

Article

The Structure of Entrepreneurial Team Members' Competencies: Between Effectuation and Causation

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Abstract: A conscious shaping of entrepreneurial competence is a relevant element of entrepreneurial education. In order to recognize which of the competencies regarded as entrepreneurial are characteristic of members of entrepreneurial teams, which is crucial for the work of those teams, it is necessary to identify the structure of those competencies. This quantitative study was conducted with the use of a survey method and involved 111 entrepreneurs working within 48 entrepreneurial teams. The main objective of the research was to verify the compliance of entrepreneurial competence with the effectual vs. causal approach, which would allow us to answer the question regarding which of these approaches characterizes entrepreneurs to a greater extent. This study aimed to examine which entrepreneurial competencies characterize entrepreneurs working in entrepreneurial teams, to verify them with the effectual vs. causal approach, and to define their internal structure. The results of this research revealed that the competencies related to the effectual approach are indicated to more frequently and strongly characterize the surveyed entrepreneurs. Additionally, an exploratory factor analysis enabled the identification of three main, internally consistent groups of elements forming the competence structure of the surveyed entrepreneurs. Our results may be used in the development and modernization of curricula and courses in entrepreneurship education.

Keywords: entrepreneurial competencies; causation; effectuation; entrepreneurial teams; entrepreneurial education

1. Introduction

One of the basic objectives of entrepreneurship education is the conscious shaping of competencies necessary in the process of initiating and conducting effective entrepreneurial activity. Which competencies are considered supportive in such activities depends, among other things, on the understanding and approach to the decision-making process in entrepreneurial operations. For a long time, the traditional, causal approach to entrepreneurship assumed a linear causality of this process based on intentional and planned identification, as well as a rational assessment regarding the chances of realization of the assumed operation and, if this assessment was positive, further controlled implementation of the project. Meanwhile, the developing concept of effectuation assumes that the entrepreneur creates the directions and objectives of action himself, based on the subjective perception of current possibilities. Additionally, this action may be subject to constant modification resulting from the variability of conditions or their subjective evaluation. The previous research on the issue of approaches to the entrepreneurship process has focused on attempts to assess its overall character (whether it is causal or effectual) as well as to evaluate the effectiveness of using each approach [1], the correlation between using one of the approaches and the experience of the entrepreneur [2,3] or the stage of development of the project [4,5], as well as specific areas of entrepreneurial activity where the effectuation is to be particularly effective [6–8]. Despite the constant development of this

research, the issue of the existence of specific competencies necessary to undertake activities related to one of the approaches is recognized relatively sparingly [9]. Therefore, the main objective of the research presented in this article was to verify the compliance of the entrepreneurs' competencies with the effectual vs. causal approach and to subsequently examine the internal structure of the competencies held by entrepreneurs. On the one hand, the results of the research will allow us to broaden the existing knowledge on entrepreneurial competence, while, on the other, the authors of the study are convinced that its conclusions may help to develop training programs or workshops for the development of entrepreneurial competence. Simultaneously, the adopted method can be used to map the competencies of participants of such training.

2. Competencies through the Prism of Entrepreneurship and Their Implications for Entrepreneurial Education

Among works relating to entrepreneurial behavior, entrepreneurial orientation and the association between entrepreneurship process and related competencies, it is worth mentioning Covin and Slevin [10], who established a conceptual model of entrepreneurship as an organizational-level phenomenon. They described entrepreneurship as a dimension of strategic posture represented by a firm's risk-taking propensity, tendency to act in competitively aggressive, proactive manners, and reliance on frequent and extensive product innovation. Moreover, in the context of innovative ventures, Dyer, Gregersen and Christensen [11] have developed a theory that entrepreneurs differ from executives in four behavioral patterns through which they acquire information, such as questioning, observing, experimenting and idea networking. Finally, Lumpkin and Dess [12] explored and determined the following dimensions of entrepreneurial orientation: autonomy, innovativeness, risk-taking, proactiveness, and competitive aggressiveness. Much attention has also been paid to the earliest stages of the development of new economic activities and organizations, by focusing on entrepreneurial opportunities [13–15]. To capture the many important ideas commonly discussed under the "opportunity" label, Davidsson [16] suggested putting a strong emphasis on such constructs as external enablers, new venture ideas, and opportunity confidence. Discussions on entrepreneurial competencies can be derived from these approaches.

2.1. Entrepreneurship and Competencies

As Mitchelmore and Rowley [17] describe competency as a class of features which can be used to characterize individuals and their behaviors, there are many elements that are recognized as being associated with an entrepreneurial mindset, i.e., action orientation, entrepreneurial intentions, the need for achievement or risk acceptance. Based on these features, a list of entrepreneurial competencies can be created [18]. The term "competence" has been broadly discussed in the literature [19] and there are many different methods of its understanding [20]; however, there is no doubt that competencies are one of the key factors of entrepreneurial development. Similarly to Kynd and Baert [21], we perceive competencies as combined and integrated components of knowledge, skills and attitudes, which are necessary to achieve the desired performance level in a particular activity or task [22] and to execute the work successfully [23].

