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Innovative Design of Marketing Ecosystems

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ABSTRACT

This study is devoted to the issues of ecosystems and the ecosystem approach. The formation and use of marketing ecosystems can simplify both the processes of transformation of technological patterns and the interaction of different types of business models of enterprises. A separate focus is on marketing ecosystems as one of the important innovations of Industry 5.0. The transition from Industry 4.0 to Industry 5.0 is accompanied by the creation of the necessary software and algorithmic base of quantum computing, introduction of technologies for visualisation of management decisions, development of neuromorphic models of enterprise architecture, digital twins of business processes.

The **purpose** of the study is to develop approaches to designing a marketing ecosystem within the framework of Industry 5.0 and Industry 4.0, which is necessary for building effective interactions between innovative enterprises of different business spheres. The article considers the stages of innovative design of new marketing ecosystems, the result of which is the end-to-end integration of information resources of their member enterprises, which is necessary for the consolidation and synchronisation of structured and unstructured data on different business models of companies and the organisation of predictive analytics mechanisms. In the course of the work, the **method** of scientific analysis of literature on the research problem was applied, and the empirical experience of the authors of the article was used. The **results** of the study will be useful to all managers of innovative companies as well as the heads and employees of marketing departments of these companies.

Keywords: marketing ecosystem; Industry 4.0; Industry 5.0; business processes; marketing research; innovative design; end-to-end integration of information resources

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INTRODUCTION

Marketing Ecosystem in the Transition from Industry 4.0 to Industry 5.0

Industry 4.0 uses a new approach to production, which is based on the active application of IT tools in industrial activities and involves full-scale automation of business processes. A feature of Industry 5.0 is artificial intelligence (AI) technologies used for predictive analytics and end-to-end data integration [1].

The goals of implementing the Industry 4.0 concept are:

1. Higher productivity of innovation activity results.
2. Reduction of workplaces under hazardous and harmful labour conditions.
3. Increased competitiveness of the enterprise.
4. Emergence of qualitatively new products - innovations.

According to [2] the properties of Industry 4.0 are:

- the use of big data in the organisation's work;
- the possibility of a virtual overview of the process of production of goods or provision of services;
- combination of virtual and real environments;
- cloud computing;
- cyber security;
- modelling.

In [3] it is emphasised that as the use of intelligent systems increases, the efficiency of the enterprise as a whole increases. By utilising software, a company can produce higher quality products. Through innovation and other changes, Industry 4.0 will increase the share of high value-added products, leading to faster economic growth and increased competitiveness of organisations.

The following elements form the basis of the Industry 5.0 concept, according to the authors [4]:

a. an intellectual core based on artificial superintelligence;

b. a four-component tetrad of ecosystems;

c. a complex of ecosystems, including the central ecosystems — socio-economic and neurodigital ones.

The authors [5] point out the link between the concepts of Industry 4.0 and Industry 5.0, but argue that one is not a direct continuation of the other. They should be considered together, i.e., as a coexistence of Industry 4.0 and Industry 5.0 oriented towards social values. According to these scholars, a "techno-social revolution with technology as the tools and social needs as the ultimate goal" is underway, which further proves the importance of the social human factor within the framework of Industry 5.0.

The article [6] provides a classification of business model types (integrative, service, consulting), which is the most complete. The authors describe these models from the point of view of Industry 4.0, provide an algorithm for choosing the right one among them, and also suggest considering their characteristics from the point of view of Industry 5.0 (*Table 1*).

An interesting approach to defining company behaviours within the Industry 5.0 framework is demonstrated by the researchers in [7]:

1. "Transform or perish": the business model consists of investing significant resources in high technology in order to increase overall business efficiency.
2. "Transform to win": the business model is to seek greener solutions. Transformation is not full-scale — most likely a new development track is added.
3. "Transform to develop": the business model is based on an ecosystem approach that develops technologies, procedures, business processes that are available to ecosystem participants.

