore focuses on the determinants and aspects of strategy and strategic management among SMEs in e-commerce that have been served as the basis for process business model of strategic management in e-commerce.

## 1. Theoretical Background

The research in the field of SMEs (Šebestová and Nowáková, 2013) shows that the success of SMEs depends more on business policy than on external pressures and factors affecting them.

The research (Skokan, Pawliczek and Piszczur, 2013) performed among 677 SMEs from the Czech Republic and Slovakia confirmed that bigger enterprises pay more attention to strategic management and more often have elaborated a full, detailed strategy (strategic document). Aragón-Correa et al. (2008) confirmed the existence of a direct and positive relationship between financial performance and environmental strategies concerned with the development of preventive and innovative practices and eco-efficient practices. Strategy in an SME is defined as a set of (Burke and Jarratt, 2004): *planned activities being carried out to achieve stated objectives, resources and capabilities being deployed to put strategic decisions into action, markets being entered, as well as environments providing signals filtered through personal and entrepreneurial networks*. E-commerce offers a diversity of decision-making that leads to strategic approaches (from web design, understanding of online customer behavior to brand building and strategic market positioning) (Roztocki and Weistroffer, 2015).

An e-commerce strategy (or e-strategy) is not only for online businesses. An e-commerce strategy and planning include the following: *e-risk management and planning of unforeseen events; web technologies, applications, infrastructure, security, resources and budget; website content – information architecture, customer experience, design, branding and marketing; marketing planning and budgeting; e-commerce planning (if applicable); a change management strategy* (Hernández, Jiménez and Martín, 2009; Yoon and Chae, 2009; Raisinghani, Meade and Schkade, 2007; Nadeem et al., 2018; Leung et al., 2018). An e-commerce strategy is an important part of strategic management, consisting of the research, review, evaluation and selection efforts needed to plan the strategy; strategic management therefore means introducing any measures within the organization to implement these strategies and all work-related activities, including the e-commerce strategy (Halici and Erhan, 2013). Each company should determine its e-commerce strategy, concepts, principles, and development plans, considering the characteristics of its products and the business environment (Chen, Pan and Ouyang, 2014). E-strategy influences the traditional marketing mix as well, as the product can also be expanded online in addition to on the purchase site, not to mention the price of websites, online promotions and people who serve websites and so on (Chaffey and Smith, 2013; Ballestar, Grau-Carles and Sainz, 2018). A successful strategy must be clear and unambiguously formulated; it must be constantly explained to all stakeholders and be able to flexibly respond to market changes (Anvari and Norouzi, 2016; Kunešová and Eger, 2017; Marković, Čavoški and Novović, 2016).

A prerequisite for a successful e-commerce strategy is an effective process of strategic management in e-commerce (Angelovska and Ivanovska, 2009; Chen,

Pan and Ouyang, 2014; Damanpour and Damanpour, 2001). However, no comprehensive studies address the strategic management process in e-commerce. An important aspect of an effective strategic management process, not only in e-commerce, is the identification of determinants that affect the entire process. Some sources mention external and internal determinants that affect the e-commerce process, including organizational, environmental, technological and personnel (Chouhan, 2017; Di Fatta, Patton and Viglia, 2018; Choshin and Ghaffari, 2017). The success of e-commerce depends also on the determinants related to the process of strategic management, such as proper identification of mission and vision, strategic analysis and planning, implementation and control. Determinants of strategic development are crucial in the effective and successful process of strategic management in e-commerce (Eid, 2011; Jedrzejczak-Gas, Barska and Sinicakova, 2019; Ke and Sun, 2015). Nevertheless, in practice, the minor impact is given them in this process of strategic management. Some sources mention external and internal determinants that affect the e-commerce process, including organizational, environmental, technological and personnel determinants (Halici and Erhan, 2013; Ji, Xu and Sun, 2016).

Other related management activities in e-commerce, especially among e-commerce SMEs, are underestimated (Yanes-Estévez, García-Pérez and Oreja-Rodríguez, 2018; Rahayu and Day, 2015; Ocloo et al., 2020). Only limited large businesses defined the strategy and consider it as important. E-commerce businesses prioritize online activities, offline activities are underrated (Lee and Park, 2009; Long, 2017; Doern and Fey, 2006). Surprisingly, most researches focus on businesses outside the area of e-commerce, the importance of strategy, strategic process and related aspects are not deeply investigated. Therefore, based on the previous literary research, it is important to deal with the issue of importance of strategic development in e-commerce.

## 2. Material and Methods

The main aim the research is to propose a business process model of strategic management for enterprises primarily oriented on e-commerce taking into account the determinants of strategic development, the determinants of online shopping behavior and the current financial strategy that, based on the determinants, identifies the current strategy in e-commerce market. The business process model is based on a research survey, which is divided into five research parts:

1. *Evaluation of the importance of strategy and strategic management attributed to enterprises primarily oriented on e-commerce.* The research survey evaluating the importance of strategy and strategic management in e-commerce

is realized using the method of personal questioning in the form of a questionnaire survey and semi-structured interviews with managers or owners of enterprises primarily oriented on e-commerce.

2. *Identification and evaluation of the importance of determinants of online shopping behavior in strategic management in e-commerce.* This partial goal is fulfilled by evaluating the development of the shopping behavior of online customers shopping in e-shops in the Czech Republic that affect the environment of Czech e-commerce.

3. *Evaluation of the financial situation and financial strategy of enterprises primarily oriented on e-commerce* in 2017 compared to 2012 and the development of a dynamic model of financial strategy of enterprises primarily oriented on e-commerce. To achieve this goal, methods of financial analysis are used.