Perceiving competencies as a key feature influencing venture performance is a relatively new development [22,24,25]. Entrepreneurial competencies represent essential skills which include all existing and acquired knowledge leading the entrepreneurs to certain behaviors and actions [25]. Both of them can be referenced to managerial competencies [26,27], as well as derived from the entrepreneurial literature [17]. There are a few classifications of entrepreneurial competencies ordered by the temporal assessment of competencies—before or after venture formation or the location of competencies—from an individual to an organizational level [28]. As various authors place these elements differently within the discourse [21,29–40], below, several examples of various approaches are presented. Some authors indicate only a few (from three to six) components of entrepreneurial competencies, e.g., Rasmussen, Mosey and Wright [29] emphasize the role of opportunity refinement,



leveraging and championing. Sanchez [30] points to individual characteristics specifically linked to an entrepreneurial attitude such as self-efficacy, pro-activeness, and inclination towards risk-taking. Hayton and Kelley [31] indicate innovation, brokering, championing and sponsoring, while Man, Lau and Chan [32] distinguish categories that include opportunistic, relational, conceptual, organizing, strategic, and commitment competencies. Other authors extend the list of entrepreneurial competencies to include 10 or 12 components. The list mentions perseverance, self-knowledge, orientation towards learning, awareness of potential returns on investment, planning for the future, independence, building networks, an ability to persuade, seeing opportunities, insight into the market, social and environmentally conscious conduct [21] or performance orientation, creativity, taking initiative, taking calculated risks, leadership, communication skills, planning and organizing, decisiveness, collaboration, reflection [39] and many more. These competencies can be shaped, acquired and developed purposefully during the course of education.

2.2. Education for Shaping Entrepreneurial Competencies

Education is a crucial determinant of individuals' professional situation [41], and entrepreneurship education affects, among other things, students' entrepreneurial intention, as well as the self-efficacy of their entrepreneurial decision-making [42]. Nowadays, in the context of increasingly dynamic socio-economic changes, the awareness of the need for economic education is growing [43], while a bigger demand for entrepreneurial education in the hope of boosting new venture creation can be observed [44]. Higher education institutions are expected to create an entrepreneurial mindset and competencies with the purpose of making students be able to identify opportunities and transform them into market solutions [45]. However, as was stated by Czyżewska and Mroczek [46], in the modern economy, said education has become a challenge due to the growing complexity in managing a business, as well as the universality of entrepreneurial competencies. Previous examinations have proven that, whereas competencies can be shaped [47], more attention should be paid to developing business competencies as part of the reform of the education system, and entrepreneurship education should become more practical and oriented towards preparation for operating one's own business, as well as using financial services [48]. While modern entrepreneurial education is driven by the goal to develop real-life business skills and behaviors [49], it is important to make an effort to recognize and analyze entrepreneurial competencies and then use the acquired knowledge to enhance the quality of said education. It can be achieved by creating or modernizing curricula within all levels of the educational system (primary, secondary and university level), but also by life-long learning, within which entrepreneurship was defined as one of the key competencies by the European Union [50]. This may take the form of designing specific training programs and workshops aimed at developing the competencies of both new and experienced entrepreneurs, as business education on previous levels prepares students in a general manner, while life-long learning is oriented towards suitable work-related requirements.

3. Causal and Effectual Approaches to the Entrepreneurial Process

The concept of effectuation was introduced into the literature by Sarasvathy [51], who contrasted it with the causal decision-making process, and has been described as a logic of perception that aids entrepreneurs in starting businesses, particularly when the future is unpredictable. It is not a linear description of a "to do" process, but rather heuristics that apply to the challenges that entrepreneurs encounter [2,51–53]. More generally, effectuation aims at controlling present solutions without relying on analytic techniques [54].

The difference between the two approaches is visible at the level of basic aspects of conducting business activity, i.e., the development and establishment of a business strategy, relationships with business partners and competitors, perception of business opportunities, reaction to change and unexpected events, utilization of resources and the development of products and solutions. In the traditional understanding of entrepreneurship, using a cause-and-effect (causal) approach,

the entrepreneur first attempts to objectively and logically identify achievable objectives, assess the chances of achieving them, and then begins to search for and collect the resources necessary to achieve the previously planned objective. After their assembly, he implements the previously created business plan and controls its execution. In the process of effectuation, however, the entrepreneur's action consists initially of a subjective recognition of his own existing resources at a given moment (Who am I? What do I know?) and, on this basis, the creation of directions and objectives of action (What can I do?), which are open to modifications and modernization at all times, resulting from the change in the characteristics of the situation and the arrival of new information. Interaction with the environment and other entrepreneurs, regarded not as a competition but as people who can co-create a given undertaking, play a very significant role in this approach [2,52]. The described differences are often presented as complete opposites: competitive landscape vs. stakeholder commitment, controllability vs. uncontrollability, risk aversion vs. affordable loss, predictability vs. unpredictability or flexibility vs. rigidity [54]. This takes place regardless of the fact that Sarasvathy (2001) has been emphasizing, from the initial moment of presenting the concept of effectuation, that both ways of thinking and acting are natural to each person and can be used by them depending on the context of the decision and operation taken. Moreover, the results of certain studies [55] indicate that the use of both approaches is beneficial for the conducted projects. In the context of the presented research, it is worth emphasizing at this point that Smolka et al. [55] believes that working in teams conducting a joint business venture may create an environment that enables both approaches to be shared and implemented.