Along with the achievement of environmental, social, and economic goals, the ideas of technological development, high-tech imple-

Table 1

Characteristics of business models from the point of view of Industry 5.0

No.	Model name	Industry 4.0 business model	Industry 5.0 business model
Integration of the value chain participants			
1	Crowdsourcing	The trusted data access model	A model of the influence of society on the achievement of production results. The model emphasises the role of the individual not only as a source of knowledge, but also as a subject of decision-making regarding the financing of certain activities. The role of society in the final activity of the company increases significantly
2	Production as a service	Services model in the value chain	Consumer-producer model. Within the framework of the model, a person is defined not only as a consumer of products, but also as a direct participant of its development
3	Customisation of production	Services model in the value chain	The model of intellectual adaptation. Within the framework of the model, products are adapted to the specific needs of certain categories of customers, often the smallest ones
Customer service for products and services			
4	Solution Support	Internet of Things Platform Model	Decision Automation Model. The model assigns a special role in decision-making to AI and big data analyses
5	Product as a service	Internet of Things Platform Model	The model of intellectual sharing The model involves the creation of more and more new products that people use by applying sharing technologies. The model is implemented based on analysing the demand for sharing products through big data analysis
6	Process as a service	Internet of Things Platform Model	Intelligent Processing Model. The model provides easy consumer access to various processes based on AI and big data analysis. Customised services are being replaced by mass services
Data-driven consultancy			
7	Consultancy on product operation and exploitation	Trusted Data Access Model	Ecosystem consulting model. The model creates a common knowledge base of companies within the same ecosystem
8	Consultancy on process organisation	Trusted Data Access Model	Ecosystem consulting model. The model creates a common knowledge base of companies within the same ecosystem
9	Mediation services	Trading platform model	Ecosystem trading model. The model creates an intelligent internal trading platform for goods and services within an ecosystem of companies. Its advantages lie in the exclusivity of access to it and in the formation of demand and supply in automatic mode using AI methods
10	Process efficiency analysis	Trusted data access model	Ecosystem business process model. The model consolidates business processes of companies within one ecosystem. Common AI-based business process management systems are introduced, which significantly increases the efficiency of the ecosystem and its components

Source: compiled by the authors based on [6].

mentation, robot-human interaction — play an important role in the concept of Industry 5.0. Also important are the transfer, storage, analysis of bioinformation data and energy efficiency as factors of business competitiveness [8].

A company that wants to achieve global competitiveness must change its existing traditional business models and increase investment in achieving social business goals. In fact, in Industry 5.0, the role of people and society in business is multiplying. The socialisation of business models implies a shift from creating new jobs and increasing employment to maximising the personalisation of products and providing better working conditions for employees, including through the maximum use of artificial intelligence.

In the framework of the Industry 5.0 concept, the company's employees are considered not as a "cost" but as an "investment", which gives an opportunity to develop both the company itself and its workforce. The uniqueness of this investment is that employees, by developing, improve the company, which gives them even more room for development. As such, a business should be keen to invest in the skills, capabilities, and well-being of its workforce to achieve its goals. This approach is very different from simply balancing employee costs and financial returns: human capital becomes more valuable, which is an important feature of business models within Industry 5.0.

It is important to realise that the Industry 5.0 concept is not limited to a social focus. Its key objective is to improve the economic performance of the business, and it does so by meeting the needs and interests of employees, as well as ensuring environmental sustainability and resource efficiency. "Resource efficiency is about producing "better with less", optimising the relationship between outputs and resource inputs" [9]. A company or an entire industry operating under the Industry 5.0 concept must be prepared to rapidly adapt its entire business model to the changing conditions of key value chains [9].

In the long term, the overall benefit to industry is increased competitiveness through successful adaptation to a changing world and new markets.

Thus, in the context of Industry 5.0, changes in business models are inevitable. In fact, all these transformations can be described by two factors:

1. Industry 4.0 and Industry 5.0 offer a huge space for companies to update their business models — thanks to the possibilities of using AI and other high technologies, enterprises can apply virtually exclusive business models, which makes them unique to a large extent.

2. The role of the human being in an organisation's business model is multiplied, both as a consumer (external side) and as an employee (internal side). This is especially noticeable against the backdrop of the growing use of AI and high technologies.

In the course of transformations in business models, the requirements for innovation activities of enterprises are changing. If earlier innovations primarily concerned the introduction of technologies into business activities (in terms of production methods or its organisation), as well as the introduction of new (innovative) products to the market, then within the framework of Industry 4.0 and Industry 5.0 concepts the role of innovations has changed significantly — they are becoming the flagships of company development.

The task of innovation is not just to select, implement and introduce new technologies, but to achieve a unique combination of technological, social, and environmental aspects of business activity, as they all play an equal role in the concepts under study.

The same can be said about the result of the company's activity — a finished product or service. If earlier innovativeness was already a

significant factor of choice for the client, then from the point of view of the studied concepts innovativeness has become a unique combination of technology, environmental friendliness, social orientation and personalisation of a product or service.