4. *Creation of a business process model of strategic management for enterprises primarily oriented on e-commerce using the program Vensim.* The method of systematic dynamics was used including selected methods of statistical induction, i.e. Spearman correlation index for proposing this model.

5. *Simulation of the business process model of strategic management in e-commerce and the verification of its validity in practice* (in the form of a case study on the example of a selected enterprise primarily oriented on e-commerce in Vensim).

Data collection and analysis took place mainly during 2019. All models are modeled and then simulated using Vensim that is an interactive software environment that enables the development, exploration, analysis and optimization of simulation models. The program would be designed to enhance the capabilities and productivity of model makers; the program has functionality that improves the quality and understanding of models (Eberlein and Peterson, 1992).

The business model should describe how a business creates and delivers real economic and social value. It is a tool that allows the executive team to experiment with different ideas and scenarios and predict output in a safe, low-risk environment (DaSilva and Trkman, 2014; Baden-Fuller and Morgan, 2010; Wirtz et al., 2016; Cosadesus-Masanell and Ricart, 2010; Prashant, 2009; Richard et al., 2010).

### **3. Research Sample**

A research sample of enterprises was identified according to the following criteria: Enterprises belonging to the category: 1. *SMEs primarily focused on e-commerce* (with affiliated stone shops); 2. SMEs are then compared to large enterprises; 3. Enterprises that *trade mainly through websites*; 4. Enterprises

selling predominantly on the *B2C market*. Enterprises *offering physical products*; 5. Registered main seat *in the Czech Republic*; 6. Legal form of business: *Joint Stock Company, Limited Liability Company*; 7. Existence of the enterprise on the market – at least 7 years (i.e. established in 2011 and earlier); 8. A prerequisite is the *trustworthiness and reliability* of the enterprise (membership in the Association for Electronic Commerce or certification of a customer-verified award by *Heuréka.cz*); 9. Enterprises that have at least *one or more full-featured e-shop*. Studying the environment of Czech e-commerce has shown there is no comprehensive database of enterprises primarily focused on e-commerce. Therefore, the database was created on the basis of the restrictive criteria defined above. Each individual enterprise was searched for on the basis of the following main sources: *List of Members of the Association for Electronic Commerce, Basic data from the Commercial Register, Data from the Administrative Register of Economic Subjects*. Based on the above-mentioned restrictive criteria, the research frame of enterprises consists of 367 enterprises. An electronic questionnaire was sent to them after a phone call. Due to the sensitivity of the data, anonymity was ensured for the enterprises. The research sample consists of 209 enterprises that responded to all inquiries in the questionnaire survey, 177 of them belong to the category of SME. The return of questionnaires was therefore 56.9%. According to Raosoft (2019) at a 95% confidence level and 5% error tolerance, a representative sample of 188 respondents is recommended, 173 for SME category. The representativeness of the research sample is therefore ensured.

#### 4. Results and Discussion

Lam and Harrison-Walker (2003) report that fifty models were developed to deal with strategic and decision-making processes for e-commerce ten years ago. Kao and Decou (2003), in their strategic management process in an e-commerce model, highlight the main dimensions that influence the design and implementation of an e-strategy: *finance, marketing, legislation, logistics, technology, and security for operational processes*.

Chang and Graham (2012) summarize the key critical success factors that affect strategic e-commerce projects: providing quality information, a well-formulated plan, stakeholder acceptance, suitable staff, internal communication, and interactive feedback. Power (2005) highlights the importance of resources (material, information, staff, capital) that are necessary to create a successful e-commerce strategy and easy orientation in the virtual business environment. Because of the specific determinants of strategic development and other specificities that arise from the virtual environment, phases and aspects of strategic management

are identified for e-commerce (di Fatta, Patton and Viglia, 2018). Pun (2005) give examples of proactive and reactive strategies: *horizontal and vertical integration, technology import, joint venture, market development, new business development, new product development, product differentiation and modification, selected investments, employee training and education, and research and development*.

Hutchinson (2001) talks about the positive forces (determinants) that positively influence the effectiveness of the company's strategic activities. These are divided into a group of internal, external, process and content determinants. By combining the findings from the research survey, a business process model of strategic management in e-commerce is proposed that is subsequently simulated and verified in practice. The following chapter presents the basis for creating a business process model of this research.

#### **4.1. Weights of Individual Phases for Building a Business Model and Input Formulas**

The basic design of the business process model of strategic management in e-commerce is based on the results of a questionnaire survey, in which the research sample of enterprises assesses the importance of determinants of individual phases of strategic management in e-commerce on a scale of 1 – 5 (1 – the least important for strategic management in e-commerce, 5 – the most important for strategic development in e-commerce). The determinants of the individual phases of strategic management form the basis for the construction of the business process model in Vensim. Based on the Spearman correlation coefficient calculated in software Statistica, the degree of correlation of individual determinants of the phases of strategic management and strategic development, online shopping behavior in e-commerce, i.e. the average evaluation of these importance. Using the correlation coefficients, weights of individual determinants were determined for each phase of strategic management in e-commerce (details of calculated weights are given in formulas in Table 2).

Table 1, shows the correlation matrix of the average evaluation of the importance of input determinants from previous parts of the research (financial strategy, internal determinants of strategic development, external determinants of strategic development, general aspects of strategic management and determinants of online purchasing behavior). The importance of individual determinants for strategic development in e-commerce is evaluated in a questionnaire survey by surveyed enterprises on a scale of 1 – 5 (1 – least important, 5 – most important). The correlation matrix gives a measure of the relationship that affects the whole process of strategic management in e-commerce.



