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# New Entrepreneurial Decision Model Based on Decision Theory Application

## RESEARCH PAPER

# New Entrepreneurial Decision Model Based on Decision Theory Application

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## ABSTRACT

**PURPOSE:** The purpose of this paper is to develop an entrepreneurial decision model that will provide a framework for narrowing the gap between entrepreneurship determinants and entrepreneurial decisions.

**DESIGN/METHODOLOGY/APPROACH:** The paper develops a new entrepreneurial decision model on the basis of an existing research and decision theory application. The model is then applied to empirical data.

**FINDINGS:** The paper shows that a limited effect of entrepreneurship policies is connected with a lack of attention to a decision-maker's perspective on entrepreneurial choice. The model developed in the paper, frames key behavioural aspects of entrepreneurial decisions in order to control the factors that might lead to a decreased effect of entrepreneurship policies.

**RESEARCH LIMITATIONS/IMPLICATIONS:** The created model provides a framework for entrepreneurial policy development, but does not specify entrepreneurial decision criteria. Also, the empirical study might contain country-specific results.

**ORIGINALITY/VALUE:** The suggested model of entrepreneurial decisions provides a framework for:

- measuring sufficient levels of benefits that determine entrepreneurial decisions in order to avoid ineffective resources allocation;
- identifying the importance of benefits for a particular entrepreneurial group in order to foresee different effects of a certain policy on various types of entrepreneurs;
- analysing and avoiding biased perception of benefits that might appear due to a lack of knowledge about existing policies and unobjective perception of future gains by potential entrepreneurs.

**KEYWORDS:** *multi-criteria decision analysis; entrepreneurship; decision-making*

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## INTRODUCTION

Entrepreneurship policies are applied worldwide and one of the key goals of such policies is to increase the number of entrepreneurs in a certain sphere (Ahmad and Hoffman, 2008). However, entrepreneurship policies often demonstrate a narrow effect and ineffective resources allocation (Arshed *et al.*, 2014; Sarfati, 2012). This paper considers this issue from an entrepreneurial decision-making perspective.

In Hurst and Pugsley's report (2015), the effect of subsidies is considered as relatively small due to the fact that there is a number of wealthy business owners who would have made a decision to become entrepreneurs and who would still benefit from the subsidy. Shepherd and Patzelt (2017) declare that the importance of non-financial factors in entrepreneurial decisions is nearly ignored in the literature, while policy-makers do not even consider non-pecuniary motivation as an entrepreneurship determinant (Hurst and Pugsley, 2011).

The decision-making process of potential entrepreneurs is not the focus of entrepreneurship policies or a behavioural factor of this decision (Dobryagina, 2019). Entrepreneurship determinants that represent the basis for entrepreneurship motivation policies assume rationality in the decision-making process of potential entrepreneurs. However, a number of behavioural insights, such as narcissism (Mathieu and St-Jean, 2013), assertiveness (Caliendo and Kritikos, 2008), overconfidence (Parker, 2009) and entrepreneurial persistence (Adomako *et al.*, 2016), lead potential entrepreneurs to make biased decisions.

As a consequence, failure to take into account potential entrepreneurs' decision-making process might significantly decrease the effect of entrepreneurial policies. Decision theory is the research direction that is focused on decision-making modelling and investigation of the impact of behavioural factors (Morgenstern and von Neumann, 1953; Ramsey, 1931). The paper will apply decision theory and its instruments in order to model entrepreneurial decisions. Behavioural factors that lead to biased career decisions are investigated in the literature (Caliendo and Kritikos, 2008; Cooper *et al.*, 1988); to the best of our knowledge, however, these were never modelled. The new model will be checked through empirical research. The paper's contribution is focused on narrowing the gap between entrepreneurship determinants and entrepreneurial decisions.

## LITERATURE REVIEW

### Two Perspectives on Entrepreneurial Choice

From the existing literature, we can clearly identify two key perspectives on entrepreneurial choice. The first considers entrepreneurial choice through entrepreneurship determinants, the factors that influence entrepreneurial opportunities and the attractiveness of an entrepreneurial career. The second perspective considers entrepreneurial choice from the decision-maker's perspective. In this paper we will consider why a lack of policy-makers' attention to the second perspective might lead to a decreased entrepreneurial policy effect.

