

ORIENTATION TO VALUE CREATION BUSINESS MODEL 4.0 IN THE ENVIRONMENT OF INDUSTRY 4.0

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<https://doi.org/10.37904/clc.2022.4532>

Abstract

Industry 4.0 or the Fourth Industrial Revolution means not only technological changes, but also social and industrial changes caused by the digital transformation of industry. These changes create a new environment for the functioning of enterprises and, to a different extent, influence the shaping of contemporary challenges for companies. Dynamic technological development, Industry 4.0 technologies implemented in modern companies result in redefinition of their business models. Companies that want to achieve success on the market must act in such a way as to generate added value for the customer. The value is seen in a unique business model, dynamic capabilities, innovations, strategic potential of the organization, or organizational entrepreneurship. The condition to achieve competitive advantage is value creation. The company's ability to create value in a broad sense is seen as one of the important conditions for achieving and maintaining a competitive advantage of the business model. The aim of this article is to analyze the sources of value creation in the business model 4.0.

Keywords: Business model 4.0, Industry 4.0, value creation, competitiveness

1. INTRODUCTION

The Fourth Industrial Revolution (4IR) has been underway since at least 2011. It affects business, industry, and other areas of life. Provides so far unattainable for customers and enterprises. Ubiquitous digitalization, modern solutions implemented in smart factories result in changing management paradigms and building new business models that are based on maintaining balance between the development of autonomous technology, remote communication systems, and quality of life. What distinguishes the era of the fourth industrial revolution is the knowledge of the needs of yendostic customers. Accurate identification of opportunities, challenges, and limitations brought by 4IR guarantees conscious use of emerging opportunities and market opportunities [1-4].

A company's business model is presented as a set of activities, methods, and the time of their execution, using its resources to create the highest value for the customer and positioning itself to capture value. Innovation can be applied in all its elements and is necessary to create customer value [5].

The issues in the area of business models are very broad in scope. It covers various forms of doing business from the perspective of economic efficiency, as well as non-financial effects of business activity. The trend of business models, where traditional ways of delivering value propositions are supported or replaced by solutions based on innovative IT solutions, is developing intensively. In the face of dynamic changes occurring on the market, business cannot be indifferent to the changing expectations of customers. These expectations relate to products, but also to their price, forms of promotion, added value offered, or building a relationship with the company, which really cares about the environment and its surroundings [6-9].

The analysis of the concept of building models is an important aspect of the theoretical approach to business modeling, which is a part of strategic management. Business models are currently a very important area of

scientific research exploration related to the search for ways to better understand their very essence, as well as the ecosystems that are shaped by them. Therefore, the aim of the article is to analyze the sources of value creation in the business model 4.0.

2. CREATING VALUE THROUGH BUSINESS MODEL 4.0

The business model 4.0 can be defined as a configuration of business processes that connect and develop resources, shaped in the form of an enterprise social and technical architecture, built on flexible, digital processes, enabling cyber-physical networking that can meet the demand for personalized products [10].

The business model 4.0 is based on a strong combination of the megatrends of the fourth industrial revolution and the pillars of Industry 4.0. The megatrends of the fourth industrial revolution are the following. Economy 4.0, Smart Factories, Society 5.0, Sustainable Consumption and Sustainable Production. The pillars of Industry 4.0 include autonomous robots, Big Data, cloud computing, systems integration, additive manufacturing, Industrial Internet of Things, augmented reality, simulation, and technologies supporting cyber security. The implementation of the strategy in the business model 4.0 in practice takes place through the construction of a cyber-physical network of cooperation, ensuring both the efficient use of resources and skills and their renewal. Implemented technological innovations enable cooperation in cyber-physical networks, which aim to produce personalized products and offer complementary services. These activities take into account the principles of sustainable production [10].

By absorbing the pillars of Industry 4.0, the business model 4.0 significantly creates value by leveraging them. This gives the ability to monetize value, which makes the business model 4.0 informationally innovative. Various analytics techniques are also setting new trends in big data. These include data mining techniques, large online repositories, visualization methods, machine learning, optimization methods, and social network analysis, among others. These methods increase the operational functionality of processes. Variety, speed of processing, size of data, reliability of data, value of data - determine the assumptions of shaping the business model 4.0 based on access and use of data. The technical architecture of the business model 4.0 is built on the pillars of Industry 4.0, which support the creation of value throughout the value chain. Table 1 shows the impact of the Industry 4.0 pillars on value creation [12].