The above considerations lead to substantive conclusions. If the literature emphasizes that, for effective entrepreneurial activity, it is necessary to possess specific entrepreneurial competencies, then the successful completion of an activity characterized by an effectual or causal logic should result from adequate competencies. This indicates that, by examining the competence of entrepreneurs, it is possible to assess which approach they are associated with.

These approaches became the introduction for the selection of specific items for the empirical part of the study, the assumptions and results of which are presented below. Some of the competencies listed above belong to the causal approach, such as planning and organizing, while others can be assigned as effectual, e.g., opportunity refinement or inclination towards risk-taking. However, this does not contradict the fact that both serve a specific role in undertaking and executing entrepreneurial activities. They form a basis for decision-making, activities and achieving objectives and they are linked to the performance level, as well as the probability of the venture's success.

4. Methods

Based on the theoretical assumptions presented above, the following research objectives were set:

Examination of which entrepreneurial competencies characterize entrepreneurs working in entrepreneurial teams,

- (1) Verification of compliance of these competencies with the effectual vs. causal approach,
- (2) Determination of the internal competence structure of the surveyed entrepreneurs.

The study had a quantitative character and was conducted based on a survey method. This type of research is very often used for the examination of entrepreneurial competence, as it results from the belief that an individual possesses competence that influences his or her behavior [56,57]. The questionnaire was distributed to the respondents electronically between October and December 2019.

4.1. Research Sample

The research sample was selected on the basis of purposive sampling. Using a database of 4000 enterprises run by entrepreneurial teams in northern Poland, an invitation to participate in the study was sent to randomly selected teams. Since only 2 of the selected teams agreed to the survey, two additional paths to reach the respondents were implemented. First, we sent an invitation to

the remaining entrepreneurial teams in the database. Second, responders were asked to identify entrepreneurial teams known to them and to recommend the study (chain referral sampling).

The survey involved 111 entrepreneurs working in 48 teams defined as groups of entrepreneurs who act together during stages of the entrepreneurial process: identify opportunities, define the goal and the model of the venture, make strategic decisions, assess the need for various resources, acquire these resources, manage the company's development and share profits [58,59]. Entrepreneurial teams consisted of 2 to 6 people. Among the surveyed entrepreneurs, there were 31 women (28%) and 80 men (72%). The ages of the surveyed entrepreneurs were between 23 and 66 years (M 36.9; Me 35.5; SD 10.3). The surveyed respondents were part of entrepreneurial teams that were mainly operating micro enterprises (94 respondents); 15 respondents represented small enterprises and only 2 represented medium ones. The study participants represented both manufacturing (food, sanitary and furniture) and service industries (retail, hotel, healthcare and training).

4.2. Questionnaire

The questionnaire used in the study was created at an earlier stage of the project [60]. Based on the literature research, six basic aspects of an entrepreneur's activity—development and establishment of business strategy (strategy), relationships with business partners and competitors (partners), perception of business opportunities (opportunities), reaction to change and unexpected events (change) utilization of resources (resources), development of products and solutions (solutions)—and two approaches to entrepreneurship—effectual vs. causal—were adopted. For example, the item for the utilization of resources in the effectuation approach was “relying on and employing what I have”, while in causation it was “estimating and obtaining the resources needed”. The item for the development of products and solutions in the effectuation approach was “Active search for new solutions and directions of operation”, while for causation it was “In-depth analysis of ideas before their implementation”.

In the first step, a review by experts was used to assess the congruence of items with one of the two approaches to entrepreneurship. On this basis, 44 items were selected for testing in pilot studies. The results obtained in these studies were analyzed and the following statistical tests were used: Cronbach's alpha coefficient was calculated for each subscale to obtain an internal reliability score and, in a subsequent step, paired-sample *t*-tests were performed to verify which competencies were perceived as more important for an effective entrepreneur within each activity aspect (i.e., effectual or causal ones). After analyzing the results of all the items, those that were found to decrease reliability and validity were excluded and, to strengthen the probability of obtaining a valid and reliable questionnaire, the selected items had to meet three criteria: they had to be congruent with the theoretical description of the effectual and causal approach; they had to represent each of the previously identified aspects of the entrepreneurs' activities; they had to form an internally reliable scale. Once these conditions were met, the questionnaire reached the internal reliability level of 0.74 in the case of effectuation and 0.76 in the case of causation. These levels can be perceived as fully satisfactory [61,62] and allow further use. Since the measured items that were found to decrease reliability and validity were excluded, their numbers in categories are different. However, the numbers of items in the causation and effectuation scale are the same.

Prior to completing the questionnaire, the respondents were asked to carefully examine the items on the list and decide to what extent each feature characterizes them. To collect the answers, a five-point scale was used, where numbers correspond to the following categories: 1—“it doesn't concern me at all”, 2—“it rather doesn't concern me”, 3—“it moderately concerns me”, 4—“it rather concerns me”, 5—“it concerns me very much”. The names of the entrepreneurs' activity aspects, as well as approaches to entrepreneurship, were not revealed to study participants to reduce the risk of biased responses. The mean results of the responses received for individual items are presented in Table 1 below.

