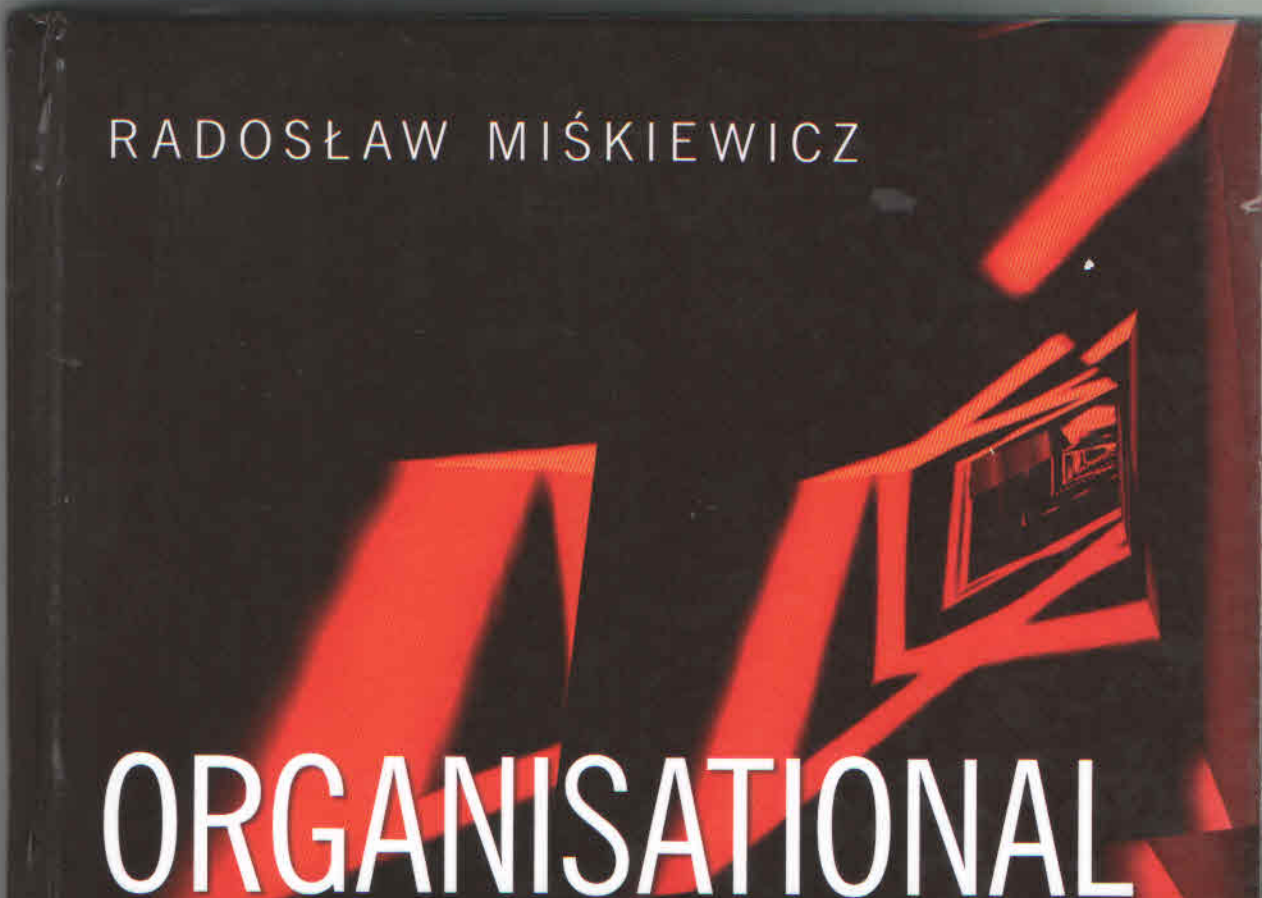


RADOSŁAW MIŚKIEWICZ



ORGANISATIONAL
STRUCTURE
in the PROCESS
of INTEGRATION

on the example of iron and steel
industry Enterprises in Poland

Difin

ORGANISATIONAL
STRUCTURE
in the PROCESS
of INTEGRATION

RADOSŁAW MIŚKIEWICZ

ORGANISATIONAL
STRUCTURE
in the PROCESS
of INTEGRATION

on the example of iron and steel
industry Enterprises in Poland

Difin

This edition published in 2017 by Difin SA
00-768 Warsaw, ul. F. Kostrzewskiego 1, Poland
Phone: +48 22 851 45 61, +48 422 851 45 62
www.ksiegarnia.difin.pl

Copyright © Difin SA 2017

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior written permission. Any person or persons who do any unauthorized act in relation to this publication may be liable to criminal prosecution and civil claims for damages.

Scientific work co-financed by Gemi Sp. z o.o.

Reviewer
prof. dr hab. Kazimierz Krzakiewicz

Translation into English
MiDiO – Poznań

ISBN 978-83-8085-471-0

Printed in Poland

CONTENTS

Introduction	7
Chapter 1. Concept of organisational structure	9
1.1 Notion of organisational structure	9
1.2 Functions of organisational structure	12
1.3 Conditions and principles of shaping the organisational structure	16
1.4 Types and kinds of organisational structures	25
1.5 Documents describing organisational structure of an enterprise	30
Chapter 2. Characteristics of enterprise's organisational structure	34
2.1 Knowledge and its theoretical aspect in an enterprise	34
2.2 Utilitarian character of knowledge in an enterprise	43
2.3 A collection of organisational structure characteristics	54
2.4 Selection of variables recognised as subject of the analysis	62
2.5 Operationalisation of selected variables	67
Chapter 3. Identification and diagnosis of organisational structure	74
3.1 Stages of the organisational structure research methodology	74
3.2 The essence and principles of identifying entire organisational structure and its particular elements	77
3.3 Description of multidimensional organisational structure	79
3.4 Diagnosis of the organisational structure	81

Chapter 4. Problem of organisational structures assessment in the context of their similarity	85
4.1 Similar structures and similar organisational forms	85
4.2 Similarity of organisational structures and their susceptibility to integration	87
4.3 Methods of structure research in the context of susceptibility to integration	94
4.4 Identification of the diagnosis elements to determine the degree of organisational structures similarity within the due diligence analysis	101
4.5 General characteristics of methods and techniques for diagnosing similarities of organisational structures of consolidated enterprises	105
4.6 Integration of organisational structures of enterprises consolidated in the metallurgical industry	113
Conclusion	131
Bibliography	133
List of diagrams, figures and tables	141

INTRODUCTION

The iron and steel industry, like the entire economy, was undergoing transformation processes in the 1990s. An inspiration for these changes was signing by Poland of the Association Agreement with the European Union in December 1991. This document sets directions for functioning of the ironworks in Poland. It resulted in the development of the ironworks restructuring processes in the years 1992, 1998, 2001–2003, aimed at the improvement of their economic efficiency. It meant seeking economic efficiency of metallurgical enterprises, also known as fundamental changes in their organisational structures. A number of literature sources, both Polish and English recognise the issue of reforms by means of restructuring employment, finances, and resources. In the 1990s and in the first decade of the 21st century, the influence of the organisational structure on the efficiency of iron and steelworks was studied more and more frequently. Their theoretical justification is found in, i.a. the works of M. Weber, H. Fayol, Zb. Zakrzewski, A. Krupski, A. Stabryła, A. Nalepka, A. Kozina and others. Scientific suggestions in publications have given rise to the discourse that organisational structures should be dealt within a social and technical aspects, as processes, sets, and events. They are one of the most important tools for the management, a factor binding the enterprise with the environment.

Today the predominant view is that the organisational structure is influenced by many factors and in principle to a different extent. It means that the determinants and principles of shaping enterprise organisational structures should be

considered in two aspects: theoretical and utilitarian. The achievements of organisational and management theories have been utilised, as this doctrine orders certain practical experiences, formulates hypotheses and theorems according to logical rules of inference, applying in this field achievements of other areas of science in such matters e.g.: economics, law, sociology, psychology. The other dimension refers to economic practice of operating enterprises and changing environment. In both cases the enterprise is considered as organisation that is the dominant form of collective life, covering almost all aspects of human activity. This is emphasised by K. Mreła, J. Jaszek, K. Krzakiewicz, S. Cyfert, A.K. Koźmiński, E. Michalski, S. Flaszewska, M. Potoczek, S. Podczarski, H. Dźwigol, J. Brzóska, J. Pyka, A. Hamrol, R. Miśkiewicz. Due to the modular character of the structure, with weak coherency which constitute a significant majority, the interaction of individual factors does not cause identical changes in shaping all dimensions of the structure. If the organisational structures were coherent, the interaction with one of their modules would lead to modification of all the other modules and thus achieving the assumed goals. In fact, structures are poorly coherent and the associated modularity of the structure and loose connections between modules, autodynamism, and interactive effects define a set of internal conditions through which the context interacts with the causal structure and determinants.

Contextual conditioning, usually referred to as an environment, is divided into internal and external. The first relates to: technology, employees' knowledge, organisation life cycle stages, organisation size. The latter expresses legal, economic, cultural and social environment, also considering globalisation processes in the modern economy and its development paradigm, where knowledge is an important link.

The subject of research, adopted aims and hypotheses have determined the choice of both research methods related to processing of materials and systematisation of results and analytical methods in relation to the studied literature. In addition, the index of general efficiency of restructuring, indicator analysis, induction method and graphical method were used. A monograph was given both theoretical and utilitarian value, which was reflected in its structure.

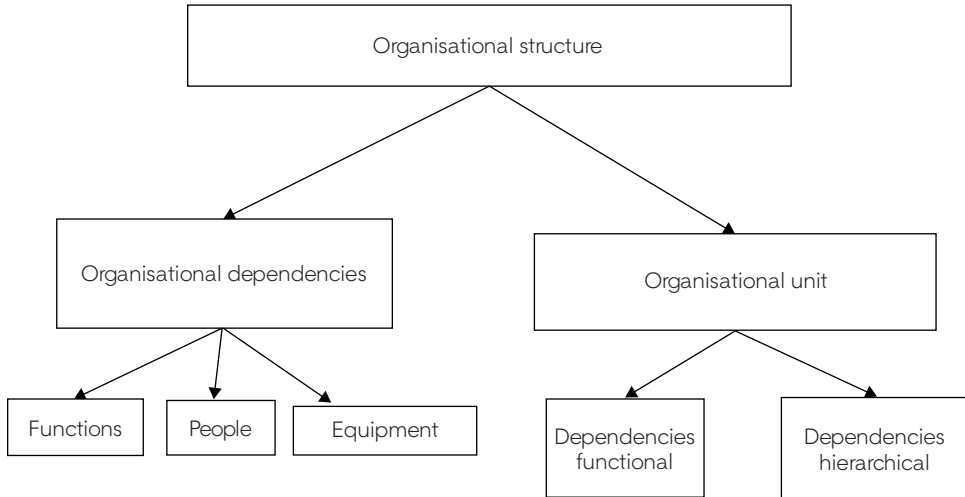
CONCEPT OF ORGANISATIONAL STRUCTURE

1.1 Notion of organisational structure

Organisational structures are often encountered in social life. M. Weber was the first to consider them. He assumed that the transparent bureaucratic entirety of the administrative apparatus was under the supreme authority. Moreover, it was composed of appointed officials. Their professional work was based on the division of tasks and competences, a specific hierarchy of positions, possession of necessary qualifications while employing people. The functions and positions have been given an impersonal character, while maintaining strict specialisation, control and discipline. [Weber 1947, p. 309 *et seq.*] F.W. Taylor also made a significant contribution to development of organisational structures. In his concept of scientific management he incorporated observation and measurement. By introducing the concept of functional management to the science, he acknowledged that the separation of work done from the management leads straight to the ultimate single organ – the organisation’s office. [Taylor 1947, p. 6 *et seq.*] In addition to these considerations, H. Fayol notes that development of the enterprise leads to the creation of the so-called “factory offices”, i.e.: permanent, professional and strong administration. [Fayol 1947, p. 18 *et seq.*]

Organisational structures have been the subjects of a number of empirical studies, aiming at fully defining them, establishing their determinants, origins, characteristics and functions. However, an unambiguous definition of structure is difficult to be established due to the multiplicity of its meanings. For example, the notion of social structure refers to “... social differentiation, relations of production, forms of association, integration of values, functional interdependence, roles and positions, and combinations of these and other factors” [Blau, 1974, p. 220]. Thus, the needs shaped the set of roles and relations between them. This systemic approach has also been noticed by A. Schaff, suggesting that the system is the name of an entirety consisting of elements, whereas the manner in which these elements are interrelated is referred to as the structure [Schaff, 1983, p. 12]. Nevertheless, by examining the role of the environment as a structure creating factor, T. Burnes and G.M. Stalker emphasised the importance of looking for such an organisational structure and manners of management to adapt them to a particular situation. They preferred such features as hierarchy, specialisation, competence, vertical and horizontal interaction. The more the environment is verified and the less stable it is, as emphasised by P. Lawrence and J. Lorsh, the greater the diversity of the organisational structures of the enterprise is. That is considered as an incentive to form elastic structures, departing from the mechanistic model. At the same time, they retained certain elements of hierarchical structures, such as divisional or matrix structure. [Zakrzewska 2012, pp. 288–323] Organisational structure plays an important regulatory role in an enterprise. It allows to shape the internal order by defining a place for each employee in the organisational system and allows designation of the desired manner of operation. Thus, in the traditional sense, it is a collection of different organisational elements: individual work places, organisational units and links between them. A set of people consisting of a manager and subordinate team members is the smallest organisational unit. [Krupski 2005, pp. 65–66] This organisational structure in the light of classical definitions is presented in Figure 1.

Contemporary organisational structures, as noted by H. Mintzberg, are often accompanied by the *ad hoc* phenomenon. It signifies the disappearance of various past permanent structural links. Tasks and functions implemented by the organisation are dynamic, constantly changing and determined on an *ad hoc* basis, depending on market challenges and changes in the environment. [Zakrzewska-Bielawska 2007, pp. 27–37]

Figure 1. Organisational structure in the light of classical definitions

Source: Trzcieliński S. 2001, p. 413.

It is also worth noting, as emphasised by A. Nalepka, that „one of the best approaches to define an organisational structure is the one that exposes the link between elements of the system, as it clearly distinguishes the notion of structure from the notion of system” [Nalepka 2001, p. 17]. Accordingly, in the presented work, the assumed starting point is the following definition of organisational structure: organisational structure is a hierarchical and functional relation in the production system between posts, units and groupings of organisational units, ensuring smooth operation of the system. Their development trends are presented in Table 1.

Contemporary science on management notes the permanent necessity of confronting the theory with practice in the scope of organisational structure. In addition, this process is intensified by technological development, implying the emergence of new IT solutions that support the optimisation and audit of organisational processes. [Lachowicz, Marejun 2012, pp. 113–116] It is noteworthy that both science and economic practice are inextricably intertwined in the evolution of the theory of management science as a scientific discipline, where the process of reasoning based on induction plays an important role. It is, what Peszko and Sudół emphasise, of particular importance in the situational approach, which is expressed in a careful observation of the economic reality by formulating a catalogue of „good practices” and organisational behaviour. [Antonowicz, Skrzyaniarz, Stolarz 2016, p. 2009].

Table 1. Development trends in organisational structures

Trend	Characteristics
The reducing scope of specialisation of work posts and entire internal units	This will result in establishment of autonomous results and will create a new image of an atomised organisation, where the relations between the internal units are definitely looser than in the traditional organisation. The chances for occurrence of phenomena such as self-organisation (independent units), empowerment (a large range of decision-making powers in the field of own work) and self-control are increased. The direction of change is consistent with the direction of social evolution, manifesting itself in the growing level of education, qualifications, the need for individualisation and achievement.
Strong decentralisation and flat hierarchies	Comprehensive range of tasks increases the possibility of transferring more rights. With regard to complex works, it is easier to set the criteria for corporate responsibility, which allows you to correlate levels of authority with responsibility. On the other hand, less time spent on coordination tasks relieves the management staff, which is an additional incentive for flattening organisational structures.
Minimising the role of central staff units	With the downward move in the hierarchy of greater decision-making powers, a reduction in their importance should occur. However, this forecast does not foresee, as it seems, the supporting role of staff in relation to entities taking decisions that are externally related, such as capital investments, co-operation, supplier selection, etc. The reduction of the staff units' role is therefore debatable.
Simple coordination	This involves the need to move away from complicated organisational forms such as matrix structures. They should be replaced mainly by task teams that do not cause conflicts and are of an ad hoc nature.
Strengthening the importance of self-alignment and organisational culture in the process of coordinating innovative (creative) activities	The importance of horizontal relations (dependencies), cooperation in organisations, i.e. non-hierarchical relations, is emphasised here. They are the basis for migration of knowledge and experience. For horizontal cooperation and self-alignment, an entrenched organisational culture is indispensable as it stabilises social relations in certain sense and makes them more predictable. Then a climate of mutual loyalty and trust can arise, constituting one of the factors of cooperation. Language artefacts and subscribed norms and values are also important.
The universality of using the task teams to implement the innovative tasks	Horizontal cooperation is most evident within task teams. These teams can be of a durable nature, e.g. a production team, where the development, production and marketing staff positions are coordinated or unrelated to implementation of a particular project.

Source: Łobos 2003, pp. 242–246.

1.2 Functions of organisational structure

Organisational structure is supposed to facilitate the process of the company's management. The structure formalised in organisational documents combines

and organises the components of the system. It can be seen from the point of view of specialisation, standardisation and coordination of activities, centralisation and decentralisation of decision-making and the size of the work unit. [Piotrowicz 2009, p. 5 *et seq.*] From this point of view, the most important functions are:

- organisational structures constitute the framework of organisational activities,
- regulate actions of individual employees and teams,
- enable to reach a certain level of employees' needs fulfilment,
- ensure effective implementation of the organisation's goals,
- shape hierarchical and functional capabilities,
- share decision-making powers and responsibilities. [Nalepka, Kozina, 2007, pp. 20–25].

