

ICEST 2022**III International Conference on Economic and Social Trends for Sustainability of Modern Society****AGILITY AND SELF-ORGANIZATION PRINCIPLES FOR SELF-EMPLOYED ENTREPRENEURS**

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Abstract

The self-organization principle refers to an indeterminate approach in high uncertainty and digital transformation conditions. The entrepreneurial agility of self-employed entrepreneurs lies in the digital transformation of analog businesses under the influence of the high uncertainty of the business environment. The work aims to form a conceptual model of agility based on scientific papers on adaptability, transformation, and agility, applying an ontological approach to information and the deduction. The self-organization of a category in the context of a self-employed entrepreneur bases on an ecological approach to analyze. The authors' works are analyzed in the paper. We use the deductive method combined with synthesis and decomposition and the graphical method to compare the theoretical agility approaches and the self-organization theoretical approaches. The scientific novelty lies in the proposed conceptual model based on ambidexterity – simultaneous possession of analog business competencies and information technology (IT) competencies and adaptation to changing requirements caused by digital transformation. Emergence is a property of the entrepreneur's competence system, at which cross-functional competencies are received. As a result, we get synergy from the interaction of these competencies. The aggregate value of the interacting elements is greater than the sum of individual values. It is according to the interpretation of the synergetic approach to the elements of the system. Entrepreneurial agility is due to the influence of self-organization and the creation of ambidextrous development in equal conditions of both analog business competencies and IT competencies. Digital transformation is an accelerator of these processes in entrepreneurship.

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1. Introduction

From the point of view of cognitive sciences, "self-organization" corresponds to one's behavior to create an order based on interaction with each other, and not through external intervention or instructions, using spontaneous ordering algorithms in complex systems (Shultz, 2001; Willshaw, 2006). The theory of self-organization is based on evidence that living systems express distinctive types of internal dynamic order. Goodwin (2001) this category can easily migrate to any sciences, both technical and socio-economic. The idea of self-organization is that functionally different subsystems can develop in one complex system. O'Sullivan (2009) considers that self-organization refers only to adaptive systems that can change according to the external environment. Thus, a self-organized system depends on the external environment and other hidden factors.

2. Problem Statement

The self-organization principle attitude indeterminate approach prevails in high uncertainty and digital transformation conditions. The relevance of adapting self-employed entrepreneurs to the external environment lies in the digital transformation of analog businesses. Analog business is a classic economic activity, the demands start by both buyers and entrepreneurs. Holmstrom (2021) believes that digitalization or digital transformation is a process that goes beyond the introduction of technology and implies a more significant change in the entire business model and the evolution of work based on information technology (IT) and digitized data to manage the interaction between the user and the agent to create revenue streams. Digitalization manifests in changing the analog business with the help of information technology. Accordingly, with the influence of information technology on entrepreneurship, there is a need to develop IT competencies.

The scientific novelty lies in the proposed conceptual model based on ambidexterity – simultaneous possession of the analog business and IT competencies and adaptation to changing requirements caused by digital transformation.

3. Research Questions

- i. What categories are included in the term self-employment?
- ii. What elements are included in the entrepreneurial agility that allows entrepreneurs to develop in conditions of uncertainty?

4. Purpose of the Study

The paper aim is to form a conceptual model of agility based on scientific papers on adaptability, transformation, and agility, applying an ontological approach to information and the method of deduction. The self-organization of a category in the context of a self-employed entrepreneur bases on an ontological approach to analyze.

5. Research Methods

The paper analyzes the authors' works. We use the deductive method combined with synthesis and decomposition and the graphical method to compare the theoretical agility approaches and the self-organization theoretical approaches.

The essence of the study is that self-employed entrepreneurs should have the agility to apply internal principles to adapt to digital transformation effectively. This aspect is similar to intra-organizational agility in organizations but differs in that self-employed people mobilize only their resources and professional and personal qualities to improve their business activities. In this regard, the literature on self-organization and agility is analyzed in the paper. Nevertheless, the main postulates are mimicked in entrepreneurship and self-employment.

6. Findings

This section analyzes the literature on the subject of the study. Mityaeva and Zavodilo (2019) identify the problems hindering digital transformation:

lack of technical competence. In the future, this disadvantage will be the basis of resistance to change due to the high uncertainty of self-determination in the updated system.

lack of consistency of physical and digital systems. This problem expands the problem of the lack of technical competencies in business tasks and business competencies in IT.

