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## The Role and Use of ICT in Agile Organizations

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Artur Kwasek<sup>1</sup>, Maria Kocot<sup>2</sup>, Hubert Gąsiński<sup>3</sup>, Krzysztof Nowakowski<sup>4</sup>

### **Abstract:**

**Purpose:** The article aims to explore the role and application of ICT (Information and Communication Technologies) in agile organizations. Additionally, it analyzes the impact of ICT technology on the efficiency and functioning of various departments in these organizations.

**Design/Methodology/Approach:** The research was conducted in 2023 using a survey method aimed at assessing the role and areas of application of ICT in agile organizations. Data analysis included statistical methods to interpret survey results and identify key trends and patterns.

**Findings:** The results indicate that ICT is considered indispensable in the workplace, significantly improving task completion, work efficiency and operational speed. The research shows diverse uses of ICT in various organizational departments, with the highest use in sales and services.

**Practical Implications:** The study suggests that agile organizations should prioritize ICT investments to improve operational efficiency and adaptability. Specific recommendations include the use of advanced analytical tools in marketing and finance, automation in logistics, and e-learning platforms for employee development.

**Originality/Value:** This study contributes to the understanding of the key role of ICT in enhancing organizational agility. It provides valuable insight into how different departments in agile organizations use ICT to remain competitive and respond to dynamic changes in the business environment.

**Keywords:** Agile organizations, ICT technologies, organizational agility, enterprise, innovations.

**JEL codes:** I21, I23.

**Paper Type:** Research article.

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<sup>1</sup>Ph.D., University of Technology and Economics, Warsaw, Poland,  
ORCID: 0000-0003-4386-1444, [artur.kwasek@uth.edu.pl](mailto:artur.kwasek@uth.edu.pl)

<sup>2</sup>Ph.D., University of Economics in Katowice, Poland,  
ORCID: 0000-0001-5150-3765, [maria.kocot@ue.katowice.pl](mailto:maria.kocot@ue.katowice.pl)

<sup>3</sup>Ph.D., WSB Merito University in Poznan, Poland,  
ORCID: 0000-0002-5226-4468, [hubert.gasinski@warszawa.merito.pl](mailto:hubert.gasinski@warszawa.merito.pl)

<sup>4</sup>Ph.D., Vistula University in Warsaw, Poland,  
ORCID: 0000-0002-85194646, [krzysztof.nowakowski@vistula.edu.pl](mailto:krzysztof.nowakowski@vistula.edu.pl)

## **1. Introduction**

Information and communication technologies (ICT) play a key role in the dynamically changing business world, where the speed of response to changing market conditions and customer needs is extremely important. Agile organizations that can flexibly adapt to new realities gain a competitive advantage.

Modern enterprises must constantly look for ways to increase their operational efficiency and the ability to quickly introduce innovations. In this context, ICT technologies constitute the foundation for building organizational agility (Morlacchi, 2020).

Addressing the topic of the role and use of ICT in agile organizations is justified by several key factors. First of all, in the era of digitalization, ICT technologies are an indispensable element of the functioning of modern companies, enabling process automation, analysis of large data sets and faster and more effective resource management. Moreover, agile organizations that are characterized by flexibility and the ability to quickly respond to changing market conditions need advanced technological tools to meet growing customer demands and maintain competitiveness (Swan and Psarikidou, 2023).

ICT technologies support innovation by enabling enterprises to bring new products and services to the market in a shorter time. Also in the context of globalization and the growing complexity of the business environment, these technologies enable effective international cooperation and management of operations on a global scale.

## **2. Literature Review**

### **2.1 Agile Organizations by Definition**

Agile organizations, also known as agile organizations, are characterized by flexibility, adaptability, and the ability to quickly respond to changing market conditions and customer needs. The concept of agility comes from the agile approach, which was originally used in project management, especially in the IT industry.

However, over time, agile management methodologies have found application in a wide range of industries and business areas (García-Granero, Piedra-Muñoz and Galdeano-Gómez, 2020).

