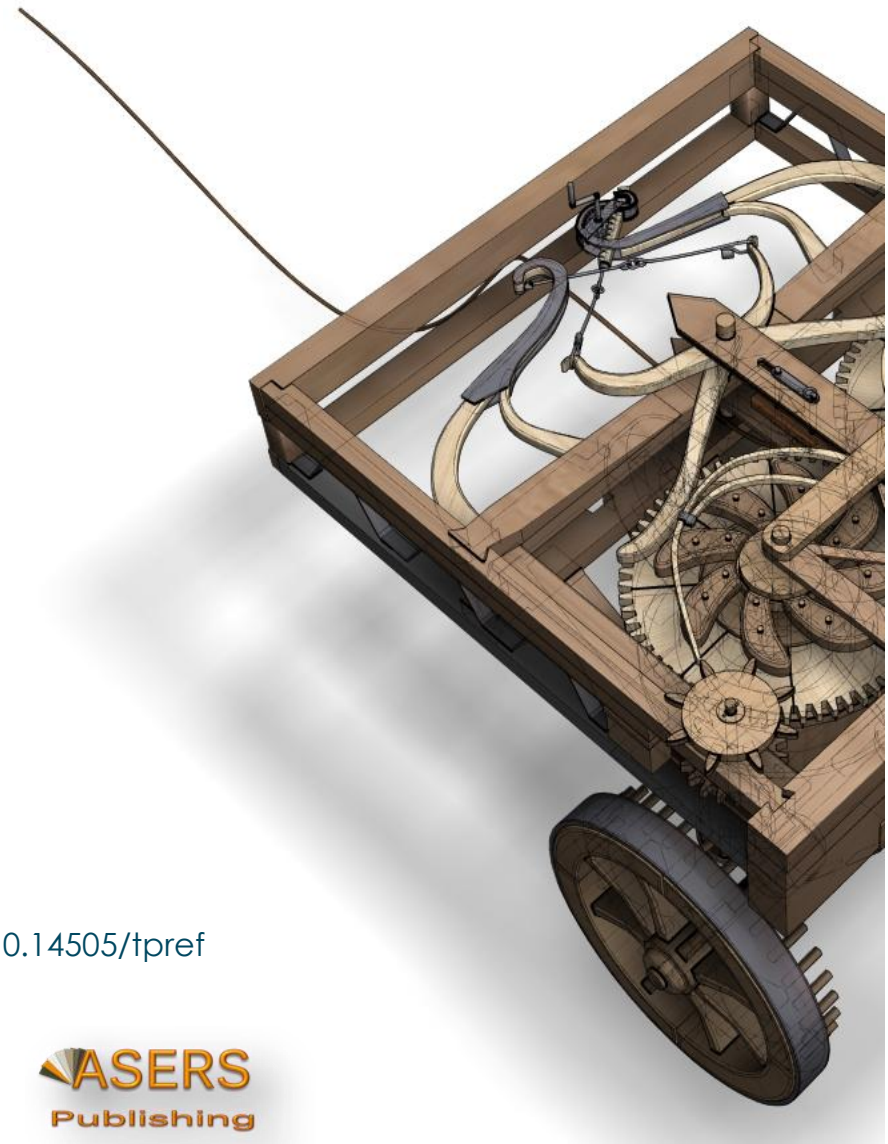
Theoretical and Practical Research in Economic Fields



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The Role of Adaptive Management in Ensuring Enterprises' Sustainable Development

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Abstract: In an ever-evolving business landscape, designing adaptive management systems and agile business models emerges as a pivotal element in guaranteeing companies' enduring growth and competitiveness in the long term. The aim of the study is to examine the role of adaptive management in ensuring the enterprise's stable development in a changing business environment. The study utilized empirical methods such as: experimental method, questionnaire method, analysis method, control method based on key performance indicators and modeling method. The mechanism of adaptive management of the enterprise has been developed and tested within the framework of the training course. The author's model of manufacturing enterprises' adaptive management via the introduction of digital tools into the business model of sustainable development is presented. The survey results demonstrated that the implementation of adaptive management helped their companies achieve key performance indicators. Namely: strategic - 79%, operational - 81%, financial - 76%, production - 84%, marketing - 86%, HR - 77%. The expediency of introducing an adaptive approach to management was confirmed by 93% of respondents. The practical significance of the study lies in the presented model of adaptive enterprise management. It can serve as the basis for the development of sustainable development programs in the context of Industry 4.0.

Keywords: adaptive management; digital technologies; business model; flexibility; innovation; competitiveness; sustainable development.

JEL Classification: L22; L52; M13; M14; C15.

Introduction

Adaptive capabilities of the enterprise in the face of a rapidly evolving business environment, digital transformations of the socio-economic system, and paradigm shifts in the management and organization of business processes hold significant value in the business ecosystem.

To not only survive, but also uphold their competitive edge, organizations must exhibit resilience, enabling them to thrive, being flexible and adaptive (Almutairi & Ghandour, 2021). Accordingly, the formation of adaptive management mechanisms to respond to changes is companies' priority aimed at long-term productivity and sustainable efficiency.

In modern business circles, issues related to enterprises' adaptive management in the context of technological progress and digital transformations of business systems are becoming increasingly relevant. Adaptability is an integral characteristic of the socio-economic system. It combines flexibility, mobility, maneuverability and other characteristics that ensure the rearrangement of the system elements without significant changes in its structure. At the enterprise level, adaptability reflects the ability level of the overall enterprise management system to function in a changing external environment. Adaptive enterprise management, based on flexibility and innovative solutions, is becoming a key tool to ensure their sustainability and competitiveness in the face of rapid technological advances and digital transformations (Nikonenko et al., 2022).

