

Scientific approach to the formation of stakeholder interaction in the innovative economy

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Abstract. The relevance of involving stakeholders in the decision-making process is due to the need to identify, group and classify them based on their circumstances or views on potential business conditions that can be realised, which will allow predicting interaction with stakeholders in conditions of dynamic opportunities. The purpose of the study was to define stakeholder interaction as a normative concept with implementation practice that can stimulate the development of theory and provide practical application in practice. The basis of the formation of a scientific approach to the formation of the interaction of stakeholders in the innovative economy were such methods as structural and comparative analysis, the method of generalisation. A scientific approach to the formation of stakeholder interaction is proposed, which involves an integrated process of their interaction in an innovation network based on dynamic capabilities with elements of model variable analysis. This enables the adjustment of the elements of the innovation network, the nature of relations with stakeholders and promotes the evolution of commitment, relations and knowledge sharing between stakeholders, as well as the adjustment, reflection and adaptation of interaction with stakeholders and consists of: the formation of an information space to define the components of the innovation network and relationships in the process of stakeholder interaction; implementation of the process of interaction of stakeholders in conditions of dynamic opportunities; reasoned choice of management decisions regarding the impact on the interaction of stakeholders. The research findings reflect a stakeholder interaction framework based on a process of identification, organisation and transformation integrated into co-creation and value, innovation network and knowledge sharing. The obtained results can be applied in the practical activities of state authorities and local governments, higher educational institutions, state enterprises, organisations and institutions, private entrepreneurial structures in the formation of intellectual, scientific resources and information technologies, effective use and qualitative improvement of all factors of production, which will contribute development of a new quality of public-state relations

Keywords: innovation network; knowledge exchange; business relations; identification; organisation; transformation

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● INTRODUCTION

Economic development is impossible without taking into account the innovation factor. Since the beginning of the 90s, the scientific world began to realise the phenomenon of innovative and technological globalisation, and thereafter, significant shifts took place in international economic development that required state regulation.

The 17 sustainable development goals (SDGs), which are defined by the United Nations [1], are aimed at stimulating action to solve the global problems of mankind. The SDGs engage governments, which can act through policy and regulation development, as well as private initiatives to conduct research based on societal values, needs and expectations. Enormous tasks are emerging that cover a large

number of people not only in one country, but also beyond its borders, affect international communities and the planet as a whole, requiring joint efforts to solve them.

Education, science and innovation require new methods of managing innovative development, which include wider involvement of stakeholders in the decision-making process, anticipation of society's needs and reflection of problems. Stakeholder engagement aimed at strengthening the means of implementation and activation of the Global Partnership for Sustainable Development can be a means of mobilising and sharing knowledge, experience, technology and financial resources. Despite the essence of stakeholders in the innovation economy, there is still little

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research on their involvement. The results of previous studies [2-4] are represented by management processes with a strong regulatory burden without clear practical guidance on implementation tools. Despite the general recognition of the importance of involving stakeholders, anticipating their needs and analysing their feedback in support of new solutions proposed to society, many questions remain regarding the quantitative and qualitative characteristics of stakeholders in the innovative economy.

A large number of studies [5-7] within the innovative economy are focused on the identification of stakeholders of current activities, but there is a need to identify potential and indirect stakeholders. The need to define, group, and grade stakeholders based on their circumstances or view of potential business conditions that may be realised will allow to predict engagement with stakeholders in the context of dynamic opportunities. Stakeholder influence may vary at different stages of the activity, depending on the ability to make decisions about the activity and implement a stakeholder management strategy.

The aim of the article was to define a scientific approach to the formation of stakeholder interaction in the innovative economy that can stimulate stakeholder engagement in practice.

In accordance with the goal, the following tasks were set: to determine the components of the innovation network and relations in the process of stakeholder interaction; to group stakeholders by the level of involvement

(degree of commitment/participation/influence on the activity), types of connection with the activity for each of the stakeholders and the purpose/results of such activity; to organise a process of interaction with stakeholders, based on dynamic possibilities; to determine approaches to management decision-making regarding the identification, organisation and transformation of stakeholders.