The definition of agile organizations is based on several key elements. The first is customer orientation. Agile organizations place great emphasis on understanding customer needs and expectations and on delivering value in the shortest possible time. Thanks to this, they are able to quickly respond to changing market requirements and adapt their products and services (Liu, Ke, Wei, and Hua, 2013).

Another important aspect is the flexibility of the organizational structure. Traditional, hierarchical management models often inhibit quick decision-making and change. Agile organizations prefer flatter structures that enable faster information flow and decentralization of power. In such organizations, employees have greater autonomy, which promotes innovation and creativity (Maximini, 2015).

Organizational agility also involves continuous improvement and learning. These organizations promote a culture in which a mistake is treated as a learning opportunity rather than a failure. Regular retrospectives and feedback from customers allow for continuous improvement of processes and products. In this way, agile organizations strive to continually increase their effectiveness and competitiveness (O'Reilly and Tushman, 2013).

Another element of agility is agile project management. Methodologies such as Scrum, Kanban and Lean are commonly used in agile organizations. They are characterized by an iterative approach to project implementation, where work is divided into short cycles, called sprints. After each sprint, plans for the next period are reviewed and adapted, which allows us to respond to changing conditions and priorities on an ongoing basis. (Sajdak, 2013).

Technology plays a key role in agile organizations. Process automation, data analysis and the use of tools supporting cooperation and communication are inherent elements of the functioning of such organizations. Technology enables faster and more effective resource management and supports innovation and the development of new products and services (Yang and Liu, 2012).

The organizational culture of agile organizations is based on trust, cooperation and employee involvement. Leaders in such organizations act as mentors and coaches, supporting their employees in developing and achieving goals. Communication in agile organizations is open and transparent, which helps build an engaged and motivated team (Żarczyńska-Dobiesz and Chomałowska, 2014).

Agile organizations can manage change effectively. In today's dynamically changing business environment, the ability to quickly adapt to new realities is crucial. Agile organizations are able to anticipate market changes and proactively respond to them, which allows them to maintain a competitive advantage (Qureshi, 2016).

To sum up, agile organizations are characterized by high adaptability, flexibility and customer orientation. Their organizational structures are flat and the work culture is based on trust, cooperation and continuous improvement.

Thanks to the use of agile project management methodologies and modern technologies, they are able to quickly respond to changing market conditions and effectively manage change.

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## **2.2 The Use and Development of ICT Technologies**

The use and development of ICT technologies plays a key role in the transformation of the modern world. These technologies cover a wide range of tools and resources used to communicate, process and store information. Their development has contributed to significant changes in various areas of life, both at the individual, social and economic level (Nath and Agrawal, 2020).

ICT technologies enable the quick and efficient transmission of information on a global scale. The development of the Internet, mobile telephony, and broadband communication networks has revolutionized the way people communicate and cooperate. Thanks to technology, it has become possible to establish international contacts, conduct remote meetings and cooperate between companies from different parts of the world.

The introduction of instant messaging, video conferencing platforms and social media allowed for the immediate exchange of information, which significantly shortened the response time to changing market conditions and consumer needs. (Morlacchi, 2020).

The development of ICT technology has also contributed to the evolution of the digital economy. E-commerce, or electronic commerce, has become one of the most important sectors of the modern economy. Companies can now sell their products and services online, reaching customers around the world.

Automation of business processes, supply chain management and real-time data analysis have become possible thanks to advanced ICT tools, which have significantly increased the operational efficiency and competitiveness of enterprises. (Meyer and Meijers, 2018).

In education, ICT has introduced new methods of teaching and learning. E-learning, i.e. remote learning, enables access to education regardless of place and time. E-learning platforms, online courses and digital educational resources are becoming more and more popular, which allows you to personalize the teaching process and adapt it to the individual needs of students. These technologies also enable better collaboration between students and teachers and access to the latest research and knowledge from around the world (Sumukadas and Sawhney, 2012).