Table 1

**Correlation Matrix of Input Determinants and Phases of Strategic Management**

Variable	Correlation (Determinants of strategic development) The marked correlations are significant at the sign. level of $p < 0.05000$ N = 208 (complete cases omitted in ChD)				
	Analyzing	Strategy preparation and formulation	Planning	Implementation	Control
Internal determinants of strategic development	<b>0.795748</b>	<b>0.506881</b>	<b>0.379632</b>	0.132387	<b>0.404170</b>
External determinants of strategic development	<b>0.751161</b>	<b>0.375466</b>	<b>0.220599</b>	0.096756	<b>0.159251</b>
General aspects of strategic management	<b>0.715733</b>	<b>0.467171</b>	<b>0.316223</b>	-0.088310	<b>0.517590</b>
Determinants of online shopping behavior (quality)	<b>0.530316</b>	<b>0.481184</b>	<b>0.457917</b>	<b>0.257265</b>	<b>0.160801</b>
Financial strategy (evaluation)	0.074327	<b>0.158267</b>	<b>0.170891</b>	<b>0.171450</b>	0.068547
Any phase of strategic management	<b>0.350551</b>	<b>0.381377</b>	<b>0.482035</b>	<b>0.167001</b>	<b>0.057019</b>

Source: Own processing (in Statistica).

**4.2. Description of Proposing a Business Process Model**

Based on the literature review and the results of the research, a business process model of strategic management in e-commerce is proposed, which will enable identifying the current strategy in e-commerce based on the selected criteria. The business process model is based on the following variables: *identified determinants of individual phases of strategic management in e-commerce, complemented by determinants of strategic development in e-commerce, then model is supplemented with determinants of online shopping behavior and also considers the current financial situation and position by identifying the current financial strategy in e-commerce*. The following Figure 1 shows the basic design of the business process model of strategic management in e-commerce in Vensim. The main line of the model is based on the main phases of strategic management in e-commerce, i.e. analyzing, strategy preparation and formulation, planning, implementation and control. Identified determinants of individual phases of strategic management in e-commerce enter these individual phases. Based on an evaluation of the correlation rate using a correlation matrix (see Table 1), the model also enters the identified determinants. The business process model is also expressed using mathematical formulas based on which the model was modelled (see Table 3 in the appendix). The determinants defined in the model is scored on a scale of 1 – 5 (hint: 1 – the lowest rating, i.e. the worst quality of the variable for the monitored enterprise, 5 – the highest evaluation, i.e. the highest quality of the variable for the monitored enterprise). While weights of individual determinants

were identified based on the calculation of the Spearman correlation coefficient, the score of individual variables is evaluated based on the partially subjective assessment of the evaluator. Reducing the level of subjective evaluation can be achieved by selecting an independent and unbiased evaluator. For each evaluation of the phase of strategic management (analyzing, strategy preparation and formulation, planning, implementation, control) in the model, a score was identified and a strategic approach at each point interval. The score was identified based on a gradual substitution of the score on the scale 1 – 5 for each variable and a summary. The result of the model is the output, which is evaluated as a weighted arithmetic mean of the final score of individual phases of strategic management in e-commerce. Based on the resulting scoring of the model, a specific strategy in e-commerce is identified. Everything is described in more detail in Table 2. Subsequently, strategic approaches are chosen: crisis (rescue) strategy, conservative (stabilization) strategy, balanced (retention) strategy and aggressive (development) strategy.