On the other hand, Włodarski A. and Grzesiuk E. suggest that the organisational structure should also be considered in the following aspects:

- social – as a union of people, i.e. enterprise employees,
- technical – as a combination of the production process and products of the enterprise,
- processes – as a combination of activities carried out by the enterprise,
- sets – as a connection of the enterprises' organisational links,
- events – as a combination of goals, tasks, and functions of the enterprise. [Włodarski, Grzesiuk 2002, p. 118]

In such a setting, the organisational structure has many basic functions because it:

- is a management tool,
- integrates the enterprise's components into an entirety, leads to a specific internalisation of employees' objectives with the goals of the enterprise,
- ensures the enterprise a relative balance, thus preventing the organisation from destruction,
- ensures spatial and temporal synchronisation of processes implemented in it,
- reduces the uncertainty of the probabilistic nature of the organisation,
- binds the enterprise with the environment,
- plays an adaptive role. [Włodarski, Grzesiuk 2002, pp. 118–119]

The reflections of J. Ober, who distinguishes the following functions: information, motivation, control and emotion are interesting from the effective communi-

cation in management perspective . [Ober 2013, p. 260 *et seq.*] The regulatory structure out of all organisational structures and their functions plays a fundamental role. Due to this fact, an internal order of action is created by regulating:

- interpersonal relationships manifested particularly in the domain of hierarchical and functional relations,
- relations between components of technical equipment, i.e. means of work including: location of rooms, schedules of technical equipment operation, placement of machines and equipment, development of work spaces, etc.;
- relations between the staff – members of the enterprise’s crew and the components of the generally understood technical apparatus, consisting of the application of appropriate working methods, procedures determining the content and scope of work, resulting from the production and settlement documentation, etc. [Włodarski, Grzesiuk 2002, p. 119]

As it has already been noted the structure bonds and orders the enterprise. For the purposes of this study, during the research process it was assumed that the most frequently mentioned functions of the metallurgical enterprises organisation are presented in Table 2.

Table 2. Functions of the organisational structure

Functions	Stoner, Wankel	Przybyła, Wudarzewski, Koziański	Borkowski	Nalepka
1. Division of work	x		x	
2. Relations	x			x
3. Division of authority	x		x	x
4. Hierarchy	x			x
5. Responsibility	x			
6. Continuity of task implementation	x			
7. Coordination with the environment	x	x	x	
8. Management tool		x		
9. Connection of the system components		x		
10. Ensuring system balance		x		

11. Reducing the system's probabilistic feature		x		
12. Adaptation to the system		x		
13. Positioning of processes in time and space			x	
14. Configuration of positions and organisational units			x	x
15. Classification of targets				x
16. Ordering system components				x
17. Formalisation				x

Source: own description based on [Nalepka, Kozina, 2007, pp. 20–25].

The catalogue of functions presented in the table shows that the authors' views on their set are quite diversified. Obviously, it is possible to discuss whether certain concepts do not overlap themselves, at least partially, but it is not very important to determine their scope. Based on different methodological assumptions, M. Hopej and L. Martan propose a slightly different arrangement, as presented in Table 3.

Table 3. Features of structure by different authors

Authors	Features of the organisational structure
Blau	Specialisation, bureaucratic coordination.
Burnus, Stalker	Hierarchy of management, authority and communication, specialisation, precision in definition of competences and responsibility, relation of vertical to horizontal interactions, type of authority, formalisation.
Gościński	Formalisation, specialisation, hierarchy, complexity.
Jermakowicz	Vertical decentralisation, horizontal decentralisation.
Kieser, Kubicek	Specialisation, coordination, configuration, delegation of competence, formalisation.
Lawrence, Lorsche	Structural diversity, integration.
Pugh, Hickson, Hinning, Turner	Specialisation, centralisation, formalisation, standardisation, configuration.
Steinman, Scheryógg	Organisational diversity, organisational integration.

Source: Hopej, Martan, (ed.) 1999, pp. 31–32.

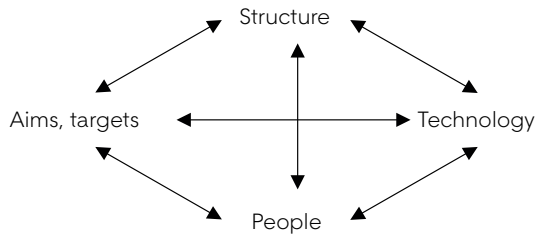
The table shows that in the set of characteristics there are features present in views of at least few authors. It was recognised that the basic functions of organisational structure are those which: define positions and organisational units, introduce centralisation, specialisation, formalisation and standardisation. It seems that this approach to the problem will coincide with the dimensions of the structure adopted further in the study, to assess the similarity of the integrated structures in the process of identification. Increasing the degree of their fulfilment can be considered as the main goal of their improvement. [Nalepka, Kozina, 2007, p. 20]

1.3 Conditions and principles of shaping the organisational structure

Analysing the determinants and principles of shaping enterprise's organisational structures the problem should be considered in two aspects: theoretical and utilitarian. The first one applies to achievements of organisation and management theory. This doctrine: arranges some practical experiences, describes phenomena and events, generalises the results of studies, and formulates hypotheses and theorems according to the logical rules of inference. It also looks for some regularity in functioning of enterprises that are the main subject of the research. In this process, it uses the achievements of other scientific disciplines such as economics, law, sociology, psychology, etc. [Sopińska 2015, p. 140 *et seq.*] The second dimension refers to the economic practice of functioning enterprises and the changing environment. In both cases the enterprise is considered as organisation that is the dominant form of collective life, encompassing almost all aspects of human activity. It is worth recalling that, according to R. Ackoff, organisation is a state that behaves deliberately, has at least two subsystems of common purpose, forcing the division of labour. [Ackoff 1999, p. 74 *et seq.*] On the other hand T. Kotarbiński suggested that the organisation is a kind of entirety due to its own elements' relationship with it, namely, the entirety, where all components contribute to the success of the entirety. This means that the organisation is an open, purposeful, complex, structured system. [Kotarbinski 1965, p. 58 *et seq.*] The most frequent reasons for creating an organisation are: efficiency (synergy, organisational effect); social background, affirmative needs and the desire to control chaos. They affect models of organisations that are described in the literature as:

Leavitt’s System Model (Leavitt’s Diamond) – The four-component model reflects the layout of the four basic elements of a specific carrier structure of an organisation that remain in specific relations with one another and with the environment.

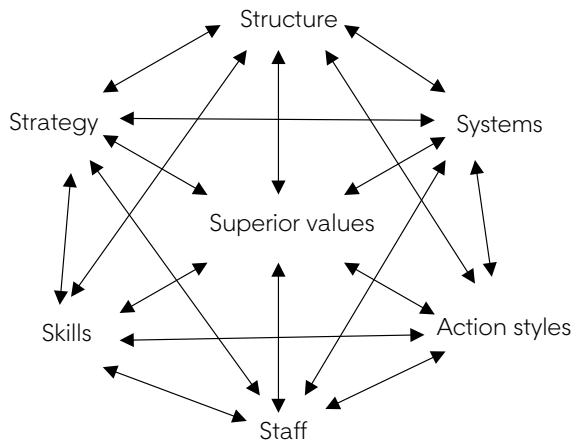
Figure 2. Leavitt’s system model



Source: Hopej M., 1999, p. 16; Krzyżanowski L 1992, p. 173.

1. **Model 7S (Peters & Waterman)** – this model takes into account the intangible characteristics of the organisation. Model 7S is not a recipe for building a perfect strategy, but it is an incentive to rethink the company’s internal business activity that affects its future development.

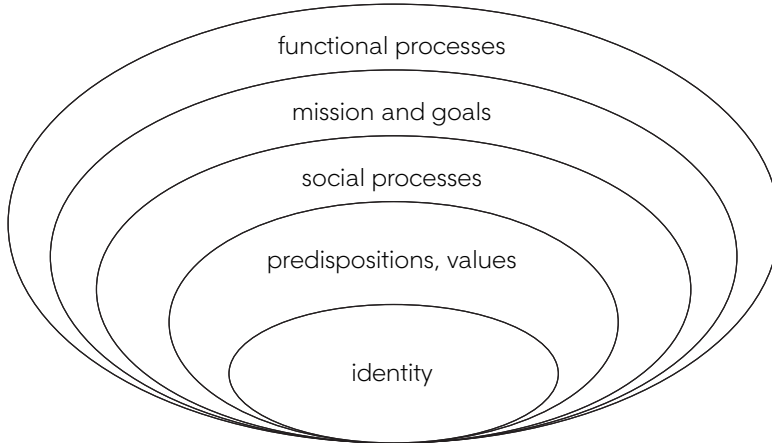
Figure 3. Model 7S



Source: Waterman, R.H., Peters, T.J., & Phillips, J.R. 1980, pp. 14–26.

2. Onion model

Figure 4. Onion model



Source: Hofstade 2000, p. 43.

The organisations are created, they grow, develop, and fall into crises. They shrink, age and divide, join, are liquidated (the subject of the organisation's life cycle concept). In general, organisations are subject to changes in the environment and within the organisation. [Olszewska, Czarnecki, Piwoni-Krzeszowska 2013, p. 313 *et seq.*]

From the above considerations the organisational structure of the enterprise emerges, which, according to R.H. Hall, P. Tolbert, correlates with the arrangement of organisational parts. (Thus, organisational structure can be considered as the arrangement of organisational parts). [Hall, Tolbert 2005.] On the other hand, M. Blau suggests that it is the distribution, along various lines, of people among social positions that influence the role relations among these people. [Blau 1974, p. 15 *et seq.*]

According to S. Ranson, B. Hinings, R. Greenwood, organisational structure is a complex control mechanism that emerges from the interaction of people and at the same time it shapes these interactions. Thus, the organisational structure is both determined and determining (a complex medium of control which is continually produced and recreated in interaction and yet shapes that interaction: structures are constituted and constitutive). [Ranson, Hinings, Greenwood 1980, No. 25, p. 1 *et seq.*]

It is a cliché to state that shaping an organisational structure depends on the factors outside and within the enterprise, on the factors that are dependent and independent of the will of the people who govern the enterprise, and that the organisational structures are different. The problem arises when one wants to establish and quantify the factors that cause these differences. Initially, it was thought that structural differentiation takes place due to one decisive factor. One example and probably the most familiar one-dimensional approach is A. Chandler's view that there is a direct and determinant relation between the structure and the strategy of an enterprise, with the first being the dependent variable in this relation [Chandler 1962]. A detailed list of the organisational structure determinants is shown in Table 4.

Table 4. Factors determining the organisational structure by different researchers

Author	Structural factors
M. Bielski	Genotype function of organisation, environment, technology, people, strategy
H. Bieniok, J. Rokita	Size of organisation, degree of diversification of its products and technology differentiation, scope of organisation's association with others, degree of monopoly in suppliers and customers, strategy, people
A.D. Chandler	Strategy, environment
M. Hopej	Size of organisation, degree of diversification of production, environment, technology, strategy
P. Lawrence, J. Lorsh	Environment
H. Mintzberg, J.B. Quinn	The age and size of the enterprise, technical system, power, environment
D.S. Pugh	Size of organisation, cooperation, statute, technology, location
R. Rutka	Environment (government, economic and capital conditions, supplier and recipient markets, technology, human potential), organisational resources (human, material, financial), organisation strategy
J. Skalik	Organisation goals, technology, type of production, organisation size, organisation phase, external environment
A. Stabryła	Previous structural solutions, management system, manufacturing system (internal environment), proximate environment (task), further (general)
Strategor	Organisation, technology, environment, diffusion, integration,
J. Woodward	Type of production process

Source: Flaszewska 2016, p. 62.

Today the predominant view as far as the organisational structure is concerned is that it is influenced by many factors and in principle to a different extent. Furthermore, due to the modular character of the structure, with weak coherencies, which constitute a significant majority, the interaction of individual factors does not cause identical changes in shaping all dimensions of the structure. If organisational structures were coherent, interaction with one of their module would lead to modification, through interaction, of all the other modules and thus achieving the assumed goals. In fact, structures are poorly coherent, and the associated “modularity of the structure and loose connections between modules, auto-dynamism, and interactive effects define a set of internal conditions through which context interacts with the causal structure and determinants”. [Mreła, 1988, p. 130]

Contextual conditioning, usually referred to as an environment, is divided into internal and external. The first relates to: technology, employees’ knowledge, organisation life cycle stages, organisation size. The latter expresses the legal, economic, cultural and social environment. Learning the components of the environment allows to explain the reasons for the differentiation of organisational structures. [Jaszek 1984, p. 127; Krzakiewicz, Cyfert 2015, p. 241 *et seq.*] It seems reasonable, as emphasised by A.K. Koźmiński, D. Jemielniak, that when shaping organisational structures, the general directives such as simplicity, economy, transparency and harmonisation should be followed. [Koźmiński, Jemielniak 2008, pp. 84–85] Thus, the shaping of organisational structures is treated as a multi-stage process based on many principles, such as:

- 1) Principle of purpose – the need to define organisation’s objectives and its components clearly by dividing the objectives’ system into partial demarcation of organisation distribution of decision-making powers, division of work, duties and responsibilities, system of rules governing procedure, unified modes of conduct;
- 2) Principle of combining partial targets into general one – grouping individual posts into units and larger units (divisions, sections, departments) to which the higher targets are subordinated;
- 3) Principle of specialisation – grouping of structure elements according to possible homogeneous tasks; basic grouping criteria: technological and subject specialisation;
- 4) Principle of coordination – manners of co-operating by individual members of the organisation, performing separated functions, place and role of the advisory cells;

- 5) Principle of balance of tasks, powers and responsibilities – assignment of specific tasks to a defined position, which entails granting a sufficiently wide range of powers: the position is responsible for the assigned tasks and powers;
- 6) Principle of one-man management – one should strive to subordinate the hierarchical structure of each work station to only one managerial position;
- 7) Principle of rational supervisory boundaries – refers to respecting rational size of a team that can be efficiently managed by a single superior [Flaszewska 2016, pp. 65–68; Zakrzewska-Bielawska 2012, p. 264 *et seq.*].

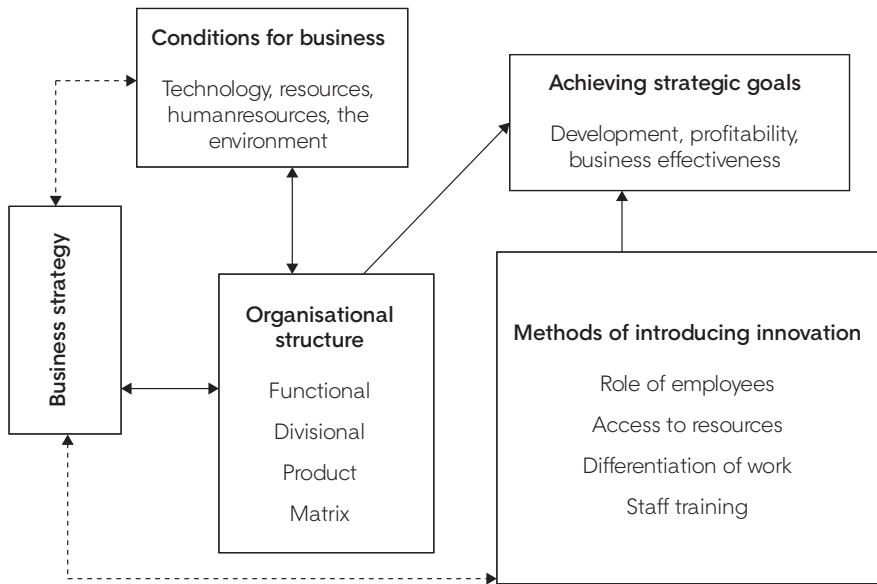
In the works of A. Stabryła, K. Krzakiewicz and S. Cyfert, internal and external factors shaping, directly and indirectly the structure of the organisational structure were identified and classified. Not all of the factors mentioned above have an equal influence on organisational structures. Into account have been taken those that, according to the author, exert a significant influence on the considerable differentiation of these structures, which further hinders their integration. Nevertheless, identifying them will allow for the proper targeting of further research. [Stabryła (ed.) 2009, pp. 53–57; Krzakiewicz, Cyfert 2013, p. 91 *et seq.*]. It is worth noting in the summary of this part, as emphasised by E. Michalski [Michalski 2013, p. 175] that factors influencing organisational structures are internal factors, external factors and production technologies. A full list of them is included in Diagram 1.

Among internal aggregated factors shaping organisational structures in the metallurgical industry, which is the subject of the analysis, should be emphasised according to the author: the development strategy, the company management, the procedures in place (organisational processes), the operational subsystems and the information system.

The adopted strategy also shapes the structures, and perhaps first of all, in the process of their integration as the role of differences in the strategic assumptions of the consolidated enterprises is then highlighted. For example, in the metallurgical holdings, which employ a growth strategy by means of the incorporation of individual steelworks and small holdings, appropriate structures were created aimed at absorbing new organisations to holdings without incurring the costs of possible integration perturbations. Another issue is the effectiveness of these units operation. On the other hand, the organisations that are incorporated do not have such services, and consequently these are under the double pressure of: the buyer with its decision-making rights and the organisational structures of the acquiring entity. Certainly, the above example does not depict all the differences arising from

the strategy, they go much deeper and often show the complete lack of conformity of the structure in many areas of activity. [Moszkowicz 2015, p. 9 *et seq.*]

Diagram 1. Issues to be considered while the process of creation of the organisational structure



Source: Michalski 2013, p. 175.

