

ANALYSIS OF QUALITATIVE AND ENVIRONMENTAL ATTRIBUTES OF SUCCESS OF FOUNDRY ENTERPRISES

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Karolina Czerwińska¹ – *orcid id: 000-0003-2150-0963*

Andrzej Pacana² – *orcid id: 0000-0003-1121-6352*

¹Rzeszow University of Technology; Faculty of Mechanical Engineering and Aeronautics, Rzeszow, **Poland**

²Rzeszow University of Technology; Faculty of Mechanical Engineering and Aeronautics, Rzeszow, **Poland**

Abstract: The purpose of the study was to identify and typify the main qualitative-environmental aspects of the success of foundry enterprises facing economic changes. The research method developed was based on methodological triangulation. This procedure influenced the credibility of the collected data by including a significant number of sources and reducing the measurement error. The study used: surveying, face-to-face interviews, multiple case studies and content analysis. The survey made it possible to categorize the attributes of success (quality, sustainability, resources, flexibility, environment, management strategy customer relations). Assuming that the frequency of occurrence of an attribute indicates the level of its effectiveness, the following were considered the main determinants: training/courses, supervision and control, reliability and durability of products and compliance with standards and requirements, waste management and waste disposal, core and reserve capital, and customer service.

Keywords: mechanical engineering, management and quality, determinants of success, foundry industry

1. INTRODUCTION

Nowadays, under the conditions of deregulation of markets, increasing globalization, as well as increasing intensity of competitive struggle (in accordance with the trend of hypercompetition), effective management of a business unit becomes important (Bełch and Bełch, 2021; Pacana and Czerwińska, 2020b). The indicated phenomena in the micro- and macro-environment, as well as the activities undertaken by enterprises, generate a high level of activity and variability in the company's operations. Adequate use of available resources (Klimecka-Tatar and Ingaldi, 2020; Borkowski; 2012), attention to the quality of the offered products (Pacana and Czerwińska, 2021; Skotnicka – Zasadzień, 2010) and their environmental aspects of production (Ulewicz and Blaskova, 2018; Hajduk – Stelmachowicz, 2017; Pacana and Siwiec, 2021; Siwiec and Pacana, 2021) and choosing the right development strategy for the organization (Ingaldi and Jagusiak –

Kocik, 2014; Czerwińska and Pacana, 2022; Kuzior, 2022) enables you to function efficiently in an extremely turbulent and demanding environment. At the same time, these factors are an important component of building a successful business (Wolniak, 2013). At the same time, the success of the enterprise itself is difficult to clearly grasp. It is influenced by a considerable number of factors, which include the occurrence at several levels of de-escalation, the multifaceted nature of the phenomenon, and the interweaving of causes with effects (Pietraszek et al., 2020; Ulewicz et al. 2019). With regard to businesses, success has a broad and multifaceted meaning. The success or failure of an organization is a consequence of adapting its capabilities to emerging market challenges (Pacana et al., 2020). An important point is that there are no proven recipes or ready-made concepts that bring success (Kubickova and Chuda, 2021, Ulewicz and Ulewicz 2020). However, this is not possible, as it would result in the elimination of any competitive advantage. The basis for the success of a given business unit is specific only to the specifics within it. Attributes of success are prioritized by companies and considered separately for each of them (Ghobakgloo et al., 2021).