Table 1 Impact of Industry 4.0 pillars on value creation

Pillar of Industry 4.0	Value Creation
Autonomous robots	Increase process efficiency Increase in production efficiency Reduction of manufacturing cost Increase in Flexibility of processes Increase in safety for employees
Big Data	Reduction of infrastructure costs (by outsourcing) Garanty of data protection against cyber attacks Possibility of using additional services of advanced analytics and artificial intelligence (machine learning)
System integration	Efficient flow of information and data between production and business systems Creating a network of cooperating companies Reduce delivery times for personalized orders Accelerate decision-making between teams Increase profitability
Additive Manufacturing	Reducing Prototyping Costs Reducing storage costs

Industrial Internet of Things	Creation of reliable information on the progress of processes Unlimited access (time and place) to information Increased quality of personalized products
Augmented and virtual reality	Time and cost savings in the physical preparation of new product prototypes Reduced time to introduce new employees Increased Work Safety Reducing operational costs Reducing the cost of deploying new employees
Simulation	
Technologies to support cybersecurity	Protecting data, information, and networks from cyber attacks and unauthorized access

Analyzing **Table 1**, it can be indicated that autonomous robots increase process efficiency, production efficiency and flexibility, reduce manufacturing costs, and increase the level of safety for employees. Big data makes it possible to reduce the cost of infrastructure, is a guarantee of data security against cyber attacks, and gives the opportunity to use additional services of advanced analytics and artificial intelligence. Integration of systems, in turn, is an effective flow of information that allows the creation of cyber-physical networks of cooperating companies, which in turn increases profitability. With additive manufacturing, companies reduce prototyping and warehouse costs. The Industrial Internet of Things gives unlimited access to information, which has a direct impact on increasing the quality of personalized products. Augmented and virtual reality and simulations support the induction of new employees, employee training, and increase workplace safety. And technologies that support cyber security ensure that data, information, and networks are protected from cyber attacks.

The creation through the business model 4.0 is emphasized through [11]:

- the value proposition, i.e., the value created for customers through a specific offering of personalized products and complementary services,
- definition of the target market segment and specification of the revenue generation mechanism (i.e., it defines the recipients of the offer and the reason why they will be interested in the offer)
- definition of the value chain structure required for the creation and distribution of the offer and the complementary resources necessary to support the position in the value chain,
- detailing the mechanisms by which the company will receive payment for the offer delivered and thus earn revenue,
- determination of the costs of fulfilling the offer and the level of profit that can be achieved,
- determining the company's position in the value network,
- formulation of assumptions of competitive strategy allowing to obtain and maintain competitive advantage over rivals.

Figure 2 shows the value of the business model 4.0, which consists of four interlocking elements. These are strategic components, value network, value retention, and value creation. The strategic components are headed by the customer, the value proposition offered to the customer, the company's competencies, personalized product offerings, strategy, brand, differentiation, and company mission. The value network, on the other hand, consists of suppliers, business partners, data and information, customer relationships, and the flow of information, products, and services. Value retention is achieved by selecting costs so that the enterprise can generate profit. Through the enterprise's resources and their use in the cyber-physical enterprise network and digital, flexible processes, value is created.