To a much lesser degree, this refers to the role of business leadership as a structural factor. In general, the diversity of posts, qualifications and distribution are similar in proportion to the size of the enterprise. There may, however, be variations in the approach to shaping the structure, depending on the values adopted by the leadership. Some will prefer the extension of internal control, others will accept the quality problem as a priority, etc. Depending on the point of view taken by the management certain services will be more or less extensively shaped. Obviously, the same problem concerns more or less authoritarian manner of decision-making and the autonomy of individual parts of organisational structure. [Miśkiewicz 2017, p. 68 *et seq.*]

It can be said that in this respect there is relatively strongest, direct shaping of the organisational structure. The importance of the organisational processes (procedures) in shaping the organisational structure comes to light only when these procedures are changed. In the organisation of metallurgical enterprises in the

past 20 years little has been changed in this respect. [Podczarski 2016, p. 37 *et seq.*; Hamrol 2016, p. 27 *et seq.*]

The structure creation role of the discussed factor is often revealed during incorporation of steelworks into holdings. In such cases the holdings often impose their procedures, which are not always suitable for single plants and may be associated with personnel disturbances. Thus, structures are confronted, differences are identified and the degree of integration imperviousness is revealed. Similar problems in shaping organisational structures result from implementation of planning, controlling or motivation operational subsystems. Every change in this area is immediately reflected in the number of posts, units and their relationships and dependencies. Therefore, one can imagine a number of changes caused by amalgamation of organisational structures, differing in strategies and sizes of the enterprises. Analogous activities characterise an information system. In the steel industry, some factors inherent in the manufacturing system itself are of bigger importance. It can be stated that the most important of them is the size of the enterprise and the manufacturing technology in its broad meaning. Apart from these factors, there are other, e.g., territorial distribution or supporting functions. However, in both cases they are stable in the metallurgical industry. The production process is usually concentrated in one place. The same concerns the supporting services, they are relatively stable and very similar to each other in different steelworks. [Miśkiewicz 2017, p. 70 *et seq.*; Arendt 2015, p. 13 *et seq.*]

Many authors consider that the size of an enterprise is of great importance in shaping organisational structures. Increasing the size requires greater coordination, which obviously enhances the company's costs. The division of labour is expanding, which requires standardised procedures for processing of increasing amount of information. According to the Strategor, "the correlation between the growth in size of the organisation and its bureaucracy is evident ... big company looks for the best compromise between coordination costs and the costs of the autonomy of the units that make it up" [Strategor 2001, pp. 288–289; Podczarski 2016, p. 39 *et seq.*].

In the metallurgical industry, where large companies dominate, the diversity of organisational structures by size is limited. Hence, the importance of this factor by examining the integration of structures in consolidation of individual steelworks with holdings where the size differences are indeed substantial is worth noticing. In these cases, the number of employees and the number of organisational units influencing the organisational structure should be taken into consideration. Among internal factors, a significant importance of structure-building is generally attributed

to technology perceived in a broader sense. Strategor defines technology as “all of transformation processes made by an enterprise that combines both the primary stream of internal transformation as well as all purchases necessary for its supply and what the company sends out” [Strike 2001, p. 290]. Each organisation selects the organisational structure appropriate to the technology used. Individual services in companies also adapt their partial structure to technological requirements. There is a link between the variety of tasks, technology and the corresponding organisational structures. This is confirmed by the author’s research for the purpose of this paper. The author notes that in the iron and steel industry the technological differences in products, the technological process itself, equipment and supporting functions are not significant. An exception is the situation when enterprises are compared, characterised by different production ranges resulting from more or less complete production cycle. This indicates that a full production cycle is not always present, i.e. melting of pig iron with further processing into steel and semi-finished products, e.g. rolled products, wire, forged products, etc. Depending on the absence of individual parts of the cycle, the organisational structure changes as well.

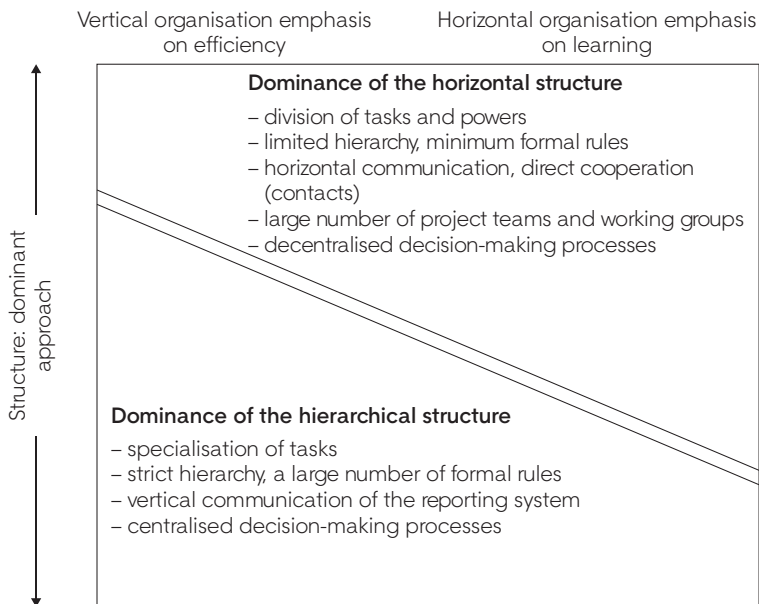
Undoubtedly, the role of the environment as an external factor in the process of creating an organisational structure is apparent. This is pointed out by Nalepka and Kozina who suggest that the attempts to identify and define structure-creating factors are intended to explain the reasons for differentiation of organisational structures [Nalepka & Kozina 2007, p. 20]. Such an explanation would be very helpful in determining the characteristics (dimensions) of the structures responsible for these differences. However, it is not necessary while examining the differences themselves as the paper concerns only their measurement and not the repair or improvement.

The author shares the view that by examining an impact of the environment on the organisational structure, the competitive environment prevails: markets of suppliers and customers, distributors and market competitors. Without going into details it should be stressed that the most important, in the metallurgical industry being the subject of this research, are the conditions resulting from the turbulent nature of the environment, including the entry of large enterprises into the Polish market. This case involves e.g. the entry into the metallurgical market of Mittal organisation from India and the Ukrainian capital. Therefore, as it is emphasised in A. Stabryła’s work, the environment requires a decentralised structure and a structure that can quickly adapt to new conditions and also has a flexible communication system. [Stabryła (ed.) 2009, p. 57] This allows to identify correctly the dimensions of the integrated structures, created precisely because of the influence of the external environment.

1.4 Types and kinds of organisational structures

The typology of organisational structures is important in understanding the integration process in consolidated enterprises. This results from the fact that the study on similarity of structures is based on the basic parameters that shape them. They are treated as criteria for distinguishing structures by their type after the necessary simplification of modelling. It should be emphasised that although models of particular types of structures are separate in theory, in economic practice they are always a kind of hybrids. The division according to organisational relations, covering linear, functional and staff structures is an example of classical division of organisational structures. [Krzakiewicz & Cyfert 2013, p. 54; Flaszewska 2016, p. 57 *et seq.*] Diagram 2 presents structural orientations dominant in literature.

Diagram 2. Dominant structural orientations

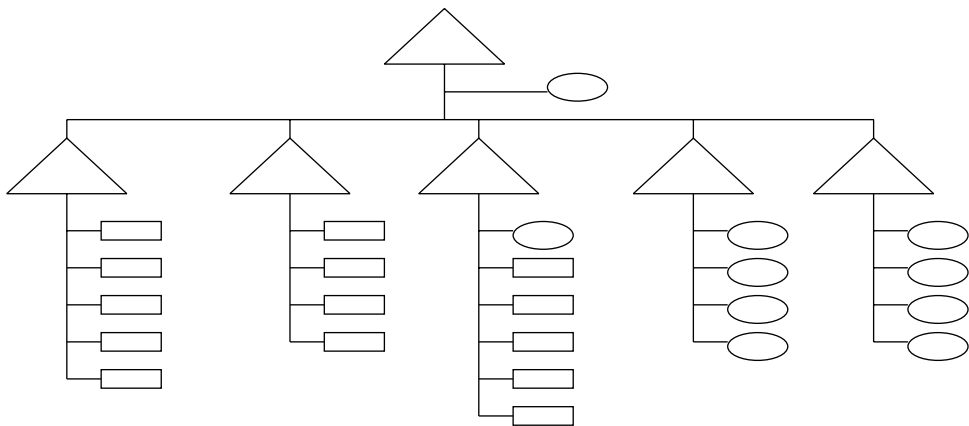


Source: Krzakiewicz & Cyfert 2013, p. 54.

The reasons for building modern organisational structures are associated with the maximum flexibility of the enterprise. Hence, the features of great importance, from the knowledge management perspective, are the structures similar to task (project), process, hypertext, fractal, network or virtual ones. [Flaszewska 2016, p. 17 *et seq.*]

The cases, which are in author's interest, i.e. metallurgical companies, present an organisational structure in a slightly modified version of integrated divisions. Thus, the basic division distinguishes: structure of integrated units, divisional structure, collegial structure and a number of others of lesser importance in economic practice. In this paper the first of these – the structure of integrated units is of major interest. It also occurs under the name of departmentalisation. In literature, it is also known as functionalisation, and it means the creation of an organisational structure, characterised by specialisation of organisational elements due to the type of performed functions (actions). [Nalepka 2001, p. 74] The synthetic organisational diagram of such structure is shown in Diagram 3.

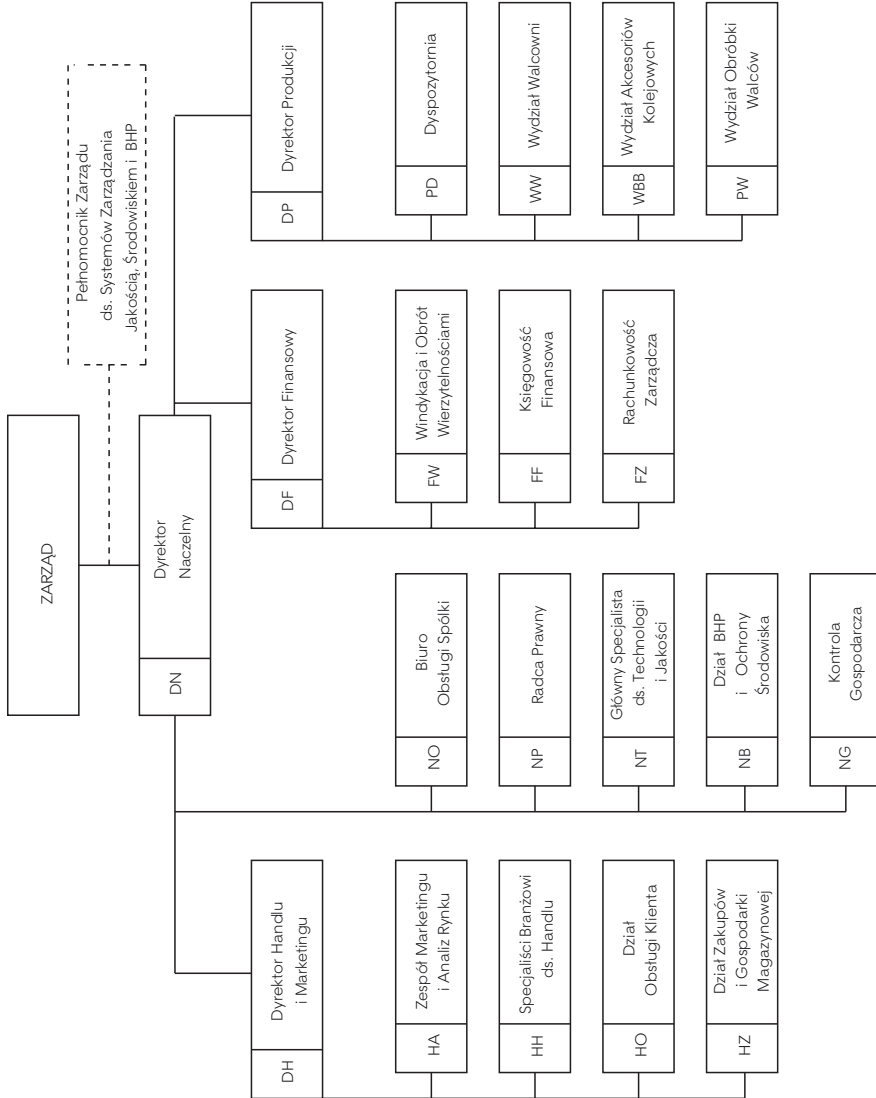
Diagram 3. Organisational structure of integrated units



Source: Nalepka & Kozina 2007.

The actual ones, different from the model, illustrate an example of the steelworks organisational structure X (Fig. 1). As it results from the comparison of the two structures, the number of divisions differs – in the first case there are five, in the other three. In addition, the CEO (Chairman) does not limit himself to coordination (only one staff unit in the model), but personally heads the largest of all units, directing such units as health and safety and fire-protection, quality control, laboratory, etc. These are quite significant differences, but in everyday business, “clean” models rather do not exist. An example of the organisational model of the steelworks is presented in Diagram 4.

Diagram 4. Sample organisational structure of steelworks



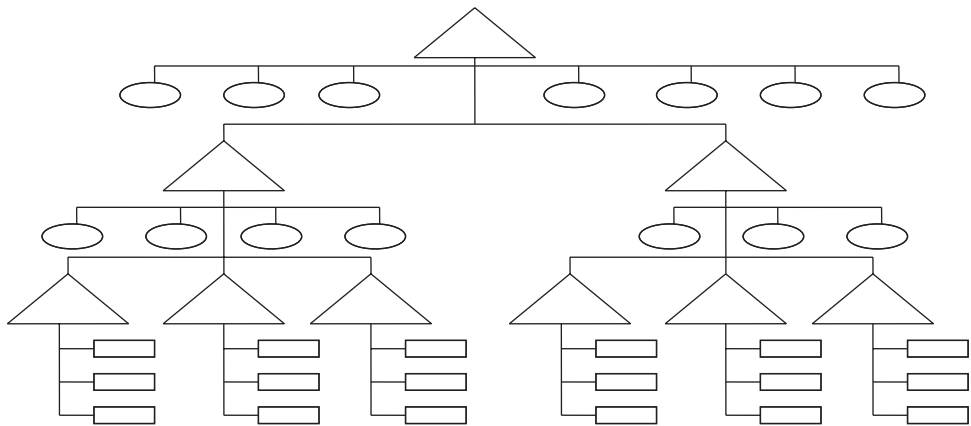
Source: own study based on organisational diagrams of steelworks.

POLISH	ENGLISH
Zarząd	Management Board
Dyrektor Naczelny	Chief Executive Officer
Pełnomocnik Zarządu ds. Systemów Zarządzania Jakością, Środowiskiem i BHP	Management Board representative for Quality, Environment and OHS Management Systems
Dyrektor Handlu i Marketingu	Trade and Marketing Director
Zespół Marketingu i Analiz Rynku	Market Analysis and Marketing Team
Specjaliści Branżowi ds. Handlu	Branch Specialists for Trade
Dział Obsługi Klienta	Customer Service Department
Dział Zakupów i Gospodarki Magazynowej	Purchase and Warehouse Management Department
Biuro Obsługi Spółki	Company Service Office
Radca Prawny	Legal Counsel
Główny Specjalista ds. Technologii i Jakości	Technology and Quality chief Specialist
Dział BHP i Ochrony Środowiska	OHS and Environment Protection Department
Kontrola Gospodarcza	Business Control
Dyrektor Finansowy	Finance Director
Windykacja i Obrót należnościami	Debt collection and collection period
Księgowość finansowa	Finance accounting
Rachunkowość zarządcza	Management accounting
Dyrektor Produkcji	Production Director
Dyspozytornia	Dispatch centre
Wydział walcowni	Rolling mill department
Wydział akcesoriów kolejowych	Rail accessories department
Wydział obróbki walców	Roll processing department

In the departmental structure all linear and commanding organisational units belong to functional divisions managed by the deputy directors. It can be said that in a certain sense functional dependencies occur from the second level of management.

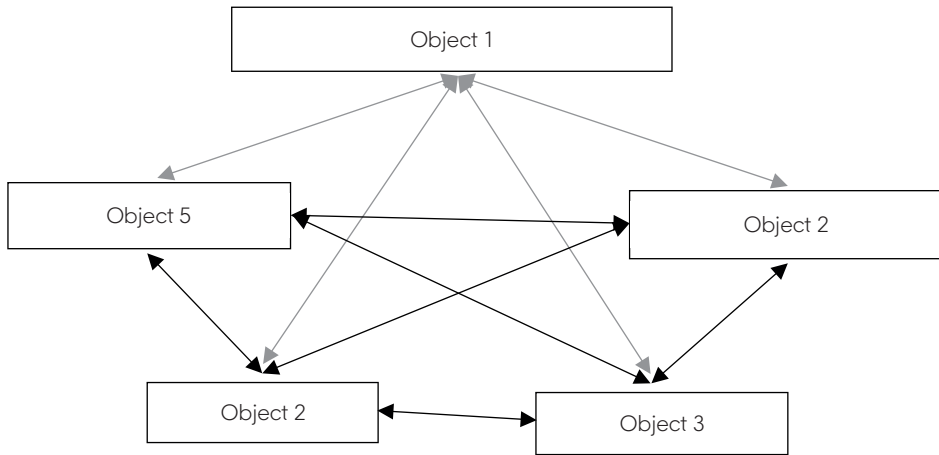
As it has already been mentioned in the Polish metallurgical industry dominates the organisational structure of the departmental type. However, there are cases, especially when the enterprise includes non-core production, where its organisational structure is either divisional or mixed. This may be the case when, apart from the strictly metallurgical production, there are refurbishment and investment departments, or others. On the other hand, some variation in the divisional structure is experienced in metallurgical holdings, where large units are separated, e.g. divisions, plants, etc. on a subjective basis, creating kind of separate enterprises, with almost complete delegation of tasks, powers and responsibilities. Due to the subject of the research (incorporation of steelworks into holdings), on the one hand differences between holding structures and independent steelworks will be considered. It can be immediately assumed that the differences in the types of organisational structure will not be conducive to their susceptibility to integration. The synthetic organisational layout of the structure is listed in Diagram 5.