ECOSYSTEM APPROACH AND THE IMPORTANCE OF MARKETING ECOSYSTEMS IN THE ACTIVITIES OF INNOVATIVE COMPANIES

Industry 4.0 techno-economic paradigm is characterised by the introduction of digital technologies in the management of an organisation to increase its digital maturity through the informatisation and automation of production and the transition to cyber-physical systems.

The term is used to represent processes in a socio-economic subsystem. The term "ecosystem" is used to represent the different levels of information transformation in an integrated way.

A very detailed description of the latter and its role in business functioning is given by G.B. Kleiner [10]. The ecosystem, in his opinion, becomes a natural shell, the main task of which is to implement the interaction of the enterprise with the external environment through the association in clusters, platforms, business incubators, which allows to achieve effective, smooth, and connected functioning of the company. Thus, the ecosystem:

- is a natural extension of the enterprise as a concept and as a form of organisation of real economic activity;
- becomes a logical extension of the cluster economy.
- contains several interrelated business systems.

The requirements for specifying the composition and content of technical and technological platforms during the development and operation of modern business systems, which are inextricably linked to the stages of innovative design, become an integrating basis for the formation of digital ecosystems. At the pre-project stages (at the level of forming technical specifications), marketing research methods and models are used, as this approach shifts the focus from studying the market as a whole to analysing an individual ecosystem, resulting in more authentic results.

In his other work, G.B. Kleiner applies an ecosystem approach to the description of economic structure: he presents the market not as a "pile of grains of sand", where one differs from another only in size. Each ecosystem is a special planet with its own history, culture, and genetic mechanisms of trait inheritance. Since ecosystems by definition lack centralised management, self-organisation mechanisms must be organically embedded in their institutional structure. Within an ecosystem, a special role is given to human control and instruments of interaction between enterprises [11].

Analysing the specifics of the ecosystem approach, it should be emphasised that an ecosystem cannot fully function without regular qualitative information exchange. This approach is necessary for the emergence of competitiveness strategies of both individual market participants and entire industries, regions and even the state as a whole [12]. Indeed, today we are witnessing that even at the state level, it is deep ecosystem interactions that prove to be most effective.

One of the explanations for this phenomenon is given in the works of foreign experts in this field,[1] who call the forces affecting ecosystem development both centrifugal and centripetal,[2]

[1] Information portal Faces of HR: Don Robertson on Building an Ecosystem of Connectivity, Culture & Talent. By Bianca Herron, Editor, HR Daily Advisor Staff May 18, 2023 Faces of HR. URL: https://hrdailyadvisor.blr.com/2023/05/18/don-robertson-on-building-an-ecosystem-of-connectivety-culture-and-talent/ (accessed on 05.11.2023).

[2] Information portal Ove Granstranda, Marcus Holgersson Innovation ecosystems: A conceptual review and a new definition. URL: https://www.ip-research.org/wp-content/

which serve as the basis for maintaining balance both within an individual company and the entire ecosystem [13–14]. It is these factors that allow companies within an ecosystem to remain resilient in times of crisis, as well as to easily (or more easily) transition through various transformational processes [15].

It should be noted that domestic and foreign experts actually agree on the definition of the concept of "ecosystem", its features and role in business. At the same time, the ecosystem concept itself has been considered in foreign literature for more than 20 years. A number of works by foreign scientists, studied by the authors of this article during its preparation, emphasise the ecosystem as a logical (and largely inevitable) development of business, including the consumer (which does not contradict the opinion of domestic experts, but is separately emphasised). In general, we can talk about a harmonious combination of domestic and foreign understanding and interpretation of the term "ecosystem".

The concept of marketing ecosystem should be considered separately as having special significance in the context of organisation and conduct of marketing research. However, the analysis of literature shows that it is not fully defined and considered in scientific sources.

In the publication [16] the marketing ecosystem is defined as "an integration of participants implementing marketing goals aimed at complementing and developing business, building customer-centric business models", which includes:

- suppliers;
- intermediaries;
- investors;
- government agencies;
- universities.

uploads/2020/01/Granstrand-Holgersson-2020-Technovation-Innovation-ecosystems-a-conceptual-review-and-a-new-definition.pdf (accessed on 06.11.2023).

At the same time, this paper considers only the external actors in the marketing ecosystem, while the internal component is left out of the picture.

In [17] we can find an interesting comparison between the digital marketing ecosystem and the classical marketing approach. The former is constantly updated, there is an evolution of marketing tools and approaches to work. In addition, the marketing ecosystem can be used by a company cooperating with a large number of partners, customers, suppliers, distributors, as it is very flexible and is constantly in the process of development.