Table 1. The results of the average indications for each competence category and t-Student test for one group ¹.

No.	Category	Variable/Competence	M	t-Student	Significance Level
1	EFF_strategy_1	Analyzing the current situation to modify plans accordingly	4.31	18.74	***
2	EFF_resources_1	Relying on and employing what I have	4.24	14.12	***
3	EFF_partners_1	Recognizing the source of potential business development opportunities in business partners	4.19	13.45	***
4	EFF_change_1	Adapting plans and operational methods of the company to the changing situation	4.16	15.95	***
5	EFF_solution_1	Active search for new solutions and directions of operation	4.12	12.73	***
6	CAU_solution_1	In-depth analysis of ideas before their implementation	4.11	11.68	***
7	EFF_resources_2	Proper evaluation of the resources available and determining methods of operation on their basis	4.08	12.07	***
8	EFF_opportunities_1	Discovering the development opportunities even in a situation of failure or crisis	4.06	13.81	***
9	CAU_strategies_2	Adapting the activity to the long-term strategic objectives	3.93	9.941	***
10	CAU_resources_1	Estimating and obtaining the resources needed	3.93	11.13	***
11	CAU_partners_3	Searching for business partners among those who provide profit from cooperation	3.86	8.486	***
12	CAU_strategy_1	Prioritization of work according to the long-term business objectives of the company	3.86	8.926	***
13	CAU_resources_2	Searching for external resources necessary to achieve predetermined objectives	3.81	8.441	***
14	CAU_opportunities_1	Analysis and estimation of costs and profits resulting from the implementation of possible alternatives	3.73	7.770	***
15	EFF_partners_2	Creating a network of business acquaintances and using it in business activities	3.71	6.315	***
16	EFF_resources_3	Indicating resources that can be sacrificed or lost	3.61	6.578	***
17	CAU_partners_2	Collecting information about rival entrepreneurs, analyzing competition and monitoring their actions	3.55	5.025	***
18	CAU_partners_1	Noticing that business partners can become a source of potential threats or competitors	3.52	4.956	***
19	EFF_resources_4	Engaging only those resources whose loss is acceptable	3.33	3.442	***
20	CAU_change_1	Holding to a plan once chosen, also in the event of changes	3.00	0.000	ns

¹ Source: Own elaboration: EFF—effectual competencies, CAU—causal competencies. *** $p < 0.001$, ns—not significant.

5. Results

Initially, the average answers of the respondents regarding the list of competencies, consistent with the effectual and causal approaches, were analyzed. The IBM SPSS software was used for all statistical analyses in the presented study. The mean of the whole list of competencies related to the effectual approach was higher ($M = 3.99$; $SD = 0.52$) than the causal one ($M = 3.73$; $SD = 0.61$). Statistical analysis using the dependent-sample *t*-test revealed that the difference is statistically significant at $T = 6.121$; $p < 0.001$. This implies that the surveyed entrepreneurs believe that effectual competencies characterize them more strongly than causal ones.

5.1. The Analysis of Competence Categories

In the next step, the average answers for each competence category were analyzed statistically using the t-Student test for one group, verifying the statistical hypothesis of the presence vs. absence of an indication of each competence as a characteristic for the responders. Obtaining a mean of more than three indicated that the respondents recognized a given competence to a higher degree than moderately, on a scale of 1–5. (Table 1).

The analysis of average responses for individual items revealed that the five initial, most strongly recognized elements (M 4.31–4.12) belong to different categories of effectual competencies: Strategy—analyzing the current situation to modify plans accordingly; Resources—relying on and employing what I have; Partners—recognizing the source of potential business development opportunities in business partners; Change—adapting plans and operational methods of the company to the changing situation; Solution—active search for new solutions and directions of operation. In the first ten highest-ranked categories, however, there are competencies belonging to all six effectual categories, including two in the resources category. This implies that the surveyed entrepreneurs rate the occurrence of particular categories of effectual competencies higher than causal ones.

It is worth noting that the most strongly evaluated causal competence belongs to the solution category—in-depth analysis of ideas before their implementation—while the most poorly assessed effectual competence involves the resources category—indicating resources that can be sacrificed or lost. A detailed interpretation of these results requires further research; however, it appears that possession of the mentioned competencies at this level may be the result of the traditional approach to entrepreneurship that has been preferred in educational programs thus far, which strongly emphasizes in-depth analysis and minimizing losses rather than their planning.

5.2. The Analysis of a Given Set of Variables Structures

Next, to uncover the underlying structure of a given set of variables, exploratory factor analysis (EFA) was used. EFA is a statistical technique that is widely utilized and broadly applied in the social sciences [63], whose ultimate objective is to uncover and identify the underlying relationships between measured variables. This technique should be used when the research is not an a priori hypothesis about factors of a pattern of measured variables. Thus, it gives us the opportunity to discover a more interpretable structure that adequately represents the data within a factor [64]. EFA provides procedures for determining an appropriate number of factors and the pattern of factor loadings, where factor loadings are understood as numerical values that indicate the strength and direction of a factor on a measured variable [65]. The analysis allowed us to distinguish three main and internally consistent groups of factors forming the structure (construct) of competencies characterizing the examined entrepreneurs (Table 2). The first, highest-ranked group (mean of 4.04) consists of the competencies necessary to initiate and conduct the project. The second group (mean of 3.84) are competencies that enable the noticing and implementation of external relationships and resources in the environment. The third one (mean of 3.81) is related to the use of one's own resources in various critical situations. In particular, what is worth emphasizing is the fact that the first two factors (competence groups) are created by both causal and effectual competencies, while the third one is only created by the latter.



