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## Article

# Effectuation processes, gender, innovativeness and performance of SMEs : case of Belarus

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**BEROC Working Paper Series**

**BEROC WP No. 57**

**Effectuation Processes, Gender, Innovativeness and Performance of SMEs:**

**case of Belarus**

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**Abstract**

Entrepreneurial actions are based on certain principles and prevailing decision-making logic. Effectual and causal reasoning are considered to be among the essential tools explaining the entrepreneurial strategy and outcomes. The present research explores the link between the applied effectuation principles, gender of the leader and SMEs financial and innovative functioning. Using the data on 407 SMEs, a number of hypotheses is tested. The obtained results show (1) positive impact of the effectual reasoning on the knowledge transfer and the innovative outcomes of SMEs; (2) on contrary, causal rationality negatively affects the implementation of incremental novelty. Consistent with existing literature, the results show that combined usage of causal and effectual logics can be both beneficial and harmful. The findings also clearly indicate women being more prone to the hybrid decision-making strategy than men.

**Keywords: Causation, Effectuation, Gender, Performance, Uncertainty**

**JEL Classification: J16, L25, O31**

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## Introduction

Successfulness of SMEs depends on ability to adapt to the initial conditions, identify emerged opportunities earlier than competitors, diminish risks (Gilbert and Eyring, 2010) as well as to be innovative (Kaplan and Waren, 2007; Liao et al., 2009; Ramadani and Gerguri, 2011). Basically, this is all about decision making under conditions of uncertainty. Basically, this is all about decision making under conditions of uncertainty.

The question is what are the dominant and efficient decision-making models applied within the company's innovative behavior. Causation and effectuation appear in the literature as two fundamental approaches within the effectuation theory (Brettel et al., 2012) used by the companies in the uncertain environment. In order to cope with the unpredictability that occurs due to the overall macroeconomic situation or company's innovative activities, companies can apply different decision-making logics and strategies: effectuation and causation (Wiltbank et al., 2006; Nummela et al., 2014). Causation theory is a traditional decision model that assumes rational decision-making process and achievement of already set up goals with a focus of prediction and planning is a key instrument under causation theory. On contrary, effectuation is an alternative approach to rationality and is focused on usage of emerged opportunities and available resources (Sarasvathy, 2001, 2008). Empirical research evaluating application of these two models shows that both approaches have strengths and weaknesses (Werhann et al., 2015; Dew et al., 2015; Guo et al., 2016).

At the same time studies focusing on estimation of impact of decision strategy on the performance of the company in the transition economies where the level of uncertainty is often higher compared with the developed countries remain scarce (Lingelbach et al., 2015). The underdevelopment of institutions and reform processes provide additional ambiguousness for the companies operating in such environment (Lei et al., 2016) and that results in various additional perspectives and obstacles for the companies (Yu et al., 2017). Companies in transition countries are often dealing with various resource constraints (Lingelbach et al., 2015). On the one hand they have to analyze the initial conditions and what they have now, and on the other to make certain forecast about the prospects of business taking into account the permanent transformation process in the country. Thus, often this implies simultaneous usage of both causal and effectual logic during the decision-making process and the amount of quantitative studies measuring both the independent effects and the combined effect of two logics is limited (Smolka et al., 2015; Yu et al., 2017).

Along with that the amount of research looking on gender differences in decision-making strategies is even more limited (Alsos et al., 2013). On the one hand women value relations and

communication as very important component of the decisional process (Stelter, 2002; Burke and Collins, 2001), which is a part of the effectuation strategy. On the other hand according to several studies the level of risk-averseness among women is higher (Wagner, 2001; He et al., 2007; Eckel et al., 2008; Croson and Gneezy, 2009; Castillo and Freer, 2018) that makes them more careful, rational and pro-causal. Thus, taking into account the gender diversity of the decision-makers, the clarification of whether there are any peculiarities in decision-making likely would be beneficial for the formation of winning strategy of the company functioning in the uncertain environment in the transition economy.

In this regard, this paper tries to answer the question concerning how usage of causal and effectual logic impacts on the innovative and other outcomes of the company operating in Belarus. It also looks at whether the usage of both strategies cohabits together. Finally, taking into account different attitude to risk of men and women revealed in the literature, among the goals of this study is to look at what logic prevails depending on the gender of the decision maker in SMEs.

This research project aspires to contribute to the literature on entrepreneurial decisions in a number of ways. First, it aims to expand the understanding of any gender differences in decision-making strategy under uncertainty. Second, the paper expands the quantitative block of literature measuring the effect of effectual and causal logic on company's performance. Besides, this is the first study that looks at impact of decision-making strategy in Belarus - the country in transition that is still transforming from the planned towards the market economic model. That means the higher scope of uncertainty faced by the companies compared with their competitors from the developed economics.

The obtained results show positive effect of the effectual principles on the knowledge transfer and SMEs' innovative outcomes; on contrary, causal rationality negatively affects the implementation of incremental novelty. The findings showed the direction of impact of the combined usage of causal and effectual logics depends on the level of uncertainty and the radicalism of implemented innovations. Mutual application of both logics has a positive effect on the successfulness of drastic innovation and negative one in case of incremental changes. The findings also clearly indicate women being more flexible and prone to the hybrid decision-making strategy than men.

The paper begins with an overview of the literature on effectuation theory in Section 2. Next, goes Section 3 that explains the methodology. Section 4 presents the summary of the data and how it was constructed. Section 5 shows the estimated results. Section 6 summarizes the paper.

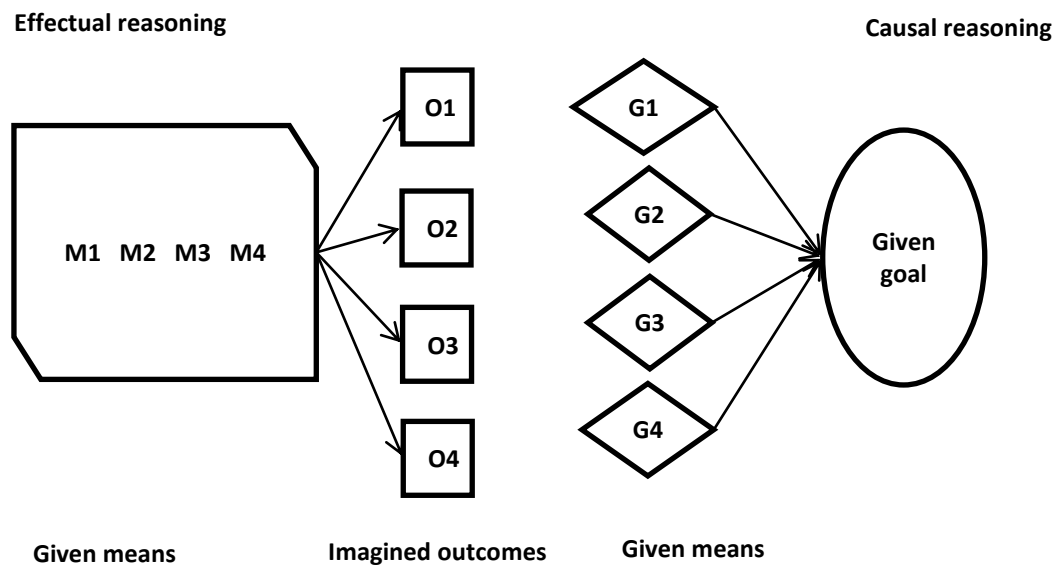
## Theoretical Framework and Hypotheses

### Causation vs. Effectuation

I start with the introduction of two types of decision-making models: effectuation and causation, their specific features and the way they are guiding decision-makers to operate under uncertain situations.