Success is a very multi-element process, which makes it difficult to clearly define the recipe for its achievement. Through an in-depth analysis, it is possible to distinguish certain factors that indisputably contribute to the success of an enterprise. There is often a phrase that success is "the successful outcome of some endeavor, the achievement of an intended goal" (Fabo et al., 2023). However, the definition indicated cannot be directly applied to manufacturing companies. It treats success as a one-time result and does not count the perspective of time, which is important in relation to running a manufacturing business. What currently takes the name of success may cease to be so in a short interval of time. For this reason, in the context of manufacturing companies, it seems much more appropriate to identify success with a process carried out at the highest level of capability striving to achieve dreamed-of goals (Pacana and Czerwińska 2020a). The literature on the subject distinguishes a considerable number of definitions of the concept of success. Success is the success, prosperity and successful outcome of activities and the ability of an organizational unit to develop in the long term (Ojha et al., 2023; Krynke, 2020). An enterprise is successful when it meets the expectations of stakeholders who influence the organization's decisions while being influenced by it at the same time. Success can be associated with positive economic results, an increase in the level of profits and an increase in the value of the enterprise. Such an approach can mean an improved image, expansion in markets and the organization's ability to maintain its position in the market in the long term (Sułkowski and Wolniak, 2013, Ulewicz, 2014). There is a lack of well-defined strategies and recommendations, the implementation of which will guarantee the success of a foundry enterprise. Therefore, the purpose of the study was to identify and typify the main qualitative-environmental aspects of the success of foundry enterprises facing economic changes.

2. RESEARCH SUBJECT AND METHODS

The completed research described in the paper is preliminary-pilot research. The purpose of this type of research was to obtain basic information and preliminary knowledge about the analyzed community. This activity confirms the applicability and validity of the choice of the research tools and methods presented in Figure 1, thereby increasing the effectiveness of the main study. The second ingredient that guarantees the success of the execution of effective and useful empirical research is the appropriate selection of the

subjects included in the research sample, The sample should be selected from the general collection by random sampling, so that it is as representative as possible. The empirical study was carried out according to the methodology shown in Figure 1.