Adaptive management is indispensible in the face of uncertainty and constant unpredictable changes. An adaptive approach to management contributes to a deeper design of management decisions that draw upon scientific pespectives. This is not a "trial and error" process but rather learning through the process of practical application (Rogers & Macfarlan, 2020). Adaptive management is a key component of crisis management, as it allows us to quickly identify external threats and new opportunities. It also contributes to a deep analysis of the enterprise's internal strengths and weaknesses, which makes it possible to develop effective solutions to prevent crisis situations (Korytko & Piletska, 2022). The USAID Adaptive Management Discussion Note (USAID, 2018) states that adaptive management does not involve any objectives' revision. The essence of adaptive management is not to change the goals themselves in the process of implementation, but to adjust the ways to achieve them in response to the emerging changes. Adaptive management is carried out at both tactical and strategic levels (Lelyk et al., 2022). At the tactical level, solutions are developed to respond to market changes, while strategic management includes indicative planning, monitoring and diagnostics of the business environment, ensuring decision correction grounded on new information (Zinchenko et al., 2022). Accoding to Rangwala (2024), adaptive management involves responding to a situation after it has occurred, offering solutions to eliminate destructive consequences. This approach is less preferable for overcoming uncertainty, as it does not take into account the importance of time and the potential financial consequences of decisions made. Adaptive management, drawing upon a scientific approach and flexibility in decisions' implementation, becomes a key factor for successfully confronting crises and ensuring sustainable development in conditions of uncertainty. Therefore, the relevance of delving into adaptive enterprise management is due to rapid changes in the business environment, technological progress as well as digital transformations. Under such conditions, companies must be flexible and adaptable to maintain their competitiveness and ensure sustainable development.

The aim of the study is to examine the role of adaptive management in ensuring the enterprise's stable development in a changing business environment. To achieve the goal of the study, the following tasks were set:

- develop the concept of the training course "Strategy of Adaptive Management at Manufacturing Enterprises" and conduct a training experiment with manufacturing enterprises managers from Ukraine, Poland, Romania and Moldova;
- design and test the enterprise's mechanism of adaptive management, as well as evaluating the feasibility of introducing adaptive approaches to managing the activities of manufacturing enterprises;
- evaluate the impact of implementing the adaptive management approach on the achievement of the elaborate performance indicators.
- design an adaptive model of managing the manufacturing enterprises through the introduction of digital tools into the business model of sustainable development.

1. Literature Review

In the dynamic landscape of business management, the integration of advanced technologies has become a prerequisite for maintaining competitiveness and efficiency (Rane, 2023). Modern digital technologies are making significant and positive changes in the enterprises' activity, radically changing established models and pushing

enterprises towards more efficient and innovative activities (Bruno, 2024). In the ever-changing landscape of digital transformation, monitoring, measurement, and metrics are the pillars that drive progress, efficiency, and innovation (Aldoseri et al., 2024). Business models based on digital service-oriented solutions enable manufacturers to gain a competitive edge through the use of innovations in the field of products and services. Moreover, it provides an opportunity for knowledge sharing and externalizing risks (Naeem et al., 2024).

According to Bejarano-Auqui (2024), the constant changes in the socio-economic system under the influence of 21st century technologies require entrepreneurs to be far-sighted in business management. This prioritizes the use of knowledge and effective management of information value. Adama and Okeke (2024) point out that digital transformation has radically changed traditional business models, forcing companies to innovate and adapt quickly to dynamic market conditions. Digital technologies allow us to quickly create prototypes, experiment and integrate new business models. According to Marion et al. (2025), digital technologies have a significant positive impact on radical innovation in firms by opening up new opportunities to obtain, analyze, and use knowledge. The use of digital technologies allows companies to analyze vast amounts of data, extract valuable information, and generate innovative ideas that can provide a competitive advantage. According to Gin (2025), artificial intelligence-driven systems can significantly improve forecasting accuracy and decision-making efficiency by learning from dynamic data environments.

Furthermore, Lecocq, Warnier, Demil and Plé (2024) consider that generative digital technologies are powerful tools for management. They allow creating new business models and improve existing ones. Digital technologies are able to model the performance of business models in different scenarios, which helps companies to be aware of risks and opportunities for making informed management decisions. Drawing on the above, generative digital technologies are becoming an important tool for creating and optimizing business models. Thus, enabling companies to more effectively assess risks and opportunities, as well as to make more balanced management decisions in conditions of instability. Researchers Daskalopoulos and Machek (2025) argue that the implementation of AI technologies can reduce planning costs, which will allow for more complex, flexible and informed decisions. AI can be an effective tool in developing organizational ambidexterity, promoting rational diversification and sustainable improvement in the performance of companies.