## Policy-makers' Perspective

Policy-makers construct entrepreneurial policies based on entrepreneurship determinants (Ahmad and Hoffman, 2008). A Eurostat Report on Entrepreneurship Determinants (2012) names three groups of entrepreneurship determinants: opportunities, skilled people and resources.

The OECD report, *Entrepreneurship at a Glance 2012*, includes such determinants as creation and diffusion of knowledge, access to finance, regulatory framework, market conditions, entrepreneurial capabilities and entrepreneurship culture. In this classification, opportunities and market conditions represent two distinct groups, in contrast to the previous classification. The OECD classification also adds two more groups of entrepreneurship determinants, regulatory framework and culture. This list of factors has several disadvantages, the main one being the interdependence between groups of factors. "Creation and diffusion of knowledge" includes a subgroup "university interface"; this has an impact on the "business and entrepreneurship education" subgroup, included in "entrepreneurial capabilities". The groups of determinants as explanatory factors should not overlap as that would create a problem of multicollinearity, making it impossible to evaluate the effect of the determinants (Tintner, 1975). Because of this, the listed classifications of determinants have limited applicability in policies focused on entrepreneurship motivation.

## Decision-makers' Perspective

The second approach, which considers entrepreneurial choice from the decision-maker's perspective, is represented by occupational choice models and models of entrepreneurial decisions.

The earlier models of entrepreneurial decisions were based solely on financial factors. According to Evans and Jovanovic (1989), an individual will choose an entrepreneurial career only if their expected income would exceed the income from working for others. The occupational choice model assumes that entrepreneurship is a career alternative considered by a decision-maker (de Wit, 1993). According to this model, if  $pi > w$  ( $pi$ —profit from entrepreneur,  $w$ —wage), an individual will choose to become an entrepreneur.

The key disadvantage of these models is the absence of non-financial factors in entrepreneurial decisions. However, starting with Schumpeter (1934), non-financial factors were considered as the key driving force of entrepreneurial decisions (Burke *et al.*, 2000; McClelland, 1961).

Non-financial factors as decision criteria appear in later models, such as Sullivan (2009):

$$V_{igt}^* = w_{igt} + H_{igt} + \varepsilon_{igt} \quad (1)$$

Where the value of a career alternative  $V_{igt}^*$  depends on income  $w_{igt}$  and non-financial gain  $H_{igt}$  in occupation  $q$ . Although Sullivan emphasises the importance of non-financial criteria, these are not specified.

Simon Parker (2009) decided to combine two perspectives and created an equation that includes both future benefits and entrepreneurship determinants:

$$Z^*=z(\Pi-w, X_{huc}, X_{soc}, X_{risk}, X_{psy}, X_{dem}, X_{ind}, X_{mac}, X_{emp}) \quad (2)$$

Where  $Z^*$  is the preference to become an entrepreneur,  $\Pi-w$  represents the difference between entrepreneurship profit and wage. Other elements are  $X_{huc}$  human capital,  $X_{soc}$  social capital,  $X_{risk}$  risk,  $X_{psy}$  psychological factors,  $X_{dem}$  demographic factors,  $X_{ind}$  industry-specific factors,  $X_{mac}$  macroeconomic factors and  $X_{emp}$  characteristics of employers. Parker also attributes all individual behavioural and psychological factors to a single group  $X_{psy}$ .

Parker's classification also faces the multicollinearity problem. The financial determinant  $\Pi-w$  strongly depends on industry-specific factors, risk and human capital. Also, a lack of attention to the different effects of psychological factors can cause biased results (Drouin *et al.*, 2019).

From the decision theory perspective, all the models have another shortcoming: they do not take into account the biased perception of potential gains (Krawczyk and Wilamowski, 2017).

### Policy-makers' Perspective Limitations

The final decision to become an entrepreneur is based on expected benefits from an entrepreneurial career, while entrepreneurship determinants represent factors that are supposed to influence these expected benefits. However, the perception of expected benefits by potential entrepreneurs can be biased (Cooper *et al.*, 1988; Hamilton, 2000; Hsu *et al.*, 2017; Zhang and Cueto, 2017).