Diagram 5. Organisational layout of the divisional structure



Source: Nalepka & Kozina 2007, p. 94.

Separate types of organisational structures emerging in recent years are the modern ones. These include process, network and virtual structures. The first one is horizontal. There is no hierarchy in it and functional units were replaced by task teams. It is customer oriented, designed to meet the needs of the market. Network structure includes not only internal organisational units but also external entities.

Diagram 6. Network structure

Source: Piotrowicz 2009, p. 5.

A network of companies is created. It aims at exploiting market opportunities. The hierarchy is negligible and operation is based on trust. This type of structure does not exist significantly in the studied industry. On the other hand, virtual teams for performing specific tasks, sometimes found within traditional structures are not permanent elements of the structure and are not formal.

1.5 Documents describing organisational structure of an enterprise

The choice and adjustment of the organisational structure to the full extent, to internal and external business conditions is not sufficient for its permanent and efficient operation. It is also necessary to formalise it properly. Formalisation of the organisational structure is primarily intended to lead to the reduction of freedom in operation of the unit and employees in order to eliminate improvisation and to ensure order and regularity of processes. This process is accomplished through a complete description of: mission and objectives, basic components and their tasks, basic dependencies, important processes and procedures. [Kotłowska & Kowalak 2016, p. 48 *et seq.*]

For this purpose, patterns of operation in work processes are developed. They are, as emphasised by A. Nalepka, an objectivised rule of proceedings, an order to deal with situations such as: employment, performing a specific activity, perceiving, formulating and solving problems, making decisions, managing, cooperating with other members of the company, establishing external contacts. [Nalepka 2001, p. 96]

In practice, formalisation is carried out by documents applying to employees of the enterprise. Not all documents, however, are equally useful for examining the differences in the integrated structures, which is the main objective in this paper. The company statute is a legal expression of the general formalisation of an enterprise organisation. Nevertheless, for the comparative purposes of organisational structures, the statute is insufficient because of the lack of direct references to the characteristics (dimensions) of the organisational structure. Hence, the data on organisation of the governing and supervisory authorities is applied. Noteworthy is the general knowledge concerning the nature of the organisational structure, on basic bodies and their representatives and the scope of tasks, powers and responsibilities at senior managerial posts. It should be noted, however, that the relevant data can be derived from the terms and conditions as well as from the organisational chart, which usually constitutes an integral part of it.

Organisational terms and conditions are defined as a set of normative acts that determine the manner in which a member of an organisation (in this case an employee of an enterprise) functions. The regulations contain standards, instructions and procedures. The organisational terms and conditions *sensu stricto* present the division of an organisation or organisational unit constituting its part, as well as their functions. It also sets out the basic principles applied in management of the enterprise and its units. The most important part of the regulations, not included in the statute, are:

- description of demarcation and organisation chart of the company,
- tasks of managerial positions and organisational units,
- framework instructions,
- manner of introducing any amendments to the rules. [Bielski 2002, p. 139 *et seq.*; Kieżun 1980, p. 264 *et seq.*]

Apart from the organisational terms and conditions of an enterprise there are separate detailed rules connected with work, bonuses, protection, etc. It is worth emphasising here that the organisational structure is an integral part of the organ-

isational rules. The example of the scheme of a single steelworks (company) has been shown while considering the type of organisational structure present in the metallurgical industry. This is an important document, as noted by A. Nalepka, who states that the organisational chart is a graphical representation (model) of the enterprise's organisational structure, indicating the main functionaries and their place in the enterprise as an entirety. It presents units and organisational units, their hierarchy and linear relations – sometimes also functional (e.g. in the shown diagram No. 4 of the steelworks, functional links with companies of the capital group were shown). The unit's name and symbol indicate its basic functions. The organisational units of the management board that carry out the general-administrative activities are referred to as departments, divisions and sections – sometimes these are teams, groups, etc. [Nalepka 2001, p. 107; Robbins & Coulter 2005, p. 456 *et seq.*]

In the metallurgical industry the application of such generally accepted terminology is frequently practiced. Units (divisions) are created by the director (deputy directors) and have functional character (human resources, organisation, planning, etc.). Operational units are created directly or indirectly in production (operation) as plants, departments, branches, sections and brigades. In the enterprise there are also other extra-organisational units connected with social and living activities. In the studied metallurgical industry enterprises the traditional and most commonly used type of marking, known as the vertical layout, is applied. An indispensable supplement and detailing of the documents discussed above is the so called unit (organisational unit) task sheet. In addition to the list of tasks to be accomplished the sheet sometimes includes a range of relations with other posts, implementation measures, and required qualifications. In the latter case, the sheets often duplicate the labour tariff regulations and transfer its requirements to the organisational unit. The tasks are further detailed in the scopes of activities, describing tasks, powers and responsibilities on each position. And here as well, the definition of means of carrying out tasks and required qualifications is often found.

In general it can be noted that the sequence of documents from the most important (mission, statute) to the most detailed ones (scope of activities) often results in duplication of tasks, but it is necessary due to referring to normative acts of a higher tier in the enterprise.

Instructions that interpret legal norms and determine how they are implemented are of slightly different nature. "The organisational instruction is a logic

and experience based, rule on the manner of implementing specific tasks” [Nalepka 2001, p. 112].

It regulates routine activities important in daily practice such as: document preparation and circulation, internal planning, production and supplementary processes, wealth management, and unforeseen exceptional situations. In the last point we are often faced with specification of provisions contained in regulations such as fire protection, property, health and safety, etc.

In addition to the documents described above, there are documents of slightly different nature: orders, service orders, and circulars.

The orders do not deal in principle with organisation’s condition or the inter-connections of organisational units but constitute a source of law on the basis of which only such specific matters are regulated.

Service orders are issued by the subordinate employees and regulate tasks of an ad hoc or periodic nature. Nevertheless, these should be consistent with the company’s law.

Circulars are recommendations and provide the necessary information for a specific group of employees.

All of the types of documents mentioned above will be discussed in a very detailed manner in the empirical part of the work, where they serve as a source of information necessary to compare the integrated organisational structures. In addition, and that is probably the essence, the documents themselves and their circulation are often sources of disturbance and material losses as well as human conflicts, leading to system inefficiency.

CHARACTERISTICS OF ENTERPRISE'S ORGANISATIONAL STRUCTURE

2.1 Knowledge and its theoretical aspect in an enterprise

An important problem of the contemporary world is the globally compromised balance, which manifests itself in the disruption of socio-economic order. It is accompanied by a syndrome of increasing instability in the economy and its internal structures. These unfavourable phenomena are reflected in the economic and political reconstruction of states, occurring crises, highly polarised wealth and misery, labour market volatility, unemployment, social, demographic and ecological dysfunctions. This violation of balance, according to L.C. Thurow, has been caused by movements of the so-called five economical plates which are essential from the global transformations perspective. [Mączyńska 2014, p. 23]

These processes did not circumvent the economic entities. In the Polish companies of the late twentieth and beginning of the twenty first century, it was recognised that the crises of companies and deterioration of their financial condition, the lack of reaction to the environment and the need to find new ways of development were the reasons for enterprise development. [Podczarski 2016, p. 33] The

construction of a new market economy (knowledge, capital, land, production), in which knowledge and innovation play a key role, has become a challenge for states, enterprises aiming at high level development and competitiveness. This new economy, also referred to as digital or network economy, has been acknowledged by economists and practitioners of economic life. [A. Toffler 2003, p. 72 *et seq.*]

It is also worth mentioning, as emphasised by B. Mikuła, A. Pietruszka-Ortyl, A. Potocka and others, that the industrial era has clashed with the post-industrial one, which has influenced the transformation of the post-capitalist, digital economy, information society, telematic society, information surplus society. [Potocka 2001, p. 686; Drucker 2009, p. 13 *et seq.*] Therefore, knowledge and information based economy is the most competitive world economy, directly based on production, distribution and application of knowledge and information. The high technology industries play a special role as the knowledge tools. Knowledge perceived by means of new technologies and products, supported by highly qualified work force, decides on the innovation of a given branch of economy and thus its modernity and dynamics. As M. Porter observes, the wealth of nations is created rather than inherited. It does not grow out of the natural wealth of the country, its labour force, its interest rates or its currency, as the classical economy maintains. The competitiveness of the nation depends on the ability of its industry to innovate and to raise its level. [Porter 1992, p. 36 *et seq.*]

It is clear from the previous observations that knowledge is not only one of the enterprise's main resources, but it is also the basis for defining its strategic elements of the management system, such as mission, vision, goals, plans and strategies. Proper management using the latest methods and techniques is designed to provide the company with innovation and competitiveness. [Kłak 2010, p. 15].

A. Polak's considerations referring to maps of knowledge are of great interest here. His lists of areas and elements of knowledge on organisation of an enterprise may constitute the basis for assigning specific elements of the enterprise knowledge, included in the resources of the enterprise, to the specific reasons for consolidation. As a result, it may be possible to determine the actual reason for the consolidation. If there are a few of them (which is not uncommon), it is possible to determine knowledge share in particular cases. Detailed solutions are provided in Table 5.

Table 5. List of areas and elements of enterprise organisation knowledge

Fields of knowledge	Elements of knowledge
1. System and environment	1. Mission and goals of the company
	2. Organisational structure
	3. Environment (offices)
	4. Suppliers and contractors
	5. Competitors
2. Threats	1. Quality threats
	2. Workplace safety threats
	3. Environmental hazards
3. Resources	1. Human resources
	2. Material resources
	3. Intangible resources
4. Technical preparation	1. Goods (products)
	2. Technical specifications
5. Processes	1. Management processes
	2. Manufacturing processes
	3. Supplementary processes
6. Projects	1. Customer orders
	2. Order picking (orders)
7. Logistics	1. Loads flow
	2. Inventories
	3. Storage
	4. Transport
8. Planning	1. Production plans
	2. Management plans
	3. Supplementary plans
9. Finances	1. Cost estimates for the products
	2. Financial settlements
10. Documenting work	1. Supervision over documents
	2. Document templates

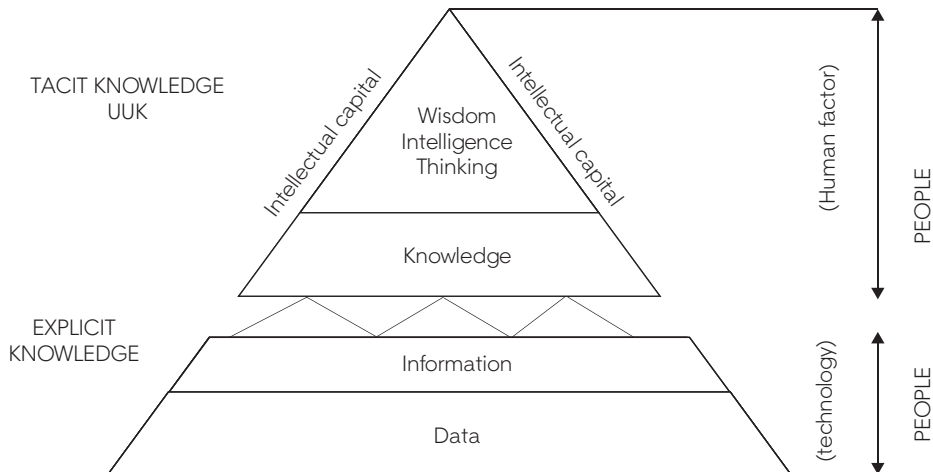
11. Utility indications	1. Literature and textbooks
	2. Standards and regulations
	3. Requirements (market and customer)
12. Expressive content	1. Calculations, analyses and syntheses
	2. Ideas, patents, innovations
	3. Changes in organisation

Source: Polak 2012, p. 10.

The data in Table 1 needs to be adapted to the purpose and content of the conducted analysis. In the case of fields of knowledge, there is no necessity to expand or reduce the number, except for removing point 10. (documenting work) which falls entirely within the concept of formalisation which is one of the basic characteristics of the organisational structure (field No. 1). It is therefore desirable to make some changes to the nomenclature in order to assign the knowledge associated with it to the type of activity concerned properly. Therefore, to the name “Preparation of production” the phrase “and products” has been added. In point 6, to the name “Projects” a phrase “within the scope of procurement” has been added, because there may be various projects in different fields. [Miśkiewicz 2017, p. 25]

The literature points out that the basis of the knowledge is the data and information that become knowledge only after they have been processed. [Brdulak 2005, p. 14] It has been presented in detail in Figure 5.

For the cognitive purposes, the elements of knowledge were subject to alterations. There have been some deletions, annotations, and changes to the names of the knowledge elements. For example, it is difficult to recognise mission and goals of a company as separate elements. They fit perfectly in the “Organisational structure”, constituting part of the formalisation. If this reasoning was to be followed, any number of components could be created, such as company statutes, organisational chart, service book, documentation flow. This, in turn, would not lead to the achievement of the objectives set initially, e.g. because of the competition of elements in attribution to a specific case and consequently it would involve the appearance of lack of clarity of the situation.

Figure 5. Hierarchy of knowledge

Source: Skyrme 1999, p. 47.

In field No. 4 the following elements should occur: cost estimate of the product, transferred from point 7. (finance), which is an integral part of the production preparation, manufacturing documentation of products and product technology. In the area of covering processes an investment implementation process has been added (that does not fit elsewhere) which is important due to the knowledge transfer. In point 7 the fully superfluous element of knowledge (flows) was deleted because as there is a separate point – transport, then the flows duplicates it. At the same time they cannot mean product flow in the production process, as this is discussed in the “Processes” field. In the field of “Planning” instead of the “Management Planning” which is unclear, “Cost and output planning” (balance sheet result) was introduced, which in turn is contained in the “Planning” field. In this field, instead of “Product cost estimates”, “Cash flow” appeared, which is typical for this business. It is important due to the role of knowledge. [Śniezek & Wiatr 2014, p. 36 *et seq.*] After these generalisations have been made it can be indicated that the proper domains and elements of knowledge are those in Table 6.

Table 6. List of areas and elements of enterprise organisation knowledge

Fields of knowledge	Elements of knowledge
1. System and environment	1. Organisational structure
	2. Environment (offices)
	3. Suppliers and contractors
	4. Competitors
2. Threats	1. Quality threats
	2. Workplace safety threats
	3. Environmental hazards
3. Resources	1. Human resources
	2. Material resources
	3. Intangible resources
4. Technical preparation	1. Cost estimates of the product
	2. Manufacturing product documentation
	3. Production technology of
5. Processes	1. Management processes
	2. Manufacturing processes
	3. Supplementary processes
	4. Investment implementation processes
6. Procurement projects	1. Customer orders
	2. Orders picking
7. Logistics	1. Inventories
	2. Storage
	3. Transport
8. Planning	1. Production plans
	2. Cost and output plans
	3. Supplementary plans

Fields of knowledge	Elements of knowledge
9. Finances	1. Cash flow
	2. Financial settlements
10. Utility indications	1. Literature and textbooks
	2. Standards and regulations
	3. Requirements (market and customer)
11. Expressive content	1. Calculations, analyses and syntheses
	2. Ideas, patents, innovations
	3. Changes in organisation

Source: Polak 2012, p. 10; Miśkiewicz 2017, pp. 25–26.