In recent years, there has been significant progress in integrating technological solutions into enterprise resource planning systems. In this light, Jawad and Balázs (2024) argue that the use of machine learning in enterprise resource planning systems is a top priority of technical progress in today's corporate environment. Machine learning allows resource planning systems to adapt dynamically based on real-time information, resulting in increased efficiency and adaptability. This is consistent with the opinion of Madanaguli, Sjödin, Parida and Mikalef (2024), who argue that the use of digital tools allows enterprises to implement cyclical business models. These models are developed in order to minimize the cost of resources and energy in the value chain. In addition, existing business cyclic typologies can be extended through technological capabilities. In a study by Marion et al. (2025), it was shown that integrating AI into the uncertain early stage of new product development enables companies to improve the accuracy and speed of product development. This is due to the ability to synthesize large-scale consumer data to improve decision-making, accelerate concept development, and enhance product evaluation. The above perspective is consistent with the opinion of Prasanth, Vadakkan, Surendran and Thomas (2023). The said authors argue that businesses can make more effective decisions owing to the ability of AI systems to analyze huge amounts of data and generate forecasts and recommendations based on them. AI can revolutionize corporate decision-making by providing faster and more accurate insights that can guide both operational and strategic decisions. According to researchers Pallathadka et al. (2021), these analytical results can help maximize sales and optimize resources. Thus, the integration of AI and machine learning into enterprise resource planning systems ensures higher efficiency, adaptability and accuracy of management decisions. Accordingly, this contributes to the processes' optimization and the creation of sustainable business models focused on minimizing the resources cost as well as meeting the customer needs. Furthermore, Farayola, Abdul, Irabor and Okeleke (2023) believe that enterprises can automate marketing research using artificial intelligence-based tools. In the context of the said approach, adaptation to the changing conditions and maintaining operational efficiency is ensured. According to Roy et al. (2025), AI adoption is not monolithic, and its nature and subsequent value appropriation processes may vary depending on external factors and the organization's strategic approach to innovation and resource management. Researchers Bhardwaj et al. (2025) draw attention to the challenges of integrating AI into organizational processes related to data privacy, model transparency, and ethics. According to Santos and Carvalho (2025), at the stage of integrating digital technologies into management processes, the formation of a comprehensive AI strategy based on ethical principles and active community involvement plays a key role. Such an approach ensures fair and inclusive

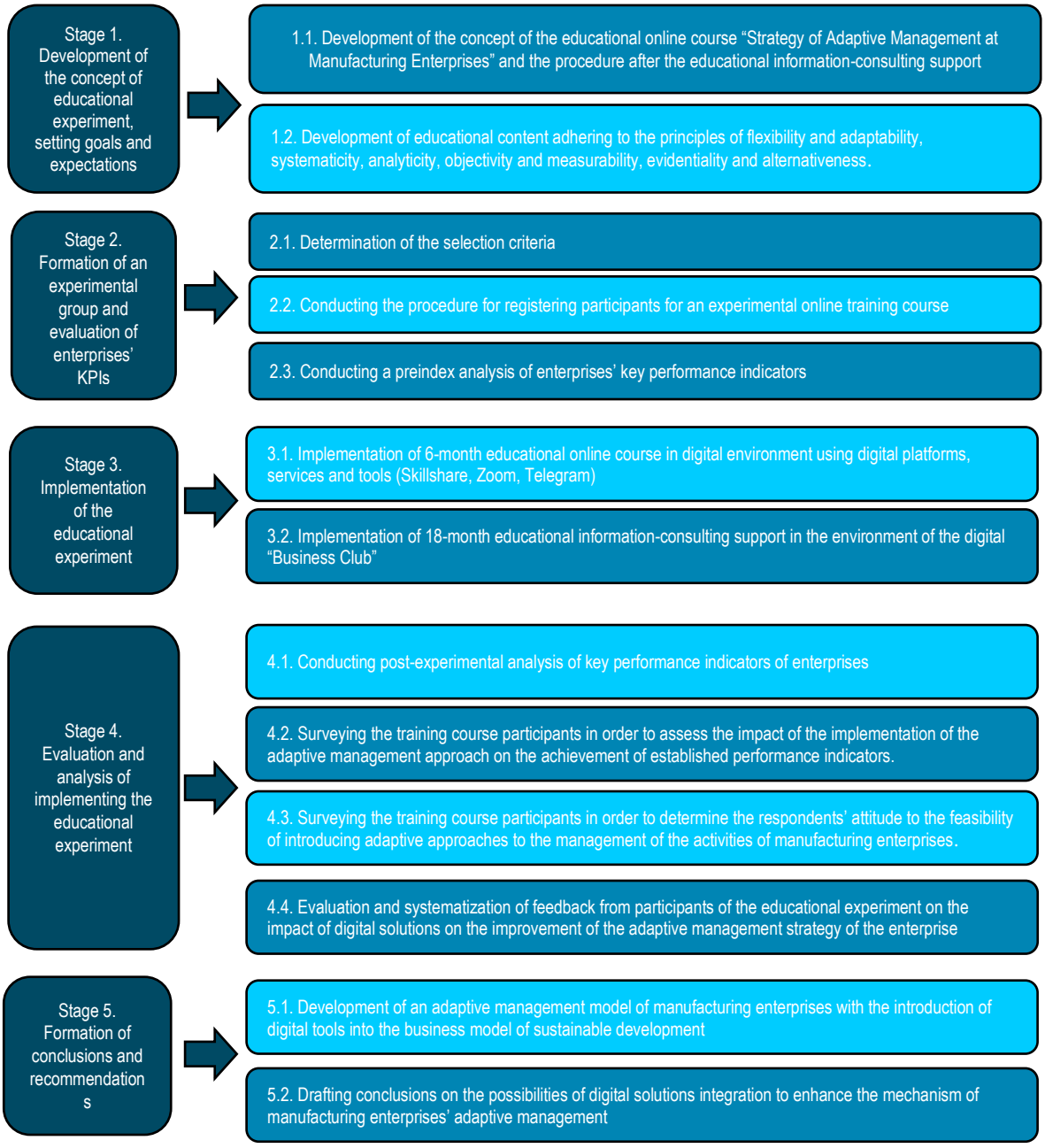
adoption of AI, promoting sustainable development and harmonious interaction of technology with society. According to researcher Ghosh (2025), the integration of modern digital solutions based on AI functions also requires a cultural shift in which leaders develop digital AI skills, begin to trust the conclusions made with its help, and adapt leadership styles to effectively use all the opportunities that artificial intelligence offers. Thus, to successfully integrate AI into business processes, companies need to develop technological competencies and train employees to manage data. In addition, it is indispensable to strengthen cybersecurity measures and create a culture of continuous learning.