Based on the studied information, the authors of this study propose to define a marketing ecosystem as a special approach to the organisation of marketing activities of an enterprise, based on the digitalisation of marketing tools and activities; including all participants of the company's activities (both internal and external stakeholders); characterised by constant updating, development and change both in terms of tools and approaches, as well as the goals of activities and the composition of participants. And it is quite obvious that such an approach can be realised only with a high degree of digital business transformation, as the ecosystem can only function on the basis of modern digital tools and models.

Nowadays, enterprises are increasingly using the concept of not just a marketing ecosystem, but a *digital* marketing ecosystem to achieve resource sharing and new product creation by digitising business processes and, consequently, simplifying interactions within the ecosystem and making them more efficient.

Within such an ecosystem, digital platforms, devices, and services work in a single context, with the consumer at its centre. The ecosystem provides an effective link between the consumer and the company's internal resources

in order to manufacture a product that best meets the consumer's needs.

There are not too many marketing ecosystems on the domestic market today. This is due to the fact that the concept itself is still at the stage of formation. The vast majority of such ecosystems exist and are developing quite actively in IT and industrial production. In these industries, consumer involvement in the activities of companies is very high due to the fact that products are often customised.

Thus, the mutual work of the customer, manufacturer, supplier, and management staff leads to the formation of a marketing ecosystem as business processes are renewed and participants are expanded to meet commercial interests.

Marketplaces such as Ozon, Wildberries, Yandex Market, etc. can be cited as the most common example of a digital marketing ecosystem. This is a digital business that closely links sellers and marketplaces in the context of constant improvement of business processes and the composition of participants. At the same time, consumers practically do not participate in the work of marketplaces as ecosystems — they are assigned the modest role of authors of product reviews.

Yandex and a number of its services serve as a better example of a marketing ecosystem. For example, Yandex Navigator, which allows users to transmit data about the traffic situation themselves, and allows owners of businesses or institutions to update information about them. In this way, the ecosystem optimises all processes as much as possible to meet the diverse needs of audiences, vendors, and other participants.

As for IT companies, they are starting to pay attention to the marketing ecosystem approach, as it is in this sector that it is possible to maximise customer satisfaction by including them in the production chain at different stages, for which modern ITSM tools are used.

SPECIFICS OF MARKETING RESEARCH IN THE ECOSYSTEM APPROACH

From the above we can conclude about the changing role of marketing research within the concept of Industry 4.0, as well as its tools and the targeting of the research process itself.

Firstly, digital technologies are used more frequently (digital maturity is increasing). Research results can be more quickly implemented in the company's activities thanks to the introduction of big data and AI technologies. Within the concept of Industry 4.0, marketing research is transforming from cumbersome periodic processes into permanent background research due to the fact that it can itself be managed by artificial intelligence and deliver results that meet the requirements of operational planning.

Secondly, in the context of Industry 4.0, the objects of study are changing. The ecosystem approach involves studying the ecosystem and all its participants (including the external environment) and ranking the objects of study from the closest elements of one ecosystem to those in another.

In an ecosystem approach, the organisation studies other ecosystem members (as well as other ecosystems); the ecosystem itself learns about other, similar ecosystems.

If in the classical model an enterprise explores the external environment of direct and indirect impact, in Industry 4.0 special attention is paid to the internal environment — it is a normal linear business process within the framework of solving some problem. As far as the marketing ecosystem is concerned, market research plays an integrative role among others.

Among them we can emphasise the following:

1. The company studies its internal environment in order to accumulate large amounts of internal information (continuous process).

2. The company analyses the external environment consisting of other participants of the ecosystem — suppliers, customers, in-