According to Sarasvathy (2001) the causal reasoning is more applicable to managers, while effectuation is about entrepreneurial approach. Causal way of thinking assumes that there is a certain defined goal to achieve like cost reduction product improvement. And the main problem is to find the right and most effective means to achieve this goal taking into account the limits (Figure 1). On contrary, Sarasvathy stated, that entrepreneurs, who follow effectual approach, operate differently. First, they look at what means they have. Second, they set up goals according to the available resources. Moreover, this approach assumes the presence of unpredicted future. That means that any small change during the implementation of the idea, any new interaction with other people is vital and can lead to unexpected result. Thus, this approach analyses all possible and imaginary outcomes.

Figure 1: Effectuation versus causation

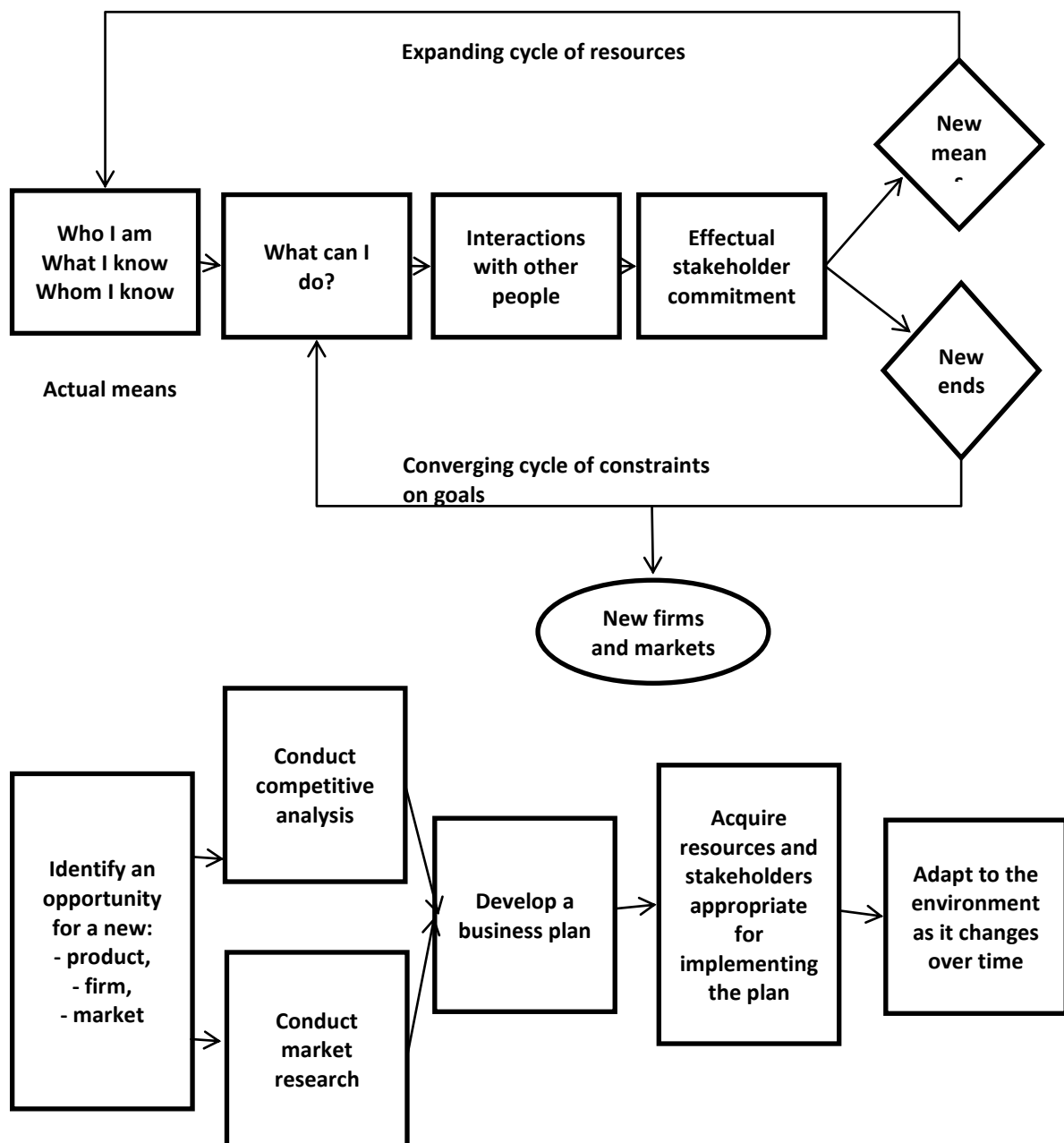


Source: Sarasvathy, 2001 - Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review*, 243-263

A more sophisticated treatment of causal and effectual process is shown in Figure 2. Effectual approach is cyclical and more iterative. Knowledge measured by "What I know?" keeps analyzing several times and appears upgraded in the next cycle. The process starts with the analysis of available means and the decision-maker tries to experiment, set up contacts with the parties

concerned in order to implement the potential project. The created network can also contribute to the project by additional knowledge and resources and this may result into new unpredicted ends, i.e. ideas, products or companies. The effectual logic points out on the emergent nature of the entrepreneurship. On contrary, causal approach is linear. It assumes that detailed planning in the very beginning is the most important part. The decision-making process occurs in the first step and then is followed by the analysis and achievement of the target goal. Here the adaptation to situation occurs subject to developed business plan.

Figure 2. The effectual and causal processes



Source: Sarasvathy and Dew, 2005; Read et al., 2009, adapted from Gartner 1985

In terms of company's innovativeness the most important principles of the effectual and causal logic are presented in the Table 1.

**Bird-in-hand principle (means vs. goals):** the followers of the effectual logic look at what they have and then proceed to what they can do with that through experimentation. The proponents of the causal logic set up a fixed goal and then try to achieve it.

**The affordable loss principle:** the effectual model looks at the limits of losses that could occur while the causal logic tries to estimate the expected returns of the project.

**The crazy quilt principle (partnership vs. competitive analysis):** collaboration and networking provides with additional knowledge and resources. According to the effectual logic commitment of other parties adds value to the project and diminishes the uncertainty. On contrary, causal logic assumes that the best way to deal with uncertainty is to do thorough competitive analysis and strategic planning.

**The lemonade principle (acknowledge the unexpected vs. overcome the unexpected):** the proponents of the effectual logic try to be flexible, embrace and leverage contingencies. They evaluate the unpredictable surprises as potential opportunities while the causal model tries to stick to the plan and to avoid unpredictability.