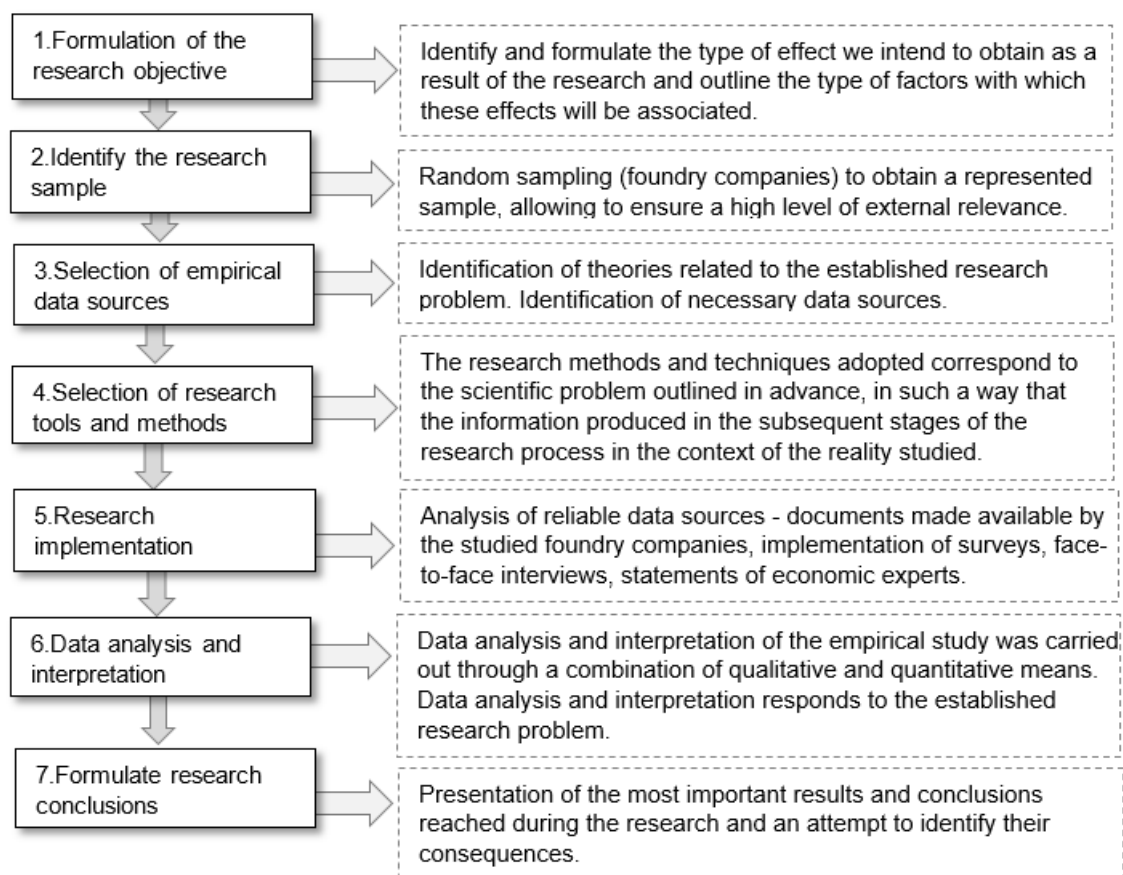


Fig. 1. Scheme for the implementation of the study

Due to the pilot nature of the study, the research sample was assumed to be 20 foundries. The headquarters of the foundry companies participating in the survey were located in the southeastern part of Poland. A key requirement for the selection of organizations was the diversity aspect. This variable made it possible to acquire a broader spectrum of knowledge and information about management specifics. Diversity criteria included: size of the foundry (micro, small, medium, large), the industry in which the company mainly operates (engine and car technology, aero-space, defense, railway, robotics, mechanical engineering), scope of operations (regional, national, global).

The research was implemented based on the conversion of qualitative and quantitative research through the use of triangulation of research methods and techniques. The research procedure was based on: content analysis, comparative analysis, multiple case stage, logical classification method, and exemplification. By way of implementing the research methodology, empirical data from 2021 and 2022 were used. Data were obtained from: foundry companies (authorized statements, shared internal documents of companies, information from websites), face-to-face interviews with management level employees, surveys, as well as statements from industry and economic experts.

3. RESULTS AND DISCUSSION

According to the research procedure presented in the study, in the process of identifying the attributes of success of foundry enterprises, 72 determinants were extracted. Based on a one-step logical classification in the context of separability and exhaustibility, the extracted attributes were divided into the following sets:

- Quality - distinguished attributes: training/courses, supervision and control, functionality of products, ease of use, reliability of products, durability of products, safety of use, compliance with standards and requirements, ease of repair.
- Sustainability - highlighted attributes: use of renewable resources, minimizing the use of non-renewable resources, social cost of producing a product, waste management, resource management, management of natural resources, environmental protection, recovery of raw materials, waste disposal, eco-development campaigns, fostering mental health, fostering physical health,
- Resources - distinguished attributes: core capital, reserve capital, reserve capital, relational capital, experience, know how, growth potential, employee competence, partner trust, permanent customer base, production infrastructure, IT systems, logistics infrastructure, raw material stock, legal resources, information resources, communication links,
- Management strategy - distinguished attributes: business impact analysis, risk analysis, system management, disaster recovery plan, business continuity plan, long-term partnership, production investment, operational efficiency, corporate community involvement, price competitiveness, R&D activity,
- Customer relationship - highlighted attributes: marketing activities, loyalty packages, after-sales service, customer preferences, customer service.

A summary of the qualitative-environmental attributes of success, along with the results of their active application in the surveyed companies, is shown in Table 1. In order to guarantee the security of data on competitive specificity in a non-production environment, the names of the organizations were anonymized after which they were randomly assigned consecutive numbers.

Table 1
Attributes of success of the analyzed foundry companies

Attributes of success	Foundry companies																				Σ
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Quality																					
training / courses	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	20
supervision and control	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	20
functionality of products	+	+	+	+	+		+	+		+	+	+	+	+	+	+	+	+	+	+	18
ease of use	+		+	+	+	+	+		+	+	+	+	+			+	+	+	+		15
reliability of products	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	20
durability of products	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	20
operational safety	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	19
compliance with standards	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	20
compliance with requirements	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	20
ease of repair		+	+	+		+			+	+		+	+	+	+	+		+	+		13
Sustainability																					
use of renewable resources			+					+					+	+		+				+	6
minimizing the use of non-renewable resources	+		+		+						+		+				+	+			7
social cost of producing a product		+	+			+		+		+				+	+	+			+		9