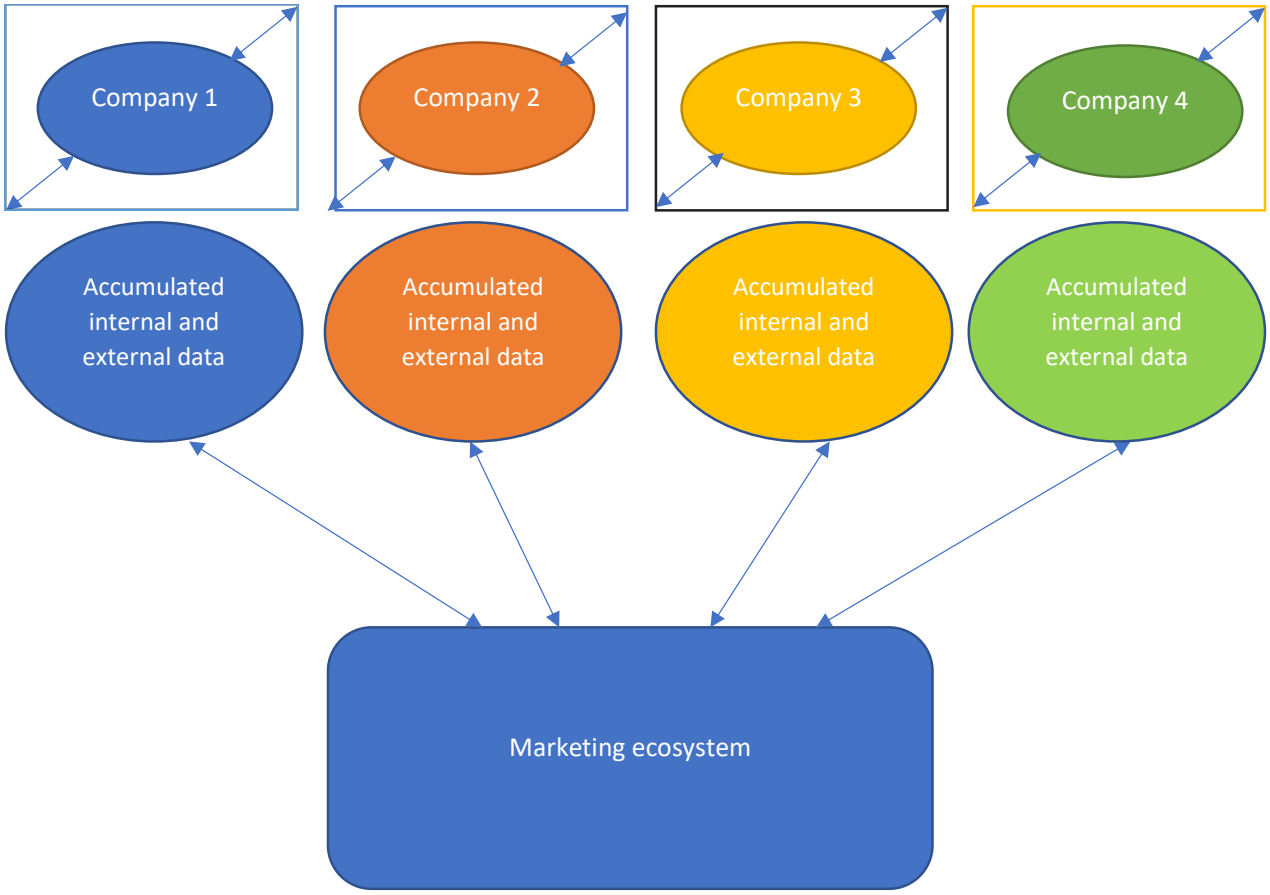

Fig. 1. **Integrating enterprise data into a new marketing ecosystem**

Source: compiled by the authors.

termediaries, investors, regulators (continuous process). Its peculiarity is that it is bidirectional — all participants of the ecosystem study each other.

3. The company's research of other ecosystems — it has a targeted focus and is implemented when necessary.

4. The ecosystem explores other ecosystems. Also, a goal-oriented process that is focused on optimising business processes within the ecosystem.

Market research allows you to create a chain of pumping marketing information across different organisations within the same ecosystem. The situation can be considered on the simplest example — a marketplace, where, thanks to a structured marketing data collection scheme, each seller collects information about consumers, the level of demand, and price elasticity and provides the marketplace with it. As a result, the latter receives an impressive amount of data from each seller, and this information is internal for the marketplace and external — for the seller. But the marketplace itself also collects external marketing information and sends it to sellers to increase the efficiency of their activities. This is the transfer (or pumping) of information between the external and internal circuits of the ecosystem. To ensure its maximum efficiency, it is important to use the ITSM approach when organising the information architecture of the ecosystem.

At the same time, one of the most important goals of marketing research is not just to solve a

specific business problem. On the contrary, the main goal is to accumulate a large amount of data for training artificial intelligence in order to increase the efficiency of managerial decision making.

The integration of enterprises (companies, organisations) into one marketing ecosystem is shown in *Fig. 1*. We are talking about a number of companies that operate in separate markets (the latter are highlighted by squares in the figure) and participate in a constant information exchange with the external market, resulting in the accumulation of internal and external data of the organisation.