Table 1. Effectuation vs. causation in the in innovative context

	Effectual logic	Causal logic
Means vs. goals	Innovative activities are driven by given means.	Innovative activities are driven by given project targets.
Affordable loss vs. expected returns	Innovative activities are guided by advance commitments.	Innovative activities are guided by expected project returns.
Partnership and pre-commitments (alliances) vs. competitive analysis	Uncertainty is reduced through partnerships and precommitments of self-selected stakeholders.	Uncertainty is identified and avoided through market and competitor analyses.
Acknowledge the unexpected vs. overcome the unexpected	Contingencies/surprises are seen as a source of opportunities.	Contingencies/surprise are avoided or quickly overcome to reach given project targets.

Source: (Brettel et al., 2011).

## Causation, Effectuation and Performance

Despite certain differences in principles effectual and causal logic, there is no exact answer on what model is more efficient for the company's performance. The studies analyzing the effects of usage of these decision-making strategies showed that both logics can be beneficial for the company. Number of studies showed positive link between the application of effectuation

principles and company's performance (Read et al., 2009; Fisher, 2012; Deligianni et al., 2017; Cai et al., 2017). In particular, in the study by Read et al. (2009) just affordable loss did not show any significant impact, while experimentation, flexibility and pre-commitments are positively related with new venture performance. Similar question analyzed by Cai et al. (2017) demonstrated significant effect of all four effectual principles and affordable loss principle in particular, as it reduces risks and makes usage of resources more effective. Evald and Senderovitz (2013) looked at SME performance and the way they search for new business opportunities. The results showed that SMEs usage of effectual logic and experimentation with means helps in search for new ideas and markets. Mthanti and Urban (2014) showed that usage of effectual logic raises the entrepreneurial orientation and performance of companies in the high-technology industry.

**H1a:** Effectual logic positively impacts on the company's financial performance

At the same time the innovative outcomes of the company and the usefulness of the organizational learning that is often taken as an ancestor of innovation (Calantone et al., 2002) can also be used as company's performance indicators. Following Fiol and Lyles (1985) possibility to conduct experiments has a positive impact on the learning process in the organization. Same holds for the effect of being flexible on learning and innovativeness (Slater and Narver, 1995; Montalvo, 2006). The level of experimentation is also impacting on the level of creativity that is closely connected with company's innovativeness (Mumford et al., 2002). Formation of various alliances and precommitments with external interested parties increases chances of producing successful and sustainable innovative outputs (Chesbrough, 2003).

**H1b:** Effectual logic positively impacts on the company's innovative performance and organizational learning

Studies with a focus on causal logic also showed pros of its' application in practice. Brettel et al. (2012) demonstrated growth of performance indicators of the companies that decided to use causal approach. It should be noted that all these enterprises operated in the environment with a low level of uncertainty. Number of studies showed positive effect of planning on the company's performance as it strengthens the company's goals as well, evaluates the competitors and potential markets (Brinkmann et al., 2010; Mauer-Haug et al., 2013; Frese and Gielnik, 2014).

**H2a:** Causation has a positive impact on the financial performance of the firm

Speaking about the effect of causal principles on innovation outcomes and organizational learning, according to Zollo and Winter (2002) scrupulousness together with extensive analysis of the external situation are accompanying the successfulness of innovative projects implemented by the organizations. Study by Katila and Ahuja (2002) on the robotics industry showed that



exploitation matters not just for the improvement of existing products, but also for the creation of something new and unique.

**H2b:** Causation has a positive impact on the company's innovative performance and organizational learning

Despite effectual and causal logics are considered as two orthogonal models of thinking that does not mean they cannot be applied together. Number of studies looked at the cumulative effect of both decision-making strategies at the company's outcomes (Berends et al., 2014; Maine et al., 2015; Ciszewska-Mlinaric et al., 2016; Smolka et al., 2016). Analysis performed by Berends et al. (2014) showed that they stage of the development matters, i.e. effectual logic is more efficient in the start-up phase, when the company operates with the high level of uncertainty, while causal model is more appropriate in a more mature stage. Similar results were presented by Nummela et al. (2015) that showed that effectiveness of both decision-making logics depends on the stage of development, background and peculiarities of environment. The qualitative research performed by Ciszewska-Mlinaric et al. (2016) focused on the impact of causation and effectuation on the growth and internationalization process. The obtained findings showed no evidence of any strict rule regarding what type of logic should be used first and when the switch should occur. The peculiarities of the obstacles faced by the company and the level of uncertainty at the particular moment explain usage of either causal or effectual logic, or the combination of them. The quantitative study by Smolka et al. (2016) demonstrated positive interaction effect of both causation and effectuation on company's performance. Research performed by Yu et al. (2017) followed these results. The authors came up with the conclusion that under high uncertainty the most effective solution is to use both logics, while causation is more appropriate in less risky conditions.

**H3:** Combination of causal and effectual logic is beneficial for the company that operates under high uncertainty

**H4:** Combination of causal and effectual logic is useless or adverse for the company that operates under low uncertainty

### **Gender and decision-making strategy**

The presence of women among decision makers provides certain benefits for company's outcomes, effectiveness and innovativeness (Akulava, 2016; Noland et al., 2016). The decision on how to operate under uncertainty or to go for innovations depends on leader's vision, experience, but also gender (Akulava, 2016; Daunfeldt and Rudholm, 2012). At the same time female-owned businesses often show lower performance compared with male businesses (Fairlie and Robb,

2009). Previous studies revealed certain gap in effectiveness of leadership style applied by men and women and the motivation that forces them to go into business (Alsos et al., 2006; Fairlie and Robb, 2009). Lack of studies on female leadership and innovative behavior is a certain obstacle for estimating the female role in business (Alsos, 2013). The prior studies tried to analyze that question on a macro-level (Amagoh, 2009; Apesteguia et al., 2012), while the researchers have only recently started looking at the same question using the firm-level perspective. This also holds for the question whether there are any gender peculiarities in a strategic decision making in the uncertain environment and whether certain logic is more applicable to women taking into the account gender differences in attitude to risk (Castillo and Freer, 2018; Croson and Gneezy, 2009). The study by Alonso-Almeida and Bremser (2014) showed that the cost-reduction actions of women include various drastic measures to a lesser extent than male actions. The study also showed that men are applying various proactive measures more frequently than women especially during the crisis period, while women keep being more central and neutral. The authors claim that such proactiveness of males is because they have lower level of risk-averseness and focus on growth to a greater extent than females. In the study by d'Andria (2014) French females that became entrepreneurs while being pregnant or staying at home with their preschool children followed effectual principles in their business activities. Banikema and Tite (2018) looked at the reasons of female strategic decisions through the lens of causation and effectuation. The results showed the hybrid model of the decision-making strategy being frequently applied by women. The authors came up with experience, level of uncertainty and initial motivation as the main factors explaining the decision-making logic.

**H5:** Women are applying combination of causal and effectual logic, while male-led companies more likely follow the effectual or causal decision model.

### **Sample and Variables**

The research is based on the results of survey conducted in the winter 2017-2018 in Belarus. The survey investigates entrepreneurial motives, external and internal barriers, intentions and usual decision-making pattern, personal and family background. The data was collected from micro, small or medium companies based on questionnaire completed by the decision-makers of the companies during the personal meetings with them. 407 business representatives and decision makers (top managers, owners and co-owners) were interviewed. Respondents were selected randomly, but the sample was structured according to region, industry and gender. The research was conducted in the 6 regions of Belarus and in Minsk. The respondents were chosen and interviewed by the "SATIO" sociologic agency specializing in conducting surveys. This company was chosen as it is one of the leaders of the sociological research in the market.