In the health sector, ICT is revolutionizing the way health care is delivered. Telemedicine, i.e., remote medical consultations, allows patients to contact doctors without the need to visit the office. IT systems for managing patient data, analysis of large medical data sets and the use of artificial intelligence in the diagnosis and treatment of diseases contribute to improving the quality of health care and increasing its accessibility (Wagner and Disparte, 2016).

The development of ICT technology also has a significant impact on the financial sector. Fintech, or financial technologies, cover a wide range of services such as electronic banking, mobile payments, cryptocurrencies and online investment management. Thanks to them, it is possible to perform financial transactions quickly and safely, which increases the convenience and availability of financial services for customers around the world (Raišienė, Bilan, Smalskys, and Gečienė, 2019).

In public administration, ICT technologies contribute to increasing the efficiency and transparency of government activities. E-administration, i.e. digital public services, enables citizens to access various administrative services online, which shortens the waiting time for handling official matters and reduces bureaucracy.

IT systems for managing citizens' data, data analysis and automation of administrative processes contribute to improving the quality of services provided and increasing trust in public institutions. (Porschen-Hueck and Sauer, 2021).

To sum up, the development of ICT technology has a huge impact on various aspects of social and economic life. They enable quick and effective communication, contribute to the development of the digital economy, revolutionize education and health care, and increase the efficiency and transparency of public administration activities. Their further development will be key to shaping the future in many areas.

### **2.3 ICT Technologies in Agile Organizations**

ICT technologies play a key role in the functioning of agile organizations, supporting them in various areas of activity. In production, ICT technologies enable process automation, quality monitoring and real-time resource management. The use of advanced IT systems allows for quick response to changes in demand and optimization of production processes (Rzepka, 2019).

In the services sector, ICT technologies support agile organizations in delivering high-quality services quickly and efficiently. Tools such as customer relationship management (CRM) platforms enable a better understanding of customer needs and tailoring services to their expectations. Automation of customer service processes and the use of artificial intelligence to analyze data allows for quick resolution of problems and increased customer satisfaction (Swan and Psarikidou, 2023).

In logistics, ICT technologies play a key role in supply chain management, route optimization and shipment monitoring. IT systems enable tracking of shipments in real time and managing inventories more effectively. This allows agile organizations to quickly respond to changing market conditions and minimize operational costs (Skyrius and Valentukevič, 2021).

In finance, ICT technologies support agile organizations by automating accounting processes, analyzing financial data and managing risk. Advanced analytical tools

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allow for more accurate financial forecasting and quick response to changes in the economic environment. Automation of financial processes contributes to increasing efficiency and reducing errors (Uhl-Bien and Arena, 2018).

In human resources management, ICT technologies enable the automation of recruitment processes, employee data management and planning of training and development. HRM (Human Resource Management) systems support agile organizations in identifying talent, monitoring work results and planning career paths. Thanks to this, organizations can quickly adapt their human resources to changing needs (Michel, 2019).

In sales, ICT technologies support agile organizations by automating sales processes, managing customer relationships and analyzing market data. E-commerce tools, CRM systems and analytical platforms enable a better understanding of customer behavior, personalization of offers and faster response to changing market conditions (Zhen, Xie, and Dong, 2021).

In promotion, ICT technologies allow the use of tools to manage advertising campaigns, analyze the effectiveness of promotional activities and optimize marketing budgets. Social media management platforms, e-mail marketing tools and analytical systems enable precise targeting and effective campaign management (Yin *et al.*, 2020).

In marketing, ICT technologies support agile organizations in analyzing market data, managing marketing campaigns and personalizing communication with customers. Big data analysis tools, campaign management systems and marketing automation platforms allow for a better understanding of customer needs and more effective reaching of target groups.

In administration, ICT technologies support agile organizations by automating administrative processes, managing documentation and monitoring operational efficiency. ERP (Enterprise Resource Planning) systems and other IT tools enable better resource management and faster decision-making (Wiśniewski, 2019).

In ICT support, technologies themselves play a key role in maintaining IT infrastructure, managing data security and supporting users. Automation of IT management processes and the use of system monitoring tools allow for faster detection and resolution of problems (Malinowski, 2021).