The policy-makers' perspective, which is based on entrepreneurship determinants, assumes that potential entrepreneurs are fully aware of all existing conditions. In reality, however, potential entrepreneurs have bounded awareness of current entrepreneurship policies (Algate, 2015; Rigby and Ramlogan, 2016) and limited knowledge about market opportunities (Kotler, 1990; Leavy and Hossain, 2014; Peters, 2012; Abdullah and Sulaiman, 2013). Another serious limitation of the policy-makers' perspective is that it does not take into account non-financial decision criteria (Hurst and Pugsley, 2011). From all of the above, we might conclude that the decision-makers' perspective represents a more accurate way of forecasting the future number of entrepreneurs.

### ENTREPRENEURIAL DECISION MODEL: DECISION THEORY FRAMEWORK

The key reason for decision theory (DT) application is that the DT models analyse the effect of biases on an individual's decisions and are focused on the decision-making process. One of the important contributions of DT is the classification of decision-making strategies.

### Conflicting Objectives in Entrepreneurial Decisions

The Multi-Criteria Decision Analysis (MCDA) as a DT strategy deals with the problem of multiple conflicting objectives (Allmendinger, 2017; Garg, 2017). MCDA can be presented as:

$$V_i = \sum_{j \in J} w_j v_{i,j}, \sum_{j=1}^J w_j = 1 \quad (3)$$

Where the value  $V$  of an alternative  $i$  is a sum of the alternative scores on each criterion  $v_j$ , which are multiplied by the importance (weight) of a criterion ( $w$ ).

According to the existing research, multiple conflicting objectives are one of the inherent characteristics of entrepreneurial decisions (Ezhova, 2013; Hanafiah and Yousaf, 2016). These conflicting objectives assume a trade-off between pecuniary and non-pecuniary benefits, profit vs free time, self-actualisation vs prestige of a position (Jackson, 2002), salary vs freedom (Kolok, 2014; Pitt Watson, 2014; Shane, 2013).

### Different Importance of Criteria

The importance of each of the decision criteria can be different depending on the decision-maker. People involved in entrepreneurship name different reasons for their career choice and might give more weight to any of the factors, including freedom, flexibility, opportunity of self-realisation or higher income (Dobbins and Pettman, 1998; Parker, 2009).

MCDA assumes not only competing goals in decision-making, but also a different importance of criteria; this represents the second reason for the suitability of MCDA for entrepreneurial decision modelling. The different importance of criteria can be modelled as:

$$w_{e,j} \neq w_{f,j} \quad \forall e \neq f \quad (4)$$

The importance of a criterion  $j$  for an individual/group  $e$  is different from the importance of a criterion  $j$  for an individual/group  $f$ .

### Uncertainty in Entrepreneurial Decisions

Uncertainty is another characteristic of entrepreneurial decision context (Navis and Ozbek, 2017). The low survival rate of companies during the first years of operation is one of the indicators of high uncertainty of entrepreneurial choice. The uncertainty issue can be added to the model as a multiplication of alternative outcomes of each of the considered decisions by their probabilities (Keeney and Raiffa, 1976):

$$v_{i,j} = \sum_{l=1}^L p_l a_{l,i,j} \quad (5)$$

$v_{i,j}$  is the expected performance of alternative  $i$  by criterion  $j$ ,  $a_{l,i,j}$  represents the performance of an alternative  $i$  under criterion  $j$  in case of scenario  $l$ , while  $p_l$  is the probability of scenario  $l$ .

## Maximisation vs Satisfaction

The entrepreneurial decision context assumes a maximisation or satisfaction approach (Thaler and Sunstein, 2009). The decision-maker might be willing to achieve a certain satisfying level on a particular criterion (satisfaction) or they might be looking for an alternative with the best possible performance on a criterion (maximisation). Existing entrepreneurial decision models apply only one approach, maximisation: income from entrepreneurship is always compared to a wage. Existing literature, however, demonstrates that there might be a minimum level of income that the decision-maker wants to receive (Kireev, 2007), and if this level is achieved then other, non-financial factors might play a greater role in occupation choice (Munoz and Otamendi, 2014).

The satisfying level of a criterion can be added to the model as:

$$v_{i,j} \geq m_j \quad (6)$$

So the value of alternative  $i$  under criterion  $j$  should be not less than a certain satisfying level  $m_j$  (determined for the criterion  $j$ ).

## Biased Perception of Future Gains and Benefits

Future gains and benefits might be overestimated or underestimated by potential entrepreneurs. While overestimation leads to future business failure (Brundin and Gustafsson, 2013; Krawczyk and Wilamowski, 2017), underestimation leads to fewer people starting an entrepreneurial career (Renko *et al.*, 2012).