Nowadays, the pandemic is the accelerator of digital transformation. Kodama (2020) believes that the digital transformation of working conditions throughout increases the pace due to the impact of COVID-19, increasing the demand for cloud services and video communication tools. Jones et al. (2021) consider adaptation to overcome the obstacle to digital transformation in time and after the COVID-19 pandemic. Opportunities that allow entrepreneurs to generate new knowledge through interaction with information technologies are the driving forces of change, leading to innovation. As a rule, most of the innovations are associated with the IT sector of the economy (Kodama, 2020). Jafari-Sadeghi et al. (2021) believe that investments in IT and their use by organizations have a positive impact on the expansion of the technology market, and the globalization of the economy permanently affects the growth of competitors due to new technologies (Jones et al., 2021). Li et al. (2021) think that the coherence of business and digital technology strengthens the link between IT and other functional areas (analog business) to increase business sustainability. Strengthening occurs based on reducing ambiguity in the decision-making process, which, in turn, increases the effectiveness of the entrepreneur's response to environmental changes.

The requirements for digital transformation are around the integration of humanitarian and technical fields of knowledge that conflict with the entrepreneur's personality. Each problem can be an attractor, because of which the entrepreneur is resistant to change, that is, resistant to adaptation or not adaptive. Therefore, when solving cause-and-effect problems, it is essential to start not by applying new methodologies for an entrepreneur but with his motivation, competencies, culture, and attitude of

entrepreneurs to change. Changes mediate by entrepreneurial agility. Let us analyze the main category of "agility" of an entrepreneur in Table 1.

Table 1. Categories related to Agility

Agility	Source
Agility is the ability of dynamic design to find the need for changes from both internal and external sources, perform these changes in a planned manner and maintain above-average performance.	Worley and Lawler (2010)
Agility is the ability to detect and use opportunities promptly	Nemkova (2017)
Agility is opportunities using (speed, accuracy, and cost savings) for innovation and competitive actions aimed at achieving the goal	Huang et al. (2012)
Agility is the ability to sense changes in the environment and respond quickly and effectively.	Zhen et al. (2021)
Agility is the ability to support economic activity and development in a competitive environment of constant and unpredictable changes by responding quickly and effectively to changing markets and product requirements.	Vernadat (2001)
Market Agility - the ability to "collect and process large volumes and a variety of information to identify and predict external changes", as well as "track and quickly improve products to meet customer needs"	Li et al. (2021)

We find common things in the categorical apparatus: the presence of changes (modifications) and the ability to adapt to them. Ability is the readiness for any action. Accordingly, the subject can perform outgoing actions. Thus, the subject is the entrepreneur, and the object is the agent; entrepreneurial agility is the adaptation of the entrepreneur to changes.

Zhou et al. (2018) examine the relationship of agility with applying an ambidextral approach to the harmonization of IT competencies as a characteristic in entrepreneurial activity, where each entrepreneurial characteristic affects agility when changed. The balance of the entrepreneur's characteristics ensures overcoming threats and the use of opportunities in the mutual exchange of knowledge, which increases agility. With an imbalance of intensity – one characteristic of an entrepreneur over another- an entrepreneur cannot be agile and adaptive due to asynchronous activity.

Consistency and synchronization between the IT competencies of self-employed entrepreneurs (for example, self-employed programmers) in the fundamental economic activity stimulate the development of emergence. Emergence is formed based on a knowledge approach, in which not the sum of competencies evaluates but their interaction. Thus, emergence is a property of the entrepreneur's competence system, at the entrance of which cross-functional competencies are received, and at the exit, we get synergy from the interaction of these competencies. The aggregate value of the interacting elements is greater than the sum of individual values. It is according to the interpretation of the synergetic approach to the elements of the system. The synergistic effect is to attract customers for whom the traditional approach to acquiring goods is a barrier to fulfillment. Therefore, the consistency of analog competencies and IT competencies enhances the effect of entrepreneurship.

Analog developer competencies refer to knowledge and experience that can be used to understand business requirements and the functioning of the business environment of the software being developed. This aspect positively affects the value of the product functions for the customer.