In classical marketing, this stage would be the final one, as the collection of information for further use was one of the most important tasks of the business. But with the ecosystem approach, companies begin to share data through a new marketing ecosystem, which actually becomes not just a tool for generating joint information about markets and companies, but also enables the transformation of the business model of each of the companies connected to the marketing ecosystem, acting as a communication platform. When the potential of the ecosystem approach is maximised, research activities are integrated, and duplicative functions and processes are eliminated. The boundaries of companies within the system are erased — companies begin to complement each other in the research of external ecosystems, and there is no need to study the external environment of direct impact, as the maximum amount of information is accumulated.

It is important to recognise that businesses with very different business models operate within the same ecosystem. This is often the principle behind the ecosystem — organisations with complementary business models are brought together to form an ecosystem.

Thanks to the development of market research and increased transparency of boundaries within the ecosystem, information from each business model flows into a common global supermodel, realised in the form of artificial superintelligence and managing the ecosystem as a whole. This blurring of boundaries and the formation of a unified knowledge base within the supermodel is possible through the use of:

- innovative approaches to business process design;
- state-of-the-art information technologies.

A special example of uniting organisations in the construction sector into one marketing ecosystem is worth considering. It includes such companies as developers, designers, design companies, suppliers, banks, real estate agencies. The ultimate goal in the construction market is the implementation of quality housing for the consumer, and all participants of the ecosystem are interested in its implementation.

In a normal situation, each company generates its own information and uses it to solve its own narrow tasks. While within the marketing ecosystem, organisations involved in the design, construction, lending, and implementation of a particular residential complex can combine their marketing expertise and make a comprehensive, high-quality offer for the end customer.

Marketing research in Industry 5.0 has its own specificity, consisting of:

1) a unique combination of artificial intelligence and humans;

2) an emphasis on studying ecosystems rather than the market or individual companies;

3) the use of qualitative research for decision-making.

This enables fundamental study of business environments, special attention to the interaction of ecosystem components, and the "humanisation" of marketing research technologies by adding unique human perceptions and expectations to the management decision-making process.

MARKETING ECOSYSTEM AND INNOVATION DESIGN IN AN INDUSTRY 5.0 FRAMEWORK

This section focuses on the issue of designing a marketing ecosystem, which, and this is important to note, is first and foremost an ecosystem.

According to the BCG Henderson Institute,[3] there are 6 questions to work through when designing an ecosystem:

- What problem does the ecosystem solve?
- Who can be part of the ecosystem?
- What should the governance model be like?
- How to capitalise on the creation of the ecosystem?
- How to get an ecosystem up and running?
- How to ensure the development and longevity of an ecosystem?

The answers are specific to virtually any ecosystem and are relevant to marketing ecosystem design as well. And it is the combination of solutions to each of these questions that forms the unique DNA of each ecosystem.

In turn, experts from the consulting company McKinsey offer the following approaches to building an ecosystem[4]:

1. Defining an ecosystem strategy:
- Identifying the most relevant trends.
- Planning the desired ecosystem and defining value.
- Shaping the key value proposition.

2. Designing the ecosystem:
- Consumers.
- Industries and partners.
- Products and services.

3. Building the ecosystem.

To achieve success in design, it is necessary to create a flexible ecosystem operating model that should not only continuously introduce new solutions, but also manage current ones by maintaining their advantages and eliminating their disadvantages. However, it is important to realise that the concept of ecosystem in general and marketing ecosystem in particular is applied primarily within the concepts of Industry 4.0 and Industry 5.0, implemented as part of the digital transformation of business, which leads to an innovative turnaround of companies. From the above, the authors of the article conclude that the marketing ecosystem is the result of an innovative approach, so its creation should be guided by the methodology of innovation design.

According to the authors, ecosystem (including marketing) design should include 3 consecutive steps (*Fig. 2*):

1. Basic — response to the 6 design steps.
2. Descriptive — detailed description of the ecosystem participants and its strategy.
3. Innovative — innovative design of the ecosystem.

The task of innovative design in the conditions of Industry 4.0 and Industry 5.0 is the digital transformation of business processes and business models, which is associated with the implementation of the task of continuous value addition of business processes. Qualitatively new characteristics of business models are provided by the stage of preliminary selection of the type of the latter and organisation of business processes within them.

Innovative design, based on market research into the needs of customers and partners and their involvement in the production of the innovation, leads to optimised resources and reduced time to implement the resulting solutions [18].