2. Method also Called Materials and Methods or Experimental Methods

2.1. Research Procedure

The research stages that were carried out when writing this work are presented in Figure 1.

Figure 1. Research Stages



Source: elaborated by the authors.

2.2. Methods

In the course of this study, the following methods were used:

1.The experimental method was applied in the process of implementing the experimental educational course and testing the effectiveness of the adaptive management mechanism at manufacturing enterprises.

2.The management method based on key performance indicators (KPI) was used to evaluate the effectiveness of implementing the adaptive approach to managing the manufacturing enterprises.

3.The questionnaire method was used in order to determine the respondents' attitude to the expediency of introducing adaptive approaches to managing the manufacturing enterprises' activities. The above method was also utilized to obtain data on the impact of implementing the adaptive management approach on the achievement of established performance indicators across the companies of the participants of the training course.

4.The analysis method was used to evaluate and consolidate the educational experiment participants' feedback in terms of the digital decisions impact on the improvement of the enterprise's adaptive management strategy.

5.The modeling method was used in the development of the author's model and adaptive control mechanism.

2.3. Instruments

The survey of respondents was carried out using Google Forms. The obtained data were analyzed and processed using statistical methods and Microsoft Excel software.

2.4. Sampling

The educational experiment was attended by the heads of 127 private manufacturing companies of small and medium-sized business from Ukraine, Moldova, Poland and Romania. The offer to participate in the online training course was sent to the companies owners whose activities were related to production. Since the analysis of the external business environment was one of the key elements of the online course concept, the experimental group consisted of business representatives from countries that are characterized by geographical proximity and have common economic interests, opportunities and challenges. The search for companies was carried out with the help of open services of state registers of legal entities. Course moderators sent proposals to 263 business owners, 127 of whom registered for the training course (Table. 1).

Table 1. Sampling

Number of participants	Scope of activity	Country
13	Food production	Ukraine (4 people), Moldova (3 people), Poland (2 people), Romania (4 people)
14	Beverage production	Ukraine (3 people), Moldova (2 people), Poland (6 people), Romania (3 people)
16	Textile production	Ukraine (4 people), Moldova (6 people), Poland (4 people), Romania (2 people)
19	Clothing production	Ukraine (3 people), Moldova (6 people), Poland (4 people), Romania (6 people)
15	Manufacture of furniture	Ukraine (3 people), Moldova (6 people), Poland (4 people), Romania (2 people)
12	Manufacture of leather, leather products and other materials	Ukraine (2 people), Moldova (4 people), Poland (3 people), Romania (3 people)
10	Manufacture of rubber and plastic products	Ukraine (3 people), Moldova (2 people), Poland (4 people), Romania (1 person)
28	Manufacture of other products	Ukraine (8 people), Moldova (5 people), Poland (9 people), Romania (6 people)
Total 127		Ukraine (30 people), Moldova (34 people), Poland (36 people), Romania (27 people)

Source: elaborated by the authors.

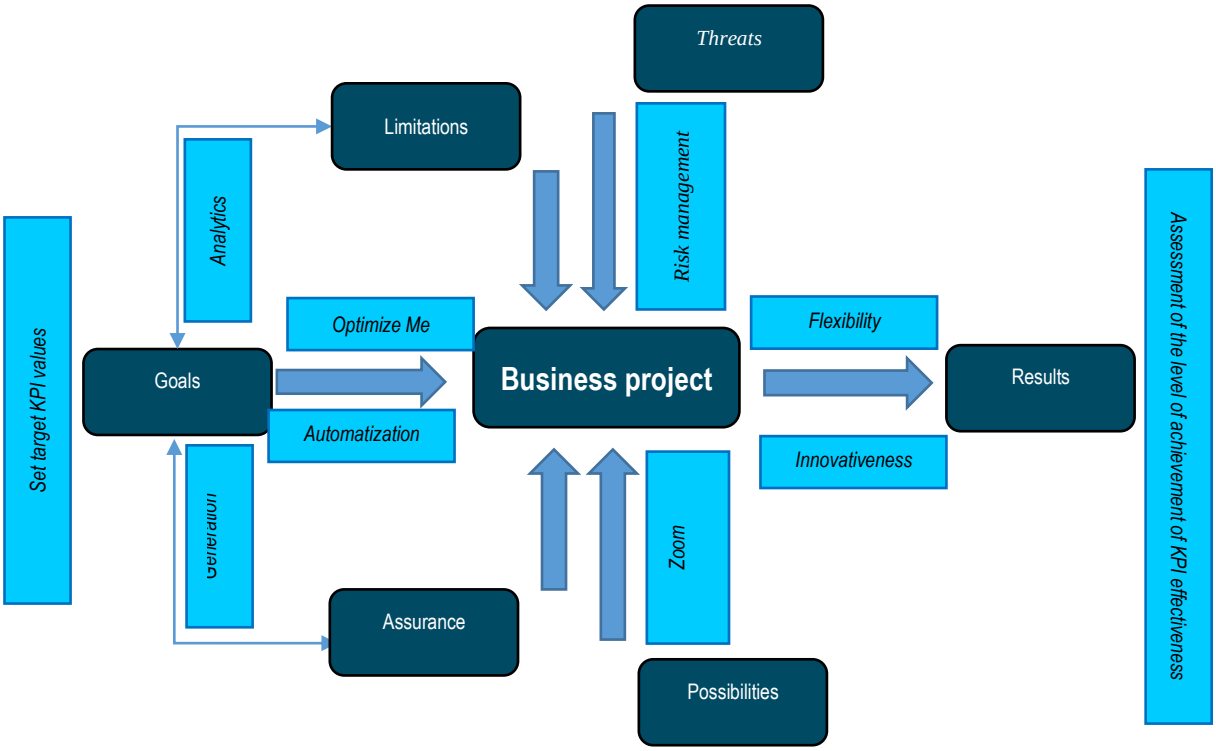
The number of participants in the online course was sufficient to realize the planned objectives of the study. The online course ran for 6 months (from September 2022 to February 2023) on the Skillshare online platform (https://www.skillshare.com) and included 15 modules with theoretical and practical cases.