LITERATURE REVIEW

Current innovation trends and global processes of internationalisation and globalisation create the conditions under which economic actors are forced to interact with a wide range of stakeholders and make decisions to take into consideration their interests. Today, approaches, methods and tools for assessing the levels of interaction of stakeholders differ according to schools and concepts. A large number of stakeholder definitions do not give a clear understanding of what the term really means. Establishing the boundaries of the concept will significantly help to solve a number of problems posed by researchers in this field.

The origin and development of the concept of stakeholders lies in the literature on social, economic and business science. An analysis of the development of the theory of stakeholders, which passed the stages of evolutionary development in accordance with the development of economic systems, business processes and were transformed according to the criteria for their identification and management is presented in Table 1.

Table 1. Development of stakeholder theory

Author (period)	The level of development of the theory
W.B. Galli (1956) [8]	The stakeholder concept is central to business theory, but does not define the essence of the stakeholder concept.
Stanford Research Institute (1963) [9]	The management’s attention is focused on the concept of representing shareholders as a single group and determining its sensitivity.
E. Freeman (1984) [10]	Continuing the concept of shareholders, it is extended to other parties as well, namely consumers, workers, suppliers, governments, competitors, consumer advocates, environmentalists, special interest groups and the media. If someone has an interest in an activity, he can influence it or try to influence it.
M. E.B. Clarkson (1995) [2]	The social effectiveness of the corporation depends on the system of managing the corporation’s relations with its stakeholders.
Y. Fassin (2009) [5]	Stakeholder management is presented from the perspective of translating ethics into management practice and strategy, identifying customers as both internal and external stakeholders.
P. Littau (2010) [6]	Stakeholders in the project management process were considered. The directions of stakeholder theory are determined by the project strategy.
S. Miles (2011) [4; 7]	Stakeholder theory is considered for different organisations, organisational forms and domains, such as individuals, projects and public institutions, as well as in politics.
Guidance on project management (ISO 21500:2012) [11]	To increase the likelihood of project success, project stakeholders, including the organisation in which the project is implemented, should be described in sufficient detail. Stakeholder roles and responsibilities can be defined in relation to their project and organisational goals.
PMBOK Guide (Project Management Institute, 2013) [12; 13]	The theory of interested parties has been improved on the basis of its isolation as a separate field of knowledge, and before that it was part of the theory of communications.
Requirements Management: A Practice Guide PMI (2016) [14]	Orientation on the involvement of stakeholders and cooperation with the customer; allows you to scale the project according to the requirements, while keeping it flexible.

Source: compiled by the author

Summarising research on stakeholder development makes it possible to identify different directions and draw the following conclusions:

1) the activity/organisation/project has relations with a large number of stakeholders who make up an appro-

priate environment (external and internal) and influence management decisions.

A systematic literature review was conducted to explore stakeholder relationships, pressures and sustainable management practices. The literature review shows that

there are three main theoretical frameworks for the study of stakeholder interaction: from the perspective of service improvement [15], as marketing and customer satisfaction [16] and technological innovation and management [17; 18].

S.M.R. Shams, D. Vrontis, R. Chaudhuri, G. Chavan, M.R. Czinkota [19] reviews current research in the entrepreneurship literature related to innovation management (IM), stakeholder engagement (SE) and entrepreneurship development (ED).

In addition, the use of stakeholder theory is dominant, followed by the use of institutional theory.

2) stakeholder theory studies the nature of relationships.

Lea Fobbe and Per Hilletoft [3] consider interaction with stakeholders as an important component of sustainable business models.

Traditional innovation, which is focused on obtaining profit for the enterprise, has turned into innovation based on interaction in the process of co-creation, where consumers are involved in the process of defining and creating value [20; 21].

3) the interests of all stakeholders can potentially be taken into account and satisfied.

Stakeholder interaction research is aimed at gradually realising the needs and expectations of each stakeholder in relation to the needs and expectations of other stakeholders, as well as the potential role of each stakeholder [22].

S. Takahashi and V.P. Takahashi [23] provided a proposal for an integrated process of interaction with several stakeholders based on the analysis of model variables. They also contribute to an evolution in commitment, in relationships and in the exchange of knowledge between stakeholders, as well as in anticipating and evaluating their interests.

4) the theory accepts management decisions.