For better visualization, the frequency analysis of the collected data was performed (Table 2). The fill dataset consists of 407 respondents, 60% are male and 40% are female. More than 50 are from 30 to 50 years old. The majority has a Bachelor of Specialist degree and more than 15 years of relevant working experience. Mostly companies have 1 or 2 owners (85.2%). More than 50% of the businesses have up to 20 employees (73%) and were founded less than 10 years ago (54.6%). The limited liability company is predominating among the legal forms of organizations (65.4%). 34.6% of the companies implemented various innovative outputs during the last 3 years and around 18% declared implementation of radical innovations.

Table 2.

Factor		Number	Percentage
Gender	Male	246	60.4
	Female	161	39.6
Age	below 30	41	10.1
	30-39	169	41.5
	40-49	95	23.3
	50 and above	102	25.1
Educational level	Secondary	12	2.9
	Secondary specialized	36	8.9
	Bachelor or specialist	326	80.1
	Master or higher	33	8.1
Related work experience	below 10	52	12.8
	10-14	90	22.1
	15-19	82	20.1
	20 or above	183	45
Legal form	LLC	226	65.4
	JSC	19	4.7
	other	122	29.9
Firm size	Up to 10	203	49.9
	11-20	94	23.1
	21-50	65	16
	above 50	45	11
Firm age	below 10	222	54.6
	10-12	53	13
	13-15	27	6.6
	16 or above	105	25.8
Implemented innovations		141	34.6
	radical	73	17.9
	incremental	83	20.4
Number of the owners	1	186	45.7
	2	161	39.5
	3	34	8.4
	4	24	6.4

Source: Author's own estimations

The data can be divided into 3 parts. The first part measures the decision-making models implemented by the organizations. The block of questions on effectuation and causation follow

measures introduced by Chandler et al. (2011). The respondents had to answer a number of questions related to the decision-making strategy on a 5-point Likert scale (5= strongly agree, 1 = strongly disagree). The causation is measured as the average of the 6-item scale that analyzes the causal model of the decision-making. The effectuation block is divided into five latent dimensions representing certain effectual principles: experimentation (4-item scale), affordable loss (3-item scale), flexibility (4-item scale) and alliances (partnership and pre-commitments) (5-item scale). So, each of the dimensions of effectuation is, first, captured by a number of items and then is aggregated. See Appendix 1 for the causation and effectuation scale.

The second part is devoted to the dependent (outcome) variables. The performance of the company is captured by a number of subjective indicators measuring financial and non-financial performance. The subjective measures are going in line with the objective indicators of performance and can be applied in case of absence of the objective information (Dess and Robinson, 1984; Ling and Kellermans, 2010). The respondents were asked to estimate the growth of revenues over the last 1-year and 3-year period. They were also asked to compare the results of their company's performance (revenue, profit and market share) relative to their competitors in the market using a five-point Likert scale (1= much worse, 5 = much better). The average of these three was used in the model as the performance indicator.

To measure company's innovative outcomes, the methodology used in the Business Environment and Enterprise Performance Survey (BEEPS) implemented by The European Bank for Reconstruction and Development (EBRD) in partnership with the World Bank was employed. The respondents had to answer several related questions and this allows using a number of indicators which work as a proxy for produced innovations. The measures of innovativeness are: introduction of a new product, new business process, new marketing strategy and startup. It also covers information on the level of radicalism of implemented innovations. Hence, there are no reasons to doubt the validity of the instrument. Finally, the organizational learning is also used as the outcome variable. The questions on learning follow studies by Zahra and George (2002) and Johansson (2014) and capture the usefulness and value of knowledge generated during the working process of the company.

The third part contains information on various controls. The data allows controlling for various characteristics that likely impact on the company's performance. This information includes various personal characteristics of company's leaders as well as other company's characteristics that impact on the performance of the organization. The data covers information on the gender of the only or one of the owners of the company, marital status, position in the company, level of educational attainment. It controls for age and the length of the relevant working and managing

experience of the decision-maker as according to the research these factors usually impact on business' performance (Van Praag, 2003, Smolka et al., 2016). The company's characteristics cover information on the size of the company, number of the owners, main operational industry, legal form of the organization and regional location. The age of the company is also taking into account and is estimated by the subtraction of the year of foundation from the year of survey's implementation.

Table 3 provides the factor and validity analysis of the variables used in the research. First, I looked at the factorability of the whole scale in order to check the appropriateness of method's application. The Bartlett test of sphericity (Chi-square = 7562.62, p-value <0.000) and the Kaiser-Meyer-Olkin Measure of sampling adequacy (KMO) = 0.749 approved usage of the factor analysis. The factor loadings conducted separately for each of the dimensions of effectuation left the 3-item experimentation construct, 3-item affordable loss principle, 2-item flexibility construct, 3-item alliances construct. The 3-item causation, 3-item performance and 3-item learning measures also confirmed its' uni-dimensionality. Those factors that fell below the threshold of 0.4 were eliminated from the analysis (Gotz et al., 2010). The composite reliability estimates were obtained during the analysis in order to check for the consistency of the remained multi-item scales. As it can be seen from the Table 3, the Cronbach's alpha is greater than the threshold equal to 0.7 (Cronbach, 1951) for almost all variables of interest except for the flexibility measure (0.667) while the Composite Reliability measure is above the required threshold (0.7) for all the constructed variables for all of the constructs making it possible to conclude that measures are reliable (Fornell and Larker, 1981; Hair et al., 2006). Overall, we can say that the reliability of the constructed measures meets the appropriate level. The average extracted variance (AVE) is above the required threshold of 0.5 for all of the measures that allows concluding about the convergent validity of the constructs (Fornell and Larker, 1981).

Table 3. Factor's reliability assessment

	Factor loadings	CA	CR	AVE
Experimentation		0.792	0.809	0.671
the final project is substantially different from the initial idea	0.880			
different approaches were tested before the optimum was found	0.831			
the final project is almost the same to the initial idea (rev.)	0.740			
Affordable loss		0.811	0.815	0.733
wy tried not use more resources than we have	0.839			

	we tried not to spend more money than we plan to invest into the initial idea	0.889			
	we tried not to invest so much money that can put the company into the dangerous situation in case of failure	0.838			
Flexibility			0.667	0.749	0.536
	we are flexible and try to use every emerged opportunity	0.858			
	we try to avoid actions that restrict our flexibility and adaptability	0.835			
Alliances			0.721	0.784	0.706
	we tried to use precommitments with our clients and suppliers as often as possible	0.580			
	we had possibility using free services of our friends and family	0.945			
	services from friends and family allow to reduce our costs significantly	0.943			
Causation			0.842	0.85	0.6
	we analyze long-term opportunities and focus on what will provide the highest return	0.590			
	our business strategy is carefully planned and detailed	0.849			
	our decisions are based on marketing and competitors' analysis	0.857			
	we have a clear vision where we are and what should be done for the successful implementation of the project	0.807			
	planning plays a key role in the strategy development	0.739			
Learning			0.741	0.746	0.661
	the project provided us with knowledge that can be applied in the other projects	0.848			
	the project provided us with the insights that resulted in the new projects	0.780			
	the project allowed improving the overall level of the competencies within the organization	0.792			
Performance			0.876	0.879	0.803
	firm's performance relative to competitors: growth of sales	0.876			
	firm's performance relative to competitors: growth of market share	0.932			
	firm's performance relative to competitors: growth of profits	0.879			