In training, ICT technologies enable the organization of online training, management of training programs and monitoring the progress of participants (Yang, 2014). E-learning platforms and knowledge management tools allow for the effective development of employee competences and faster adaptation to new market requirements. In research, ICT technologies support agile organizations in analyzing data, conducting market research and developing innovations.

Analytical tools and research project management systems enable more effective management of the research process and faster implementation of research results in practice (Ly, 2023).

In other areas of business, ICT can be used to support a variety of operational processes, project management and innovation. Thanks to their flexibility and wide range of applications, ICT technologies play a key role in maintaining the agility and competitiveness of organizations in a dynamically changing market environment.

### **3. Research Methods, Materials and Results**

#### **3.1 Research Methods**

Scientific research was conducted in 2023 using a survey method aimed at assessing the role and areas of use of ICT technology in enterprises. The research was aimed at analyzing the areas of ICT use in agile organizations and assessing their impact on the functioning of companies.

The research hypothesis assumed that ICT technologies significantly influence the efficiency and improvement of processes in enterprises and that different departments of the organization use these technologies to varying degrees.

The research questions focused on the following: To what extent are ICTs considered indispensable in the workplace? What benefits of using ICT are most often indicated by employees? In which departments of agile organizations are ICT technologies most often used? What are the differences in the level of ICT use in individual departments?

#### **3.2 Research Results**

The research conducted was aimed at assessing the role of the use of ICT technology in enterprises. Table 1 presents the results of this study, showing the various aspects in which ICT technologies affect the functioning of companies. ICT is considered essential in the workplace in 9.5% of cases, corresponding to 212 responses. A much larger percentage of respondents, 23.8%, or 532 people, indicated that ICT improves the performance of tasks.

The largest number of responses, as many as 25.3%, representing 566 cases, indicate that ICT technologies increase work efficiency. Making tasks easier was highlighted by 21.8% of respondents, which corresponds to 487 cases. Moreover, 18.6% of respondents, i.e. 416 people, noticed that ICT technologies increase the speed of operation in enterprises.

Only 1% of respondents, representing 22 cases, believe that ICT is unnecessary in the workplace. In total, the survey included 2,235 responses, which gives a full

picture of the role of ICT in enterprises. The percentage distribution of responses indicates the dominant belief in the positive impact of ICT on efficiency, streamlining and facilitating the performance of tasks and accelerating activities in companies.

**Table 1.** *The role of the use of ICT in enterprises*

is indispensable in the workplace	212	9.5%
improves the performance of tasks	532	23.8%
increases work efficiency	566	25.3%
makes it easier to get things done	487	21.8%
increases speed	416	18.6%
is unnecessary	22	1.0%
Together	2235	100.0%

*Source:* Own study.

The conducted research aimed to analyze the areas of ICT use in agile organizations. Table 2 presents the results of the study, showing the percentage of different departments in the use of ICT. Manufacturing occupies 4.1% of the total ICT use, which corresponds to 92 cases. Services have a significant share of 13.3% , which translates into 297 cases. Logistics, with 6.7% and 150 cases, is also an important area of ICT use.

The financial sector accounts for 10% of ICT use, accounting for 223 cases. Human resource management uses ICT in 5% of cases, which corresponds to 112 cases. Sales record the highest share of 14.4% , which means 322 cases. Promotion, with 7.3% share and 163 cases, is also an important area.

Marketing covers 11% of the use of ICT, which translates into 245 cases. The administration has an 8.7 % share, which corresponds to 195 cases. ICT support is the smallest area with 3%, accounting for 68 cases. Training accounts for 7.2% of the share with 161 cases, while research accounts for 2.1% with 48 cases. Other areas account for 7.1% with 159 cases.

In total, the study included 2,235 cases, which gives a complete picture of the use of ICT in agile organizations. The percentage share of individual departments indicates the diversified use of ICT technologies, with sales and services clearly dominating.