Upon completion of the course, participants were provided with informational and advisory support. The support included collective training activities in the environment of the virtual "Business Club" and individual consultations to business owners on request. Collective training events were held on Zoom online communication platform (https://zoom.us/) once a week and within the course included 84 online seminars, which were conducted by 5 experts - course moderators and 12 invited experts - business consultants. In addition, a "Business Club" group was created in Telegram, where course participants had the opportunity to share feedback, conduct discussions, and discuss current problems of the modern business environment. The administration of the group in Telegram was carried out by 1 expert - the course moderator.

3. Research Results

The results of the training experiment conducted revealed the promising possibilities of applying an adaptive approach to management. The implementation of a scientifically grounded approach to the organization and management of the interaction between internal and external factors in the business environment has enabled managers to delineate competitive advantages and formulate strategic directions for the companies' development. The skills of systems analytics allowed managers to take a comprehensive approach to the management of the company, taking into account the impact of management decisions on all aspects of its activities. Analyzing and systematizing the discussion activities of the participants of the educational experiment in the Telegram Business Club group, the importance of this work was noted. In the adaptive management system, the analysis of external and internal factors of the business environment is the basis for making flexible management decisions. The above-mentioned analysis allows us to identify the key trends, risks and opportunities that shape the company's operating environment and allow the management team to project optimal trajectories for sustainable development. Figure 2 shows the adaptive control mechanism tested within the training course and is presented as follows.

Figure 2. Mechanism of Enterprise's Adaptive Management



Source: elaborated by the authors

The pivotal role in the mechanism is held by the target enterprise - a venture subject to adaptive management. At the initial stage of the process of adaptive management of the enterprise, the management sets the target values of the KPI. Finally, an assessment of the level of achievement of the indicators of the

effectiveness of KPI is carried out. Work with the project begins with the analysis of the external and internal environment. With the help of business analytics tools, opportunities and limitations in the implementation of the project are evaluated, collected, processed, and analyzed data from the external business environment. At this stage, promising target audiences of consumers are determined, a product concept is developed and improved to meet market requirements, and alternative directions of project implementation are outlined. Next, an assessment of the company's own capabilities for the implementation of the project goals, the search for possible resources, the generation of solutions for resource diversification and the search for alternative resources and their combinations is carried out. At this stage, the ideas of production processes' automation, the technological tools' introduction in the production and product sale are worked out.

Financial efficiency indicators increased by 17.4%, indicators of production process efficiency - by 13.5%, and indicators of enterprise's sales activity efficiency - by 12.8%. In addition, the performance indicators of labor management increased by 9.7%. In general, these indicators demonstrated a steady improvement in the financial condition of enterprises and their readiness for further development.

Table 2. The effectiveness of the implementation of an adaptive approach to enterprise management

Key performance indicators of the company (KPI)	The effectiveness of implementing an adaptive approach to enterprise management (change of KPI level (+/-))
Financial Performance Indicators	**+17.4%**
Profitability	+17%
Liquidity	+14%
Solvency	+12%
Profitability	+21%
Business activity	+23%
Performance indicators of the production process	**+13.5%**
Production efficiency	+14%
Productivity	+16%
The level of quality of products	+7%
The level of the innovative component of the production cycle	+13%
Level of execution of production plans	+18%
The rate of growth of the volume of production	+13%
Indicators of the enterprise's sales activities efficiency	**+12.8%**
Sales volume	+23%
Profitability of sales	+19%
Efficiency of advertising and marketing activities	+16%
Sales cycle duration	+9%
Market share	+4%
Level of competitiveness	+6%
Indicators of labor resources' management effectiveness	**9.7%**
Workforce productivity	+7%
Efficiency in the use of working time	+9%
Percentage of completed planned tasks	+13%

Source: Elaborated by the authors

The results of surveying the participants of the educational experiment confirmed the expediency of introducing adaptive approaches to the management of the activities of manufacturing enterprises. 93% of respondents agreed with this. According to the respondents, the implementation of adaptive management helped their companies achieve key performance indicators: strategic - 79%, operational - 81%, financial - 76%, production - 84%, marketing - 86%, HR - 77% (Table 3).

The digital tools market is evolving rapidly, offering innovative services. Participants in the course were afforded the opportunity to experiment with cutting-edge technologies throughout the training and mentoring period. The analysis and systematization of the experience of corporate consulting within the framework of the experiment, as well as the evaluative observation of the activities of companies that implemented the principles of

adaptive management became the basis for the model development. The author's model of an adaptive management system for manufacturing enterprises integrates digital tools into a sustainable business model. (Figure 3).