The list of organisational knowledge fields and the basic units of the organisation allow to assign the corresponding, specific knowledge. It should be emphasised that despite the considerable approximation, the fields and the aforementioned elements are not sufficiently operationalised to use them in the course of further analysis, aimed at attributing knowledge to a specific aspect of corporate mergers. The presented list attempts to assign specific knowledge to its elements, generally occurring in metallurgy. [Freese 2016, p. 31 *et seq.*]

The first element of knowledge contained in Table 2 depicts the organisational structure. It is recognised as media of both practical knowledge (tacit) and, above all, explicit knowledge expressed in formalisation of the enterprise's activity. [Miśkiewicz 2017, p. 28] Organisational structure as a multidimensional object is defined by many features, the number of which ranges from several to even several hundred. In practice, and especially in the case investigated here, it is impossible to use a large number of features. Therefore, when considering the organisational structure as an element of knowledge, the author is closer to the features formulated by K. Mreła in his work on analysis of the multidimensional organisational structure. [Mreła 1988, p. 78] A similar range of features is also reported in other studies. Examples include configuration, centralisation (or decentralisation), specialisation, formalisation, and standardisation. These focus on organisational knowledge that plays a significant role in the process of the merged companies' integration. [Pugh, Hickson, Hinnings & Turner 1969, No. 14]

As far as configuration is concerned, this knowledge is quite limited. It focuses on the differences in the arrangement of organisational units and their interrelations, which are important in case of consolidation of enterprises of different production scales and in a vertical merger, for example in consolidation of raw materials and processing units. However, in the metallurgical industry, horizontal consolidations are predominant. Therefore, knowledge on configuration is slightly differentiated. Nevertheless, knowledge of these differences can help in integration in the scope of organisational structure. In turn, from the degree of centralisation depends, i.a. knowledge creation in the enterprise – wide autonomy fosters creation of technical and organisational ideas, allowing for certain risks in the undertaken ventures. This particularly applies to knowledge in the scope of technology and production organisation, implementation of which depends to some extent on the freedom of operation of the various levels. Decentralisation is also conducive to the emergence of virtual teams, created to solve emerging problems. In these cases the knowledge of the organisational structure, within the scope of centralisation, is mainly needed. Therefore, consolidation of a highly centralised company with an enterprise characterised by a loose organisational structure can lead to the use of the experience (knowledge) that has so far been alien to a centralised enterprise [Grudzewski & Hejduk 2004, p. 75 *et seq.*; Miśkiewicz 2017, p. 28]

Another aspect of knowledge is included in the enterprise's specialisation. It is very often the desire to acquire particular technology or specialists whose number is scarce on the labour market. It is one of the major causes of mergers. The most important – from the knowledge transfer perspective – characteristic of the organisational structure is formalisation. This is usually explicit knowledge. Merging companies often differ in details. Knowledge stored in organisational, analytical, financial and payroll documents, as well as the one resulting from systems in force, is extremely important to the acquiring entity, and allows for accurate and rational decisions. It should be noted that the employees of the acquired enterprise have knowledge encoded in their minds and they follow it. A failure to take their experience into consideration can disrupt the course of integration (primarily in the sphere of production). It is worth remembering that part of this knowledge can also be of value to the acquiring entity. It is therefore desirable that the transfer of knowledge is bilateral. [Mikuła 2005, p. 16 *et seq.*; Sarvary 1999, p. 95]

Organisational structures are also characterised by a wide degree of standardisation. It is very specific and useful knowledge, both due to costs, productivity and overall efficiency. It is known that the level and type of products and other spheres

of enterprises' activity are different. Therefore, the transfer of standards may be one of the invisible goals of the takeover. It is worth stressing that the transfer of knowledge presented in standards can work the opposite way in different proportions. It can cause creation of added value in the acquired company. This is a clear example that the goals of minimising costs and maximising sales are in fact the pursuit of knowledge acquisition. [Świtalski 2005, p. 165]

In the field of knowledge, elements that are defined by the term „suppliers and partners” play a significant role. It is interesting that knowledge is understood here not only as knowledge of the most advantageous sources of supply and sales markets, but, above all, as relations established by people employed in organisational units that deal with it. The personal relations of these people with their counterparts in supply and sales constitute valuable knowledge useful in relations with the environment. Acquiring it with a company is very difficult as it is a typical example of tacit knowledge, which is carried by individual employees. It is therefore important that the company undergoing integration and consolidation process must protect itself against the labour outflow. The knowledge on the competition, expressed in acquired information and performed analyses, but also the sources of information in the form of employees specialised in the field who have access to it on a basis of private contacts is of a great value. This latter knowledge is not written anywhere and is a typical example of *tacit* knowledge. In the field „threats” the quality is brought to the fore. It can be understood in two ways – as a threat of being overtaken by competitors as far as quality is concerned or a decline in the quality of own products. In the first case we face a similar situation as with the knowledge of competitors. It is therefore advisable to have knowledge about the competitors' level of quality or about the research and innovation processes that are being carried out there (the obtained attestations and awarded prizes, etc.). This rather tacit knowledge allows the enterprise management to signalise threats. Its acquisition is often connected with individual employees and its rapid acquisition will enable the management to undertake appropriate pre-emptive measures. In the second case, the knowledge of quality is the *explicit* one, which does not diminish its value. Awareness of this element of knowledge is important in avoiding the loss resulting from deficiencies and complaints, and to „appearing” the enterprise on the market. [Davenport 2007, p. 24]

The knowledge of work safety is of different nature. As a rule, it is explicit, written in regulations, post-accident reports, and analyses; although there is also a margin of tacit knowledge – in individual of employees and executives experiences.

Acquiring the knowledge within the scope of workplace hazards has a particular importance when it comes to different knowledge in both consolidated entities as possible increased work-related accidents can have an impact on the integration process.

The environmental hazards are different in nature. These are usually problems with gas emissions, contamination of land and water. There are a number of publications, regulations and institutions helping in preventing these phenomena. They may vary in the companies that consolidate. The lack of knowledge transfer in this field may cause, for example, lack of vigilance in the area of environmental pollution by the new management. It means that as a result additional costs, possible conflicts with local authorities and obstacles to business continuity might be generated. [Hausner & Primus 2013, p. 36 *et seq.*]

2.2 Utilitarian character of knowledge in an enterprise

The knowledge domain related to the resources that the company has at its disposal is essential. Human resources are given the priority “and knowledge is an attribute of individuals [...] Therefore, it is concluded that the core knowledge resource are the key skills and competencies of employees. For the purposes of this part of the paper, it is important to identify the knowledge resources for assigning them to specific elements and areas of knowledge. First of all, it must be stated that they are written in all discussed domains and elements of knowledge. For example, elements of knowledge related to the organisational structure were previously specified. The same applies to the knowledge elements in question, concerning hazards, etc. It is therefore important to ask what is left to be assigned to human and other resources? Probably just quantitative knowledge estimation, which is a very difficult matter (and hardly feasible). The amount (scope) of knowledge can be approximated by: the number of employees with high competences and skills, their structure according to the level of their knowledge value and the possibility of expanding human resources by means of establishing and developing human resources reserve. Precise specification of these sizes, however, requires separate studies.

The knowledge contained in material resources is mainly documentary in nature and includes such documents as projects, technical descriptions, operating instructions, equipment operation records, performed overhauls, etc. However, its acceptance requires hiring qualified staff. Unless it is possible it is advisory to use existing services, e.g. in cases when the dissatisfied with the merger specialists leave, what sometimes happens, when the integration process is not well prepared. Intangible assets are works, solutions and markings. For example, in the group of works there are computer forecasts and the solutions include e.g. inventions, industrial designs, innovations; the markings are, e.g. trademarks, etc. Apart from the above mentioned there are intangible assets that are free of legal limitations, and therefore often published in the media, or intangible goods whose protection span has expired. In the integration process knowledge is available, but during the implementation of the merger there is a problem with staff, as described above.

In the field of production preparation, explicit and tacit knowledge is included in the cost estimates of products. Staff involved in drawing up cost estimates not only has extensive knowledge of regulations on the applicable technology and standardisation, but also their own interpretative skills and knowledge of the ways to maximise their use to improve product profitability. They are also a source of knowledge on the possibilities of cost reduction. Losing professionals with such skills is often very painful for the new management of the consolidated companies. Other elements of knowledge in the field of production preparation, i.e. product documentation and production technology, are also important in the transfer process, although their role is limited. It is worth adding that people engaged in mastering the details of the product implementation and technology cost are, or may constitute, one of the most effective sources of innovation and rationalisation of production.

Knowledge in the sphere of „Management processes” is mainly associated with the theoretical skills but also with the individual managerial skills developed in the course of practice. The same applies to manufacturing and support processes. The only difference relates to middle and lower levels. This is somewhat different with regard to the investment process, where, besides broad knowledge in various fields, the ability to work with the environment is required – not on the basis of subordination, but above all cooperation.

Customer's order is connected with marketing. In order to be effective it requires a broad knowledge on customers, their attitudes and capabilities of the enterprise to meet their needs. In this respect there is documentary knowledge,

deep knowledge of which is a prerequisite for effectiveness, and the knowledge manifesting itself in individual marketing skills, concerning relations of sales-people and customers. The term “Order picking” is understood as formation of a portfolio of orders. This is explicit knowledge but requiring knowledge of the market and assessment of the company’s production capabilities.

Logistics, besides its material implementation measures such as means of transport, warehouses, transshipment equipment, requires substantial knowledge. First of all, this concerns thorough knowledge of the materials purchasing market in terms of price, stability and reliability of suppliers, both dynamically and in terms of the optimal use of material resources. In particular, the ability to optimise stock levels in order to secure undisturbed production processes and to avoid inventory redundancy, which generally leads to a reduction in cash flow and increased costs. These are key skills, especially when the enterprise experiences problems in the financial management. The loss of professionals who possess this kind of knowledge in the context of poor post-consolidation integration leads to a loss of priceless (at this stage) knowledge. [Bendkowski 2013, p. 8 *et seq.*]

Other types of key skills are required from the planning specialists. In contrast to the methods used in the previous economic regime, involving mainly planning on the basis of the past entries (implementation of the plan in the past) and the needs arising from the economic problems of the state, currently the application of the so-called *foresight* methods is required. There is no Polish equivalent of this concept. It focuses on the use of statistical and econometric tools, analogies and heuristic methods, mainly based on experts’ opinions.

The knowledge that the planners should have at their disposal must be very extensive in these conditions. Additionally there is an experience factor to be considered as well. The knowledge encoded in the minds of planners, concerning production and costs, is of particular importance, because of the need to adjust the production schedule in the horizontally consolidated enterprises, to the new requirements, meeting the not increased cost level. Experienced planners whose knowledge derives from many years of experience, should be able to handle this task. As it can be seen, the concern to prevent the outflow of highly qualified staff in the integration process is often a *sine qua non* condition of the knowledge transfer required to avoid the failure of a merger or acquisition.

Another area where knowledge transfer is very important is corporate finance. The most important element of financial knowledge, the transfer of which determines the correct day-to-day operation of the enterprise, is the ability to regulate

cash flows. In this case enterprise knowledge or instructions are not sufficient. Undoubtedly, these are indispensable but they do not replace many years of experience, where intuition and psychology play an important role. This is particularly evident in cash settlements and relations with creditors and debtors. An experienced finance expert knows when to push a debtor or give way and how to deal with creditors. This knowledge cannot be transferred easily, as often even employees themselves are not aware of it, knowing primarily the nature of their own enterprise and its environment. As each of the merged entities is in a specific situation, it has been extremely difficult to reconcile financial policies pursued so far. This knowledge is more difficult to convey, as it concerns very sensitive matter, which is cash payments.

The term *utility indications* implies any data and information taken from the outside of the organisation. The norms and laws that may be essential in consolidated enterprises are of great importance. Nevertheless, they require correct interpretation. Their mastery is a condition for their effective use. The most important requirements in this area – market and customer – are not sufficiently clear. This is often information coming primarily from the customer, regarding wishes, quality, features and price of the product. This is a valuable knowledge and its precise conveyance conditions the company's development. This knowledge is encoded not only in the documentation, but mainly in employees' minds and is a typical example of tacit knowledge. The most important source of knowledge, which is in fact one of the most important reasons for a merger, is its expressive content. Calculations, analyses, and syntheses are invaluable sources of knowledge on condition they are drawn up in a correct, diligent and honest way. Their knowledge is applicable to analytical units and partially to the management of an enterprise (sometimes also the supervisory board). It saves effort in starting various actions which generate costs and at the same time waste valuable time. The results of the calculations concerning the chances, threats and prospects of the company are vital. The second group of expressive elements are ideas, patents and innovations. The designations of the elements apply to reality. Transfer of this knowledge is perhaps the most important, as it is often the main, though usually concealed, reason for a merger. The last item considered in the group of expressive content is organisational change. They can be understood in two ways – either as knowledge of the performed changes, which is rather of historical nature, or as a source of knowledge on failures of the acquired company, and this will also allow to reveal

organisational shortcomings of other parts of the company and even to make changes to the acquiring entity.

The specific content of the elements of knowledge, assigned to certain domains, allows indirectly to link them to the objectives of consolidations. It may be difficult to determine which reasons to choose for a planned comparison. After all, it is not easy, as there is no agreement in this regard. Objective reasons are frequently chosen as the knowledge transferred in the context of a merger applies to them. On the other hand, those of a subjective nature – an increase in managerial salaries, prestige, authority, etc. – are not so relevant to the objectives of a knowledge-based acquisition or containing its components. Ultimately, being based on extensive literature and own experience it has been recognised that market goals: cost reduction, maximisation of sales, synergy by the use of common manufacturing potential, financial, technology and infrastructure are considered important in the acquisition process.

The presented selection, drawn up on the basis of knowledge criterion indicates that objectives related to the knowledge transfer between the consolidated enterprises were included in the list. Knowledge is the incentive for the companies to consolidate. In this case it will not be knowledge related to consolidated companies coming from publishers. It will derive from the enterprise documents and the applicable normative acts in the area of merging business entities that should be provided in the process of consolidation. This may relate to applied technologies of products and the course of internal production processes. The most important element will be knowledge, encompassing especially: employees competences and technical achievements in the form of: patents, utility models and performed innovations. Some difficulty appears in the case of certain manifestations of knowledge which can be hidden behind two or more objectives at once. For example, employees with specific competencies may be the reason for a takeover, due to ensuring workforce and occurring synergies, but also for lowering costs, due to, for example, increasing productivity.

Taking the issue of knowledge and experience of many authors into account, it has been acknowledged that the 57 components of knowledge are extremely important and they constitute part of different business consolidations. Their specifications are in Table 7.

Table 7. Knowledge components in business consolidation process

Table 31.	Explicit knowledge of competitors and markets
2.	Suppliers' market knowledge
3.	Personal relations with suppliers and buyers
4.	Information and analyses of competition quality
5.	Knowledge of the competition's R & D (inventions, innovations, quality, patents)
6.	Marketing knowledge of customers
7.	Complaints analyses
8.	Portfolio of orders and ability of its shaping
9.	Knowledge in the scope of foresight
10.	Knowledge of statistical and econometric tools
11.	Standards and regulations
12.	Analyses, calculations and syntheses
13.	Forecasts of research units
14.	R & D activity ref. company's development
15.	Quality documentation
16.	Personal knowledge of specialised staff
17.	Ability to shape stocks optimally
18.	Product, technology and organisational standards
19.	Operating records of machinery and equipment
20.	Record of inspections, periodic and capital repairs
21.	Knowledge of costing
22.	Knowledge of production technology
23.	Materials for analyses, calculation and cost syntheses
24.	Ideas, patents, innovations
25.	Product documentation
26.	Employees with valuable skills and competencies
27.	Technical descriptions and manuals
28.	Computer programs, utility models, trademarks
29.	Planning experience

30.	Practical experience of employees in the sphere of sales
31.	Skills and competences in collaboration with the environment
32.	Relations with customers and sales representatives
33.	Customer information on the quality, features and prices of the products
34.	Current R & D activity within the company
35.	Knowledge of production capabilities and delivery dates
36.	Knowledge of optimal stock shaping
37.	Knowledge of laws and regulations and internal instructions
38.	Relations with debtors and creditors
39.	Tacit knowledge of financial workers
40.	The ability to regulate financial flows
41.	Configuration of organisational units
42.	Principles and organisation of autonomous units
43.	Knowledge of quality regulations
44.	Specialisation of divisions and organisational units
45.	Health and safety regulations, inspection and accident reports
46.	Fire Regulations
47.	Sanitary-epidemiological procedures
48.	Personal experience in occupational safety and health, fire, sanitary and epidemiological fields.
49.	External and internal regulations on the protection of the air, land and water
50.	Standards for gas emissions, land contamination and water pollution
51.	Instructions for behaving in case of emergency
52.	Production technology
53.	Projects, technical descriptions, manuals
54.	Intangible goods protection (which period has expired)
55.	Practical experience of supervisory staff
56.	Tacit knowledge of executive workers
57.	Information and analyses of product characteristics

Source: own study.

The studies show that the same skills or documents can be associated with different objectives, therefore the number of components is bigger and amounts to 93 items. Considering the sum of the individual components included in Table 3, it can be stated that on average about 10 components match one objective. In fact, they are not evenly distributed between the objectives and even the phenomenon of their accumulation is visible. However, to make sure the problem is perceived as a whole, the sum of the repetitive components had to be used. Their aggregation is presented in Table 8.

Table 8. List and sum of knowledge components with repetitions

Objectives							
COMPONENTS	Market	Lowering costs	Maximising sales	Synergy by the use of common manufacturing potential	Financial	Technology and infrastructure	Number of objectives
1	X	X	X				3
2	X						1
3	X		X				2
4	X						1
5	X						1
6	X		X	X			3
7	X		X				2
8	X						1
9	X		X	X			3
10	X		X	X	X		4
11	X		X		X		3
12	X		X	X	X		4
13	X						1
14	X						1

15		X	X	X		X	4
16		X		X			2
17		X				X	2
18		X		X	X		3
19		X				X	2
20		X					1
21		X					1
22		X					1
23		X					1
24		X				X	2
25		X	X			X	3
26			X	X			2
27			X	X			2
28			X	X	X		3
29			X	X			2
30			X				1
31			X	X			2
32			X	X			2
33			X				1
34			X				1
35			X	X			2
36				X		X	2
37						X	1
38						X	1
39						X	1
40						X	1
41						X	1
42						X	1
43						X	1

Objectives							
COMPONENTS	Market	Lowering costs	Maximising sales	Synergy by the use of common manufacturing potential	Financial	Technology and infrastructure	Number of objectives
44					X		1
45						X	1
46						X	1
47						X	1
48						X	1
49						X	1
50						X	1
51						X	1
52						X	1
53						X	1
54					X		1
55						X	1
56						X	1
57						X	1
Number of components	14	12	20	15	7	25	

Source: own study.

The analysis of the data shown in the table illustrates large dispersion and unevenness of the components. One can clearly see those that shape the connection objectives. Bearing this in mind, the components that are the reason for consolidation seem to be interesting. Their list is in Table 9.

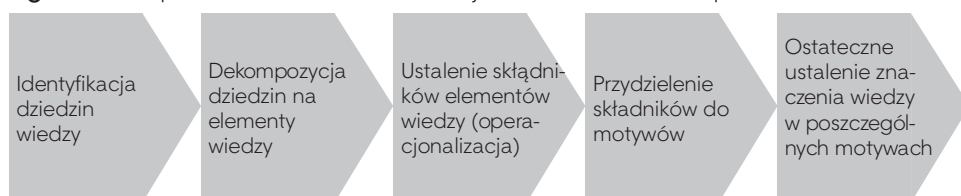
For the total number of 93 knowledge components allocated, 45 concern two objectives: technology and infrastructure (25) and sales maximisation (20). Other components are scattered and do not play such a role in the motivation research.