Table 2. Results of exploratory factor analysis for the tested effectual and causal competencies ¹.

Factor 1	
Competence Required to Initiate and Conduct the Project	
Mean = 4.04, Reliability: Cronbach's Alpha = 0.840	
Name of factors	Means
Adapting plans and operational methods of the company to the changing situation /EFF_change_1/	4.17
Active search for new solutions and directions of operation /EFF_solution_1/	4.13
In-depth analysis of ideas before their implementation /CAU_solution_1/	4.12
Adapting the activity to the long-term strategic objectives /CAU_strategy_2/	3.93
Prioritization of work according to the long-term business objectives of the company /CAU_strategy_1/	3.86
Factor 2	
The Ability to Notice and Implement External Relationships and Resources	
Mean = 3.84, Reliability: Cronbach's Alpha = 0.748	
Name of factors	Means
Recognizing the source of potential business development opportunities in business partners /EFF_partners_1/	4.20
Searching for business partners among those who provide profit from cooperation/ CAU-partners_3/	3.86
Searching for external resources necessary to achieve predetermined objectives /CAU_resources_2/	3.81
Noticing that business partners can become a source of potential threats or competitors /CAU_partners_1/	3.52
Factor 3	
Internal Resource Management Competence	
Mean = 3.81 Reliability: Cronbach's Alpha = 0.707	
Name of factors	Means
Relying on and employing what I have /EFF_resources_1/	4.25
Discovering the development opportunities even in a situation of failure or crisis /EFF_opportunities_1/	4.07
Indicating resources that can be sacrificed, lost /EFF_resources_3/	3.61
Engaging only those resources whose loss is acceptable /EFF_resources_4/	3.34

¹ Source: Own elaboration: EFF—effectual competencies, CAU—causal competencies.

The applied method, reducing the number of variables/competencies, allowed us to detect their specific structure and the general regularities between them. It appears that the connections detected indicate the possession of competencies that can be applied in a specific purpose or area of certain entrepreneurial activities, regardless of whether they are effectual or causal competencies. Only in the third factor/group do the competencies belong to the effectual categories.

6. Discussion and Limitations

The results of the presented research revealed that the surveyed entrepreneurs, who worked in teams, indicate effectual competencies as those which more frequently and strongly characterize them. At the same time, however, the analysis of the structure of the examined competencies implies the existence of a correlation between the competencies, resulting primarily from the immanent objectives of the business activities, rather than the classification of the competencies as causal or effectual characteristics of these operations.



Despite the apparent lack of consistency in these results, it appears that a rational explanation should include an understanding of the daily activities of entrepreneurs in the current, constantly changing business environment, which requires very flexible and fast action, characteristic of the effectual approach. Simultaneously, we must be aware that—at the foundation of such an activity—lies, anchored in the causation, perhaps only a generally accepted but stable direction (effective entrepreneurial activity), which involves the constant characteristics of the environment and a longer time perspective. Such an understanding of the features of entrepreneurial activities requires both a variety of behaviors and support for their different, both causal and effectual, competencies.

The authors are aware of the limitations that characterize this study, whose assumptions and results are presented above. These include, above all, the limited representativeness of the research sample in relation to the purposive selection. In accordance with the original assumption of the researchers, a survey based on random selection was planned to be conducted in order to obtain a sample representative of the surveyed population. However, due to the difficulties in approaching the examined group, it was not possible to create a large enough random sample; thus, a purposive selection was used. Another disadvantage of the survey was the structure of the sample, which, for the vast majority, represented people from micro-enterprises; although, in some way, it does reflect the structure of enterprises in Poland, which is dominated by small entities. The stage of the entrepreneurial process was also not taken into consideration in our study. When designing future research, to deepen the analysis during further examinations and improve the overall research quality, the limitations indicated above should be removed.

Despite the deficits indicated, this study appears to be a valuable voice in the discussion regarding the analysis of the structure of entrepreneurial competence and, at the same time, may be a foundation for further empirical analyses, including, among other things, answers to questions regarding whether the competencies of members of entrepreneurial teams are different from those of individual entrepreneurs, whether they are complementary or rather homogeneous, whether the nature of the competencies used results from the nature of entrepreneurial activities or rather from a relatively constant set of competencies acquired, e.g., in the course of education and preparation for business activity, whether, in the end, any of the competence groups (causal/effectual) is more effective in certain specific business situations, or whether it is precisely their simultaneous implementation that can influence the effective pursuit of an objective. However, the method presented in this paper of understanding and testing competencies should certainly be considered while constructing training and educational programs related to entrepreneurship, including the conscious implementation and development of competencies.