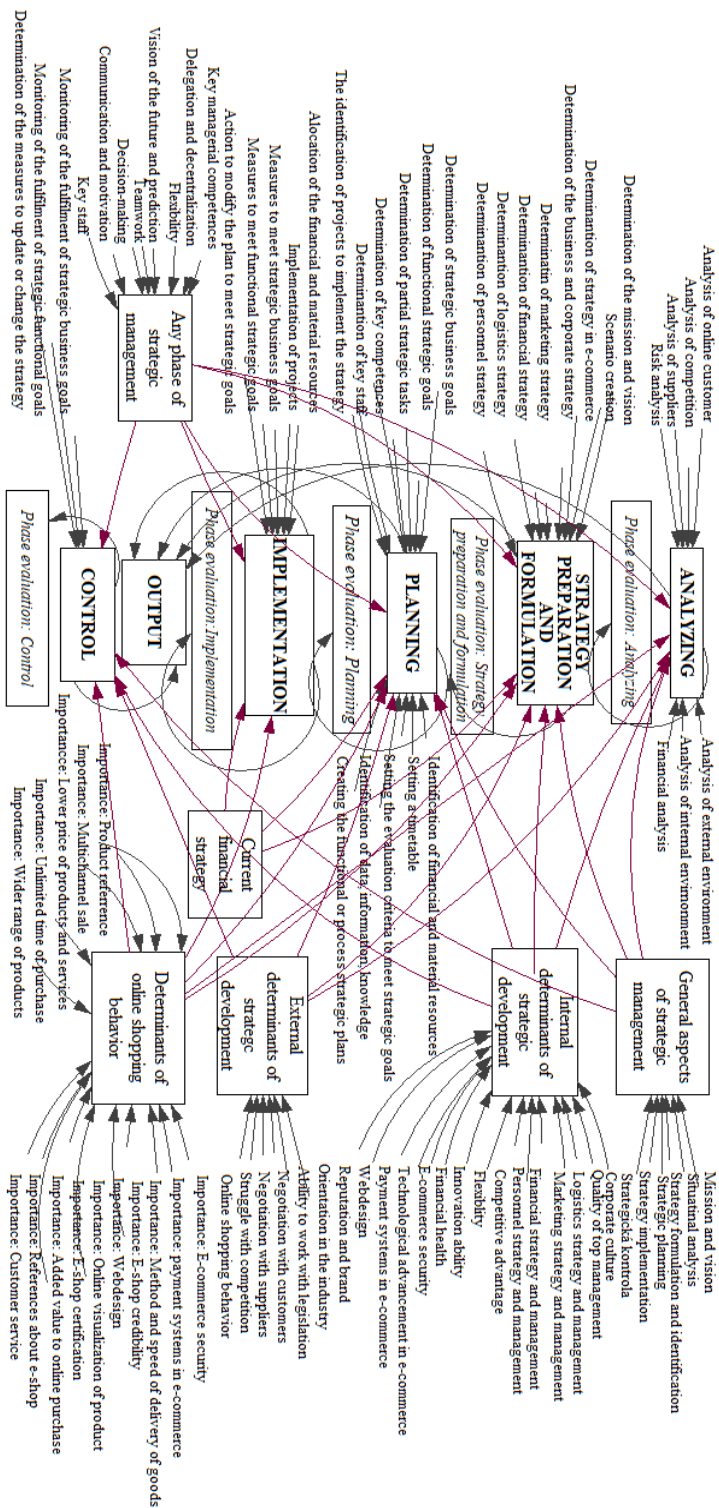
Table 2

**Strategic Approach and Type of Strategy: Model Evaluation**

<b>Point evaluation: Model output (m)</b>	<b>Strategic approach: Model output</b>	<b>Type of strategy in e-commerce</b>	<b>Description of the type of strategy in e-commerce</b>
15 – 35	Crisis (1)	<b>Rescue</b>	The enterprise does not apply a comprehensive strategic approach, accompanied by low financial performance, the enterprise struggles with its own low competitive ability and the absence of identification of its own competitive advantage. The enterprise has to concentrate on survival in the market and overcoming the crisis period, identifying the biggest problem areas in strategic management and tools for their elimination.
36 – 55	Conservative (2)	<b>On stabilization</b>	The enterprise focuses on achieving a stable competitive position in the market, exploiting its unique competitive advantages and gaining a stable position in the market, the potential of growth of a loyal customer base. The enterprise should focus on optimizing the financing of its strategic objectives.
56 – 75	Balanced (3)	<b>On maintaining position, on quality</b>	The enterprise has achieved a stable competitive position, the enterprise has built a certain brand and reputation, a stable financial position, the enterprise focuses on strengthening its position, the number of loyal customers is no longer growing, a focus on quality and another approach to maintaining and increasing customer loyalty.
76 and more	Aggressive (4)	<b>On development</b>	The enterprise achieves market leadership and a unique and strong financial position, a strong brand and reputation. The strong position of the enterprise can be used for further development and expansion into other markets, further growth potential.

Source: Own processing.

Figure 1  
Proposal of a Business Process Model of Strategic Management in E-commerce



Source: Own processing (in the Veinsim).

#### 4.3. Dynamic Model Simulation (Verification of Business Process Model in Practice)

To simulate and verify the model in practice, the enterprise E, which participated in this research, was chosen. The reason for selecting this enterprise is the willingness of the management to engage in other research activities of this research study, their priority focus on the electronic market or the stable market position. The anonymity of this enterprise was ensured. The quality of the individual determinants is evaluated on a scale of 1 – 5 (1 – lowest quality, 5 – highest quality). The partial and final evaluation was consulted with the management of enterprise E. Enterprise E is one of the medium-sized enterprises that have been specializing in the electronic market since 2004 and is focused on selling a wide range of home and household products. The aim of the model is to verify whether the quality of the individual determinants in the model of strategic management in e-commerce corresponds to the current development-oriented strategy, as enterprise E itself declared. Enterprise E applies a conservative financial strategy with a score of 2.2, which is used as an input indicator of the model. In addition, the following input variable values were selected into the business process model for Enterprise E. Based on the results of critical analysis, a semi-structured interview and discussion of individual variables with top management, Table 4 lists assessments of the determinants in model. Table 5 shows the resulting evaluation of the business process model for enterprise E. Based on the results of the semi-structured interview, enterprise E is currently implementing a development-oriented strategy as it expands to a number of foreign markets (Hungary, Slovakia, Romania, Poland). However, the evaluation of the model (72.8769 points in total) shows that enterprise E should apply a strategy aimed at stabilizing market position and quality. The evaluation of all phases of strategic management, in addition to the Control phase, also reflects the focus strategy aimed at stabilizing market position and quality. The control phase is influenced by a high ranking of the determinants of strategic development and the quality of determinants of online shopping behavior.

Table 4

##### Model Evaluation for Enterprise E

Phases and determinants of strategic management in e-commerce	Evaluation of the phases and determinants of strategic management in e-commerce	Selected strategy based on model evaluation
Phase: Analyzing	80.7825	On maintaining position (3)
Phase: Strategy preparation and formulation	84.4841	On maintaining position (3)
Phase: Planning	87.2097	On maintaining position (3)
Phase: Implementation	36.4956	On maintaining position (3)
Phase: Control	75.4124	On development (4)
Model output	72.8769	On maintaining position (3)

Source: Own processing (in the Vensim).