P. Pluchinotta, G. Salvia [24] tried to understand stakeholders' perception of system boundaries and problem structuring, as well as their potential impact on decision-making by systematically comparing causal maps of different stakeholder groups around a common problem. A. Zingraff-Hamed, F. Hüesker, G. Lupp, C. Begg, J. Huang, A. Oen, Z. Vojinovic, C. Kuhlicke, S. Pauleit [25] used systematic methods to identify relevant stakeholders, which are crucial to enhance planning efficiency, reduce bottlenecks and time, and are paramount for business system planning, design, and implementation.

● MATERIALS AND METHODS

The presented scientific approach was based on analysis methods and is presented in a logical sequence. First, a synthesis was used, which allows to reveal and show complementarity between the studied parameters. Furthermore, the structuring of development stages takes into account

the behaviour of variables in the corresponding phases with the adoption of the process of identification, organisation and transformation as an integrating dimension.

Systematic and interdisciplinary approaches to formation of stakeholder interaction in the innovative economy became the methodological basis for achieving this goal. The structural analysis made it possible to determine certain regularities, according to which all processes and phenomena can be classified into groups, singling out their features, as a result of which Structuring stakeholder theories according to different levels of economic aggregation was obtained.

In addition, taking into account the dynamism of socio-economic phenomena, with the help of the generalisation method, it is possible to generalise them into certain groups based on similar characteristics.

The analysis also allows to evaluate the phenomenon not separately, but taking into account the influence of the external environment on it. One positive consequence of using these methods is the broad functionality of their results.

Using the method of logical generalisation, a sequence of actions was formed to establish structural relationships between variables or elements of scientific approach to the formation of stakeholder interaction in the innovative economy.

● RESULTS AND DISCUSSION

Formation of the information space for determining the components of the innovation network and relations in the process of stakeholder interaction

Building an optimal model of stakeholder interaction should take into account the transformational processes currently taking place all over the world, which significantly change the directions of development and purpose of activities. The solution to this problem is carried out within the network structures of interaction in the field of educational, research, information technology, business and other types of activities. Therefore, issues related to the system of formation and determination of appropriate forms and types of stakeholder interaction are relevant.

However, the methodological base, which allows to reveal and analyse contradictions in the study of economic relations between institutions and science and the business environment, is not fully formed. This fact proves the need to develop scientific and methodological support for the formation and implementation of stakeholder interaction, taking into consideration dynamic changes, goals that must be achieved by the subjects of relations, and opportunities for their implementation. For this, a scientific approach to the formation of stakeholder interaction is proposed, which consists of 3 blocks (Fig. 1).

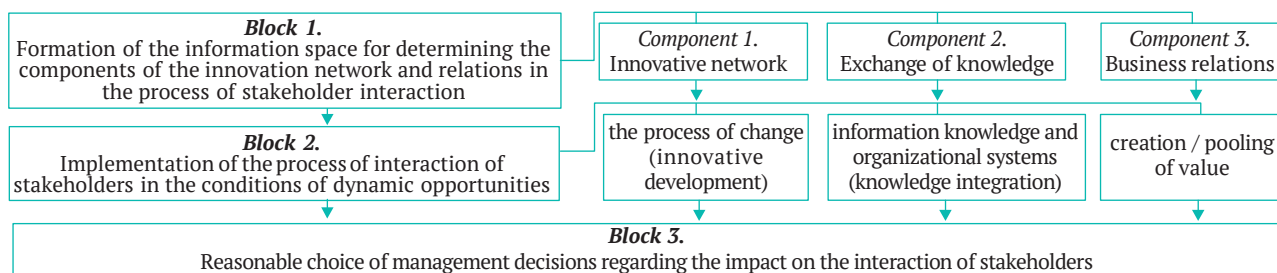


Figure 1. A scientific approach to the formation of stakeholder interaction in the innovative economy

Source: developed by the author

In accordance with **Block 1** (Fig. 1), a study of Ukrainian and foreign experience in the development of forms of stakeholder interaction was carried out in accordance with the structure of the innovation network, requirements for knowledge exchange and specifics of business relations.

In interaction with stakeholders, before changing the configuration of the network itself or existing processes, it is advisable to determine the evolution in obligations, in relations and in the exchange of knowledge between stakeholders (Table 2).