Table 9. Comprehensive summary of the share of knowledge in the objectives for mergers

Consolidation objectives and knowledge components	Ingredients of knowledge	Share %
Market	14	15.1
Lowering costs	12	12.9
Maximise sales	20	21.5
Synergy and the use of common manufacturing potential	15	16.1
Finances	7	7.50
Technology and infrastructure	25	26.9
Total	93	100

Source: own study.

The share of knowledge in technology and infrastructure and sales maximisation covers 48.4% of total motivation, which is important in shaping the acquisition objectives [Mierzejewska], whereas the market and financial objectives are strengthened by the value of intellectual capital. Knowledge of customers, their needs, relations with all stakeholders, competence related to the organisation management, technological *know-how*, patents, etc. is therefore essential. The directions of actions in this regard are presented in Figure 6.

Figure 6. The path of relations between objectives and their components

POLISH	ENGLISH
Identyfikacja dziedzin wiedzy	Identification of fields of knowledge
Dekompozycja dziedzin na elementy wiedzy	Decomposition of fields into elements of knowledge
Ustalenie składników elementów wiedzy (operacjonalizacja)	Determining components of the knowledge elements (operationalisation)
Przydzielenie składników do motywów	Assigning components to objectives
Ostateczne ustalenie znaczenia wiedzy w poszczególnych motywach	Final determination of the importance of knowledge in individual objectives

Source: Miśkiewicz 2017, p. 40.

2.3 A collection of organisational structure characteristics

Characteristics of the organisational structure selected for the conducted research constitute the starting set. Its full identification will allow the selection of variables constituting the operationalised characteristics of the examined organisational structures properties, i.e. parameters. They are necessary to refine the formula for operation of these variables, i.e. the measurement scales, weighing and aggregation rules. In this regard, it is important for further analyses to refer to solutions of the so-called Aston group. However, in the course of further discussion, a definitive review of organisational structure should be performed as it was done in Table 10.

The analysis of the so-called Aston group concept (Pugh, Hickson 1969) points out the appropriateness of referring to five structural dimensions. They are: configuration, specialisation, standardisation, centralisation and formalisation.

The first feature discussed is *configuration*. It gives information on the number and size of the enterprise organisational units. In addition, it defines the number of management levels, i.e. the so-called structure build-up. The scope of operation is very important information obtained by means of testing the configuration. As part of its analysis, a number of other data is obtained such as on the proportion of organisational, management, executive, decision, and advisory units. Organisational configuration reflects the shape of the structure of roles and organisational positions, i.e. presents the location, number and type of divisions, organisational units and work stations. It also reflects the number of levels in the organisation chart. The measure of configuration, as emphasised by K. Krzakiewicz, S. Cyfert [Krzakiewicz, Cyfert 2013, p. 99], is the degree of horizontal and vertical demarcation and location of organisational roles and positions. It is determined by the location of the number and type of divisions, units and organisational positions, the height of the organisational hierarchy, the extent of controlling at each level and the degree of organisation dismemberment.

Table 10. Selected definitions of the organisational structure

	Author	Definition of organisational structure
Emphasis on the elements of a certain entirety and their arrangement	E. Górška J. Lewandowski	It is a layout of work stations, organisational units of organisational divisions and, possibly, larger elements, together with the various types of relations established between them
	R.W. Griffin	A set of structural elements that can be used to shape an organisation. The result of their use in the form of a specific layout of the organisation elements and their interrelations.
	H. Mintzberg	Manner of dividing work into different tasks and their coordination
	D.L. Nelson J.C. Quick	Division of work on tasks and joining departments in the organisation
Emphasis on relations between elements of an organisation	G.A. Cole	Intrinsic network of relations between people, their common goals and tasks that these people define to achieve these goals.
	W. Kieżun	The totality of relations binding various parts (subsystems)
	J.G. March H.A. Simon	These are aspects of an organisation behavioural pattern that are relatively stable and undergo only certain changes.
	J.A. Pearce R.B. Robinson Jr.	Formalised distribution of the relations between responsibility for tasks, people, and the resources of the organisation.
	J. Zieleniewski	The totality of relations between the elements of an entirety and between them and the entirety, considered for a specific reason.
	J.R. Schermerhorn	It is a system of tasks, relations of subordination and communication links that connect different parts of an organisation.

Source: Zakrzewska-Bielawska 2011, p. 182; Flaszewska 2016, p. 62.

As one can note, this characteristic is so information capacious that some authors isolate the structure overlap or the scope of operation as separate properties of the structure. For the purposes set out in this paper, i.e. the comparison of organisational structures in the course of consolidation of enterprises, it is sufficient, in view of the time factor in this process, to remain with a more aggregated nature of the examined feature. Differences in the number and diversity of consolidated organisational units are one of the major causes and sources of conflicts accompanying the integration process. For example, the simple fact of uneven job

load (differences in staffing) is often the cause of dissatisfaction and protest of this part of an organisation which in this context is placed at disadvantageous situation. [Krzakiewicz & Cyfert 2013, p. 99]

As long as these are exceptional situations or of minor occurrence and severity, it does not matter significantly. If this is a common phenomenon and also affects other features of the integrated organisational structures, serious interferences may occur. This does not amount to a mere dispute over the scope of work – the size of a unit or group of units follow the issue of remunerations, and this already causes visible dissatisfaction and consequently further claims. The above phenomenon is just an example, because in a particular reality configuration differences abound in a multitude of similar situations.

The author, based on his own experience in organisation and management of an enterprise, believes that unless the differences in the organisational structures of the steelworks treated as entirety are not particularly large, the differences in structural characteristics may be obvious and will largely concern configuration of organisational units, centralisation and their specialisation. The similarity on three levels: structure types, similarity of features (their modules), and similarity of characteristics (preferential aspects) affect the susceptibility of structures to integration. Overlapping of lack of or insufficient level of similarity from these three levels can make the structures largely incompatible. These general statements and figures concerning the structure are accompanied by the underlying human factor. Regardless of what structural feature is considered, its change will always have an impact on integration by the people involved. Even such seemingly distant structural features, as formalisation and standardisation, affect the success or failure of the consolidation by the people who perform these functions. Reducing formalisation can result, e.g. in staff redundancies, which become obsolete in de-formalisation of activities and decisions. The sum of all differences (lacks of similarity) will be referred to in this paper as the degree of organisational structures susceptibility to integration. [Miśkiewicz 2016, p. 83 *et seq.*].

Centralisation (decentralisation) determines the division and distribution of power (decision-making powers) in hierarchy of positions, organisational units and their groups at various levels of organisation management. For example, P. Cabala, L. Koziół and others define “relations and manners of coordinating actions among members of an organisation” ... “The basic organisational tool for coordination in all categories of enterprises is the organisational hierarchy [Stabryła (ed.) 2009, p. 302]. It is a complex property. As A. Nalepka and A. Kozina

[2007] write, “the function of forming hierarchical relations and formation of executive units is a complex function, and concerns:

- determining vertical dependencies and defining rows of the hierarchical system structure,
- separation of managerial positions, regulating the functioning of individual organisational units and the closure of the process of shaping organisational units,
- next to the managerial post, posts (sometimes even units) that have supporting functions are created, which together with a given position, make up complex executive units.”

Dependencies arising from the position within the hierarchy are related to the scope of authority and define the distribution of authority and responsibilities.

In the metallurgical industry the degree of centralisation has always been high. In the process of organisational structures integration, it is further enhanced. This results in occurrence of significant differences in the degree of centralisation between the incorporating entity and the incorporated entity. Investigation whether these differences do not seriously limit the integration susceptibility of organisational structures is one of the essential tasks of the study being conducted. But as the literature shows, the dimension of centralisation adopts two model solutions i.e.:

- full centralisation when all decision-making powers are attributed to the highest managerial positions,
- full decentralisation when all powers are delegated to lower management levels.

Detailed conditions are presented in Table 11.

Table 11. Factors conducive to centralisation and decentralisation

Trends to centralisation	Trends to decentralisation
<ul style="list-style-type: none"> - Stable environment - Lower level managers do not have the proper qualifications and experience - Lack of motivation given by lower level managers - Most of the decisions are strategic in nature - Organisation is threatened by crisis - High concentration of production - Increasing risk in the implementation of the strategy, its effectiveness depends on the quick decision of the management 	<ul style="list-style-type: none"> - Situation in the environment is complex and uncertain - Lower level managers have the right qualifications and experience - Lower level managers want to participate in formulation of decision options - Organisational culture is conducive to active approach of the organisation members - Organisation is spatially distributed - Effectiveness of strategy implementation depends on the involvement of managers at all levels and the flexibility of their behaviour

Source: Krzakiewicz & Cyfert 2013, p. 106; Poczowska 2016, p. 27 *et seq.*

In practice, mixed solutions are used, whereby strategic decisions are usually assigned to top management positions, and tactical and operational decisions are delegated to the intermediate and the lowest levels. The conflict between centralisation and decentralisation is reflected in the arguments in favour of both solutions. For example, the arguments for centralisation are:

- brilliant, energetic people with knowledge are rare, therefore power must be held by them,
- both large and small organisations need coordination and integration of their various activities. This can be best achieved by centralised authority, which recognises the needs.
- in a fairly large and diversified organisation various functional and operational managers may think differently and focus on their own units, perhaps exaggerating their significance within the entirety. From time to time the overriding interest of the organisation will require unpopular decisions, which most staff disagree with. Only centralised management can make such decisions.
- confidentiality of strategic plans and tactical decisions is easier to maintain if these are known by only a small group at the top.

However, those preferring decentralisation are:

- as the organisation grows and complexity increases – senior management deludes themselves as far as their stance on maintaining a centralised control is concerned. Centralisation is not feasible since the deterioration in the quality of central control system is unavoidable – logical decentralisation should be made by delegation of powers,
- decentralisation leaves the power in the hands of managers who know best the details of their products, customers and market conditions. Their policy guidelines and procedures will therefore always be more appropriate than those set by the central management,
- decentralisation leads to the creation of organisational units that are small enough for the managers to know them and identify with them. If the manager has sufficient authority, the organisation may use the same kind of commitment and motivation as the manager – the owner,
- delegation of decision-making powers downwards in the organisation's structure will allow more people to participate. This will increase overall motivation and job satisfaction while the instruction process among the managers will be more effective.

Today's search for the answers to the decision on centralisation/decentralisation is facilitated by the following criteria:

- ease and cost of communication,
- access to necessary information, the necessity for rapid response.

Thus, the dimension of the structural centralisation is measured by determining the degree of centralisation, i.e. the number of decisions taken at each level of the organisation taking into account their validity. Hence, the decision centralisation factor is calculated in the following manner:

$$C_p = \sum_{n=1}^N C_{fn} \quad (1)$$

Where:

C_f – index of group decision centralisation within a specific function,

N – number of selected features to be tested.

Specialisation is the property of an organisational structure resulting directly from the division of labour in an enterprise. "The dimension of specialisation illustrates the depth of internal division of labour and the resulting degree of performed functions' diversity, with additional consideration of the criteria for grouping these functions within organisational positions and units (e.g. functional, subject)" [Haus 1999].

The property of *specialisation* is also that resulting from the division of labour. It limits the freedom in the process of fulfilment of organisational tasks and responsibilities [Hopej 1999, p. 31]. Within its framework a special role is played by the specialisation of management units, degree of which is recognised as a measure of the division of tasks in management of the system (enterprise). The form and scope of management divisions specialisation which is highlighted i.a. by A. Nalepka determines the hierarchical dependence of positions, organisational units, creating a specific type of organisational structure [Nalepka 2001]. Taking into account the criterion of specialisation, the following types of organisational structures can be distinguished: linear, functional, linear-staff and matrix. The first one, due to the principle of the unity of the commandment, is less specialised than the functional structure. To a certain extent this concerns the linear-staff structure. The highest degree of specialisation is presented by the matrix structure. In research on the structures of the consolidated metallurgical enterprises a relatively high degree of management specialisation will occur, due to the integrated units (departmental) structure present in the steelworks.

The property of *formalisation* specifies forms and tools that map the organisational structure. As long as the feature of the configuration is mapped graphically mainly by means of the organisation chart, both its descriptive complementation and reflection of other properties is done by means of different types of documentation. In practice these are:

- founding act, company's agreement, statute,
- organisational rules defining tasks, powers and responsibilities, and the related specialisation and centralisation of organisational units and managerial positions,
- workplace sheets, supplementary regulations (work, internal control, etc.),
- instructions and regulations on organisational procedures (e.g. ISO). [Haus 2001; Miśkiewicz 2012, p. 762 *et seq.*]

While examining the problem of organisational structures and their analysis it is also suggested to use aggregated tools, e.g. service and quality books, competence tables. This does not reflect the full picture of organisational reality – there are elements that do not fit in the formal structure, but are difficult to be recognised as the property of the organisational structure. In metallurgy, as in other studies, formalisation does not cover the full range of organisational processes. Individual steelworks do not keep the entire documentation mentioned above, using it quite selectively.

Besides basic founding documents, in any other cases the organisational documentation is applied to a minor extent and not everywhere workplace sheets are used. Service books are not always kept (often even if, they are not updated regularly), and the scope of the application of the supplementary regulations is different. Therefore, integration difficulties may arise. This may be a result e.g. of formal documents where very different scopes of tasks, powers and responsibilities occur. In some cases, this process will not be possible at all, due to the lack of adequate documentation (completeness) but also its changes and their frequency. In addition, there are differences between the actual tasks and the ones written in organisational rules. This is acknowledged by research results from various scientific centres. For example, Stabryła suggests that: an excellent organisational structure is the one, where the process of the improvement of the organisational structures develops properly, and the overlapping of actual and regulatory tasks varies from 70% to 95% [Stabryła (ed.) 1991]. Differences in information systems being part of the problem are not without any significance for the integration. [Skorupińska 2015, p. 69 *et seq.*]

The *standardisation* feature unifies and limits the autonomy as far as the configuration solutions and the related to the implementation of tasks procedures are concerned. Another definition indicates that „standardisation means the repetition of typical organisational patterns, according to the same rules, and their stability.” [Nalepka 2001, p. 49]. The same author proposes different scopes of standardisation. The first and most common is the routine course – the implementing person does not have any choice. The second, an alternative one, where the choices are strictly defined. The third one covers roughly programmed courses, which equals with the lack of specific rules and the implementing party determines how to implement them (within the defined framework). The lack of programmes, even frameworks, denotes lack of standardisation. Different degrees of standardisation may constitute an obstacle to integration of the organisational structures. This applies not only to organisational processes in production and logistics, but also to mundane procedures, such as employing and dismissal of employees or granting them leaves [Słowiński 2010, p. 55 *et seq.*; Pańków 2014, p. 153 *et seq.*]

From the above analysis one may infer that the features of the organisational structure discussed can be reflected as vectors of the audited structure and the structure being referred to (specimen).

$$X_{10} = \begin{bmatrix} x_{10} \\ x_{20} \\ \vdots \\ x_{m0} \end{bmatrix} \qquad X_{11} = \begin{bmatrix} x_{11} \\ x_{21} \\ \vdots \\ x_{n1} \end{bmatrix}$$

where:

X = structural feature,

m = audited variables,

n = standard variables.

The performed conceptualisation of the organisational structure characteristics is not ideal but it seems to be most useful for the research purposes assumed in this paper. The properties which are important in the integration of the organisational structures have been distinguished. The remaining properties, especially contextual ones, have been omitted and in this case they are less important. This problem is highlighted by A. Nalepka, who among the listed principles of structure identification states that „the knowledge and description of an organisational structure should be preceded by defining its proper characteristics. [Nalepka 2001, p. 202]. Nevertheless, S. Flaszewska's suggestion [Flaszewska 2016, p. 70 *et seq.*] that the structure of a particular organisation is one of a kind and a unique one must be taken into account. Obviously, differences in these properties in the integrated structures can only be identified upon their operationalisation, i.e. finding the appropriate means of measuring them.

2.4 Selection of variables recognised as subject of the analysis

From the previous considerations it appears that within a set of organisational structure characteristics there is a subset of its characteristics. It is further recognised as a subject of the analysis. The subset comprises: configuration, centralisa-

tion, specialisation, formalisation and standardisation, which have been identified as best aspects for comparing the similarity of integrated structures. These actions, defined as conceptualisation of qualities, constitute an introduction to the second stage of research that involves finding the proper measurement of these characteristics, i.e. their operationalisation.

This part of the paper first attempts at determining the parameters which will measure in the best way all earlier mentioned structural properties. In the further part of this paper the measurement scales and weights required to preserve the proportions between the significance of individual characteristics will be presented. It is worth taking into consideration the fact that in practice it is not possible to measure characteristics of an organisational structure directly. They are generally aggregates of components not necessarily very coherent. This remark is shared by K. Mreła, suggesting that it is indispensable to specify detailed variables – parameters that relate to phenomena determined by the content elements of each of the five organisational dimensions [Mreła 1983, p. 90 *et seq.*]. It should be emphasised that the parameter is different from feature it measures not only in name and measurability. The range of the parameter is generally narrower than the feature, which results in a particular area of uncertainty. This inconvenience can be eliminated by e.g. introduction of two or more parameters, which in turn can be referred to as an extensive method of selecting the parameters. D. Nowak concludes that the maximisation of rejection power rather than the inclusion power should be considered as a reasonable one. [Mreła 1983, p. 92 *et seq.*; Nowak 2012, p. 247 *et seq.*].

Following these indications, parameters were selected consecutively for the five features previously adopted. The first of them *configuration* concerns the division of tasks in organisation between positions, organisational units and teams of those units. Consequently, parameters for these tasks may be:

- number of organisational units,
- size of organisational units,
- management levels in the management division system,
- scope of targeting.