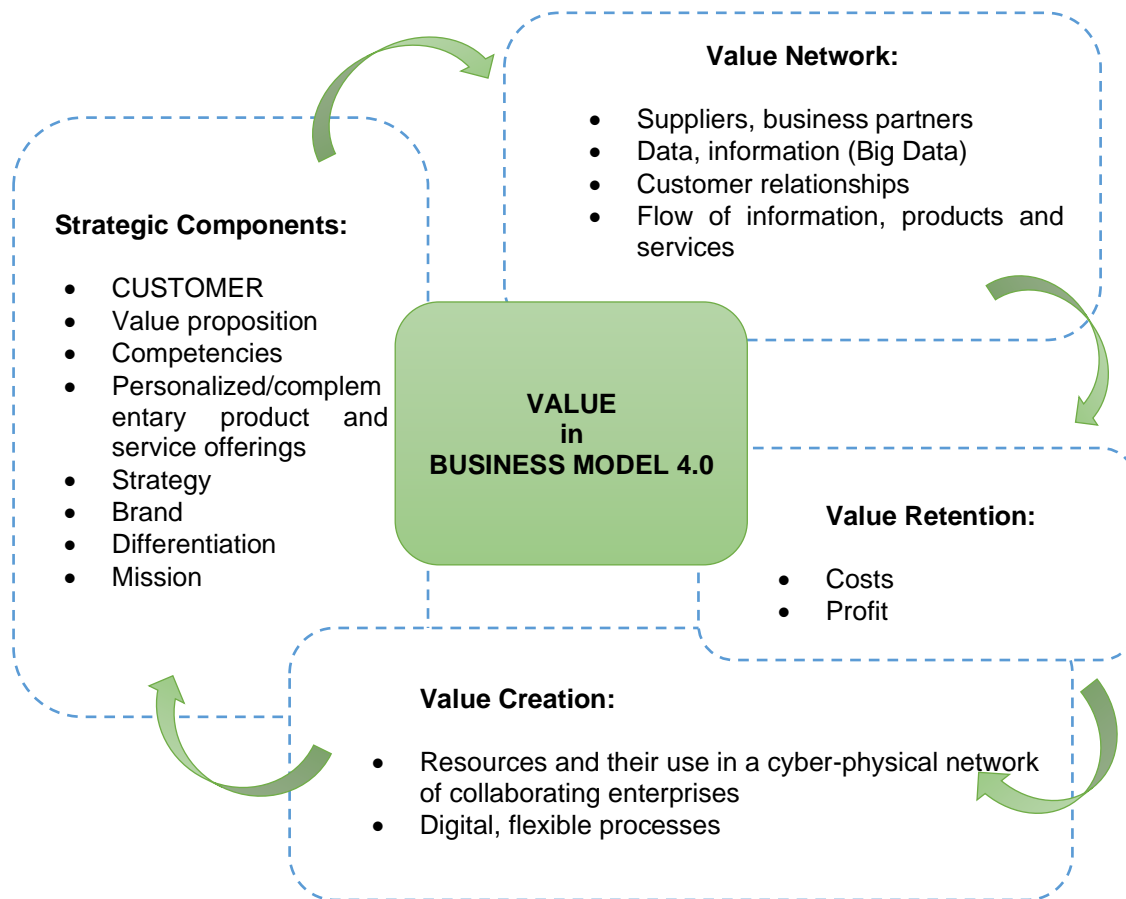


Figure 2 Value in business model 4.0

Figure 2 distinguishes the customer as the company's main element of the strategic values in the business model 4.0. Here, it should be noted that the customer is willing to pay for needs that he consciously expects, but also for such elements that he has not consciously identified. This is why personalization has received so much attention in the Business 4.0 model. The company's task is to provide a value proposition that not only responds to the customer's demand, but also meets future complementary values. Your correct identification and offer to the customer is the most important bond between the customer and the manufacturer, which affects the length and durability of the customer-company relationship. This in turn translates into the competitiveness of the enterprise's business model. The elements of the competitive advantage of business model 4.0 are shown in **Figure 3**.

Analyzing **Figure 3**, it can be seen that an effective enterprise 4.0 business model that achieves long-term profitability should be based on the following elements of competitive advantage:

- a strategy that enables sustainable competitive advantage, which is constantly monitored and based on the megatrends of the fourth industrial revolution,
- a management system that ensures operational efficiency through competitive business processes built on the pillars of Industry 4.0.

These are the two main components of the model, except that their role and the way they are shaped are treated quite differently. The basis of the strategy is the strategic (competitive) position achieved by the company, which results from the value offered to customers and the selection and configuration of relevant activities. Shaping this position is a fundamental, superior, and innovative part of the model, a condition that determines the long-term profitability of the company [12-14].