Table 2. Structuring stakeholder theories according to different levels of economic aggregation

Criterion for the development of stakeholder theories			
the number of people who can be attributed to stakeholders	degree and direction of influence between stakeholders and business	management tools and value-targets of performance in interaction	the extent of identification of stakeholders in relation to the levels of economic processes and systems, restrictions on the organisational scope of activities
W.B. Galli (1956) [8]	-	-	-
Stanford Research Institute (1963) [9]	-	-	-
E. Freeman (1984) [10]	-	-	-
-	M.B.E. Clarkson (1995) [2]	-	-
-	-	Y. Fassin (2009) [5]	-
-	-	-	P. Littau (2010) [6]
-	-	-	S. Miles (2011) [7]
-	-	Guidance on project management (ISO 21500:2012) [11]	
-	PMBOK Guide (Project Management Institute, 2013) [12; 13]		
-	Requirements Management: A Practice Guide PMI (2016) [14]		

Source: developed by the author

The considered theories are grouped in a visual-spatial logical way. This made it possible to organise the theories of stakeholder development according to their coverage of the criteria for their identification and management. The result of the grouping will allow stakeholders to be differentiated according to the scope of the activity (for project, business or government), the type of activity or content area, or the specific type of relationship to the activity. A specific activity can be a task, a project, a program, an en-

terprise of a corporation or a state body, and even determine specific cases of behaviour of individuals.

The key point is to identify and separate both the level of involvement and the type of connection that different stakeholders may have. Morphological analysis determines the level of involvement (the degree of commitment and non-commitment to the activity taking place), the types of connection with the activity for each of the stakeholders, and the purpose/results of such an activity (Table 3).

Table 3. Morphological analysis of stakeholders according to the structure of the innovation network and relations in the process of interaction

Subject (innovation network)	Level of participation (knowledge sharing)	Type of communication (business relationship)	Goal/outcome
-	their ownership based on the following attributes: authority to influence the firm, legitimacy of relations with the firm, and urgency of the claim against the firm	-	-
	life, environment or business is affected by three spatial scales and beyond accepted constructs		directly and/or indirectly involved in the selected scales and beyond
	has or claims ownership, rights or interests		in the corporation and its activities
individuals and institutions	have a stake or claim, interest	-	regarding the company
different / another clientele	interested		in the results of the project
plaintiffs / the claimants	-	have contracts	-
individuals or groups of individuals	can affect or is affected by	-	achievement of organisational goals
	with legitimate interests		in procedural and/or material aspects of corporate activity
	requires sacrifices or contributions on the part of participants	voluntarily accept the benefits of a mutually beneficial cooperation scheme	-
	are inadvertently exposed to risk	arises in connection with the company's actions	

Table 3, Continued

Subject (innovation network)	Level of participation (knowledge sharing)	Type of communication (business relationship)	Goal/outcome
an individual, group or organisation	has an interest in, or is influenced by, or may be influenced by	-	any aspect of a project, program or portfolio
groups	-	in a relationship	with the organisation

Source: developed by the author

The time is different for each level of involvement. Direct participants (immediate interested parties) or managers start, observers or secondary interested parties can feel the impact in the process or for the results of the activity, the end users feel the impact from the results of the activity (which should exclude negative impacts during which there are persons covered). secondary stakeholders as a secondary category).

The resulting morphological analysis is intended to determine the power of influence, legitimacy and necessarily takes into account dynamism. The dynamics of determining the urgency of solving the problems of the interested party depends on the activity.

Implementation of the process of interaction of stakeholders in the conditions of dynamic opportunities

The process of attracting interesting pages, taking into account the dynamics of influence, is the ability to shape, combine and change internal and external conditions to be able to describe a rapidly changing environment in the process of work. Therefore, in accordance with **Block 2** (Fig. 1), this process is divided into three phases: identification interaction, organisation of interaction and transformation of interaction (Fig. 2). Thus, identification, organisation and transformation are unifying elements of these processes, which involves theoretical and practical justification.