Table 3. Results of the respondents' survey

Statements	Rating scale (1-5 points)				
	Totally disagree	*Rather disagree*	*Neutral*	*Rather agree*	*Totally agree*
The implementation of the adaptive management approach enabled the company to achieve the established performance indicators, namely:					
Strategic KPI		2%	7%	12%	79%
Operational KPI	2%	3%	5%	9%	81%
Financial KPI	4%	5%	8%	7%	76%
Production KPI			2%	14%	84%
Marketing KPI			3%	11%	86%
HR KPI	3%	6%	8%	6%	77%

Source: Elaborated by the author

The sustainable advancement of the company amidst the evolving external and internal operational landscape is regarded as the primary strategic aim of adaptive management. The tactical objective is to ensure the flexibility and efficiency of the company's response to external changes, allowing rapid adaptation of strategies and processes. An effective system of adaptive management of a manufacturing enterprise involves the integration of digital technologies into key areas of the company's activities, namely: i) business intelligence tools and generative artificial intelligence; ii) adaptive corporate systems and CRM systems; iii) Internet of Things, simulation systems and cloud platforms. Owing to the introduction of digital tools, the company is able not only to react instantly to changes, but also to proactively anticipate them. This greatly improves the company's competitiveness and ability to survive in dynamic market conditions. Analysis of the feedback from the participants of the experiment made it possible to identify the key arguments confirming the appropriateness of their use in the process of implementing the adaptive management strategy:

1. Digital technologies significantly increase the efficiency of adaptive enterprise management, providing flexibility and speed of response to change.

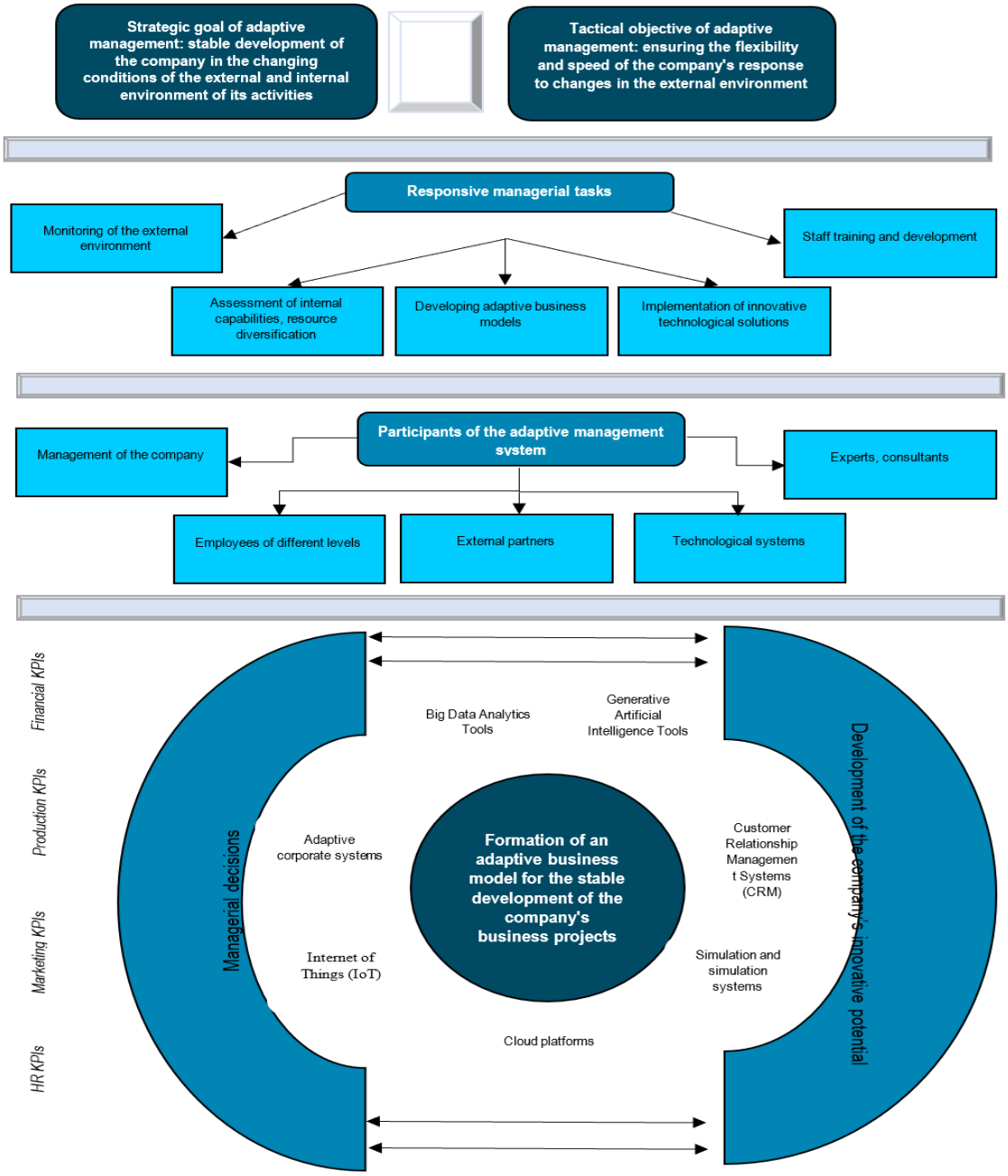
2.The generative functions of digital tools allows automating the monitoring of the external environment and the assessment of the internal capabilities of the company, helping to identify new resources and optimize their use.

3. An advantageous aspect of digital technologies lies in their capacity to formulate adaptive business models that can promptly adjust to fluctuating market conditions.

4. Modern digital technologies play a key role in predicting future changes and developing solutions that contribute to the sustainable development of the company.

5. The introduction of digital technologies allows creating a flexible business model that contributes to the sustainable development of business projects.