waste management	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	20
resource management	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+		18
natural resources management	+	+	+		+	+		+	+	+		+	+	+			+	+	+	16
environmental protection	+					+							+		+				+	5
recovery of raw materials	+	+	+		+	+	+		+	+			+	+	+	+		+	+	15
waste disposal	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	20
eco-development campaigns			+												+					2
fostering mental health	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	19
fostering physical health	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+		18
Resources																				
share capital	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	20
reserve capital	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	20
supplementary capital	+	+	+		+	+	+	+	+	+	+	+	+	+	+		+	+	+	18
relational capital	+		+					+		+			+		+				+	9
experience	+	+	+		+	+	+	+		+			+	+	+	+	+			14
know how	+		+			+	+	+						+		+			+	7
growth potential	+		+					+					+			+			+	6
employee competence	+	+	+		+	+	+	+	+				+		+	+	+	+		16
partners' trust	+	+	+	+	+	+		+		+			+	+	+	+	+	+		15
permanent customer base	+		+	+	+		+	+		+			+		+	+	+	+		13
production infrastructure	+	+	+	+	+	+	+	+		+		+	+	+	+	+	+	+	+	18
IT systems	+		+			+		+					+		+	+	+		+	9
logistics infrastructure		+	+		+	+		+		+	+		+	+	+			+		13
stock of raw materials		+	+	+					+	+	+	+		+					+	10
legal resources	+		+					+		+			+					+		7
information resources	+	+	+	+	+	+		+		+			+	+	+	+		+	+	15
communication links	+		+					+		+			+					+		8
Management strategy																				
business impact analysis	+		+		+		+		+		+						+			8
risk analysis	+	+	+		+	+	+		+		+		+	+	+	+	+		+	15
system management	+	+	+		+		+		+		+	+	+		+	+	+	+		15
disaster recovery plan	+		+		+								+		+			+		6
business continuity plan	+	+	+	+	+	+	+		+	+	+		+		+		+		+	15
long-term partnership	+	+	+		+		+	+	+	+			+		+		+	+	+	14
production investments	+	+	+	+	+	+	+	+		+	+	+		+	+	+	+	+	+	18
operational efficiency	+	+	+	+	+	+	+		+	+	+	+		+	+	+	+	+		17
corporate community involvement					+		+				+		+					+		5
price competitiveness	+	+	+		+			+	+			+	+	+	+	+	+		+	14
r&d activity	+		+		+		+						+					+		6
Customer relationship																				
marketing activities				+	+	+			+				+					+		6
loyalty packages	+		+		+				+				+	+		+	+	+		11
after-sales service	+	+							+				+	+			+	+		7
customer preference research		+		+			+	+			+	+		+		+	+	+	+	12
customer service	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	20

The quality of the product delivered to the market is one of the key aspects shaping the level of competitiveness of a manufacturing company in the domestic, European, or global market. Analyzing the results of the research presented in Table 1, it can be seen that, according to enterprises, product quality, and in particular quality understood as reliability and durability of products, compliance with standards and requirements, are determinants of positive customer perception, both of the organizational unit and the product it provides. The key aspects that build the market position and brand of the company supporting the

mentioned determinants turned out to be the implementation of courses and training, as well as supervision and constant control.

The concept of sustainable development imposes responsibility on business units and societies for activities carried out within the framework of the economy, the environment and the environment. Among the aspects analyzed in the set of sustainable development, the leading determinant turned out to be: waste management and disposal. Waste management is a complex - interdisciplinary concept, and includes both planning activities and the implementation of projects and technologies along with their control. Waste management in manufacturing enterprises is understood as the generation of waste and its management, i.e. the collection, transportation and processing of waste, along with the supervision of these activities. The issue of waste disposal, on the other hand, is a significant cost to manage. Both large and small organizations face huge costs of storage, transportation, screening and then crushing in properly designed waste disposal plants. Despite this, the surveyed foundry companies declare that they carry out rational waste management and implement the process of waste disposal, which mainly includes molding sands, mold remnants and ceramics. The aforementioned materials are subject to segregation and processing in such a way that they can be used in the form of aggregates and suitable mixtures for industry and for the reclamation process.