7. Conclusions

The results of this research have revealed that the competencies related to the effectual approach are indicated to more frequently and strongly characterize the surveyed entrepreneurs. Additionally, an exploratory factor analysis enabled the identification of three main, internally consistent groups of elements forming the competence structure of the surveyed entrepreneurs. The strongest, group I, included the competencies necessary to initiate and conduct a new operation, group II included the skills required to perceive and use external resources, while group III included the competencies of managing internal resources. Moreover, it was found that group I and II were formed both by effectual and causal competencies, while group III only by the former. The value of the research and the importance of the obtained results are increased by the analysis of entrepreneurial competencies through the prism of the effectual and causal approaches, which was not the case in previous studies.

The results may be used in the development and modernization of curricula and courses in entrepreneurship education. Insightful recognition, deepening the analysis of entrepreneurial competency structures, may allow for the selection of a tailored form of entrepreneurship education intervention that is appropriate to the needs of a given group being subjected to the education process. This will enable the development of effective training programs at all levels of entrepreneurial education.



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References

- Shirokova, G.; Osiyevskyy, O.; Laskovaia, A.; MahdaviMazdeh, H. Navigating the emerging market context: Performance implications of effectuation and causation for SMEs during adverse economic conditions in Russia. *Strateg. Entrep. J.* **2020**, *470–500*. [[CrossRef](#)]
- Sarasvathy, S.D.; Dew, N. New market creation through transformation. *J. Evol. Econ.* **2005**, *15*, 533–565. [[CrossRef](#)]
- Cha, V.; Ruan, Y.; Frese, M. Re-visiting Effectuation: The Relationships with Causation, Entrepreneurial Experience, and Innovativeness. In *The Entrepreneurial Behaviour: Unveiling the Cognitive and Emotional Aspect of Entrepreneurship*; Caputo, A., Pellegrini, M.M., Eds.; Emerald Publishing Limited: Bingley, UK, 2020; pp. 213–237.
- Matalamäki, M.J. Effectuation, an emerging theory of entrepreneurship—Towards a mature stage of the development. *J. Small Bus. Enterp. Dev.* **2017**, *24*, 928–949. [[CrossRef](#)]
- Pacho, F.T.; Mushi, H. The effect of effectuation set of means on new venture performance: Flexibility principle as a mediating factor. *J. Entrep. Emerg. Econ.* **2020**. [[CrossRef](#)]
- Brettel, M.; Mauer, R.; Engelen, A.; Kupper, D. Corporate effectuation: Entrepreneurial action and its impact on R&D project performance. *J. Bus. Ventur.* **2012**, *27*, 167–184.
- Cieślak, J.; Skala, A. Nowe tendencje w kształceniu innowacyjnych przedsiębiorców. *Horyz. Wych.* **2016**, *15*, 309–322.
- Wu, L.; Liu, H.; Su, K. Exploring the dual effect of effectuation on new product development speed and quality. *J. Bus. Res.* **2020**, *106*, 82–93. [[CrossRef](#)]
- Tomczak, M.T.; Stankiewicz, K.; Krawczyk-Bryłka, B.; Ziemiański, P. Planowanie czy spontaniczność—Jakich kompetencji potrzebuje współczesny przedsiębiorca? *Zarządzanie Zasobami Ludzkimi* **2019**, *2*, 27–41.
- Covin, J.G.; Slevin, D.P. A conceptual model of entrepreneurship as firm behavior. *Entrep. Theory Pract.* **1991**, *16*, 7–26. [[CrossRef](#)]
- Dyer, J.H.; Gregersen, H.B.; Christensen, C. Entrepreneur behaviors, opportunity recognition, and the origins of innovative ventures. *Strateg. Entrep. J.* **2008**, *2*, 317–338. [[CrossRef](#)]
- Lumpkin, G.T.; Dess, G.G. Clarifying the entrepreneurial orientation construct and linking it to performance. *Acad. Manag. Rev.* **1996**, *21*, 135–172. [[CrossRef](#)]
- Brown, T.E.; Davidsson, P.; Wiklund, J. An operationalization of Stevenson’s conceptualization of entrepreneurship as opportunity-based firm behavior. *Strateg. Manag. J.* **2001**, *22*, 953–968. [[CrossRef](#)]
- Davidsson, P. A “Business Researcher” view on opportunities for psychology in entrepreneurship research. *Appl. Psychol.* **2016**, *65*, 628–636. [[CrossRef](#)]
- Davidsson, P. Opportunities, propensities, and misgivings: Some closing comments. *J. Bus. Ventur. Insights* **2017**, *8*, 123–124. [[CrossRef](#)]
- Davidsson, P. Entrepreneurial opportunities as propensities: Do Ramoglou & Tsang move the field forward? *J. Bus. Ventur. Insights* **2017**, *7*, 82–85.
- Mitchelmore, S.; Rowley, J. Entrepreneurial competencies: A literature review and development agenda. *J. Entrep. Behav. Res.* **2010**, *16*, 92–111. [[CrossRef](#)]
- Shaver, K.G.; Commarmond, I. Toward a comprehensive measure of entrepreneurial mindset. In *Rigour and Relevance in Entrepreneurship Research, Resources and Outcomes*; Laveren, E., Blackburn, R., Hytti, U., Lindstrom, H., Eds.; Edward Elgar Publishing: Cheltenham, UK; Northampton, MA, USA, 2019.
- Gawrycka, M.; Kujawska, J.; Tomczak, M.T. Competencies of Graduates as Future Labour Market Participants—Preliminary study. *Econ. Res.* **2020**, *33*, 1095–1107. [[CrossRef](#)]
- Smith, B.; Morse, E. *Entrepreneurial Competencies: Literature Review and Best Practices*; Small Business Policy Branch: Ottawa, ON, Canada, 2005.