It seems that the above mentioned parameters encompass the scope of the *configuration* feature in case of steel industry enterprises. Apparently, it is possible to use several other parameters, such as the number of independent posts, the number of managers, etc., but “the space of parameters (detailed variables)

requires the reduction to the smallest possible number of variables ...” [Mreła 1983, p. 94]. In this case, additional parameters would not bring new cognitive values, as they largely coincide with the information already obtained from the previously established parameters. The division of power expressed here as a *centralisation* feature or the decision autonomy, can be experienced from different perspectives. In each case the degree of the feature intensification is examined. An analysis can be done at the same level or at other levels of the hierarchy. In the audited case, when the purpose was to determine the differences in the level of centralisation (decision autonomy) the parameters should indicate differences in their level of severity, which have a significant impact on the suitability of organisational structures for integration. In the author's opinion it is of great importance to remember that there are visible differences while considering decision-making processes at the same levels of the structures in case of consolidated enterprises when the process of delegation of powers to the lower levels is in question. The differences in competencies are to be measured by: scope of authorisation, frequency of decision-making, time to make them, personal effects and increased risk. [Miśkiewicz 2016]

The above-mentioned discrepancies result, when they convey a certain level and have a significant influence on the integration process of organisational structures. Certainly, one can further differentiate the indicated parameters by distinguishing, e.g. subgroups of decisions, dispositions, participation, ordering, etc., but in practice this is unachievable at the research level of this paper.

From a methodological point of view, there is a possibility of presenting different set of parameters: independent implementation of tasks, independent disposal of resources, or free choice of tasks' performance methods. [Miśkiewicz 2012, p. 762 *et seq.*]

It seems that both groups of parameters, although their conceptual region overlaps, may be used in the research parallel.

The *specialisation* feature in the audited scope concerns specialisation of the managerial divisions, as in the process of organisational structures integration the executive posts and units have least contributed to the degree of the success. Therefore, as the primary parameter of specialisation, a type of organisational structure was adopted, which usually in metallurgical enterprises takes the form of a department and it does not mean that they are identical. Individual steelworks vary greatly, e.g. in the number and nature of divisions and departments. This causes specific difficulties in the integration process of organisational structures.

With regard to holdings, their structure can be described as hybrid – there are both elements of division according to function as well as the subject of production in subordinate independent enterprises or plants. [Sikorski 2005, p. 77 *et seq.*]

In this case, the integration of organisational structures faces even greater obstacles due to their high degree of diversity.

Specialisation of organisational structure types is not the only way of its manifestation. It is also done by diversification of the type of organisational units. It has to be emphasised that the second parameter of specialisation, only to a certain degree, overlaps with the typology of structures. Hence, in literature, it is often proposed to include the number of specialised units in relation to the total number of the organisational units. Sometimes, as it is pointed out by K. Mreła [Mreła 1983, p. 96], about half of them are specialised. It is obvious that this opinion concerns a different time and economic system, but it points out the purpose of such research as well. The third parameter concerns the deepening of the specialisation study, which involves the number of specialised posts within the organisational units. [Zakrzewska-Bielawska 2012, p. 288 *et seq.*] This applies to parties who are obliged to perform tasks assigned to them. It seems that previously mentioned parameters should satisfy the sphere hereby referred to as specialisation.

Finding the right parameters of *formalisation* is not easy. This is due to the fact that not all documentation has the same meaning in the process of organisational structures integration. The more important the document is and the more significant issues it relates to, the more the discrepancies in its content will negatively influence the integration of the organisation. Accordingly, the properly selected parameter must include the most important processes. It is proposed to take as one of the parameters of the formalisation module the number of activities formalised in relation to all of the projects carried out within the organisational structure. The second parameter can be a set of basic documents used in an enterprise, from statute, organisational regulations, activity sheets and other documents. This set can be and most often it is very different in enterprises, including metallurgical ones, which certainly hinders the integration of organisational structures. Variability of the parameter will consist of differences from the full set to its complete absence, which is, in the first and especially in the last case, only theoretical assumption.

The manifestations of formality also include features such as correctness of the documentation, its frequency, accuracy, timeliness, etc. These characteristics are

different in each structure and may be relevant to comparisons. In practice, they cannot rely on statistical data for performance reasons. They often depend on very subjective evaluations. In this situation, correctness of the documentation was adopted as a parameter, which as a notion includes its listed characteristics. The parameter itself will be the result of the evaluation made by the management staff, which unfortunately due to the subjectivity, condemns the researcher to certain quite considerable margin of error.

Finding a *standardisation* parameter for an organisational structure is a bit simpler due to the transparency of terms and the limited capacity of this concept. Taking into account the realities of the research subject, i.e. metallurgical enterprises, where the process of the organisational structure standardisation is relatively far-reaching (e.g. due to organisational unification from the previous economic system), the following measures were applied in the paper: the typicality of organisational units and posts and procedural standards in their operation.

The first case deals with the sizes of the specified organisational units and the typical relations between them. The second case concerns procedures for document circulation, related to the movement of workers (hiring, dismissals, leaves, etc.) and standard circulations of material management, fixed assets management and other business operations. Features and their parameters selected for further operations related to operationalisation are summarised in the following Table 12:

Table 12. Characteristics and measures chosen to examine the susceptibility of organisational structures to integration

Features	Parameters
1. Configuration of organisational structure	<ol style="list-style-type: none"> 1. Number of organisational units 2. Size of organisational units 3. Management levels in the management division system 4. Management scope
2. Centralisation (decentralisation) or autonomy	<ol style="list-style-type: none"> 1. Scope of decision-making powers to perform tasks independently 2. Scope of the rights to decide on the use of means independently 3. The scope of freedom in the choice of tasks implementation methods

3. Specialisation of the organisational structure	<ol style="list-style-type: none"> 1. Type of organisational structure 2. Number of specialised units to the total number of units 3. Number of specialised posts within organisational units
4. Formalisation of organisational structure	<ol style="list-style-type: none"> 1. The contribution of formalised activities to their total number 2. Composition of the basic set of organisational documents 3. The degree of documentation accuracy
5. Standardisation of organisational structure	<ol style="list-style-type: none"> 1. Typicality of organisational posts and units 2. Procedural standards in organisational activities

Source: own study.

2.5 Operationalisation of selected variables

Determining the measures (tools) of the researched characteristics does not use the scope of their operationalisation in full, emphasising the need to assess their level of comparability and to place them on a certain scale.

For this purpose, an analysis of preferences was applied, which, according to A. Stabryła, is a research approach, involving qualification of the objects on a certain scale, which is reflected in the importance hierarchy of the objects. [Stabryła 2007, p. 92] The analysis of preferences in diagnostic studies is widely spread and hence its application in this paper. Therefore, the purpose of the study will be to determine the multi-criteria aggregate assessment of the organisational structures susceptibility to integration, expressed in their similarity. This means that operationalisation of the process within the analysis of preferences requires determination of: the object, its characteristic values, evaluation criteria, preferential aspects, procedure of calculating the weighted value of the object. [Miśkiewicz 2012, p. 762 *et seq.*; Stelmaszyk & Karpacz 2015, p. 957 *et seq.*]

In the audited case the objects are features of the organisational structure (configuration, centralisation, etc.). The criteria for assessment are parameters used for diagnosis. They have an evaluative character. Preferential aspects are the reasons that allow for determining the value of objects, their hierarchy, and assigning preferential points to them. *Preferential aspects may also be criteria for evaluation* [Stabryła, p. 100]. This possibility has been taken into account in the course of further research. The procedure for calculating the weighted object value is as follows:

- development of an object evaluation pattern,
- selection of preferential aspects (in this case they are evaluation criteria – parameters),
- determining the weights of evaluation criteria,
- verification test. [Kalinowski 2015, p. 1023 *et seq.*]

A. Stabryła notes that the evaluation pattern is a set of evaluation criteria forming an aggregate that constitutes a multi-criteria evaluation system [Stabryła 2007, p. 96]. In the analysis of organisational structures similarity, a normative pattern has been adopted, since all deviations from the pattern are recognised as a negative phenomenon, reducing the similarity of the integrated objects and thus reducing the susceptibility to integration.

Hence, all the patterns are neutral variables. It should be emphasised that in research on the similarity of structures there are pairs consisting of the incorporated structure and the incorporating structure (usually in holding) and the latter constitutes the pattern. [Stecki, Leopold Holding]

The next step is to determine the preferential aspects. Since the use of parameters as preferential aspects was allowed to be used in this case, the measures presented in point 2.2 were adopted. The susceptibility to integration within organisational structures played a significant role while choosing the parameters. Due to the very different significance of the preferential aspects in question, it was necessary to give them the appropriate weights in the process of integrating organisational structures. Not all measures (tools) related to configuration of the organisational structure are of equal importance here. It seems, however, that the number of management levels and the scope of operation in units and groups of organisational units play a major role. Difficulties arising in the integration process associated with a significantly different number of management levels and a considerable discrepancy in the scope of operation have a vital impact on antagonising relations in both integrated structures. It is primarily due to the faulty flow of instructions and information and secondly, different working and remuneration conditions for the same or similar work that ignites conflicts among employees. [Miśkiewicz 2009, p. 78 *et seq.*]

In this situation, it was decided that the parameters of the number of the managerial levels and the scope of operation will weigh 1.3. The other two parameters concerning organisational units and their size will weigh 1.2 and 1.3 respectively.

According to the author preferential aspects concerning centralisation are considered as a key element and in the audited case they include two parameters: decision-making powers to independent tasks performance and using the assets. Both in the first and the second case power is at stake – in the first over the people and in the second over the assets. This is a sensitive aspect in any organisation. In consolidated structures it is given special importance as it is about company's survival.

Apparently, the incorporating structure is always at an advantage. Nevertheless, it must take into account the use of passive and sometimes active resistance against the deliberate changes in the scope of management in the combined structure, which negatively affects the integration progress and may even inhibit it. Hence the high rank of their weight (3.2). In addition, 2.0 was assigned to the scope of freedom as the choice of tasks implementation method is concerned.

The specialisation of organisational structure is represented in the study by three preferential aspects (parameters): structure type, number of specialised units, and number of specialised posts in these units. The impact of specialisation parameters is limited. As far as types of organisational structure are concerned they have already been partly explained by means of the structural features discussed above. The area of their influence does not comply with the interaction with the integration of aspects related to specialisation. The degree of participation of professional units and specialised organisational positions in these units affects the interrelation of the integrated structures. It leads to differences in case of remuneration and working conditions, which is often a cause for potential misunderstandings.

Additionally, the type of structure automatically causes the difficulties in the growth of the structures, resulting e.g. from a wide range of powers, duties and salaries, for example in the departmental structure of the steelworks and generally divisional structure in holdings. Therefore, in the latter case, the structure type was assigned a weight of 1.5 and the remaining 1.1.

The degree of organisational structure formalisation in integration practice sometimes means that what is formally established in a single structure turns out to be outside the formal boundaries of the other, or is formalised in a different manner. This often results in failures or faulty execution of the commands and responsibilities assigned beforehand.

There are also differences in precise preparation of documentation and the level of access to it, although this is not as significant for the integration process as the

overall contribution of the formalised activities in their entirety. Due to the above mentioned reasons, the first of these parameters, i.e. the share of the total activity, had a weight of 1.6 and the second, i.e. the regularity and availability of 1.5. The remaining parameter, referring to the content of the set of basic organisational documents, was given a weight of 1.2. This procedure is due to the fact that the lack of one of these documents in the set affects the integration process of organisational structures only to a minor extent.

Parameters of standardisation in the audited integration range express the influence of the typicality of organisational posts, units and the procedures on the process of the structure integration.

The integration proceeds in a more efficient way in case of metallurgical enterprises with highly developed structures. On the other hand, in cases where structures vary in the types of units and procedures, the entire process is slower. This also applies to situations in which structures of the consolidating enterprises are standard, but totally different standards are present there. Taking into account these circumstances, these parameters were given a weight of 1.4 each. Research results in this regard – weights for individual parameters (preferential aspects) are presented in Table 13.

The application of weights was based on the opinion of three experts – practitioners employed at key managerial posts in consolidated enterprises. It is worth noting that the procedure for calculating the weighted values comes to the multiplication of the empirical quantities of the parameters by their weights. Among the parameters listed in the table 2, concerning organisational structure configuration one part is measurable and expressed directly in natural units e.g. a number of units or management levels whereas the remaining parameters, such as the size of the organisational units or the scope of operation is measured indirectly by the number of employees, which in turn reflects the contents of the meter.

However, there are cases when it is witnessed that the values of parameters cannot be added directly. Such processes are inevitable. Nevertheless, if the final result of the survey is the specification of an aggregation index that evaluates capacity for integration expressed in similarity of objects in taxonomic analysis, then it is necessary to apply the scoring or ranking method.

Table 13. Weights assigned to parameters (preferential aspects of features of integrated organisational structures)

Feature	Parameter (preferential aspect)	Weight
Configuration	number of organisational units	1.2
	size of organisational units	1.3
	number of management levels	3.0
	scope of operation	3.0
Centralisation	scope of decision-making powers to perform tasks independently	3.2
	scope of the decision-making rights to decide on the use of means independently	3.2
	scope of individuality in the choice of tasks	2.0
	implementation method	2.0
Specialisation of the organisational structure	type of organisational structure	1.5
	number of specialised units to the total number of units	1.1
	number of specialised posts within organisational units	1.1
Formalisation of organisational structure	contribution of formalised activities to their total number	1.6
	composition of the basic set of organisational documents	1.2
	correctness of documentation	1.5
Standardisation of organisational structure	typicality of organisational posts and cells	1.4
	procedural standards in organisational activities	1.4

Source: own study.

In this case, due to the need for more discriminating observation results determining effectiveness of taxonomic calculations, the scoring method was applied. The scoring method is more precise than the ranking for further categorisation of objects. In addition, objects (features) differ in significance by determining their similarity, which is, as it has been previously stated, a condition for successful integration of organisational structures. Hence, it was indispensable to give them the weights, according to the role performed in this process. While making a decision to express the parameters in points some arrangements must be made. First of all, the parameter's variability area must be determined in relation to the minimum and maximum values. Secondly, the manner of transposing the parameters value to a point scale, e.g. in the form of a specific function (usually linear) has to be decided. For example, if in case of the parameter under the heading „number of management levels” it was found that in the examined sample there were 3, 4, 6 and 7 levels, then the variability area for the discussed evaluation criterion was [3, 7].

By setting a point scale it is necessary to transfer the points assigned to individual parameters, starting with the maximum size. It is advisable to consider the second highest rating of the parameter [Stabryła, 2007, p., 126], but having a very small sample it is necessary to start with the first value. The conversion is done by dividing the observed values by the maximum value. Experts established twenty points as the maximum number of points possible to be obtained for each parameter. Hence, the parameter under the heading “number of management levels” has been assigned a maximum value.

Prior to the commencement of the above mentioned operation, the number of levels must be multiplied by the established weight¹.

$$7 \times 1.3 = 9.1$$

$$6 \times 1.3 = 7.8$$

$$4 \times 1.3 = 5.2$$

$$3 \times 1.3 = 3.9$$

Upon setting the proportion of the calculated values to the maximum value which equals 20 (see p. 44), the following numbers are obtained

$$9.1 : 20 = 0.455 \approx 0.46 \text{ or } 45 \%$$

$$7.8 : 20 = 0.390 \approx 0.40 \text{ or } 40 \%$$

$$5.2 : 20 = 0.260 \approx 0.26 \text{ or } 26 \%$$

$$3.9 : 20 = 0.195 \approx 0.20 \text{ or } 20 \%$$

As a result, the number of points for each enterprise is presented below:

45, 40, 26, 20

¹ In case of the same parameter, the weight is identical, but when on the scale (0, 1] or (0, 100] different indicators are compared, the weights have their differing significance.

It should be noted that in the further course of the tasks at hand, not only management levels will be examined, but their differences revealing the degree of similarity of organisational structures that determine their degree of susceptibility to integration.

In this case, if *different* parameters are used for the construction of a synthetic indicator or for taxonomic structure, the standardisation procedure used in the calculation of the verification assessment will be applied to maintain comparability.

The above indicated calculations are just an example of a method presented on a small sample and only one evaluation criterion.

IDENTIFICATION AND DIAGNOSIS OF ORGANISATIONAL STRUCTURE

3.1 Stages of the organisational structure research methodology

Improving organisational structure is a continuous process. It must concern a permanent improvement of the work organisation within the scope of its material resources and improvement of conditions. Hence, three parts were distinguished in the research methodology of this paper, i.e.:

- cycle of research process,
- description of the research area,
- detailed methods.

The cycle of research process involves solving problems that result in statements, rules, and projects. This paper does not deal with projects as its purpose is not to improve the structures but only to assess their capacity for consolidation. Accordingly, the results of the paper shall be statements about specific states of integration capacity and not specific projects. In the investigated case, the research cycle includes stage processes such as registration, description and overall analysis, synthesis, modelling and diagnosis. In the overall process, design and measure-

ment of the product were consistently omitted. Measurement is made when the research subject is an enterprise. When it is an organisational structure, it would not be reasonable, as the organisational structure does not produce anything, and the possible adoption of artificial products, such as activities or procedures, would be meaningless and would have no connection with the paper.

In the literature on improvement of organisational structures, stage processes relate to each cognitive behaviour [Stabryła (ed.) 2008, p. 130]. They can be applied to solve any practical problem, such as those the paper concerns, as its aim is to avoid the integration of organisational structures that are unsuitable for that purpose or at least to make decision makers aware of the risk of taking such decision. [Noga 2009, p. 121 *et seq.*]

Characterisation of the research area is mainly associated with the establishment of a set of elements constituting the object of investigation. This includes:

- formulating objectives,
- structuring the field,
- determining the set of domain determinants,
- conceptualising and operationalising the determinants,
- presenting results and planning research documentation.

The determination of the context in which the research field is located is frequently given. This stage is omitted here as integration of structures is conducted after all the preparations have taken place. The context was taken into account while taking a decision. At the stage of making a decision on consolidation the influence of context is no longer relevant.

