

Summary of the doctoral dissertation

THE INTERNET OF THINGS ECOSYSTEM IN BUILDING COMPETITIVE ADVANTAGE OF COMPANIES

Key words: Ecosystem of Internet of Things, Competitive Advantage, Technology, Marketing, Digital transformation

Currently, the phenomenon of the digital transformation of the economy can be observed, which affects practically every aspect of economic life. Under such conditions, a new view of the market and of the determinants of building competitive advantage is necessary. The advantage nowadays is dynamic in nature, and companies that do not open themselves up to the digital transformation will lose their competitive position or even disappear from the market. As a result, they are looking for factors that create opportunities for greater adaptation to the changes they are seeing. It is not surprising, therefore, that there is an increasing interest among businesses in digital technologies, which, like the Internet of Things Ecosystem, are seen as crucial to the further evolution of the market.

Taking this fact into account, the main objective of the thesis was set – to identify the role of the Internet of Things Ecosystem in creating a company's competitive advantage. The research problem of the thesis was reduced to the question - What are the determinants of the implementation of the Internet of Things Ecosystem in a company and how does it translate into the level of competitive advantage? The main hypothesis of the thesis was also formulated as follows - The implementation of the Internet of Things Ecosystem determines the level of a company's competitive advantage.

The dissertation is theoretical and empirical in nature. It is based on both secondary and primary sources. As far as secondary sources are concerned, the literature on the subject, both in Polish and English, was used, in the form of articles and scientific monographs, reports from research and consulting agencies and Internet sources. Data from primary sources, on the other hand, were obtained through the design and implementation of two empirical surveys. In the empirical part of the work, triangulation of research methods was used, consisting in combining different research methods (quantitative and qualitative), and in the

second study of a quantitative nature - triangulation of research techniques, consisting in using two techniques for obtaining information within one research method. The paper consists of an introduction, four chapters and a conclusion. The first chapter is devoted to the essence and meaning of the Internet of Things Ecosystem concept. It includes a bibliometric analysis based on scientific databases such as SCOPUS and Web of Science. The genesis of the Internet of Things Ecosystem, definitions and technological structure were also presented, based on a critical analysis of the literature. A categorisation of its individual components – technological solutions - was proposed and the author's concept of the Internet of Things Ecosystem Continuum was presented, which organises the existing conceptual apparatus related to the issues discussed in this chapter.

The subject of the second chapter was the application of the Internet of Things Ecosystem in the context of building competitive advantage of a company. In this part of the work, the emphasis was placed on presenting the definition (based, mainly, on the resource school) and the basis for creating a competitive advantage with the use of the Internet of Things Ecosystem. It also presents examples of the application of the Internet of Things Ecosystem within the enterprise value chain, in terms of M. E. Porter's scheme. Based on the issues addressed, a theoretical model for the thesis is proposed.

The third chapter presents the results of the qualitative survey conducted among experts. The analysis of their results is preceded by a presentation of the survey methodology, which includes assumptions in the form of formulated objectives and research questions, the characteristics of the surveyed experts, and the procedure of conducting the survey. This part of the work focuses on presenting the experts' opinions on the application of the Internet of Things Ecosystem among enterprises, indicating the benefits of the opportunities, limitations and brakes of its implementation, as well as defining the framework of competitive advantage and digital maturity of the organisation. The chapter concludes with the formulation of conclusions.

The fourth chapter was devoted to the main empirical study conducted among enterprises registered in Poland. It contained three parts: methodological, analytical and conclusion. In the first part, the objectives of the study, research questions and hypotheses were defined, and the variables used in the analysis were operationalised. The part also presents an algorithm for determining the individual level of the Internet of Things Ecosystem based on the author's concept of the Internet of Things Ecosystem Continuum. This

is followed by a description of the procedure associated with the pilot and main study and a characterisation of the study group. The analytical part presents the results from the conducted, including the testing of the main theoretical model of the thesis. The last part of this chapter is devoted to the formulation of conclusions.

Based on the dissertation considerations and the empirical research carried out, it emerged that the vast majority of the companies surveyed perceive the role of the Internet of Things Ecosystem in building competitive advantage as either large or very large. The reason for this may be due to its numerous implementation possibilities, both in terms of the functions it enables in its various technological configurations and areas of the company. The study showed that its implementation is possible in practically every key area of the company's operations, demonstrating the high potential offered by the Internet of Things Ecosystem. Furthermore, the role was found to vary depending on the size of the company, the sector, the leading nature of the business, the industry and the digital maturity of the organisation.

These differences may be due, for example, to the fact that larger companies typically have more financial capital to invest in new technologies and are more willing to adopt innovative solutions, such as at least some elements of the Internet of Things Ecosystem. Small and micro enterprises, on the other hand, may have limited financial and technological capabilities, which may be a bit of a brake on their ability to take full advantage of the Internet of Things Ecosystem. In terms of the dominant business sector, it is B2B companies that often have more complex operations and may have a greater need for ecosystem solutions that improve operational efficiency, optimise production processes or facilitate resource management. B2C companies, on the other hand, may not see such direct benefits from their implementation. In terms of the nature of the business, manufacturing companies typically have numerous complex and intricate processes that can be streamlined with Internet of Things Ecosystem solutions. This could include process automation, real-time machine monitoring or supply chain management. Service businesses may not experience the same benefits, especially if their business is not directly related to technology. In terms of industry, it is worth noting that IT and High-Tech companies are inherently more likely to adopt new technologies, so it is not surprising that they see a greater role for the Internet of Things Ecosystem. Similarly, the construction, property development and logistics and transport industries can benefit by improving efficiency, security and real-time monitoring. Companies in the consumer goods and sales and professional services industries may not see such direct

benefits, which may explain their lower perceived role of the Internet of Things Ecosystem in building competitive advantage. Conversely, in terms of an organisation's degree of digital maturity - companies with a high degree of digital maturity are more likely to use and appreciate the benefits of implementing ever newer and more technologically complex Internet of Things Ecosystem solutions than companies with a lower degree of digital maturity. These organisations may already have a permanent implementation of the Internet of Things Ecosystem not just as a support, but as an integral part of the organisation.

In addition, the digital maturity of an organisation has been shown to be an important mediator of the relationship between the amount of valuable organisational competencies (resulting from the application of the Internet of Things ecosystem) and a company's level of competitive advantage. This may mean that companies that are more digitally mature may be better positioned to use these competencies in ways that increase their competitive advantage. Businesses with more developed digital maturity are generally characterised by a greater ability to adapt and implement innovative technologies, such as the technological solutions of the Internet of Things Ecosystem. They have the necessary IT infrastructure, processes and competences to effectively implement and use these technologies. With a deeper understanding of the technological aspects, they are able to identify and benefit from the organisation's most valuable competences provided by the implementation of the Internet of Things Ecosystem, which in turn contributes to achieving a competitive advantage.

The verified assumptions of the dissertation, the conclusions formulated on their basis and the proposed recommendations for business provide a starting point for further research and discussion related to building competitive advantage among contemporary enterprises. They are also a certain strategic signpost for companies planning to implement the Internet of Things Ecosystem in their operations and its expansion.