**Table 2.** *Areas of ICT use in agile organizations*

Production	92	4.1%
Service	297	13.3%
Logistics	150	6.7%
Finance	223	10.0%
Human Resource Management	112	5.0%
Halls	322	14.4%
Promotion	163	7.3%



Marketing	245	11.0%
Administration	195	8.7%
ICT support	68	3.0%
Training	161	7.2%
Research	48	2.1%
Others	159	7.1%
<b>Together</b>	<b>2235</b>	<b>100.0%</b>

Source: Own study.

In order to fully analyze the data from Table 2, the mean, median and standard deviation were calculated for the percentage of ICT in the various agile areas of the organization (Table 3). Calculating these descriptive statistics allows for a better understanding of the distribution of data and the diversity of ICT applications.

The average, i.e., the average percentage share, informs about the average share of ICT technology in particular areas. This is useful for obtaining an overall picture that indicates how a typical area uses ICT.

The median, which is the middle value in a set of data, provides information about the central tendency in the distribution. The median value is less susceptible to the influence of extreme values than the average. This allows for a better understanding of the typical level of ICT use in the areas, minimizing the impact of possible outliers.

Standard deviation measures how much values differ from the mean. A high standard deviation indicates a lot of variability and variation in the data, while a low standard deviation suggests that the values are more concentrated around the mean. This is important to assess how diverse the contributions of ICT are in different areas of the organization.

Table 3. Descriptive statistics for Table 2

Statistics	Value
Average	7.68
Median	7.2
Standard deviation	3.60

Source: Own study.

Calculations will be carried out for the percentage shares of ICT technologies in various areas: Production (4.1%), Services (13.3%), Logistics (6.7%), Finance (10.0%), Human resources management (5, 0%), Sales (14.4%), Promotion (7.3%), Marketing (11.0%), Administration (8.7%), ICT support (3.0%), Training (7.2 %), Research (2.1%), Other (7.1%).

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### **3.3 Discussion**

The conducted research allows for the formulation of conclusions regarding the role and use of ICT in agile organizations. The analysis of the results shows that ICT technologies are a key element of modern companies, influencing various aspects of their functioning. Research on the role of ICT in enterprises clearly shows that ICT is perceived as indispensable in the workplace.

Respondents emphasize that these technologies improve the performance of tasks, increase work efficiency and facilitate the fulfillment of duties. Moreover, it was noticed that ICT contributes to increasing the speed of enterprises. A very small proportion of respondents believe that ICT is unnecessary, which indicates its widespread acceptance and understanding of the benefits of its use.

Analysis of the areas of ICT use in agile organizations shows the diverse use of these technologies in various departments. ICT technologies are most often used in sales and services, which emphasizes their importance in commercial processes and service provision. Marketing and finance also show significant use of ICT, highlighting their key role in managing information, financial data and promotional strategies.

Administration and logistics use ICT to manage operations and the flow of goods, which is important for the efficiency and coordination of activities in companies. Smaller areas such as human resources management, promotion, training and other departments also show significant use of ICT, highlighting the versatility and flexibility of these technologies.

The average level of ICT use in the various agile areas of the organization indicates their widespread use, which is evenly distributed among different departments. The central tendency is close to the average level, suggesting no large deviations and an even distribution of data.

The moderate variability indicates that although some areas use ICT to a greater extent, the overall distribution is relatively uniform, highlighting consistency in the use of technology across different departments of the organization.

To sum up, ICT plays a key role in improving efficiency, streamlining tasks and increasing the speed of operations in enterprises. In agile organizations, these technologies are widely used in various areas, with sales and services dominating. The research results emphasize the importance of ICT technology in modern companies and the diversity of its applications depending on the specificity of the department and type of activity. This understanding allows for better planning of ICT implementation strategies and process optimization to maximize the benefits of its use.

#### **4. Conclusions**

Based on the research conducted, several recommendations can be formulated for agile enterprises in the use of ICT technologies. First of all, ICT technology should be considered an indispensable element of the functioning of modern organizations.

Investing in modern information and communication technologies should be a priority, as it translates directly into improved work efficiency, streamlined task execution and increased speed of enterprise operation.