Source: Author's own estimations. varimax rotation with Kaiser normalization. CA – Cronbach's alpha, CR – composite reliability, AVE – average variance extracted

Table 4 provides the descriptive statistics and the correlation coefficients for all the variables used in the research. The correlation coefficients mostly show weak or moderate level of correlation between the variables meaning that multicollinearity may not be a problem causing the distortion of the results. Moreover, the variance inflation factors (VIF) estimated after the regression model

(Appendix 1) do not exceed 5 and are lower than not just the widely used threshold of 10, but also the conservative threshold of 4 (except for the relevant experience of the decision-maker = 4.67 and age of the decision-maker = 4.07) indicating absence of the multicollinearity problem (Netter et al., 1996; O'Brien, 2007). The descriptive statistics shows that the respondents are following the causal logic (mean = 3.75) more frequently than the effectual one (mean = 3.57). However, the distinction between different directions of the effectuation reveal that the frequency of usage of the affordable loss (mean = 4.02), flexibility (mean = 3.93) principles is higher compared with the causal logics. At the same time the effectual principles are positively correlated with each other (0.087\*-0.55\*\*\*) except for correlation of experimentation and flexibility with the alliances. Thus, we can say that there is a connection between the effectual principles. As for the outcome variables, subjective estimation of the performance is strongly and positively correlated with the growth of sales of the last 1 and 3 years (0.514\*\*\* and 0.511\*\*\*) and negatively with the female gender of the owner (-0.01\*\*, -0.233\*\*\* and -0.192\*\*). Surprisingly no significant relationship between the financial performance and the decision-making models was revealed. Organizational learning is in positive and significant relation with almost all effectual principles except for the alliances and precommitments (0.102\*\* - 0.393\*\*\*).

Table 4.

Variables	Mean	S.D.	Learning	Innovation	Radical	Incremented	Performance	Growth of sales (1yr)	Growth of sales (3yr)	Age of the owner	Relevant experience	Managing experience	Female	Level of education
Learning	3.72	0.73	1											
Innovation	0.35	0.48	0.088*	1.000										
Radical	0.18	0.38	0.086*	0.440***	1.000									
					-									
Incremented	0.20	0.40	0.046	0.695***	0.237***	1.000								
Performance	3.54	0.72	0.035	-0.084*	0.007	-0.102**	1.000							
		39.3												
Growth of sales (1yr)	23.14	7	0.058	-0.067	-0.021	-0.084	0.514***	1.000						
		60.3												
Growth of sales (3yr)	36.91	3	0.027	0.020	0.076	-.001	0.511***	.718***	1.000					
Age of the owner	41.32	8.93	-0.019	-0.013	-0.121**	0.059	-0.045	-0.122	-0.072	1.000				
Relevant experience	13.51	8.93	-0.034	0.013	-0.089*	0.074	-0.068	-0.195**	-0.069	0.783***	1.000			
Managing experience	10.41	8.14	-0.026	0.004	0.003	0.002	-0.060	-0.159**	-0.121	0.599***	0.703***	1.000		
								-						
Female	0.40	0.49	-0.076	-0.103**	-0.090*	-0.035	-0.010**	0.233***	-0.192**	0.000	-0.068	-0.103**	1.000	
Level of education	3.96	0.62	0.003	0.063	0.112**	-0.017	0.160***	0.081	0.209***	0.001	0.028	0.010	-0.062	1.000
Industry	4.71	3.30	-0.061	-0.033	-0.021	-0.043	-0.066	-0.012	0.003	-0.016	-0.053	-0.050	0.207***	0.082*
													-	
Region	2.38	2.05	0.027	0.112**	0.079	0.049	-0.026	0.121	0.09	0.042	-0.004	0.003	0.155***	0.035
Legal form of the company	1.90	0.88	-0.002	0.029	-0.035	0.071	-0.001	-0.084	0.059	0.021	0.023	-0.040	0.051	0.137***
Age of the company	2.04	1.28	-0.062	0.084*	-0.004	0.095*	-0.067	-0.147*	-0.066	0.269***	0.212***	0.265***	0.040	0.064
Size of the company <sup>a</sup>	2.51	1.13	-0.103**	0.023	0.016	0.028	0.031	-0.044	-0.012	0.028	0.067	0.070	-0.039	0.084
Number of owners	1.75	0.86	0.120**	0.064	0.067	0.024	-0.004	-0.045	-0.037	-0.014	-0.005	-0.007	-0.008	0.079
Experimentation	2.96	0.92	0.368***	0.048	0.026	0.063	0.052	0.105	0.031	-0.041	-0.057	-0.046	-0.015	-0.003
Affordable loss	4.02	0.77	0.217***	-0.031	0.092*	-0.097*	0.016	-0.007	0.052	0.047	0.065	0.097**	-0.034	-0.005
Flexibility	3.93	0.74	0.393***	0.048	0.090*	0.013	0.000	0.079	0.113	0.046	0.028	0.040	-0.005	0.039
Partnership and precommitments	3.06	0.79	0.059	0.014	-0.014	0.023	-0.061	0.072	0.054	-0.019	-0.004	-0.020	0.074	-0.108**
Causation	3.75	0.67	0.045	-0.004	-0.035	0.024	0.010	-0.089	-0.037	0.000	-0.029	-0.047	-0.022	0.029
Effectuation <sup>b</sup>	3.57	0.49	0.373***	0.02	0.041	0.015	0.013	0.105	0.118	0.013	0.014	0.019	-0.008	-0.014

Source: Author's own estimations. \*\*\*p<0.01; \*\*p<0.05; \*p<0.1. a – ln (size of the company). b – Effectuation – an aggregated average including all its' dimensions



Table 4 (cont.)

Variables	Industry	Region	Legal form	Company's age	Size	Owners	Experimentation	Affordable loss	Flexibility	Alliances	Causation	Effectuation
Learning												
Innovation												
Radical												
Incremented												
Performance												
Growth of sales (1yr)												
Age of the owner												
Relevant experience												
Managing experience												
Female												
Level of education												
Industry	1.000											
Region	0.044	1.000										
Legal form of the company	-0.070	0.011	1.000									
Age of the company	-0.041	0.019	0.207***	1.000								
Size of the company	-0.210***	-0.017	0.270***	0.332***	1.000							
Number of owners	-0.042	0.013	0.334***	0.080	0.190***	1.000						
Experimentation	0.014	0.049	-0.014	-0.025	-0.054	0.039	1.000					
Affordable loss	-0.008	-0.020	0.064	0.080	0.068	0.035	0.108**	1.000				
Flexibility	0.010	0.111**	0.044	-0.027	-0.080	0.086*	0.267***	0.540***	1.000			
Alliances	-0.009	-0.003	-0.014	-0.046	-0.139***	0.002	-0.011	0.087*	0.081	1.000		
Causation	0.057	0.111**	0.019	-0.035	-0.053	-0.038	0.075	0.181***	0.209***	-0.013	1	
Effectuation*	0.014	0.046	0.04	-0.025	-0.081	0.063	.512***	.710***	.726***	.457***	.258***	1

Source: Author's own estimations. \*\*\*p<0.01; \*\*p<0.05; \*p<0.1. a – ln(size of the company). b – Effectuation – an aggregated average including all five dimensions (experimentation, affordable loss, flexibility, alliances and focus on resources).