Based on the proposed business process model for enterprise E, which identified that enterprise E should implement a strategy aimed at stabilizing the market position and quality, which does not correspond to a real development-oriented strategy, a dynamic business process model of strategic management in e-commerce for enterprise E was proposed, which identified problem areas, for more details see Table 5, which were rated by 1 or 2 points, and which proposes changes in these defined critical areas. Changes in the model have been set for the next 3 years (i.e. the shortest period when strategic changes usually take effect), i.e. each critical area (determinant) is improved by 1 point each year, i.e. by 3 points of overall improvement.

Table 5

### Changes in the Dynamic Business Process Model for Enterprise E

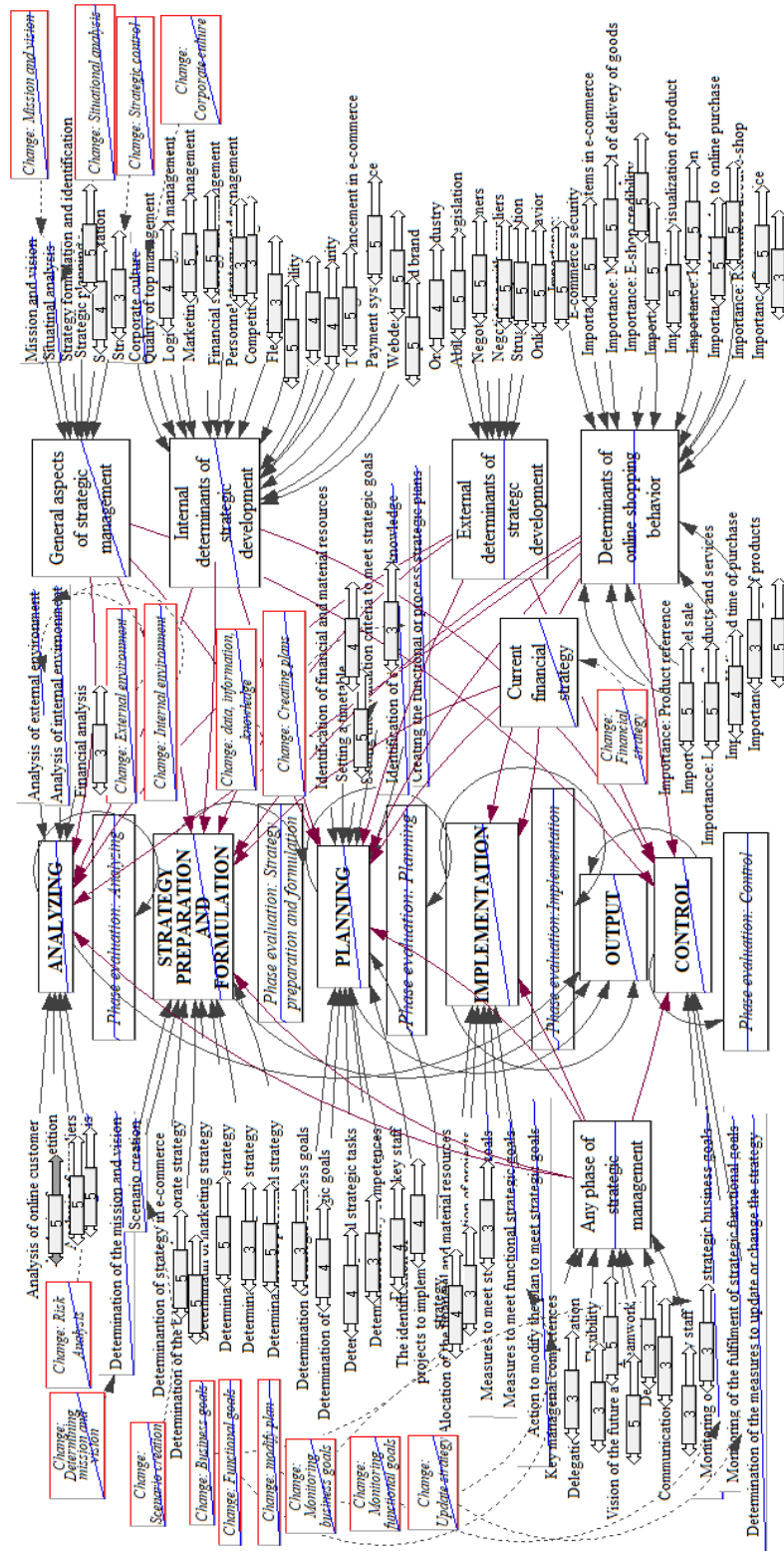
(determinants of strategic development in e-commerce)

Determinants of strategic development	Selected original points evaluation	Point evaluation after changes (in 3 years)
<b>General aspects of strategic management</b>		
Mission and vision	1	4
Situational analysis	1	4
Strategic control	2	5
<b>Internal factors of strategic development</b>		
Corporate culture	2	5
<b>Determinants of individual phases of strategic management with a focus on e-commerce</b>		
<b>Phases: Analyzing (Strategic analysis)</b>		
Risk analysis	2	5
Analysis of the external environment of e-commerce	2	5
Analysis of the internal e-commerce environment	1	4
<b>Phase: Strategy preparation and formulation</b>		
Mission and vision	1	4
Design and testing of strategic options (scenario creation)	1	4
<b>Phase: Planning</b>		
Identification of data, information and knowledge to achieve strategic goals	2	5
Creation of functional and process strategic plans	2	5
<b>Phase: Implementation</b>		
Monitoring, evaluation and measurement of the fulfilment of strategic corporate goals	2	5
Monitoring and evaluation of the fulfilment of functional strategic goals	1	4
Determination of the measures to update or change the strategy	1	4
<b>Phase: Control</b>		
Monitoring and measuring the fulfillment of corporate strategic goals	2	5
Monitoring and evaluation of the fulfillment of functional strategic goals	2	5
Establishing measures to update or change the strategy	2	5

Source: Own processing.