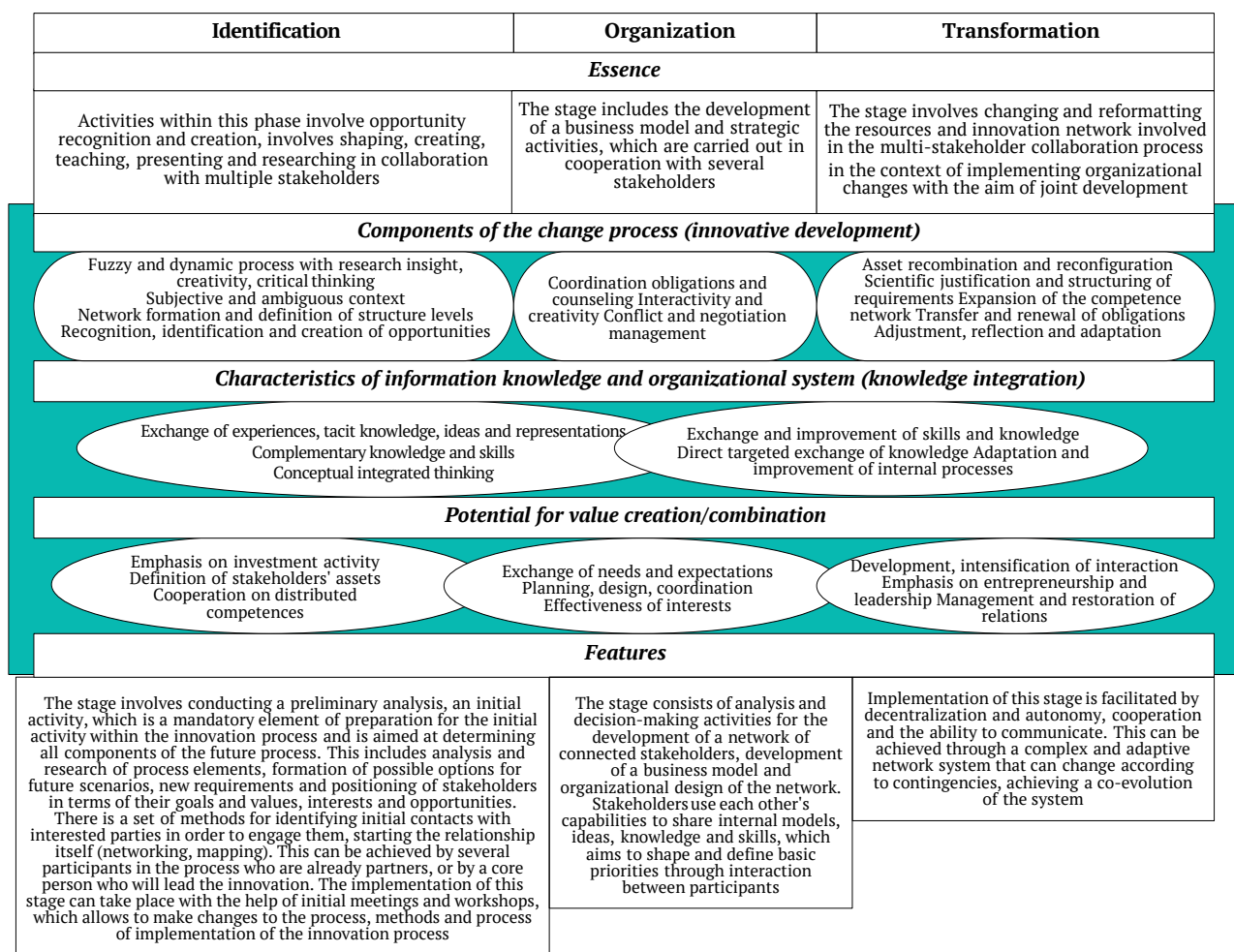


Figure 2. Implementation of the process of interaction of stakeholders in the conditions of dynamic opportunities

Source: developed by the author

Figure 2 shows the transformation of values (material-valuable and intellectual-knowledge), which is ensured by the success of the stages of stakeholder interaction in the innovative economy, taking into account the development of potential, current and realised value. This involves mapping elements of processes based on innovative development, based on interaction and transformation of knowledge, opportunities, values. As a result, a multidimensional integrated model is formed.

Figure 2 shows the process of integrating system elements within the stages of innovation development and value creation. It also demonstrates the integration of the intellectual and the material resources, the division of subjective/potential and actual possibilities, the transition from conceptual to concrete value. The change of uncertain and subjective aspects in the process of evolution is associated with the exchange of explicit knowledge, the distribution of obligations, which contributes to the involvement of the necessary stakeholders.

Interaction between stakeholders involves changing the configuration of the network or existing processes, which allows the development of relationships taking into account the obligations, responsibilities, exchange of knowledge and values between stakeholders. That is, the presented elements of the system are integrative to provide for the definition, organisation and management of stakeholders as theoretical as practical point of view.