Zhou et al. (2018) argue that knowledge of the business environment is the basis for the IT department when developing new information systems to respond to changes in business operations. Understanding the business environment based on interaction with customers refers to this approach to the stakeholder approach and the interaction between the types of competencies to the integrative one. Nemkova (2017) believes that "Agility means the ability to detect and use opportunities on time." It is important to note that for the transition to agility, the competencies of entrepreneurs play a significant role and the personal characteristics of a person (related to adaptation, training, and communication). Agility is likely to have a positive relationship with the performance of an international market with a different cultural context when entrepreneurs are aware of the market in which they work, have extensive international experience, have a high level of tolerance for ambiguity, and a focus on learning. The general concept based on their paper presents in Figure 1.

Tolerance for ambiguity is the restraint of the need for comprehensive information about the external environment. Entrepreneurs with a high tolerance to uncertainty make more effective decisions when working in unstable conditions with a lack of information, where uncertainty is not a threat but only an environment in which it is appropriate to apply different approaches and methods from those applicable in conditions of certainty.

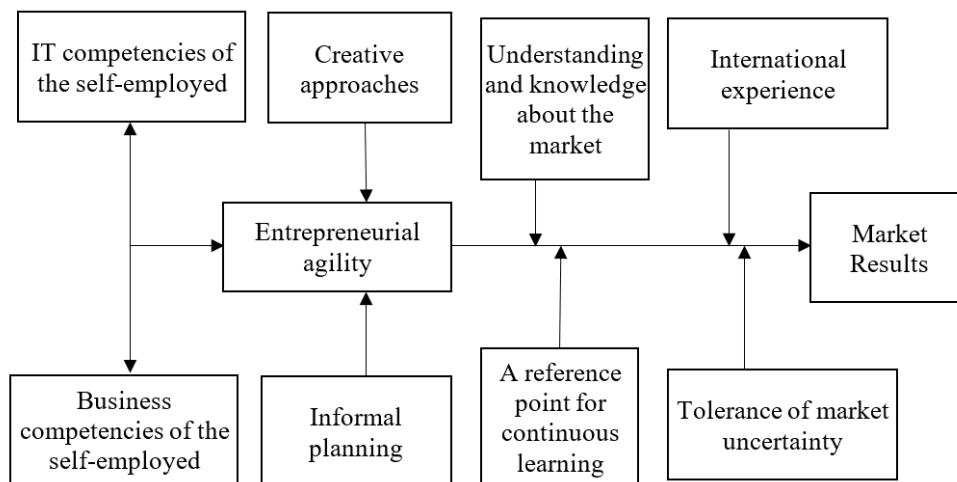


Figure 1. Conceptual model of entrepreneurial Agility (compiled on the basis of Nemkova, 2017; Zhou et al. 2018)

6.1. The Self-Organization Principle

Moseyko and Boschaeva (2012) reveal the concept of self-organization as "the process of ordering a system due to internal stimuli in the absence of ordering influences from the environment." The authors attribute any business structure to the class of self-organizing systems while defining the requirements for progressive development and, as a consequence, self-organization. The authors identify the following essential requirements: open-mindedness of the environment (the possibility of interaction with the

external environment); internal processes must be coordinated; the system must be dynamic and not in equilibrium. In the article, the authors do not precisely define the meaning of the last requirement. Presumably, in the absence of an equilibrium state, it is assumed that the system is not static, embodied in the existence of dynamic equilibrium. The result of self-organization understands as creating subsystems that are more complex in the informational sense, having the property of emergence.

The comparative characteristics of the category "self-organization" are present in Table 2.

Table 2. Theoretical approaches to self-organization

	Adaptation	Coordination	Competencies	Self-development	Dynamic equilibrium	Lack of balance	Levels of self-organization	Self-regulation	Self-study	Open-mindedness
Shestakova (2012a) "Micro-level..."	x	x		x	x	x	x	x	x	
Moseyko and Boschaeva (2012)	x	x				x				
Petrenko (2016)		x				x				
Shestakova (2012b) "Theories..."	x						x			
Gagarina (2015)	x		x	x					x	
Komarov (2013)	x		x	x	x				x	
Komarov and Molodchik (2012)	x		x	x			x		x	
Arefyev (2013)				x				x		x

Petrenko (2016) speaks about the dynamism of a self-organizing system, which can be expressed through the information process as a form of selective interaction. At the same time, while paying considerable attention to the process of information processing, attention is not paid to the knowledge approach, which involves reproducing the knowledge obtained during information processing.