Figure 2

# Proposal of a Dynamic Process Model of Strategic Management in E-commerce for Enterprise E



*Source:* Own processing (in the Vensim).

The Figure 2 shows the results after the changes in the dynamic process model of strategic management in e-commerce for enterprise E. The following Table 6 shows the final evaluation of the dynamic model after the changes over three years. The change in e-commerce development-oriented strategy will take effect in the second year as well as in the other phases of strategic management (bold marked values indicate the moment when the strategy changes). The dynamic model also introduced a change in the financial conservative strategy, which initially scored from 2.2 points to 4 points (in 3 years), which changes the conservative financial strategy to an aggressive financial strategy and at the same time corresponds to the e-commerce development-oriented strategy. The change in the financial strategy assumes an improvement of 0.6 points per year (details see Svatošová, 2017).

Table 6  
Results of Modelling for Enterprise E

Phases and determinants of strategic management in e-commerce	Phase evaluation (without changes implemented)	Selected strategy	1st year after the implementation of changes	2nd year after the implementation of changes	3rd year after the implementation of changes	The resulting strategy after changes
<b>Phase: Analyzing</b>	80.7825	Maintaining the position (3)	<b>83.9316</b>	<b>87.0807</b>	<b>90.2298</b>	On development (4)
<b>Phase: Strategy preparation and formulation</b>	84.4841	Maintaining the position (3)	<b>87.67</b>	<b>90.8558</b>	<b>94.0417</b>	On development (4)
<b>Phase: Planning</b>	87.2097	Maintaining the position (3)	90.0361	<b>92.8624</b>	<b>95.6888</b>	On development (4)
<b>Phase: Implementation</b>	36.4956	Maintaining the position (3)	38.3678	40.2401	<b>42.1123</b>	On development (4)
<b>Phase: Control</b>	75.4124	On development (4)	<b>79.2532</b>	<b>83.0939</b>	<b>86.9347</b>	On development (4)
<b>Model output</b>	72.8769	Maintaining the position (3)	75.8517	<b>78.8266</b>	<b>81.8015</b>	On development (4)

Source: Own processing (in the Vensim).

## Conclusions and Limitations

Simulation and implementation of a dynamic model of strategic management in e-commerce has shown that the proposed business process model is applicable in practice and enterprises primarily oriented on e-commerce can use it to further strengthen their strategic position and further develop their e-commerce strategy. The research identified the strengths and weaknesses of the enterprises surveyed. The paper identified the common and distinctive features of small and medium-sized enterprises compared to large enterprises primarily focused on e-commerce,

including the importance of the process of strategic management for the further development of e-commerce. All these pieces of knowledge can be used by the surveyed enterprises in their strategic management, development and consolidation of their strategic position in e-commerce. Therefore, based on the results of the research, a comprehensive business process model of strategic management in e-commerce has been proposed, which can eliminate these shortcomings. The output of the model is the identification of a strategy in e-commerce, which should consider the strengths and weaknesses of the enterprise in the process of strategic management in e-commerce.

The business process model was subsequently simulated based on the example of the real medium-sized enterprise E, which typically represents a selected research sample of enterprises primarily. By simulating a real business example, the validity of the business process model was verified in practice. In the core business process model, critical areas were identified in enterprise E that have been eliminated by introducing a dynamic business process model of strategic management in e-commerce within a set timeframe of three years that enables enterprise E to implement a development-oriented e-commerce strategy reflecting the current needs and quality of the business processes. By proposing a dynamic business process model, it has been proven that this model can improve the economic results, strategy and strategic position of enterprises primarily oriented on e-commerce. The results of the dynamic business process model of strategic management in e-commerce in enterprise E were consulted with top management, which agreed on the identified critical areas as well as the possible practical implementation of the model in existing business processes. The results of the research may be applicable to other research activities in the area as well as in business practice and the application of pedagogical methods and techniques at universities. The main benefit of this paper is based on a unique proposal and simulation of process business model of strategic management in e-commerce, which have never been done before in other research activities. Other benefits are seen in theoretical and practical approach: this model is used in practice and serve as a methodology for systematic strategy proposal and strategy changing that could lead to better competitiveness in e-commerce. In theory, the new theoretical model has been created that drives for the proposal and implementation of optimal strategy in e-commerce based on the current quality and importance of determinants of strategic development, strategic management and online shopping behavior.

Although the paper offers a comprehensive and systematic overview of modelling the strategic management process in e-commerce, it is also necessary to take into account the limits of the research survey. The research survey was limited to



a selected group of enterprises primarily focused on e-commerce in the Czech Republic. It is possible that the results may differ in other countries, and therefore it is appropriate to compare the results achieved with other countries, for example in the European Union or even with other countries on other continents. The research survey focused only on legal entities and established enterprises with their own strategy in e-commerce, does not take into account start-ups and therefore it is desirable to focus in other research on other groups of enterprises in e-commerce. The paper primarily focused on a group of SMEs primarily focused on e-commerce in the B2C market. The results may be affected by these limitations, and therefore it is desirable to continue further research activities focused on the strategic management of e-commerce, which may refine and supplement the results obtained. With the dynamic development of e-commerce, the processes of strategic management in e-commerce are also developing, together with the development of other determinants of e-commerce, which are shaping new trends in e-commerce. It is therefore clear that the defined results and outputs must be gradually updated with the development of e-commerce, so it is necessary to intensify research activities in this area. The field of e-commerce influences and shapes not only the online market, but also all other markets, including the behavior of all participants in the online and offline market. It is therefore very likely that the dominant ratio of offline trading to online trading today will gradually reverse with the development of technology and society as a whole.