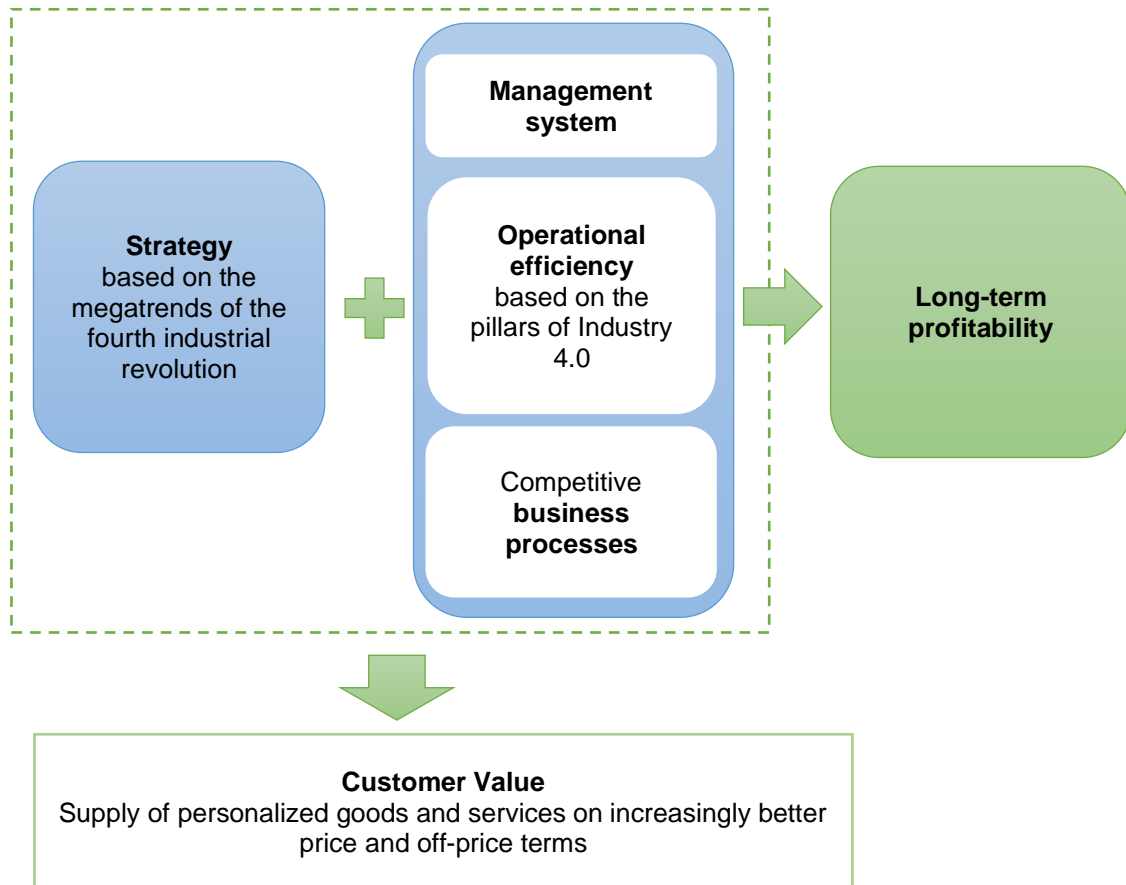


Figure 3 Elements of competitive advantage of business model 4.0

3. CONCLUSION

The fourth industrial revolution that resulted in the digitization of business and social communication has opened the way to the creation of new business models and the creation of new values resulting from them. Value creation through business model 4.0 is emphasized through: the value proposition, i.e., the value created for customers through a specific offering of personalized products and complementary services, the definition of the target market segment and the specification of the revenue generation mechanism (i.e., it defines the recipients of the offer and the reason why they will be interested in the offer), defines the structure of the value chain required to create and distribute the offer and the complementary resources necessary to support the position in the value network, details the mechanisms through which the company will receive payment for the offer delivered and thus earn revenue, defines the costs of delivering the offer and the level of profit that can be achieved, defines the company's position in the value network, and formulates the assumptions of the competitive strategy that allows the company to gain and maintain a competitive advantage over its rivals.

ACKNOWLEDGEMENTS

FUNDING Silesian University of Technology (Faculty of Materials Engineering, Department of Production Engineering) supported this work as a part of Statutory Research BK-207/RM1/2022 (11/010/BK_22/0038) and under grant 11/010/RGJ21/0031



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