Thus, the process of stakeholder interaction involves taking into account dynamic opportunities, which is aimed at the elements of creation, unification and change of internal and external factors, in the conditions of a changing environment.

Reasonable choice of management decisions regarding the impact on the interaction of stakeholders

Based on **Block 3** (Fig. 1), it is proposed to make a reasoned choice of method to make managerial decisions regarding the identification, organisation and transformation of stakeholders in accordance with the prospects, conditions and opportunities for the implementation of such relations (Fig. 3).

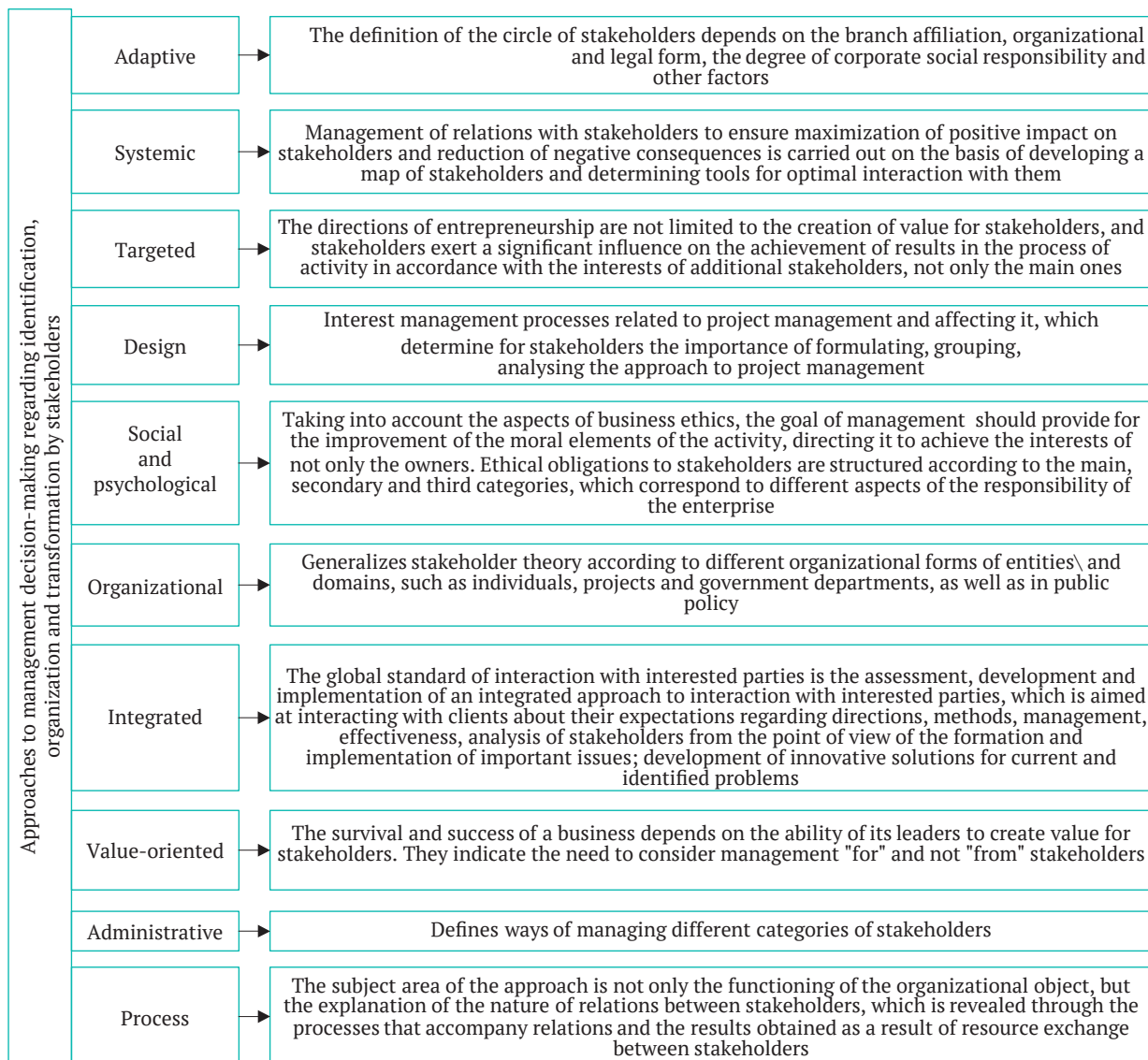


Figure 3. Methods to management decision making regarding identification, organisation and transformation of stakeholders