This biased perception of future benefits can be modelled as:

$$v_{i,j} \neq v_{i,j}^* \quad (7)$$

Where  $v_{i,j}^*$  is the objective future benefit  $j$  that will be received by the decision-maker if they choose a career alternative  $i$ , while  $v_{i,j}$  is the subjective perception of future benefit.

As a consequence, the entrepreneurial career value can be modelled as follows:

$$V_a = \sum_{j \in J} w_j v_{a,j} \begin{cases} v_{a,j} \geq m_j \\ v_{a,j} = \sum_{l=1}^L p_l a_{l,a,j} \\ v_{a,j} \neq v_{a,j}^* \\ w_{e,j} \neq w_{f,j} \quad \forall e \neq f \end{cases} \quad (8)$$

A decision-maker is expected to choose the alternative that will have the highest value compared to other alternatives.

## EMPIRICAL STUDY

### Methodology

In order to justify the model, an interview was conducted with 60 entrepreneurs. Two groups of entrepreneurs, rural and urban, took part in the survey. Existing literature provides sufficient evidence that rural and urban entrepreneurs represent two distinct groups with different decision priorities (Faggio and Silva, 2014; McElwee, 2006; Nielsen and Freire-Gibb, 2010). Therefore, two different groups of entrepreneurs will allow us to check the difference in decision criteria importance. The interview contained four questions. The first question asked interviewees to evaluate the importance of financial and non-financial factors on a 100 point scale. The second question asked interviewees about the risks they considered before starting their business. The third question asked interviewees whether they underestimated or overestimated their future benefits when they were choosing to start their own business. Finally, interviewees were asked whether they would agree to change their business sphere if the guaranteed income in another sphere is two times higher.

### Survey Data

Interviews were conducted in Russia with 60 entrepreneurs: of these, 30 were rural entrepreneurs and the other 30 were from construction, consumer goods, consumer services and health, finance and technology.

The age of the entrepreneurs varied from 28 to 54. Three interviewees in the rural group (10%) and seven interviewees in the urban group (17%) had a business education. Interviewees represented different backgrounds and cities of origin.

## RESULTS

The results are presented in Table 1.

**Table 1: Results for rural and urban groups of entrepreneurs**

	Fin*	Non-fin*	Underestimated (%)	Overestimated (%)	Risks (%)
Rural	77	82	13	27	83
Urban	91	81	27	50	93

\*Mean values

Source: Constructed by author from research data

The average importance of financial benefits was 77 and 91 points in the rural and urban groups respectively. The difference in mean values is statistically significant (t-test p-value = 0.01445). The average importance of non-financial criteria is nearly the same in the two groups (82 in rural and 81 in urban). In other words, while non-financial factors have similar importance for both groups of entrepreneurs, there is a significant difference in the importance of the financial factors. This result

demonstrates that the importance of different entrepreneurial benefits is different for two distinct groups of entrepreneurs:  $w_{e,j} \neq w_{f,j} \quad \forall e \neq f$ .

A total of 15 interviewees in the urban (50%) and 8 interviewees in the rural group (27%) declared that they had overestimated future benefits when they considered an entrepreneurial career. Eight interviewees in the urban (27%) and four interviewees in the rural group (13%) declared that they had underestimated future benefits when they had considered an entrepreneurial career. The results show that 77% of urban and 40% of rural entrepreneurs demonstrated different expected and real benefits:  $v_{a,j} \neq v_{a,j}^*$ .

When interviewees were asked whether they would agree to change their business sphere if their guaranteed income was two times higher, the results were as follows. A total of 14 interviewees in the rural group (47%) and 1 (3%) in the urban group answered that they would not change their business sphere even if their income increased by more than 100%. The other interviewees declared that they would agree to change their business sphere in case of a significant increase in profits. For the rural entrepreneurs, 9 of the 14 who were not ready to change their business sphere, at the same time gave 100 points importance to financial factors. In other words, although they mentioned financial factors as more important than non-financial, they still were not ready to change their business sphere even if their income doubled. This result demonstrates a confirmation of a satisfying approach application ( $v_{a,j} \geq m_j$ ). Therefore, even though financial benefits represent the key criterion, if a certain satisfying level of income is achieved, non-financial factors start playing a greater role for the decision-maker.