For the foundry enterprises surveyed in the resources category, an important issue is the possession and responsible management of core, reserve and supplementary capital (Table 1). These capitals make up the company's equity, i.e. the investors' own share in the business unit. Equity is the primary source of financing, which remains available indefinitely. In the context of taking care of the liquidity of the enterprise, reserve and supplementary capital perform important functions. Reserve capital contributes to the stabilization of the company's operations, mainly under turbulent conditions and considerable uncertainty in the market economy. Reserve capital, on the other hand, is a form of security - part of the balance sheet surplus is used, for example, to settle balance sheet losses. In this category of aspects as an inherent determinant of the success of foundry enterprises, considerable attention has also been paid to production infrastructure. The role of production infrastructure in the framework of the process of economic development of the enterprise is mainly to create conditions for the implementation of effective production activities.

The surveyed companies indicated a significant number of management strategies that are practiced in foundries. The implementation of the research indicated that production investments and ensuring operational efficiency were important success factors within this category. Productive investments are understood as investments in intangible assets or fixed assets for the benefit of enterprises, the purpose of which is to realize the production of products and services. Productive investments generate financial and economic returns, increase production and its efficiency. They also influence: employment growth, competitiveness and entrepreneurship, while very often supporting innovation. On the other hand, the second attribute of success identified - operational management, supports the identification of the most efficient (under certain circumstances) way to produce products. The main purpose of conducting operations management is to improve production systems in the long term on the way (e.g., minimizing manufacturing costs, reducing lead times).

In terms of building and maintaining relationships with customers, the key determinants turned out to be customer service, which is a set of procedures, processes and

interactions at the enterprise-customer level that strive to provide adequate customer support at each stage of the customer journey. Executives of the surveyed companies unanimously stressed that every interaction with the customer is an opportunity for the development of the company, and excellent customer service builds customer loyalty and will allow the company to stand out from the competition.

The analysis of the factors identified, within the framework of the developed research model, made it possible to identify the key determinants in the foundry industry. However, it should be noted that the approach to the selection of strategic attributes is ambivalent, as a consequence, the selection of criteria. Under the assumption that the frequency of occurrence of a factor in companies indicates its effectiveness, the main qualitative environmental attributes of success were considered:

- under the quality category: training / courses, supervision and control, reliability and durability of products, and compliance with standards and requirements,
- under the sustainability category: waste management and waste disposal,
- under the resources category: core and reserve capital,
- under the customer relationship category: customer service.

It is worth remembering that each foundry enterprise should define its own formula for success based on the specifics and development opportunities. Such an approach will make it possible to effectively manage and utilize the resources it has, organize the activities it carries out and strengthen relationships with the inside and outside of the company.

3. CONCLUSION

Success is one extremely complicated process. It is not possible to point to one specific list of factors for its achievement. However, their study and analysis make it possible to notice certain regularities, helpful for enterprises. There are many factors influencing success. Their in-depth analysis can be helpful in their prioritization, and their appropriate combination - to develop a "success strategy" for the enterprise. Therefore, the purpose of the study was to identify and typify the main qualitative-environmental aspects of the success of foundry enterprises facing economic changes.

On the basis of the realized research, it was concluded that the main qualitative-environmental aspects of the success of foundry enterprises are: training/courses, supervision and control, reliability and durability of products and compliance with standards and requirements, waste management and waste disposal, basic and reserve capital, and customer service.

Both the theoretical considerations and the results of the implemented pilot study support the statement that no matter how the success of an enterprise is understood, what determines it are the activities that use multiple resources and the appropriate relationships that the organizational unit establishes.

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