## Results

To check for the relationship between the decision-making logic and company's performance, the hierarchical ordinary least squares (OLS) regression analysis was conducted. First, the performance outcomes were regressed over the control factors (baseline specification 1), second, the dimensions of the effectual and causal logic were included into the model (specification 2). Finally, the interaction terms capturing the usage of both logics were added to the regression (specification 3). The F-test checking for the overall fit of the model shows that mostly just the specification 3 meets the significance requirements and the results of the analysis of the 3<sup>rd</sup> specification are presented in the Table 5. However, the information purposes the specifications 1 and 2 are presented for in the Appendix.

The first thing to be mentioned, the obtained results showed impact of the decision-making logic on the non-financial performance outcomes (the implemented innovations and the organizational learning) and almost no effect on the financial measures (growth of sales over the last year and the average of the subjective performance evaluation (growth of sales, market share and profit). The only exception is the negative impact of the mutual usage of the causal logic and the affordable loss principle on the growth of sales. The control factors showed little effect on the outcome measures. Female gender has a negative and significant effect on the implementation of innovative projects ( $\beta = -0.084$ ,  $p\text{-value} < 0.10$ ), subjective evaluation of company's performance ( $\beta = -0.127$ ,  $p\text{-value} < 0.1$ ) and growth of sales ( $\beta = -20.48$ ,  $p\text{-value} < 0.01$ ) following studies that show underperformance of female businesses compared with male-owned enterprises (Rosa et al., 1996; Fairlie and Robb, 2009; Gatewood et al., 2009; Robb and Watson, 2012). Surprisingly, relative work experience is also negatively affecting the growth of sales ( $\beta = -13.98$ ,  $p\text{-value} < 0.01$ ). The potential explanation here might be the improper usage of the possessed skills and or too rough implementation of them under changing and uncertain conditions (Khan & Butt, 2002). Level of educational attainment raises the chances of implementation of the radical innovations ( $\beta = 0.077$ ,  $p\text{-value} < 0.01$ ) similar to results by Mohamed (2005) and Laforet and Tann (2006) who showed the direct and positive linkage between the educational background of the decision-makers and the novelty produced by SMEs. Size of the company negatively impacts on the level the knowledge transfer is shared and used within the company ( $\beta = -0.057$ ,  $p\text{-value} < 0.10$ ) and goes in line with the statement that organizational learning is a crucial success factor especially for the small organizations (Gray and Gonsalves, 2002). The main reason is that larger enterprises have other resources that might increase the competitive advantages of the companies resulting in lower dependence on the learning process within the organization (Hui et al., 2013). Number of owners has a positive

impact on the organizational learning ( $\beta=0.093$ ,  $p\text{-value}<0.05$ ). The potential explanation here might be related to the arguments presented by Koohborfardhaghi and Altmann (2017) claiming that the more flexible the organizational structure is, the higher is the organizational learning performance of the company.

As for the impact of the decision-making logic on the variables of interest, as expected focus on experimentation at work on average raises the propensity of implemented incremented innovation by 8.7% and by 12.2% of the average innovative project without distinction of its radicality. It also positively impacts on the organizational learning ( $\beta=0.317$ ,  $p\text{-value}<0.01$ ). The application of the affordable loss principle negatively impacts the implementation of incremental innovations ( $\beta=0.090$ ,  $p\text{-value}<0.01$ ). The potential explanation of the negative effect on the incremental innovations might be connected with the limited resources of SMEs compared with the large companies and the higher stakes of failure. Following Smolka et al. (2016) the negative sign might signal that the maximum value of affordable loss principle lies in overall loss avoidance than incremental innovativeness. Restricted resources force small businesses to focus on what they have and be creative with what is under their control and what can provide higher outcome in future (Berends et al., 2014). Surprisingly, following causal approach negatively impacts on the successfulness of radical innovations and decreases the chances of implementation by 12.8%. Likely too much planning and formalization that raise the success rate of the innovative outcome of the large companies can ill-afford by the small firms (March-Chorda et al. 2002; Berends et al., 2014). Flexibility has a significant and positive effect on the organizational learning process in the company ( $\beta=0.278$ ,  $p\text{-value}<0.01$ ) and goes in line with the results in related studies (Slater and Narver, 1995; Montalvo, 2006). Thus, the results do not support the hypotheses H1a and H2a regarding the effects of effectual and causal logic on the financial outcomes of the organizations. The support of the hypothesis H1a that effectual logic positively impacts on the company's innovative performance and organizational learning was found. As for the hypothesis H2b that causal logic has a positive effect on company's innovative performance and the organizational learning, contrary to expectations, the results did not find support for that. However, that might be connected with the peculiarity of the small and medium businesses compared to large ones (Berends et al., 2014).

Next, I examined the effect of the effect of mutual usage of both logics on the performance outcomes. The combined usage of causal and effectual principles positively impacts on the chances of the successful radical innovativeness and cumulatively increases the chances of its' implementation by 11.0%. On contrary, the chances of incremented innovations decrease by 3.5%. At the same, radical innovations are associated with the higher level of uncertainty, riskiness and public contestation than the incremental innovations (O'Connor and McDermott,

2004). Thus, the results partly support H3 and H4 hypotheses that combination of causal and effectual logic is beneficial for the company that operates under high uncertainty (H3) and is useless or negative in the low uncertainty environment (H4).

Table 5.