Potential risks were considered by 28 (93%) of urban and 25 (83%) of rural entrepreneurs. However, when interviewees were asked to explain how they evaluated future risks, none of them mentioned different scenarios (for example, optimistic, realistic and pessimistic), according to which their future gains might vary. Instead, all interviewees declared that they only considered the risk of losing their business and money invested. From these results we can conclude that the equation  $v_{a,j} = \sum_{l=1}^L p_l a_{l,a,j}$  might be not a proper modelling tool for entrepreneurial decisions, as the decision-making process of the interviewed entrepreneurs did not include the risks of lower than expected benefits.

## MODEL CONTRIBUTION

This paper has created a new entrepreneurial decision model that includes behavioural factors of entrepreneurial decisions, such as biased perception of future benefits, application of a satisfying approach, different importance of criteria for different entrepreneurial spheres, and probabilities of different scenarios.

As demonstrated in the literature review, previous research did not model these behavioural aspects of entrepreneurial decisions (Parker, 2009; Sullivan, 2009; de Wit, 1993), although the importance of the described factors is discussed in a number of recent papers (Adomako *et al.*, 2016; Krawczyk and Wilamowski, 2017; Tykocinski *et al.*, 2017).

The suggested model can be applied in the development of entrepreneurship policies as it provides a framework for:

- measuring sufficient (satisfying) level of benefits that determine entrepreneurial decisions in order to avoid ineffective resources allocation (Arshed *et al.*, 2014; Sarfati, 2012);
- identifying benefits importance for a particular entrepreneurial group in order to foresee different effects of a certain policy on various types of entrepreneurs (Nielsen and Freire-Gibb, 2010);
- analysing and avoiding biased perception of benefits that might appear due to a lack of knowledge about existing policies (Hunter and Sanders, 2013) and unobjective perception of future gains by potential entrepreneurs (Brundin and Gustafsson, 2013; Krawczyk and Wilamowski, 2017).

The new model, which includes the possibility of a minimum acceptable level of entrepreneurial income, questions subsidies as an instrument of entrepreneurship motivation; this correlates with existing research on the limited effect of subsidies (Hurst and Pugsley, 2015).

The new model suggests an analysis of the different importance of entrepreneurial benefits. The empirical study clearly demonstrates that urban and rural groups of entrepreneurs have assigned different importance to pecuniary and non-pecuniary factors; this correlates with previous research on this topic (Dobryagina, 2020).

Entrepreneurial policies are supposed to increase expected future benefits of an entrepreneurial career for potential entrepreneurs. The created model and its application on empirical data emphasises that non-financial benefits can play a greater role than financial criteria. Therefore, entrepreneurship policies might also be devoted to the augmentation of non-pecuniary benefits.

The model also focuses policy-makers' attention on entrepreneurs' awareness about business opportunities. The existing literature confirms that the mere informing potential entrepreneurs about business opportunities might increase the attractiveness of an entrepreneurial sphere (Dobryagina, 2020).

## MODEL LIMITATIONS AND FURTHER RESEARCH

One of the limitations of the model is that there is no list of decision criteria  $v_{a,j}$  in the  $V_a = \sum_{j \in J} w_j v_{a,j}$  formula. In addition, the list of entrepreneurial decision criteria might vary depending on country and industry. For example, sustainability and social preference represent an important criterion in the decision-making process of potential entrepreneurs in developed countries (Choi and Gray, 2008), while in developing countries only a limited number of entrepreneurs consider it as a benefit (Ahmad *et al.*, 2021).

The empirical study was conducted with people who had already made the decision to become entrepreneurs. Their biased perception of future benefits was not the reason they did not start an entrepreneurial career. Therefore, future research should include people who were considering an

entrepreneurial career but chose another alternative. This new study should be focused on whether underestimation of future benefits could be a reason of not choosing the entrepreneurial path.

## CONCLUSIONS

The paper identifies the key gaps between policy-maker's and decision-maker's perspectives on entrepreneurial choice. The model developed in the paper applies decision theory and takes into account biases in entrepreneurs' decision-making process. The suggested model represents a framework for analysing the minimum acceptable level of income, biased perception of future benefits, and different importance of entrepreneurial benefits for various groups of entrepreneurs. As discussed in the paper, failure to consider these factors might significantly decrease the effect of entrepreneurial policies.

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