Agile organizations are advised to systematically assess their technology needs and invest in appropriate ICT tools that support their business goals. In particular, ICT technologies should be intensively used in sales and service departments, where their use can bring the greatest benefits in the form of increasing operational efficiency and improving the quality of customer service.

In the area of marketing and finance, ICT should be used to manage data and analyze information, which allows for better strategic decision-making. The implementation of advanced analytical tools and customer relationship management (CRM) systems can significantly increase the effectiveness of marketing activities and financial management.

In logistics and administration, it is recommended to use ICT technology to optimize operational processes. Automation and digitization of logistics processes can contribute to increasing the efficiency of supply chain management, while the use of document management and workflow systems can improve administration and reduce operational costs.

In the field of human resources management, training and promotion, ICT technologies can support employee development and effective talent management. E-learning platforms and talent management tools can help improve employee qualifications and better match their skills to the needs of the organization.

At the same time, enterprises should ensure adequate technical support and ICT support to ensure the continuous availability and performance of information systems. Regular training for employees in new technologies and investing in IT security should be an integral part of the ICT management strategy.

It is also worth paying attention to innovative applications of ICT in less obvious areas, such as research and development. Using technology to conduct market research, analyze data and develop new products can provide significant competitive advantages.

To sum up, agile enterprises should consistently integrate ICT technologies in their business processes, ensuring that the tools they use are constantly adapted and

updated to changing market needs. A proactive approach to the implementation of information and communication technologies and investing in the development of employees' digital competences are the key to maintaining competitiveness and effective operation in a dynamic business environment.

Future directions for research on the use of ICT in enterprises may include several key areas. Research should continue on the impact of advanced technologies such as artificial intelligence, machine learning and big data on the efficiency and innovation of enterprises. It is important to understand how these technologies can be integrated across various departments of an organization to maximize their potential and business benefits.

Another important direction of research is the analysis of the impact of ICT technologies on the flexibility and agility of enterprises. In particular, it is worth examining how technologies support companies' adaptation to changing market conditions and what management strategies are the most effective in the context of dynamic technological changes. Research may also focus on assessing how ICT influences decision-making processes and the effectiveness of communication and collaboration in remote teams.

In parallel, research should take into account aspects related to IT security and data protection. In an era of growing cyber threats, understanding what technologies and practices can best protect enterprises from attacks and how to manage technology risk is crucial. It is also worth examining what are the best practices in employee education and safety management in the context of increasing digitalization.

An equally important direction of research is the assessment of the impact of ICT technologies on sustainable development and corporate social responsibility. Research may focus on how technologies can support environmental initiatives, resource optimization and emissions reduction, as well as what are best practices for implementing sustainable technologies.

Moreover, it is worth conducting research on the impact of ICT on organizational culture and employee satisfaction. Analyzing how technologies impact engagement, productivity and work-life balance can provide valuable information for company managers. In the context of digital transformation, research may also include strategies to implement technological changes that minimize resistance and support acceptance among employees.

Finally, future research can explore the opportunities and challenges of ICT globalization. Understanding how technologies impact the international competitiveness of companies, how technology implementation differs in different cultures and regions, and how global technology trends shape local markets can provide valuable insights for company development strategies.

## **5. Limitations**

The study had several important limitations that should be taken into account when interpreting the results. First of all, the research was based on the survey method, which may have influenced the subjectivity of the respondents' answers. The possibility of sampling error due to incomplete representation of all departments and companies may have influenced the results.

Furthermore, the surveys were conducted over a specific period of time, which means that changes in ICT and their applications that occurred after the surveys were not taken into account. Another limitation was the potential tendency of respondents to provide socially desirable answers, which could distort the actual picture of the use of ICT technology.

Differences in the interpretation of survey questions by respondents could also affect the consistency and unambiguity of the obtained data. Finally, research has focused on specific areas of agile organizations, which may not reflect the full scope of ICT application in other types of enterprises.

## **6. Conflicts of 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.

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