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## Appendix

Table 3

### Input Mathematic Formulas into a Business Process Model

#### Phase evaluation: Analyzing

$$a = 0.406926*a_1 + 0.500135*a_2 + 0.307178*a_3 + 0.334845*a_4 + 0.604947*a_5 + 0.390742*a_6 + 0.357655*a_7 + ap + ga + id + ed + on \quad (1)$$

Clue:

- a – Phase evaluation: Analyzing
- a1 – Online customer analysis
- a2 – Competition analysis
- a3 – Vendor analysis
- a4 – Risk analysis
- a5 – Environmental analysis
- a6 – Internal environment analysis
- a7 – Financial analysis
- ap – Any phase of strategic management
- ga – General aspects of strategic management
- id – Internal determinants of strategic development
- ed – External determinants of strategic development
- on – Determinants of online shopping behavior

Point evaluation of the phase: Analyzing (a)	20 – 40	41 – 60	61 – 80	81 – 105
Strategic approach of the phase: Analyzing	crisis (1)	conservative (2)	balanced (3)	aggressive (4)

#### Phase evaluation: Strategy preparation and formulation

$$s = 0.485857*s_1 + 0.281420*s_2 + 0.463150*s_3 + 0.349678*s_4 + 0.271554*s_5 + 0.325355*s_6 + 0.629805*s_7 + 0.403573*s_8 + jf + ap + ga + id + ed + on + fs \quad (2)$$

Clue:

- s – Phase evaluation: Strategy preparation and formulation
- s1 – Establishing the mission and vision
- s2 – Creating scenarios
- s3 – Determination of corporate and business strategy
- s4 – Determination of e-strategy
- s5 – Determination of marketing strategy
- s6 – Determination of logistics strategy
- s7 – Determining the financial strategy
- s8 – Determination of personnel strategy
- ap – Any phase of strategic management
- ga – General aspects of strategic management
- id – Internal determinants of strategic development
- ed – External determinants of strategic development
- on – Determinants of online shopping behavior
- fs – Current financial strategy

Point evaluation of the phase: Strategy preparation and formulation (s)	20 – 45	46 – 65	66 – 85	86 – 110
Strategic approach of the phase: Strategy preparation and formulation	crisis (1)	conservative (2)	balanced (3)	aggressive (4)

**Phase evaluation: Planning**

$$p = 0.424554*p_1 + 0.465272*p_2 + 0.330098*p_3 + 0.363041*p_4 + 0.300943*p_5 + 0.427672*p_6 + 0.519505*p_7 + 0.245162*p_8 + 0.202011*p_9 + 0.38658*p_{10} + 0.269134*p_{11} + ap + ga + id + ed + on + fs \quad (3)$$

*Clue:*

- p – Phase evaluation: Planning
- p1 – Setting strategic business goals
- p2 – Setting functional strategic goals
- p3 – Define partial strategic tasks
- p4 – Definition of key competencies
- p5 – Definition of key labor force
- p6 – Project identification for strategy implementation
- p7 – Identification of financial and material resources
- p8 – Establish a time schedule
- p9 – Determination of evaluation and measurement criteria
- p10 – Identification of data, knowledge, information
- p11 – Creation of functional and process strategic plans
- jk – Any phase of strategic management
- oa – General aspects of strategic management
- id – Internal determinants of strategic development
- ed – External determinants of strategic development
- on – Determinants of online shopping behavior
- fs – Current financial strategy

<b>Point evaluation of the phase: Planning (p)</b>	20 – 45	46 – 65	66 – 90	91 – 115
<b>Strategic approach of the phase: Planning</b>	crisis (1)	conservative (2)	balanced (3)	aggressive (4)

**Phase evaluation: Implementation**

$$i = 0.554742*i_1 + 0.394279*i_2 + 0.429366*i_3 + 0.420928*i_4 + 0.421948*i_5 + ap + on + fs \quad (4)$$

*Clue:*

- i – Phase Evaluation: Implementation
- i1 – Allocation of financial and material resources
- i2 – Project implementation
- i3 – Measures to achieve strategic business goals
- i4 – Measures to achieve functional strategic objectives
- i5 – Measures to modify the plan
- ap – Any phase of strategic management
- on – Determinants of online shopping behavior
- fs – Current financial strategy

<b>Point evaluation of the phase: Implementation (i)</b>	10 – 20	21 – 30	31 – 40	41 – 55
<b>Strategic approach of the phase: Implementation</b>	crisis (1)	conservative (2)	balanced (3)	aggressive (4)

**Phase evaluation: Control**

$$c = 0.608793*c_1 + 0.723368*c_2 + 0.690026*c_3 + ga + id + ed + on + ap \quad (5)$$

*Clue:*

- c – Phase evaluation: Control
- c1 – Monitoring and measuring the fulfillment of strategic business goals
- c2 – Monitoring and measuring the fulfillment of functional strategic objectives
- c3 – Define measures to update or change the strategy
- ga – General aspects of strategic management
- id – Internal determinants of strategic development
- ed – External determinants of strategic development
- on – Determinants of online shopping behavior
- ap – Any phase of strategic management