21. Kyndt, E.; Baert, H. Entrepreneurial competencies: Assessment and predictive value for entrepreneurship. *J. Vocat. Behav.* **2015**, *90*, 13–25. [[CrossRef](#)]
22. Morris, M.H.; Webb, J.W.; Fu, J.; Singhal, S. A Competency-based perspective on entrepreneurship education: Conceptual and empirical insight. *J. Small Bus. Manag.* **2013**, *51*, 352–369. [[CrossRef](#)]
23. Miller, T.L.; Wesley, C.L.; Williams, D.E. Educating the Minds of Caring Hearts: Comparing the Views of Practitioners and Educators on the Importance of Social Entrepreneurship Competencies. *Acad. Manag. Learn. Educ.* **2012**, *11*, 349–370. [[CrossRef](#)]
24. Brinckmann, J. *Competence of Top Management Teams and Success of New Technology-Based Businesses*; Deutscher Universitäts-Verslag: Berlin, Germany, 2007.
25. Botha, M.; van Vuuren, J.J.; Kunene, T. An integrated entrepreneurial performance model focusing on the importance and proficiency of competencies for start-up and established SMEs. *S. Afr. J. Bus. Manag.* **2015**, *46*, 55–56. [[CrossRef](#)]
26. Boyatzis, R.E. *The Competent Manager: A Model for Effective Performance*; Wiley: New York, NY, USA, 1982.
27. Postuła, A.; Majczyk, J. Managers and Leaders in Need of Entrepreneurial Competences. *Entrep. Busand Econ. Rev.* **2018**, *6*, 91–103. [[CrossRef](#)]
28. Gümüşay, A.A.; Bohné, T. Individual and organizational inhibitors to the development of entrepreneurial competencies in universities. *Res. Policy* **2018**, *47*, 363–378. [[CrossRef](#)]
29. Rasmussen, E.; Mosey, S.; Wright, M. The evolution of entrepreneurial competencies: A longitudinal study of university spin-off venture emergence. *J. Manag. Stud.* **2011**, *48*, 1314–1345. [[CrossRef](#)]
30. Sánchez, J.C. The Impact of an Entrepreneurship Education Program on Entrepreneurial Competencies and Intention. *J. Small Bus. Manag.* **2013**, *51*, 447–465. [[CrossRef](#)]
31. Hayton, J.C.; Kelley, D.J. A competency-based framework for promoting corporate Entrepreneurship. *Hum. Resour. Manag.* **2006**, *45*, 407–427. [[CrossRef](#)]
32. Man, T.W.; Lau, T.; Chan, K.F. The competitiveness of small and medium enterprises: A conceptualization with focus on entrepreneurial competencies. *J. Bus. Ventur.* **2002**, *17*, 123–142. [[CrossRef](#)]
33. Chandler, G.N.; Jansen, E. The founder's self-assessed competence and venture Performance. *J. Bus. Ventur.* **1992**, *7*, 223–236. [[CrossRef](#)]
34. Baum, J.R. The relation of traits, competencies, motivation, strategy, and structure to venture growth. *Front. Entrep. Res.* **1995**, *5*, 13–21.
35. Bird, B. Learning entrepreneurship competencies: The self-directed learning approach. *Int. J. Entrep. Educ.* **2002**, *1*, 203–227.
36. Man, T.W.; Lau, T.; Snape, E. Entrepreneurial competencies and the performance of small and medium enterprises: An investigation through a framework of competitiveness. *J. Small Bus. Entrep.* **2008**, *21*, 257–276. [[CrossRef](#)]
37. Oosterbeek, H.; van Praag, M.; Ijsselstein, A. The impact of entrepreneurship education on entrepreneurship skills and motivation. *Eur. Econ. Rev.* **2010**, *54*, 442–454. [[CrossRef](#)]
38. Robles, L.; Zárraga-Rodríguez, M. Key competencies for entrepreneurship. *Procedia Econ. Financ.* **2015**, *23*, 828–832. [[CrossRef](#)]
39. Schelfhout, W.; Bruggeman, K.; De Maeyer, S. Evaluation of entrepreneurial competence through scaled behavioural indicators: Validation of an instrument. *Stud. Educ. Eval.* **2016**, *51*, 29–41. [[CrossRef](#)]
40. Bacigalupo, M.; Kampylis, P.; Punie, Y.; Van den Brande, G. *EntreComp: The Entrepreneurship Competence Framework*; Publication Office of the European Union: Luxembourg, 2016.
41. Tomczak, M. Gender and labour market situation among technical university graduates in Poland. *Horiz. Educ.* **2018**, *17*, 179–189.
42. Mei, H.; Lee, C.H.; Xiang, Y. Entrepreneurship Education and Students' Entrepreneurial Intention in Higher Education. *Educ. Sci.* **2020**, *10*, 257. [[CrossRef](#)]
43. Rachwał, T.; Kilar, W.; Kawecki, Z.; Wróbel, P. Entrepreneurship Education in Pre-School, Primary and Secondary Education in the New Core Curriculum. *Przedsiębiorczość-Edukacja* **2018**, *14*, 389–424. [[CrossRef](#)]
44. Ziemiński, P.; Golik, J. Including the Dark Side of Entrepreneurship in the Entrepreneurship Education. *Educ. Sci.* **2020**, *10*, 211. [[CrossRef](#)]
45. Elia, G.; Margherita, A.; Secundo, G.; Moustaghfir, K. An “activation” process for entrepreneurial engineering education: The model and application. *J. Enterprising Cult.* **2011**, *19*, 147–168. [[CrossRef](#)]