Time is a critical factor in the process of creating new products. It can take months or even years from the birth of an idea to the release of the first prototype, and even longer from prototyping to mass production. A long prod-

[3] How Do You "Design" a Business Ecosystem? BCGURL (official website). URL: https://www.bcg.com/publications/2020/how-do-you-design-a- business-ecosystem (accessed on 12.11.2023).

[4] A design-led approach to embracing an ecosystem strategy. McKinsey (official website). URL: https://www.mckinsey.com/capabilities/mckinsey-design/our-insights/a-design-led-approach-to-embracing-an-ecosystem-strategy (accessed on 12.11.2023).

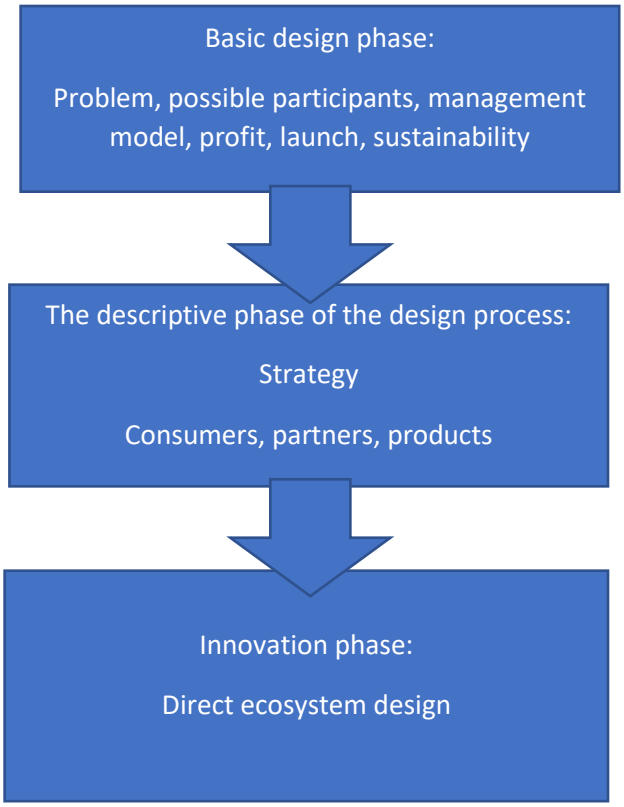

Fig. 2. **Ecosystem Design Stages**

Source: compiled by the authors.

uct development cycle has two disadvantages. Firstly, the more time spent, the greater the resource consumption and the more expensive the product. Secondly, it is not uncommon for a new product to become obsolete before development is complete. It is also important to keep in mind the "newcomer effect", which gives an innovative product a clear advantage in the market. In this regard, reducing product development time is one of the most important factors of enterprise competitiveness, and it is the innovative approach to the design of ecosystems of organisations that contributes to its development.

The next important circumstance that can be affected by innovative design is the risk factor. Launching new products is always a risk; it cannot be ignored. Research helps to reduce uncertainty, but it does not protect 100 per cent. And innovative design, in which forecasting plays a special role, helps to reduce the risk level of the project.

According to [19], the process of innovation design management includes such procedures as:

- approval of an effective strategy for innovative development of the enterprise;
- feasibility study of the efficiency of production and commercialisation of a specific innovative product;
- execution of accompanying documentation;
- innovation engineering.

It is worth noting that the authors of the article do not single out as a unique component the issues related to research and forecasting, which, in turn, occupy a central place in the process of innovative design. The specificity of the latter is that the innovation project can undergo a large number of changes, and the design itself does not end at