Specification	Innovation	Radical	Incremented	Learning	Performance	Growth of sales (1yr)
Age of the owner	-0.041 (0.039)	-0.048 (0.031)	-0.014 (0.034)	0.036 (0.054)	0.054 (0.061)	8.740 (5.361)
Relevant experience of the owner	0.038 (0.035)	0.001 (0.028)	0.037 (0.030)	-0.039 (0.048)	-0.083 (0.054)	-13.98*** (4.363)
Female	-0.0840* (0.050)	-0.052 (0.04)	-0.024 (0.043)	-0.091 (0.068)	-0.127* (0.077)	-20.48*** (6.590)
Level of education	0.049 (0.038)	0.072*** (0.031)	-0.019 (0.033)	0.012 (0.052)	0.194*** (0.059)	7.055 (4.899)
Legal form of the company	0.006 (0.029)	-0.027 (0.027)	0.029 (0.025)	-0.013 (0.040)	-0.005 (0.045)	-6.530 (4.978)
Age of the company	0.030 (0.020)	0.004 (0.016)	0.025 (0.017)	-0.018 (0.028)	-0.043 (0.031)	-3.369 (2.644)
Size of the company	-0.001 (0.025)	0.001 (0.020)	0.003 (0.022)	-0.057* (0.035)	0.022 (0.039)	1.050 (3.341)
Number of owners	0.029 (0.029)	0.030 (0.023)	0.001 (0.025)	0.094** (0.040)	-0.018 (0.044)	-0.003 (3.718)
Main industry	Yes	Yes	Yes	Yes	Yes	Yes
Region	Yes	Yes	Yes	Yes	Yes	Yes
Experimentation	0.122*** (0.035)	0.037 (0.028)	0.087*** (0.030)	0.317*** (0.048)	0.014 (0.054)	3.258 (5.046)
Affordable loss	0.007 (0.046)	0.052 (0.037)	-0.062 (0.040)	-0.025 (0.063)	0.076 (0.071)	1.500 (5.851)
Flexibility	-0.048 (0.051)	-0.051 (0.040)	0.035 (0.044)	0.278*** (0.070)	-0.064 (0.078)	3.391 (6.988)
Partnership and precommitments	-0.025 (0.044)	0.019 (0.035)	-0.043 (0.038)	0.081 (0.060)	-0.004 (0.067)	4.598 (5.905)
Causation	-0.047 (0.054)	-0.128*** (0.043)	0.052 (0.052)	0.017 (0.074)	0.030 (0.083)	3.909 (7.150)
Experimentation* Causation	-0.305*** (0.080)	-0.138* (0.064)	-0.169*** (0.068)	-0.358*** (0.109)	0.139 (0.122)	4.121 (10.82)
AffordableLoss*Causation	-0.166*** (0.084)	-0.008 (0.067)	-0.104 (0.072)	0.133 (0.114)	-0.125 (0.129)	-23.52** (10.78)
Flexibility*Causation	0.273*** (0.085)	0.248*** (0.068)	0.010 (0.073)	0.036 (0.116)	0.065 (0.130)	1.277 (10.63)
Alliances*Causation	0.151 (0.095)	0.015 (0.076)	0.134* (0.081)	-0.186 (0.129)	-0.091 (0.145)	-3.453 (13.00)
Constant	0.089 (0.321)	0.197 (0.259)	0.040 (0.276)	1.754*** (0.439)	2.929*** (0.493)	-10.40 (41.90)
Observations	406	406	406	406	406	169
R -squared	0.103	0.105	0.074	0.283	0.063	0.196
F	2.331***	2.387***	1.632**	8.033***	1.375	1.907**

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Finally, the impact of gender on the choice of the decision-making strategy using the logit regression model was estimated (Table 6). The model of thinking was divided into three groups depending on whether the respondent is strictly following the only one way of thinking or is switching between models depending on the situation. The division revealed the following

structure: 82.7% of the respondents are using both logics (balanced), 10% stick to the causal approach (pro-causal) and 7.3% are following the effectual principles (pro-effectual). The factors that might impact on the decision to follow this or that strategy are the characteristics of the company (size, age, legal form) and professional characteristics of the decision-maker (gender, position, managing experience and obtained business education). First, we can see that the position in the TOP-management reduces the propensity of mutual usage of both logics compared with the owner (by 49.5%). On contrary, TOP manager position is positive and significant for both pro-causal and pro-effectual decision-makers indicating that they are more likely using one of the potential strategies. Size of the company increases the propensity of balanced model of thinking and is negatively related to the effectual model going in line with that effectuation is more applicable to small companies with the lower level of formalization (Berends, 2014). Impact of business education varies depending on the thinking model. It has a positive and significant effect on the choice of the balanced model (by 82.7%) and decreases the propensity of the pro-causal choice (by 65.8%). The managing experience has an opposite influence, it is positive and significant in case of pro-effectual and pro-causal models indicating that experienced managers will be more likely following the effectual or causal principles and on contrary will be less likely sticking to the balanced strategy. Joint stock companies (JSC) will be more likely choosing causal approach meaning that they are interested in the higher returns and dividends while the limited liability legal form (LLC) is in negative relationship with the balanced decision structure. Finally, female gender is positive and significant in case of the balanced choice model and is negatively related to the causal way of thinking. That means that we can support the hypothesis 5 (H5) that women are applying the combination of causal and effectual logic, while male-led companies are more likely following the effectual or causal decision models.

Table 6. Decision-making model and gender

	Balanced (causal and effectual)	Pro-causal	Pro-effectual
TOP manager	-0.495*** (0.153)	0.423** (0.184)	0.464** (0.211)
Female	0.799** (0.355)	-0.972** (0.454)	-0.217 (0.476)
Ln (managing experience)	-0.583*** (0.201)	0.449* (0.246)	0.787*** (0.305)
Business education	0.828*** (0.307)	-0.658* (0.387)	-0.691 (0.422)
Ln (size of the company)	0.406** (0.171)	-0.293 (0.205)	-0.535** (0.250)
Ln (age of the company)	0.306 (0.194)	-0.349 (0.234)	-0.196 (0.274)
LLC	-0.752** (0.357)	0.623 (0.452)	0.578 (0.480)
JSC	-1.154 (0.812)	1.864** (0.857)	
Industry	Yes	Yes	Yes

Constant	1.849*** (0.610)	-2.280*** (0.756)	-3.244*** (0.912)
Observations	382	382	367

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Discussion and conclusions

So far the quantitative block of the research looking at the impact of the causal and effectual logics on the performance is still limited. This study helps widening the scope of the research on that issue and filling existing gap. The goal of this paper is to look at the impact of causal and effectual principles on firm's performance in the transition economy and also analyze whether the gender matters in terms of choice and prepossession towards different decision-making logics.

The obtained results showed relationship between the decision-making logics applied by the company and the non-financial measures of the performance. Following the effectual principles (experimenting and focusing on resources) has a positive effect on the company's innovative performance and knowledge transfer within the organization. Affordable loss principle is influencing negatively on the implementation of incremental innovations by the company. Likely the limited resources impose constraints and force making a choice between the ranked alternatives and their chances of success. Incremental innovations indicate just slight changes in the product, business model of the decision-making strategy that might be beneficial for further business operations. In that case taking into account the restricted amount of resources at hand the optimality will be gained in case of loss avoidance and not implemented incremental changes (Smolka et al., 2016). Surprisingly, causal approach negatively impacts on the implementation of radical innovations. The potential explanation here might be related with the size of companies in the dataset. On contrary to the large corporations, SME segment is limited in available resources and too much formalization and planning might result in intolerable burden affecting the success of innovative activities (Berends et al, 2014).

The research also tried answering on what is the effect of mutual application of both logics on company's performance. The findings showed opposite effects s.t. to the level of uncertainty and the radicalism of implemented innovations. The combination of both logics is positively impacting on the successfulness of drastic innovation and negatively in case of incremental changes. The results go in line with the findings by Hu et al. (2017) that demonstrated the positive interaction effect only in case of operations under high uncertainty and opposite results

in case the level of uncertainty is low. The obtained results also support statement by Fisher (2012) that usage of both logics can be either beneficial or unfavorable for business.