Source: developed by the author

According to the proposed, it is efficient to choose a method that will be optimal taking into consideration the existing conditions. The third block, on the basis of previous analytical studies, involves making a management decision regarding the choice of a method among the possible ones for one or another group of stakeholders. Based on the choice made, monitoring of stakeholders is carried out in order to detect their possible change, as well as a change in their interests and influence, their priority, which is expedient in the conditions of dynamic opportunities. Hence, a managerial decision is made to change the interaction strategy. Furthermore, the implementation of the chosen interaction strategy, its effectiveness and timing are checked and the correction is made.

This fact proves the need to develop scientific and methodological support for the formation and implementation of stakeholder interaction, taking into consideration dynamic changes, goals that must be achieved by the subjects of relations, and opportunities for their implementation. For this, a scientific approach to the formation of stakeholder interaction is proposed, which consists of 3 blocks.

Block 1 (Fig. 1) describes national and foreign experience in the development of forms of stakeholder interaction was carried out in accordance with the structure of the innovation network, requirements for knowledge exchange and specifics of business relations. Morphological analysis determines the level of involvement (the degree of commitment and non-commitment to the activity taking place), the types of connection with the activity for each of the stakeholders, and the purpose/results of such an activity.

Block 2 (Fig. 1) is divided into three phases: interaction identification, interaction organisation, and interaction transformation. The interaction of stakeholders from the initial processes (identification and organisation) to the transformation of interaction is presented in the article. Processes of value creation and acquisition, development of innovations and integration/exchange of knowledge are disclosed. As a theoretical contribution, the results of the research provide an integrated study of different types of dynamic capabilities about the need to investigate the connections or relationships between types of dynamic capabilities.

The Block 3 (Fig. 1) involves making a management decision regarding the choice of a method among the possible ones for one or another group of stakeholders, based on the choice made, monitoring of stakeholders is carried out in order to detect their possible change, as well as a change in their interests and influence, their priority, which is expedient in the conditions of dynamic opportunities.

Thus, in contrast to existing studies, new hypotheses and scientific tasks in the theory of stakeholders were formulated, appropriate directions and appropriate methods were chosen for their solution, which allows for effective system analysis, selection of a conceptual model of the information system environment based on mathematical models and methods decision-making, parameterisation of the components of the intelligent decision-making support system.

A large amount of research in the framework of the innovation economy focuses on the identification of stakeholders of current activities, but there is a need to identify potential and indirect stakeholders. Most of the scientists' research is devoted to the descriptive analysis of the evolution of documents devoted to the study of stakeholders.

The works highlight the thematic groups of open innovation, consumer-oriented analysis, service ecosystem and service innovation, as well as two new trends: servitisation and the sharing economy [18; 21]. On the basis of the presented results, the evolution of stakeholder research is identified and characterised, but as a result of the value transformation with the evolution from potential to realised, which is ensured by the successful passage of the phases of identification, organisation and transformation into identified stakeholder interaction.

Also, based on the systematisation of literature, on the basis of which the organisational and modernising factors of the variables that affect the relationship between stakeholders were selected [21] levels were formed participation and types of communication that different interested parties can have, which further determines the level of involvement (the degree of commitment and non-commitment to the activity taking place), the types of communication with the activity for each of the stakeholders and the purpose/results of such activity. The use of the specified influencing factors made it possible to determine the dynamic possibilities of the system of interaction of stakeholders, its ability to form, transform and integrate values in the conditions of a changing environment.

Scientists also proposed an integrated approach to identifying stakeholders by grouping and structuring their problems based on a combination of qualitative and quantitative analysis [24]. Quantitative analysis presented the formation of thematic groups [18] and influencing factors on stakeholders [21] supplemented by modelling of dynamic possibilities of interaction between stakeholders and aimed at the formation of sustainable management methods in the decision-making process. Qualitative analysis, which involves the identification and structuring of key problems for certain types of stakeholders, and their generalisation by forming cause-and-effect relationships around one common problem. These processes are represented and complemented by aspects of innovation development, namely co-evolution, value creation and sharing, stakeholder capabilities and innovation network structural elements, providing a multi-dimensional integrated model of knowledge integration/exchange, stakeholder capabilities and innovation network structural elements ensured by the success of interaction stages stakeholders in the innovative economy with the evolution of potential value.