<b>Point evaluation of the phase: Control (c)</b>	15 – 35	36 – 55	56 – 70	71 – 90
<b>Strategic approach of the phase: Control</b>	crisis (1)	conservative (2)	balanced (3)	aggressive (4)

**Any phase of strategic management:**

$$ap = 0.403467*ap_1 + 0.233921*ap_2 + 0.256299*ap_3 + 0.389685*ap_4 + 0.326759*ap_5 + 0.466242*ap_6 + 0.505529*ap_7 + 0.215238*ap_8 \quad (6)$$

*Clue:*

- ap – Any phase of strategic management
- ap1 – Key management competencies
- ap2 – Delegation and decentralization
- ap3 – Flexibility
- ap4 – Future vision and development prediction
- ap5 – Teamwork
- ap6 – Decision Making
- ap7 – Communication and motivation
- ap8 – Key personnel

**General aspects of strategic management**

$$ga = 0.436707*ga_1 + 0.488628*ga_2 + 0.528508*ga_3 + 0.434751*ga_4 + 0.346456*ga_5 + 0.493722*ga_6 \quad (7)$$

*Clue:*

- ga – General aspects of strategic management
- ga1 – Mission and vision
- ga2 – Situation Analysis
- ga3 – Strategic planning
- ga4 – Formulation of business strategy
- ga5 – Implementation of the business strategy
- ga6 – Strategic Control

**Internal determinants of strategic development**

$$\text{id} = 0.399507*\text{id}_1 + 0.281807*\text{id}_2 + 0.311952*\text{id}_3 + 0.293601*\text{id}_4 + 0.248339*\text{id}_5 + 0.410729*\text{id}_6 + 0.401217*\text{id}_7 + 0.312128*\text{id}_8 + 0.389833*\text{id}_9 + 0.174559*\text{id}_{10} + 0.272218*\text{id}_{11} + 0.390186*\text{id}_{12} + 0.364140*\text{id}_{13} + 0.381107*\text{id}_{14} + 0.312128*\text{id}_{15} \quad (8)$$

*Clue:*

- id – Internal determinants of strategic development
- id1 – Corporate culture
- id2 – Quality of top management
- id3 – Marketing management and strategy
- id4 – Financial management and strategy
- id5 – Personnel management and strategy
- id6 – Logistics management and strategy
- id7 – Competitive advantage
- id8 – Flexibility
- id9 – Innovative ability
- id10 – Financial health
- id11 – E-commerce Security
- id12 – Technological maturity of e-commerce
- id13 – Payment systems in e-commerce
- id14 – Web design
- id15 – Reputation and brand

**External determinants of strategic development**

$$\text{ed} = 0.419094*\text{ed}_1 + 0.317237*\text{ed}_2 + 0.699610*\text{ed}_3 + 0.235493*\text{ed}_4 + 0.410377*\text{ed}_5 + 0.699610*\text{ed}_6 \quad (9)$$

*Clue:*

- ed – External determinants of strategic development
- ed1 – Orientation in scope
- ed2 – Ability to work with legislation
- ed3 – Dealing with customers
- ed4 – Dealing with suppliers
- ed5 – Competitive struggle
- ed6 – Online shopping behavior

**Determinants of online shopping behavior**

$$\text{on} = 0.302098*\text{on}_1 + 0.144202*\text{on}_2 + 0.349833*\text{on}_3 + 0.359392*\text{on}_4 + 0.256218*\text{on}_5 + 0.425688*\text{on}_6 + 0.168556*\text{on}_7 + 0.120932*\text{on}_8 + 0.254896*\text{on}_9 + 0.458645*\text{on}_{10} + 0.320207*\text{on}_{11} + 0.313743*\text{on}_{12} + 0.233762*\text{on}_{13} + 0.301170*\text{on}_{14} + 0.254342*\text{on}_{15} \quad (10)$$

*Clue:*

- on – Determinants of online shopping behavior
- on1 – Shopping behavior: E-commerce Security
- on2 – Shopping behavior: Payment systems in e-commerce
- on3 – Shopping behavior: Method and speed of the delivery of goods
- on4 – Shopping behavior: Web design
- on5 – Shopping behavior: Customer Service
- on6 – Shopping behavior: E-shop credibility
- on7 – Shopping behavior: E-shop certification
- on8 – Shopping behavior: Online visualization and product description
- on9 – Shopping behavior: Added value to online purchase
- on10 – Shopping behavior: E-shop reference
- on11 – Shopping behavior: Product Reference
- on12 – Shopping behavior: Multi-Channel Sales
- on13 – Shopping behavior: Lower price of products and services
- on14 – Shopping behavior: Wider range of products
- on15 – Shopping behavior: Unlimited time of purchase



**Current financial strategy (fs)**

The current financial strategy was identified on the basis of the model of financial strategy in e-commerce as a weighted arithmetic mean of the achieved values in the model, i.e. ROA, ROE, current liquidity, long-term coverage, WACC (details see Svatošová, 2017).

**Model output: Evaluation of the business process model of strategic management in e-commerce**

$$m = (a + s + p + i + c)/5 \quad (11)$$

*Clue:*

- m – Output of the business process model of strategic management in e-commerce
- a – Summary point evaluation of the phase: Analyzing
- s – Summary point evaluation of the phase: Strategy preparation and formulation
- p – Summary point evaluation of the phase: Planning
- i – Summary point evaluation of the phase: Implementation
- c – Summary phase of the evaluation: Control

*Source:* Own processing.