The study also sheds new light on the gender differences in the decision-making strategy. The results suggest that female leaders are more flexible and try combining both logics together while male entrepreneurs are more unidirectional in their choice. The findings partly confirm previous research (Alonso-Almeida and Bremser, 2014) showing women as more neutral and less prone to one proactive and drastic decisions compared with male leaders. At the same time the study brings certain novelty. To the best of knowledge, this is the first quantitative study on gender differences in usage of causal and effectual logics that reveals female proclivity for hybrid decision-making strategy.

### **Limitations of the study**

The results might suffer from some limitations due to the available data. First, this is a cross-sectional data that does not allow checking the causality and the potential problem of endogeneity should be kept in mind. Hence, longitudinal data will allow making the investigation more precise. Second, the results might be country-specific. Even though Belarus is country in transition, the economy has its' own peculiarities that might affect the decision-making strategy. In addition, Belarus is a country with the high level of uncertainty avoidance (Piniuta, 2017) and according to Brinkmann et al. (2010) the return on planning actions in such countries is depreciated compared with similar actions in the countries with the lower level of uncertainty avoidance. Thus, the cross-country data would allow checking for the cultural impact on the decision-making model. Altogether getting rid of these limitations and extension of the analysis will allow having more robust results and will be complement to the research.

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## APPENDIX

Table A.1

Variable	VIF	1/VIF
Relevant experience of the decision maker	4.67	0.213947
Age of the decision maker	4.07	0.245469
Interaction: affordableloss&causation	3.56	0.281013
Interaction: flexibility&causation	3.31	0.30239
Partnershipandprecommitments	3.17	0.315175
Experimentation	2.94	0.340672
Interaction: experimentation&causation	2.83	0.352773
Interaction: alliances&causation	2.7	0.371016
Causation	2.48	0.402818
Flexibility	1.94	0.514165
Ageofthecompany	1.9	0.527222
Femalegender	1.86	0.538274
Legal form of the company	1.79	0.559152
Affordableloss	1.78	0.560426
Sizeofthecompany	1.56	0.640934
Mainindustry	1.45	0.687366
Levelofeducation	1.42	0.704161
Region	1.38	0.726255
Numerofoowners	1.32	0.757715
Mean VIF	2.43	

Table A.2

	Innovation		Radical		Incremented		Learning	
Specification	1	2	1	2	1	2	1	2
Ageoftheowner	-0.041	-0.041	-0.053	-0.052	-0.009	-0.011	0.026	0.017
	(0.040)	(0.040)	(0.052)	(0.052)	(0.034)	(0.034)	(0.061)	(0.054)
Relevant experience of the owner	0.023	0.025	0.001	-0.003	0.027	0.032	-0.036	-0.030
	(0.035)	(0.035)	(0.028)	(0.028)	(0.030)	(0.029)	(0.053)	(0.047)
Female	-0.079	-0.083	-0.050	-0.048	-0.022	-0.028	-0.094	-0.097
	(0.050)	(0.051)	(0.040)	(0.040)	(0.043)	(0.043)	(0.077)	(0.068)
Levelofeducation	0.036	0.036	0.068**	0.068**	-0.020	-0.023	0.011	0.004
	(0.038)	(0.039)	(0.0309)	(0.030)	(0.033)	(0.033)	(0.058)	(0.052)
Legal form of the company	-0.004	-0.004	-0.035	-0.036	0.028	0.029	-0.010	-0.016
	(0.029)	(0.029)	(0.024)	(0.023)	(0.025)	(0.025)	(0.045)	(0.040)

Ageofthecompany	0.0369*	0.0387*	0.011	0.009	0.026	0.029*	-0.014	-0.013
	(0.020)	(0.020)	(0.016)	(0.016)	(0.017)	(0.017)	(0.031)	(0.027)
Sizeofthecompany	-0.014	-0.007	0.000	-0.001	-0.009	0.000	-0.095**	-0.062*
	(0.025)	(0.025)	(0.020)	(0.020)	(0.021)	(0.021)	(0.038)	(0.035)
Numerofoowners	0.032	0.026	0.035	0.031	0.001	-0.003	0.125***	0.0869**
	(0.029)	(0.029)	(0.023)	(0.023)	(0.025)	(0.024)	(0.044)	(0.039)
Mainindustry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Experimentation		0.017		-0.002		0.029		0.223***
		(0.026)		(0.021)		(0.023)		(0.036)
Affordableloss		-0.052		0.042		-0.090***		0.036
		(0.041)		(0.032)		(0.035)		(0.055)
Flexibility		0.047		0.027		0.041		0.287***
		(0.040)		(0.032)		(0.034)		(0.055)
Partnershipandprec ommitments		0.017		-0.006		0.018		0.024
		(0.032)		(0.025)		(0.027)		(0.043)
Causation		-0.008		-0.038		0.023		-0.045
		(0.038)		(0.030)		(0.033)		(0.052)
Constant	0.138	0.0842	0.032	-0.057	0.144	0.106	3.830***	2.060***
	(0.177)	(0.271)	(0.142)	(0.214)	(0.151)	(0.228)	(0.270)	(0.363)
Observations	407	406	407	406	407	406	406	406
R -squared	0.036	0.043	0.048	0.063	0.021	0.045	0.044	0.258
F	1.479	1.166	1.994*	1.736**	0.829	1.235	1.822*	9.038***

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A.2 (contd.)

Specification	Performance		Growthofsales (1yr)	
	1	2	1	2
Ageoftheowner	0.054	0.054	4.813	7.108
	(0.0597)	(0.0604)	(5.095)	(5.263)
Relevant experience of the owner	-0.082	-0.080	-10.86**	-12.36***
	(0.0524)	(0.0529)	(4.230)	(4.298)
Female	-0.126*	-0.119	-17.74***	-19.83***
	(0.0752)	(0.0764)	(6.294)	(6.555)
Levelofeducation	0.195***	0.193***	6.370	7.480
	(0.0575)	(0.0584)	(4.868)	(5.033)

Legal form of the company	-0.009	-0.008	-5.045	-5.770
	(0.0112)	(0.0114)	(1.031)	(1.035)
Ageofthecompany	-0.044	-0.045	-2.713	-2.618
	(0.0174)	(0.0178)	(1.578)	(1.663)
Sizeofthecompany	0.026	0.022	-0.510	1.005
	(0.0442)	(0.0447)	(4.953)	(5.035)
Numberofowners	-0.014	-0.013	-0.358	-0.698
	(0.030)	(0.031)	(2.615)	(2.634)
Mainindustry	Yes	Yes	Yes	Yes
Region	Yes	Yes	Yes	Yes
Experimentation		0.042		1.859
		(0.0402)		(3.590)
Affordableloss		0.033		-4.458
		(0.0616)		(5.465)
Flexibility		-0.029		6.307
		(0.0609)		(5.364)
Partnershipandprecommitments		-0.033		5.325
		(0.0482)		(4.343)
Causation		0.002		-6.236
		(0.0654)		(6.313)
Constant	3.101***	3.061***	39.79*	29.27
	(0.264)	(0.404)	(22.94)	(35.31)
Observations	407	406	169	169
R-squared	0.053	0.057	0.129	0.164
F-test	2.197***	1.579*	2.348***	1.996***

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1