Shestakova (2012a), in the article "Micro-level of self-organization of socio-economic systems" notes that the mechanisms of self-organization vary significantly and depend on the level of the system, thus distinguishing macro-, meso- and micro-levels of self-organization. It should be noted that the majority of works are devoted to micro-levels of self-organization. We will conduct an ontological analysis of the literature and fragment the approach to self-organization. In this article, the authors identify the characteristics of self-organization:

- initiative. In context, it represents an entrepreneurial initiative or enterprise.
- use of best practices; best practices are subject to standardization. Self-organization is not a documented category but is only a declared and integrated principle. This item "using best practices" cannot be the main characteristic of self-organization. Best practices can be used to optimize routine tasks and formalize business processes.
- perseverance in obtaining new knowledge; use of unique development opportunities.

The application of the knowledge approach encourages continuous training of entrepreneurs. This forms a synergy from collective learning due to the emergence property. In addition, the knowledge approach contributes to the conversion of information into a body of knowledge that can be data for entry

into the standardization system. This approach forms the acceleration the absorption of new knowledge. Thus, the development of a self-learning organization depends on the speed of obtaining knowledge, taking into account quality. Summarizing the above, the development opportunities of an individual or a team for a self-learning organization are in actual knowledge now and in the speed of obtaining knowledge. Therefore, generalization can be attributed to an adaptive approach.

Komarov and Molodchik (2012) distinguish self-development characteristics, among which is "predictability of actions". Predictability of actions refers to the deterministic approach to development and, consequently, to the predictability and certainty of the external environment. The agent's properties of a changing interaction system are not permanent due to changes in the agent's role and its functions, function assignments, and other parameters. As a result, changes in the values of these parameters.

Mingaleva and Deputatova (2019) propose a "Mechanism of self-development and self-organization" in which the stimulus to change is a problem coming from the external environment, and the reaction to the problem is its solution coming from the internal environment. The constancy of the external environment's outgoing problems stimulates the reaction's constancy by appropriate solutions. It makes the rhythm of the "problem-solution" cycles a natural business environment, where the main business task is the timely detection of incoming problems.

Podlesnykh and Kuznetsov (2009) distinguish two roles for self-organization and self-management: the first one is the compensation of non-covered areas of activity or competencies; the second one is the initiation of activity development. The first thesis is consistent with the involvement of experts to form expert opinions and assessments and the outsourcing of high-level complexity tasks. Moreover, based on the internal resources of the entrepreneur, where the prevailing resource is human capital, manifested in the entrepreneurial culture.

The entrepreneurial culture influences the manifestation of the initiative mediated by the leadership culture. It should be noted that the leadership culture is based not solely on managerial competencies but on production experience, which affects skills. Thus, we illustrate the primacy of practice over theory and not vice versa. The leadership culture formation with the basic principle of the priority of practice over theory arises based on an initiative in conjunction with delegating tasks from an entrepreneur to an agent (another outsourcing entrepreneur or employee). An agile, entrepreneurial culture arises based on interaction within the entrepreneur-agent system, applying decentralization together with leadership culture. In it the agent is transformed by some signs into an entrepreneur with signs of self-organization and can develop himself and the system based on motivational factors: the content of the work (which corresponds to McGregor's theory), responsibility, and effectiveness based on delegation and initiatives. According to this conceptual scheme, the dominant feature is the agent's initiative, which manifests itself through delegation from entrepreneurs. Initiative as the dominant feature consists of a more significant number of connections between other features.

7. Conclusion

The self-organization processes create new connections of the subsystem, which are integrated into the systems, forming complex and more ordered structures (Foster, 2011). Self-organization as a property can relate to subjects of different sciences. A self-organized (or self-organizing) entrepreneurial system

depends on the external environment, but the dependence is not linear, not deterministic, but indirect. According to research, everyone's approach to self-organization has standard features. Self-organization occurs by delegating from an entrepreneur to an agent because of decisions initiated by the agent via leadership culture. Entrepreneurial agility is due to the influence of self-organization and the creation of ambidextrous development in equal conditions of both analog business competencies and IT competencies. Digital transformation is an accelerator of these processes in entrepreneurship.

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