46. Czyżewska, M.; Mroczek, T. Data Mining in Entrepreneurial Competencies Diagnosis. *Educ. Sci.* **2020**, *10*, 196. [[CrossRef](#)]
47. Rachwał, T. (Ed.) *Kształtowanie Kompetencji Przedsiębiorczych*; Wydawnictwo FRSE: Warszawa, Polska, 2019.
48. Kilar, W.; Rachwał, T. Changes in Entrepreneurship Education in Secondary School under Curriculum Reform in Poland. *J. Intercult. Manag.* **2019**, *11*, 73–105. [[CrossRef](#)]
49. Żur, A. Two Heads Are Better Than One—Entrepreneurial Continuous Learning through Massive Open Online Courses. *Educ. Sci.* **2020**, *10*, 62. [[CrossRef](#)]
50. European Parliament and Council. *Recommendation of the European Parliament and of the Council of 18 December 2006 on Key Competences for Lifelong Learning*; European Commission: Brussels, Belgium, 2006; pp. 10–18.
51. Sarasvathy, S.D. Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Acad. Manag. Rev.* **2001**, *26*, 243–263. [[CrossRef](#)]
52. Sarasvathy, S.D. *Effectuation: Elements of Entrepreneurial Expertise*; Edward Elgar Publishing: Cheltenham, UK; Northampton, MA, USA, 2008.
53. Fisher, G. Effectuation, causation, and bricolage: A behavioral comparison of emerging theories in entrepreneurship research. *Entrep. Theory Pract.* **2012**, *36*, 1019–1051. [[CrossRef](#)]
54. Reyes-Mercado, P.; Verma, R. Effectuation and causation approaches in entrepreneurial marketing: A Set-Theoretical model. In *Innovation, Technology, and Market Ecosystems*; Behl, R., Ed.; Palgrave Macmillan: Cham, Switzerland, 2020; pp. 347–361.
55. Smolka, K.M.; Verheul, I.; Burmeister-Lamp, K.; Heugens, P.P. Get it together! Synergistic effects of causal and effectual decision-making logics on venture performance. *Entrep. Theory Pract.* **2018**, *42*, 571–604. [[CrossRef](#)]
56. Bradley, D.E.; Roberts, J.A. Self-employment and Job Satisfaction: Investigating the Role of Self-efficacy, Depression, and Seniority. *J. Small Bus. Manag.* **2004**, *42*, 37–58. [[CrossRef](#)]
57. Williams, D.M.; Rhodes, R.E. The confounded self-efficacy construct: Conceptual analysis and recommendations for future research. *Health Psychol. Rev.* **2016**, *10*, 113–128. [[CrossRef](#)]
58. Cole, M.L.; Cox, J.D.; Stavros, J.M. SOAR as a mediator of the relationship between emotional intelligence and collaboration among professionals working in teams: Implications for entrepreneurial teams. *SAGE Open* **2018**, *8*. [[CrossRef](#)]
59. Gartner, W.B.; Shaver, K.G.; Gatewood, E.; Katz, J.A. Finding the entrepreneur in entrepreneurship. *Entrep. Theory Pract.* **1994**. [[CrossRef](#)]
60. Tomczak, M.T.; Ziemiański, P.; Krawczyk-Bryłka, B.; Stankiewicz, K. Perceiving Entrepreneurial Competencies through the Lens of Effectual and Causal Approach. In Proceedings of the RENT XXXIII Conference, Berlin, Germany, 28–29 November 2019.
61. Churchill, G.A.; Peter, J.P. Research design effects on the reliability of rating scales: A meta-analysis. *J. Mark. Res.* **1984**, *21*, 360–375. [[CrossRef](#)]
62. Hinton, P.; Brownlow, C.; McMurray, I.; Cozens, B. *SPSS Explained*; Routledge: Hove, UK, 2004.
63. Pituch, K.A.; Stevens, J.P. *Applied Multivariate Statistics for the Social Sciences: Analyses with SAS and IBM's SPSS*; Routledge: Hove, UK, 2015.
64. Finch, J.F.; West, S.G. The investigation of personality structure: Statistical models. *J. Res. Personal.* **1997**, *31*, 439–485. [[CrossRef](#)]
65. Fabrigar, L.R.; Wegener, D.T.; MacCallum, R.C.; Strahan, E.J. Evaluating the use of exploratory factor analysis in psychological research. *Psychol. Methods* **1999**, *4*, 272. [[CrossRef](#)]

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