Table 2

Stages of innovative design of a new marketing ecosystem

Stage	Stage description	Stage result
Formation of a problem and emergence of an innovative idea (pre-project survey)	Identifying gaps in the current ecosystem, interacting business systems, business models, business processes. Carried out by auditing the current situation using continuous background internal marketing research	Clearly articulate the problems at hand and possible alternatives. Identification of requirements for a unified platform solution for process management
Conducting a set of studies to identify opportunities and threats	Create a research plan to fully analyse the situation within the existing ecosystem. Study of the entire array of internal and external data. Audit of business processes. Analysing each alternative for applicability within the company	Detailed description of the current situation. SWOT-analysis of the situation. Evaluation of all possible alternatives to change the situation. Selection of the most attractive alternative. Selection of the composition of digital technologies transforming the interaction of business systems into a single ecosystem
Development of a prototype of a new marketing ecosystem	Based on the analysis and the selected alternative, a prototype of the new ecosystem is created, which consists of a description of the interacting business systems and optimised business processes. At this stage, the accumulated market research data is used to implement new business processes for the interacting business systems	A document describing the interaction of business systems and optimised business processes and their combination in a new ecosystem
Testing a prototype of the new marketing ecosystem	Business processes of interacting business systems are tested in two ways: initial testing takes place using digital twin technology; then test implementation of the new business process into the company's operations. The role of marketing research at this stage is to assess the changes in the company's operations when each individual process is implemented	Evaluation of each optimised business process and their combination. Making final decisions on optimising business processes
Development of project documentation	Part of the previous stage, which creates a detailed description of the interaction of business systems and optimised business processes	Emergence of regulatory documents, their harmonisation and approval
Creation of a new marketing ecosystem	Completion of optimisation of all business processes, aligning them with each other. Complete "assembly" of the ecosystem. Using market research to control the company's external environment	Fully ready for implementation of the business system
Implementing a new marketing ecosystem	Full implementation of all updated business processes, coordination between them. Development of project documentation, distribution of roles of performers and process participants. Marketing research at this stage is necessary to control the external and internal situation in the organisation during the implementation of the new ecosystem	Functioning of the new ecosystem

Table 2 (continued)

Stage	Stage description	Stage result
Operation of the new marketing ecosystem	Continuous analysis of the implemented system as a whole and each business process separately. Identification of shortcomings in the process of work. Marketing research is needed to record changes in the external environment and internal content of the company	Conclusion on the successful implementation of the innovation ecosystem
Evaluating changes in enterprise operations	Understanding how the situation in the company has changed, describing the changes, assessing the current situation. Performed including marketing research methods	Final judgement on whether the stated problem has been solved

Source: compiled by the authors.

the moment of launching products into mass production. The special role of research lies in the fact that it is research that allows to make improvements to the product during its use and to continue the process of improving the innovation project.

It is clear that innovative design today is only available to enterprises with a high level of digital transformation based on continuous analyses of both external and internal data flows.

Such design can be used not only in the direct development of new products — according to the authors [20], it can also diversify the company's business models by searching for new areas of development, as well as modernising its current business processes, thereby helping it to develop its activities. In addition, innovative design can be involved in such areas as PR and GR through attracting the attention of the company's stakeholders to its new methods of work. This idea is very interesting, as it presents innovative design as a non-linear process, consisting simultaneously of directly designing new types of products using digital technologies and the methodology of business diversification of the company's business model.

The innovation design process can be presented in the form of the following steps:

1. Problem formation and emergence of innovative idea.
2. Conducting a set of studies to identify opportunities and threats.
3. Development of the innovation prototype.
4. Testing the innovation prototype.
5. Development of project documentation.
6. Creation of the innovation project.
7. Implementation of the innovation project.
8. Study of the implemented innovation project.
9. Evaluation of changes in the enterprise's activity.

When innovatively designing a new marketing ecosystem, the following stages should be envisaged (*Table 2*).

It is important to note that the described stages are passed not by a single company, but by all participants of the projected ecosystem, and in fact marketing research plays a significant role in each of them.

It can be postulated that the importance of the latter has increased in the context of Industry 4.0 and Industry 5.0 concepts. At the same time, human participation in project management processes has caused their "humanisation" in line with the Industry 5.0 concept.

CONCLUSIONS

The article provides an overview of the ecosystem approach on the example of different business models in the transition from the technological mode of Industry 4.0 to Industry 5.0. The marketing ecosystem is defined as the basis for interaction of customer-centric business models of different ecosystems within Industry 4.0. The authors of the study show the increasing role of marketing research at all stages of innovative design of marketing ecosystems in the context of end-to-end data integration on the principles of providing platform solutions.

The article characterises different types of business models in the transition from Industry 4.0 to Industry 5.0 and postulates that the transition to a new technological mode can be considered not as a qualitatively new concept, but as an evolutionary development of the Industry 4.0 concept.

Industry 4.0 implies the development of an ecosystem approach; in the context of Industry 5.0, the concept of "marketing ecosystem" is considered as part of this approach.

Within the framework of the ecosystem approach and marketing ecosystems, the role and format of application of marketing research is changing. They become a tool for studying the ecosystem from the company's side and vice versa, as well as the company's external environment and other ecosystems. In addition, with the right approach, they serve as a tool for pumping information between the ecosystem and its components.

The article summarises the stages of practical development of an innovative project of business processes of a new marketing ecosystem, highlighting the role of marketing research in the design framework.

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