Figure 3. Adaptive Model of Manufacturing Enterprises' Management with The Introduction of Digital Tools into The Business Model of Sustainable Development



Source: Elaborated by the authors

4. Discussion

The results of the current research are consistent with those of studies conducted by Nigerian (Orishede et al., 2024), English (Sena & Nocker, 2021), Spanish researchers (Gutierrez-Broncano et al., 2024). The findings of the research confirmed that the integration of digital technologies in the management functions contributes to ensuring the company's competitiveness, sustainability and adaptability. The scientific research (Orishede et al., 2024) has shown that business intelligence systems are essential to support a multitude of business solutions, especially in the areas of personnel technological skills development, forecasting, and strategic planning. The results of a study conducted by researchers from the University of Essex (UK) (Sena & Nocker, 2021) confirmed that experimentation is an important aspect of digital technologies' introduction into new business models. The researchers concluded that the process of designing new business models forces company executives to experiment with alternative ways of generating value. The findings of a study conducted by Spanish researchers

(Gutierrez-Broncano et al., 2024) have validated that when confronted with enduring shifts in the external business landscape, the implementation of hybrid or integrated business strategies proves to be efficacious.

This approach stands out as the most optimal method to guarantee the longevity and advancement of enterprises. The researchers concluded that the implementation of a hybrid strategy requires flexible and mobile systems to adapt more and faster to change. Furthermore, it requires a combination of efficiency and innovation in both products and processes. In addition, the scientists concluded that the innovative abilities of companies depend to a large extent on the strengthening of adaptive abilities. As companies develop and implement adaptive capabilities into their procedures, systems, and organizational processes, innovation becomes a reality and helps companies stay competitive. In our study, the adaptive control mechanism is presented and tested, within the framework of a training experiment. The presented mechanism involves the integration of digital tools of business analytics into the decision-making process at all stages of the life cycle of business projects. The findings of our research validate that the implementation of adaptive management in manufacturing enterprises, coupled with the utilization of cutting-edge digital tools, can significantly enhance operational efficiency. This approach fosters resilience and adaptability in the face of dynamic business environments. The results of a study conducted by Chinese researchers (Ameen, et al., 2024) showed that the combination of AI capabilities and strategic flexibility can significantly improve the new products creativity and the productivity of developing companies' new services with a high level of institutional support. The scientists concluded that company management should promote the creation of an internal environment that simultaneously integrates the capabilities of digital technologies and maintains the strategic flexibility of the enterprise. The adaptive model of management in manufacturing enterprises outlined in our research, involving the integration of digital tools into the business framework, entails a synergistic amalgamation of cutting-edge digital solutions and adaptive management strategies. According to the authors, digital solutions can significantly increase the management efficiency.

The findings of a study conducted by Chinese researchers (Chen, et al., 2022) revealed that organizations can truly reap the technological benefits of digital advancements. This occurs when making strategic decisions in crucial domains such as marketing, product innovation, and customer relationship management. In this light, The Ukrainian and German researchers (Arefiev, et al., 2023) showed that organizing the effective functioning of marketing and logistics activities on the basis of adaptive management approaches in the conditions of digitalization is important. The process under analysis can be systematized in three main directions: i) the establishment of effective processes of financial and production logistics in their close relationship with the issues of promotion and marketing of products; ii) optimization of the internal movement of personnel resources as a component of effective personnel logistics in conjunction with the creation of effective pricing mechanisms formation and marketing of products; iii) implementation of active digitalization of business processes at the enterprise with possible attraction of credit and investment resources. Wahab, M.D.A. and Radmehr, M. (2024) concluded that Artificial Intelligence (AI) and other cutting-edge technologies are emerging as primary drivers for enhancing productivity. The above phenomenon stems from their capacity to revolutionize virtually all facets of operations within and beyond organizations. Integrating externally acquired knowledge into existing procedures and expertise allows achieving maximum efficiency in the implementation of new resource configurations, taking advantage of market opportunities. This can allow a firm to create services and products that fit the ever-changing business environment, thereby contributing to its productivity. The results of our study showed that the implementation of an adaptive management approach combined with the integration of digital tools can positively influence the achievement of key performance indicators, in particular: strategic, operational, financial, production, marketing, HR.

The adaptive management model presented in the study can serve as a basis for the development of adaptive sustainability strategies by manufacturing companies, taking into account the dynamic conditions of the business segment. The procedure of business analytics described in the study for making managerial decisions in the enterprise's adaptive management system will benefit in making flexible management decisions. Following the mechanism of implementing an adaptive management approach can shape management design optimal trajectories of stable development aimed at achieving the high level of company's flexibility and competitiveness.

4.1. Limitations

The overriding limitation of the study is its theoretical and descriptive nature. The assessment of the feasibility in terms of introducing adaptive approaches to managing the manufacturing enterprises activities as well as the effectiveness of their implementation draws upon the results of the respondents survey only. Research requires the application of more thorough quantitative and qualitative analytical methods.

Conclusions

Implementing adaptive management strategies and experimenting with new business models are key factors for success in a rapidly changing external environment. The results of the conducted training experiment, in which the industrial enterprises managers' participated, confirmed the expediency of introducing the adaptive management approach. The results of the experiment demonstrated that the implementation of enterprises' adaptive management strategy in combination with digital tools contributes to enhancing business efficiency. In particular, it ensures its flexibility and stability in the face of change. Within the framework of training and consulting, company executives were able to develop their own adaptive strategies for the company's development, taking into account the business segment's dynamic conditions. The introduction of a scientifically based approach to the organization and management of the interaction of internal and external factors of the business environment allowed managers outlining competitive advantages as well as elaborating competitive directions of companies' development. The proficiency in systems analytics empowered managers to adopt a holistic approach to the governance of the organization, considering the ramifications of managerial decisions on all facets of its operations.