Studies that focus on planning and management decision-making processes in stakeholder interaction [19; 25] involve the formation of models of polycentric governance and co-creation. The proposed methodical approach involves making a managerial decision regarding the choice of method among a possible certain group of stakeholders in order to identify their possible change in their interests and influence, a priority that is expedient in the conditions of dynamic opportunities.

● CONCLUSION

On the basis of the conducted research, a scientific approach to the formation of stakeholder interaction is proposed, which, unlike the existing ones, takes into account the multidimensionality and dynamics of the characteristics of stakeholders. Taking into consideration the fact that the dynamic possibilities of interaction of stakeholders

require reflection and adjustment, approaches to management decision-making regarding the identification, organisation and transformation of stakeholders.

Thus, the proposed scientific approach to the formation of stakeholder interaction allows us to consider the evolution in the practice of stakeholder interaction in a pluralistic context, seeking to overcome antagonisms and internal needs, synthesising in an integrated approach organisational processes that support interaction with stakeholders within the innovation network, since dynamic opportunities are integrative processes. A scientific approach to the formation of stakeholder interaction is proposed, which consists of 3 blocks (formation of the information space for determining the components of the innovation network and relations in the process of stakeholder interaction; implementation of the process of interaction of

stakeholders in the conditions of dynamic opportunities; reasonable choice of management decisions regarding the impact on the interaction of stakeholders).

The use of this scientific approach to the formation of stakeholder interaction in the innovative economy has the following advantages: the main characteristics of innovation networks and their structural aspects of stakeholder interaction are defined; interconnected processes in innovation networks are structured; the dynamic capabilities of stakeholder interaction processes are taken into account according to their phase (identification, organisation or transformation); the potential, some limitations and directions of interaction management are outlined.

The interaction of stakeholders is important for achieving the SDGs, which determines the relevance of further research.

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Науковий підхід до формування взаємодії стейкхолдерів в інноваційній економіці

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Анотація. Актуальність дослідження визначається тим, що освіта та наука потребують нових методів управління інноваційним розвитком, що передбачає залучення стейкхолдерів до процесу прийняття рішень. Вплив стейкхолдерів може відрізнятися на різних етапах діяльності, залежно від здатності приймати рішення. Метою дослідження було визначення взаємодії стейкхолдерів як нормативну концепцію з практикою впровадження, що може стимулювати розвиток теорії та забезпечувати практичне застосування на практиці. Основою формування наукового підходу до формування взаємодії стейкхолдерів в інноваційній економіці були такі методи, як структурний й компаративний аналіз, метод узагальнення. Запропоновано науковий підхід до формування взаємодії стейкхолдерів, який передбачає інтегрований процес їх взаємодії в інноваційній мережі на основі динамічних можливостей з елементами аналізу модельних змінних. Це дає змогу коригувати елементи інноваційної мережі, характер відносин із зацікавленими сторонами та сприяє еволюції прихильності, відносин та обміну знаннями між зацікавленими сторонами, а також коригування, рефлексії та адаптації взаємодії із зацікавленими сторонами та складається з: формування інформаційного простору для визначення складових інноваційної мережі та відносин у процесі взаємодії стейкхолдерів; здійснення процесу взаємодії стейкхолдерів в умовах динамічних можливостей; обґрунтованого вибору управлінських рішень щодо впливу на взаємодію стейкхолдерів. Результати дослідження відображають структуру взаємодії стейкхолдерів, засновану на процесі ідентифікації, організації та трансформації, інтегрованих у спільне створення та цінність, інноваційну мережу та обмін знаннями. Отримані результати можуть бути застосовані в практичній діяльності органів державної влади та місцевого самоврядування, вищих навчальних закладів, державних підприємств, організацій та установ, приватних підприємницьких структур при формуванні інтелектуальних, наукових ресурсів та інформаційних технологій, ефективному використанні та якісному вдосконаленні всіх факторів виробництва, що сприятиме розвитку нової якості суспільно-державних відносин

Ключові слова: інноваційна мережа; обмін знаннями; ділові відносини; ідентифікація; організація; трансформація