The outcomes of the assessment regarding the efficacy of incorporating the adaptive approach in corporate management revealed that its integration led to a substantial enhancement in key performance indicators. Financial indicators of efficiency increased by 17.4%, efficiency of production process - by 13.5%, efficiency of sales activity of the enterprise - by 12.8%, and efficiency of labor management - by 9.7%. The price observation of the activities of companies that implemented the principles of adaptive management became the basis for the development of a model of adaptive management system of manufacturing enterprises.

The novelty of the research lies in the development of a model of an adaptive management system for manufacturing enterprises, which combines digital tools with the concept of sustainable development. Developing a personalized model of an adaptive management system is extremely important for modern companies, as it allows for prompt response to external challenges, ensuring flexibility in decision-making. This increases the company's ability to quickly adapt to market changes, which in turn helps strengthen its sustainability and long-term competitiveness.

Prospects for further research are to develop a mechanism for introducing into the system of manufacturing enterprise's adaptive management intelligent performance indicators based on AI technologies. The authors intend to formulate a consistent methodology for making management decisions based on key performance indicators, which will contribute to enhancing enterprises' competitiveness and sustainability.

Credit Authorship Contribution Statement

Nataliia Hurzhyi: Methodology, Providing the Survey, Formal Analysis.
Igor Rozovyk: Methodology, Providing Survey, Data Curation.
Tetiana Kharchenko: Validation, Formal Analysis, Writing.
Serhii Kobets: Writing and Editing, Visualization.
Veronika Komandrovska: Conceptualization, Project administration, Writing and Supervision.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The authors declare that they have not used generative AI and AI-assisted technologies during the preparation of this work.

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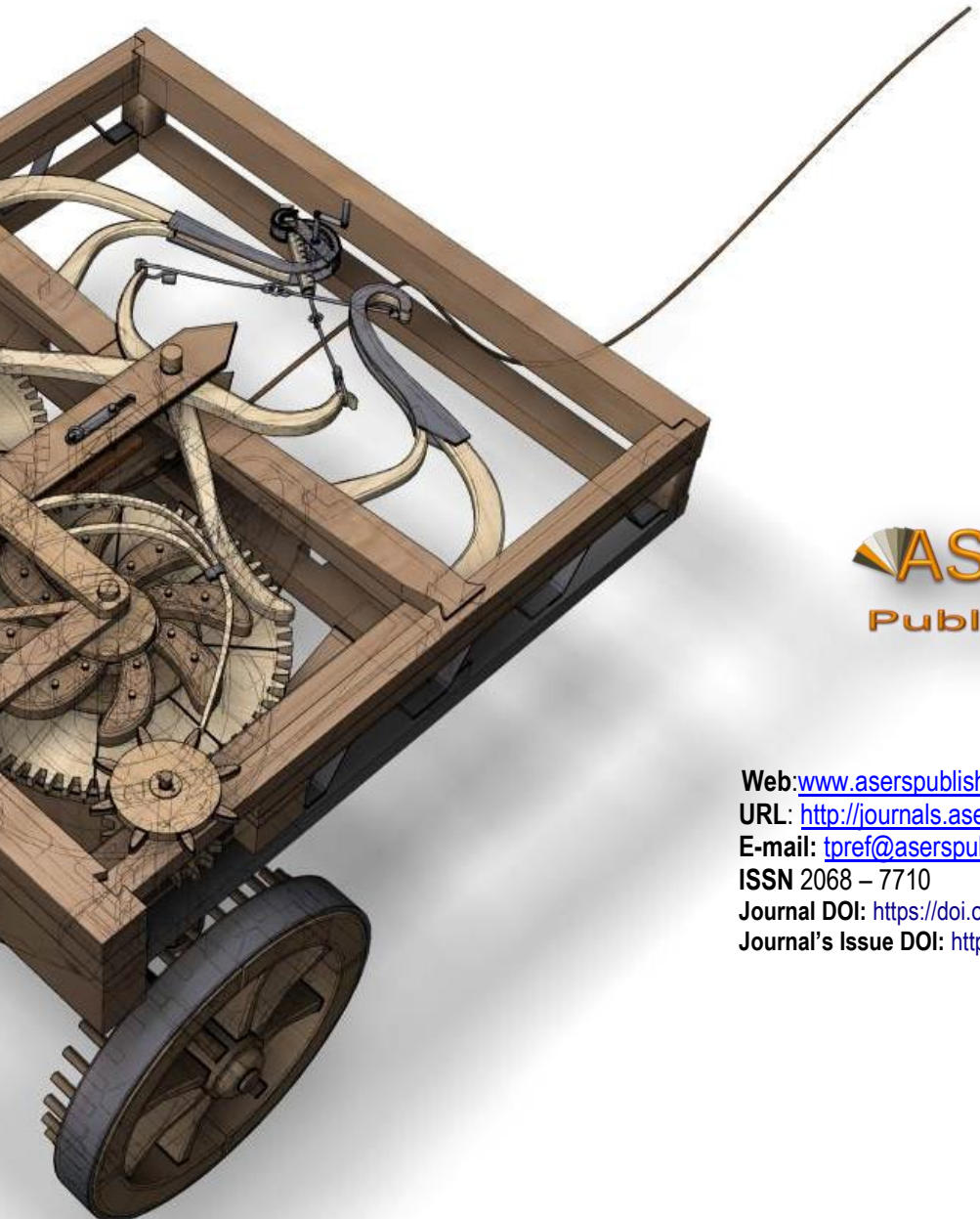

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