It is also worth noting that the specific purpose of the action is to develop a relatively simple method of examining the organisational structures foreseen for consolidation in the scope of assessing the prospects of their integration. From a research point of view it should be added that the purpose has a methodical character, which means that the developed algorithm could be used not only in individual cases but also in the entire metallurgical industry and even beyond that sphere. This implies that implementation of the established objective meets the important, specific needs in the dynamically changing economy.

Structuring the field of research is expressed in its division into systems, subsystems and possibly, as suggested by other authors, into modules. In the discussed case, they will play a significant role. Since an enterprise is considered as the system and an organisational structure is the subsystem, then the characteristics of

this structure can be defined as modules. It is at the modular level that the interactive action in the organisational structure of an enterprise takes place and at this level the two structures are encountered in the integration process. [Hamrol 2016, p. 385 *et seq.*]

The significance of the modular structure is emphasised by K. Mreła [Mreła 1983, p. 73], indicating that, as a rule, in an incoherent structure one cannot count on effective cooperation of individual modules. By considering the modularity of structure it is possible to define the field of study in a more precise manner.

Research area implies a plan of tasks (factors) necessary to achieve the goal, i.e. mainly to build the algorithm needed as a tool for decision-makers in the process of consolidation enterprises and integrating their organisational structures:

- designing scope of observation in steelworks and holding,
- designing specific questions within the so-called check list,
- designing an interview with interested managers,
- review and selection of test methods,
- measurement and development of results,
- building a model and practical algorithm. [Nelson & Quick 2002, p. 118 *et seq.*]

Determining the set of determinants allowed to compile the following list: configuration, centralisation, specialisation, formalisation and standardisation. It is slightly different from the one presented in the literature, although it takes into account its practical aspects, given the need to take into account only those determinants that are relevant to the integration process. The only problem that was to be solved was to determine components of individual modules. [Raps 2005, p. 141 *et seq.*; Bungay 2012 No. 115, Cyfert 2012, p. 42 *et seq.*].

It is important to conceptualise and operationalise the determinants within the characteristics of the research area. Conceptualisation in the examined case is the already discussed formulation of the notion of integrated structures features, expressed mainly in description by the parameters, although this does not completely exhaust the essence of these concepts. On the other hand, the operationalisation involves development of operational definitions, indicating the activities explaining these concepts.

The research results obtained within implementation of the paper topic are primarily results of comparative studies of the integrated structures as well as the model and algorithm applied to assist decision-making in the use of due diligence analysis.

The third part of the research methodology is the selection of research methods and techniques. While the previous components mainly concerned conceptual issues, this part is characterised by specificity. The most effective methods (techniques, models, etc.) were chosen. The selection criterion was labour intensity, cost of execution and achievement of required degree of accuracy. Hence, the main selected groups of methods are:

- statistical data processing,
- setting preferences for objects,
- taxonomical methods [Freund 1968, p. 78 *et seq.*; Miśkiewicz 2017, p. 107 *et seq.*]

Among the statistical methods in the research process necessary for the basic characteristics of the statistical description, the following were applied: the measure of central tendency, dispersion and concentration. Statistical verification tests were also used. Nevertheless, they were used only in such a case when there was possibility to exploit a sufficiently small statistical sample. Preferential evaluation methods include those related to point scoring, given that the results obtained by the ranking method may possibly be used for statistical surveys (on a small sample). It is also worth noting that discrimination of the set of applied characteristics does not give sufficient number of rank thresholds to use a taxonomy. Scoring allows to differentiate the research material in a manner appropriate to requirements of the method. Among the numerous *taxonomic* methods, the method of Wrocław taxonomy was selected. The choice was made due to access to existing computer programmes and the interpretation ease of the results. [Arendt 2015, p. 92 *et seq.*]

3.2 The essence and principles of identifying entire organisational structure and its particular elements

The stages of organisational structures identification presented in this part of the paper differ significantly from those found in other scientific studies. This results from the research model adopted by the author. He assumed that in the diagnostic studies, the purpose of the paper does not include monitoring of deviations (disruptions and malfunctions) and does not convert into the development of the functional characteristics of the system.

Taking into account these differences, a rough framework of the cycle of identification assumed the following sub-stages (some of which were discussed in detail in the previous parts of the paper):

- defining the system,
- development of characteristics (subsystems and modules),
- registration of objects,
- measurement of product parameters.

The system is defined in a different than usual manner. In many studies, when economic entities are subject to analysis, the system is understood as an enterprise. Here the system will be an organisational structure, understood primarily as subject, with regard to its formalised approach expressed in the documents. On the other hand, in the functional scope within the studies on structure integration, sets of tasks (functions) were used. The subsystems will be the features of the structure presented in the form of modules of parameters representing them.

Development of structural characteristics of the system is a primary activity in the identification process. It begins with construction of a determinant list, which means defining specific parameters and characteristics, and in the case of this paper – the choice of features and their parameters. This is a factual description. On the other hand, the latter formal one, covering presentation of organisational units and their configuration and the pragmatism of actions, was separated by the author in empirical part of the paper.

Registration of objects which is recognised as a universal notion in the conducted study involved registration of values of the studied structures characteristics and their parameters. Measurement of product parameters is related to achievement of objectives. If it refines the organisational structure for better business management, then it is really necessary to discuss the product along with the underlying infrastructure. When the goal is to examine the actual state of structures before their consolidation, it involves working out a helpful tool for decision-makers. In contrast, in this case, it requires processing the recorded observations into the parameters that create modules that are basic comparative material in the paper. As an example may serve here the calculation of the formal activities share by dividing the number of formalised activities by their overall number or by the share of standard procedures as the quotient of standards by the total number of procedures. The number of such processing increases when the arithmetic mean is entered into considerations e.g. by calculation of aggregate indices and categorising objects.

3.3 Description of multidimensional organisational structure

Organisational structure can be described in various ways. While in the process of identifying for the purpose of correct diagnosis it is safe and necessary to apply multidimensional description, it is not entirely clear in the problem of differences between structures in integration decisions. This is due to the fact that, apart from specific difference among parameters of these structures, it is necessary to answer the question whether its entirety is sufficiently capable to consolidate. It is worth adding that the differences themselves do not always give a clear answer here, due to the overlapping areas of operation of individual modules. [Hatch 2002, p. 79 *et seq.*]

There are two orientations in this regard: a one-dimensional approach that in case of structures improvement is only historical in nature and multidimensional (multi-criteria) approach commonly applied in the diagnostic process but differing fundamentally as far as the type and list of variables describing the organisational structure are concerned. [O'Connell, Pyke & Whitehead 2006, p. 132]

The principle of multi-criteria description is applied in the discussed subject of integration. Entire structures are compared. The only distinguishing feature is the susceptibility to integration. In definition of one dimension feature in the works of M. Weber [2002], M. Crozier [1967], P. Selznicka [1961], J. Kurnal [1979] and many others, alternative structures such as organic or mechanistic, bureaucratic structures or practical bureaucracy, etc. are considered. In the course of conducted research, the procedure leads to distinction between the organisational structure that can and cannot be integrated, described by the synthetic index or to be isolated by taxonomic methods of groups of enterprises (organisational structures) susceptible and not susceptible to integration.

Differences in relation to the aforementioned concepts involve their rather a priori establishment, and the integration capacity index is calculated from the stage results within modules. On the other hand, in the classically understood one-dimensional orientation its representatives “do not intrude in the relation between characteristics meaning the same as the concept of structure, treating it as a single variable ...” [Mreła 1983, p. 19]. The observed retreat from the one-dimensional approach concerns research in which the subject is improvement of structures. In

this case, this concept can be useful for synthesising results (e.g. when categorising companies or individual parts of their activity, in the discussed case of organisational structures). [Krzakiewicz & Cyfert 2015, p. 92 *et seq.*]

However, the overwhelming part of structural analyses, when examining their integration, relies on multi-criteria analysis. The concepts of multidimensionalism and multi-criteria are treated here as identical, although there is a certain semantic difference between dimensions and criteria of evaluation. Multidimensional analysis complements the aforementioned holistic comparison. This is due to the fact that organisational structures are not a coherent entirety. Individual characteristics of these structures measured by the parameters of modules (criteria) do not always work together in a mutual relation and in the same direction. According to Blau, Heydebrand and Stauffer, the theory of organisational structures should take into account the interdependencies between structural attributes of organisations. The interdependence between attributes (currently we would say characteristics or dimensions) of the organisational structure can be observed in a particular manner in the process of integrating the structures of consolidated enterprises. Large differences between the dimensions of the integrated structures indicate the potential for occurrence of difficulties during integration of structures as an entirety. [Blau, Wolf, Heydebrand & Stauffer 1968, pp. 91–114]

Theoretically, two extreme situations may occur: the first, when the structural elements are interchangeable and closely related, and the second when the structure, constituting an aggregate, is not interchangeable and the mutual interferences occur there do not complement and even abolish each other in action. In fact, organisational structures are neither completely coherent nor totally inconsistent, but they are a continuum of intermediate states, as evidenced by observation of everyday economic practice. This is also noted by K. Mreła, who states that the degree of cohesion does not relate to the possibility of making planned changes and economic reorganisation. [Mreła 1983, p. 73]. This refers to the situation when integration of organisational structures is supposed to take place in the merger of enterprises and the degree of coherence of their dimensions will favour or obstruct implementation of this intention. Many authors, analysing the interdependencies between elements of the structure, found a large number of them both in the coherence between the dimensions and inside them. Theoretically, the maximum number of links in a coherent structure would be $N(N-1)/2$ of characteristics, where N equals the number of dimensions or characteristics examined. The purpose here is to introduce into the due diligence analysis a relatively simple tool for calculat-

ing integration susceptibility, which in this case is nothing but determination of the degree of coherence between integrated organisational structures considered as a future united structure. Consequently, the study covered five dimensions discussed previously and a limited number of their characteristics were identified. Where collections of characteristics are divided into groups among which significant distances (differences) occur, then there is a modular organisational structure, which in principle to a lesser or greater extent exists in the economic reality. In the metallurgical industry, sometimes certain modules in two integrating structures are relatively close and then at the same time their unification is quite simple – for example, in production divisions, where the manufactured product range is similar. Though, it can be very distant, for example in financial divisions, when one deals with metallurgical companies that are in very different economic situations. [Miczka 2009, p. 52 *et seq.*]

3.4 Diagnosis of the organisational structure

Identification of the subject of study, including also operationalisation of the evaluation criteria, allows to describe properly the next research stage – diagnosis. Assuming that organisation and management belong to the field of social sciences, reference should be made to the definition of diagnosis applied therein. According to the *Nowa Encyklopedia Powszechna* [*New Universal Encyclopaedia*], “social diagnosis, the specification of features of a contemporary occurring social phenomena on the basis of empirical research, analysis of the scale and force of their influence, and the relations that take place between them constituting i.a. material for social projections”. [*Encyclopaedia* 1995, p. 72; Hammer & Stanton 1999, p. 108 *et seq.*]

This definition is too general. The more utilitarian is given by A. Nalepka [Nalepka 2001, p. 207], suggesting that the diagnosis of organisational structure consists, on the one hand, of detecting defects, explaining their causes and assessment of the impact on effectiveness of the company, on the other one on determining and examining the strengths of the organisational structure. It is shaped in the process of economic transformation, as emphasised by A. Nalepka and A. Kozin, it becomes more concise and introduces a pattern as a reference point. Hence, the essence of organisational diagnosis is understood as identification of the actual state of the system and can lead to comparison with the state considered

as the standard, which requires clarification of the discrepancy between them and the reasons for their occurrence. [Nalepka & Kozina 2007, p. 142]

For the purpose presented in this paper, i.e. the study of structures undergoing integration, the most useful one seems to be the one proposed by A. Stabryła. He recognises that diagnosis is a stage in the phase of research and analytical works, which aims at assessing the actual state of the subject of research. [Stabryła (ed.) 2009, p. 138]. It was taken into account in the research procedure as it reduces the research area to the specific tasks, relevant to this stage. They relate to: the choice of subject matter of the study, formulation of criteria for evaluation, conducting a nominative and verification evaluation, formulation of diagnostic findings, conducting a full analysis of reasons, giving rise to dynamic and spatial comparative studies. [Stabryła (ed.) p. 138]

The subject matter of the study was therefore to reveal the features and characteristics of the integrated organisational structures that are susceptible or not to the implemented process and to determine the degree of this susceptibility. The differences in relation to the classical diagnostic procedure are the fact that no change or project of new targets is anticipated. And the research results are just one of the foundations for the consolidation decision. Therefore, it is important to develop the concept of a supporting instrument for integration decision. Hence, the verification assessment will be slightly different than in the normal result verification procedure, where results are determined according to the selected measurement scale. By examining the differences of the two structures, needed to determine the integration capacity, economic and production results will not be checked, but the organisational structure characteristics that are relevant to the ability to merge.

It would not make any sense, e.g. to investigate the level of production or profit that are not relevant here and, in the context of pre-merger or acquisition dealings, has already been thoroughly checked and evaluated.

In addition, it is permissible to treat organisational parameters as verification assessments. A. Stabryła, S. Flaszewska, A. Zakrzewska-Bielawska indicate that in relation to organisational systems, e.g. enterprises, performance indicators and normalised values of features of objects are used. A verification assessment may be done in the index or scoring form. [Stabryła 2007, p. 119; Flaszewska & Zakrzewska-Bielawska 2013, p. 59]

Therefore, the standardised values of the objects features were used for the study. In this case, as a normalised feature, the structural characteristics of incorporating enterprises were adopted. Normalised characteristics belong to a set of

non-negative numbers, but deviations from the pattern can be negative and as the values studied have the nature of neutral variables, their absolute values must be taken into account. When the features of the object – the pattern – will be denoted following A. Stabryła [2007, p. 21] by \vec{x}_0

$$\vec{x}_0 \leq \{x_{01}, x_{02}, \dots, x_{0n}\}$$

where:

x_{01}, \dots – features of the object – pattern thus, if the feature is neutral variable

$$x_{0j} = \underset{i}{nom}\{x_{ij}\} \quad \text{for} \quad j \in N$$

N = set of neutral variables,

x_{ij} = value of j^{th} feature for i^{th} object (real or ideal).

Standardisation of the characteristics follows the formula:

$$z_{ij} = \frac{x_{ij}}{\underset{i}{nom}\{x_{ij}\}} \quad \text{for} \quad j \in N$$

whereas $x_{ij} \leq \underset{i}{nom}\{x_{ij}\}$

or

$$z_{ij} = \frac{\underset{i}{nom}\{x_{ij}\}}{x_{ij}} \quad \text{for} \quad j \in N$$

whereas

$$x_{ij} > \underset{i}{nom}\{x_{ij}\} \quad \text{and} \quad x_{ij} \neq 0$$

Although comparisons of characteristics are made in a partial manner for each of them, in some cases it is possible to calculate the aggregate index for the evaluation of i^{th} object.

$$Z_i = \frac{1}{n} \sum_{j=1}^n z_{ij}$$

This is precisely the case when the integration capacity of organisational structures is established, provided that the individual characteristics are given the appropriate weights.

Typically, the analysis of reasons involves investigating the causes of deviations and interferences. In the presented work a possible study deals with differences in the characteristics of organisational structure that constitute the basis for assessment of the integration capacity. The causes of these differences are not investigated in detail as it is unnecessary, in the final phase of the consolidation talks they are not eliminated because the matter will be valid after the final decision is taken and often it is distributed over a very long period of time.

Dynamic and spatial studies are conducted as part of the structures' similarity diagnosis. It is foreseen that comparison of the structure of the integrated organisation prior to integration and incorporating after integration (after lapse of a certain longer period). Therefore it will be possible to determine how it proceeded and what results the integration brought. The study also assumes a spatial nature: not only legally independent and distinguished enterprises but also geographically separated ones are analysed. [Miśkiewicz 2017, p. 202 *et seq.*]

PROBLEM OF ORGANISATIONAL STRUCTURES ASSESSMENT IN THE CONTEXT OF THEIR SIMILARITY

4.1 Similar structures and similar organisational forms

Roland Coase while contemplating the existence of any benefits of coordinated production by the „invisible hand of the market”, found that organisational structure of an enterprise also has an impact on its operation. [Stiglitz 2004, p. 164] Following suggestions from the Nobel laureate it is worth noting that the essence of similarity can be deduced from the theory of sets. Numerical sets are abstracts. At their lower level, they are names or sets of letters that identify sets of specific things or concepts. These are not abstracts then, but finite sets of perceptual or imaginable things. In case they undergo observation, they are referred to as statistical sets. [Panek 2000, p. 740 *et seq.*]

The set consists of objects. Within the set they are distinguished by name or number. Numbering the objects with natural numbers is particularly useful. Objects differ from each other or are similar to each other to a different extent. Their degree of similarity is determined by examining their characteristics.

A characteristic can be defined as a function in which the independent variable is the object and value of the function is a natural number. Therefore, the domain of this function is a collection of objects and the counterdomain is a set of natural numbers.

If the objects are numbered, the characteristics can be defined as functions that map natural numbers $[1, \dots, k]$ into real numbers, essentially non-negative [Hellwig 1995, p. 12]. In this paper the set of objects covers organisational structures of metallurgical enterprises (not the enterprises). They are given consecutive numbers regardless of the fact in which pair of consolidated steelworks they occur.

This set is defined in the space of the elementary events Ω_i . The measure μ in the form of elementary events μ_i is normalised.

Objects forming the part of the X_i set are real, have names and numbers. Each object, apart from name and number, is characterised by a number of values describing it (w_i).

The points x_i , i.e. their coordinates $(x_1 \dots x_n)$, are recognised as a geometric image of the objects. The established features in the previous chapters and subchapters w_i ($w_1 \dots w_s$) have the coordinates that will be the values of characteristics of these features in the coordinate system.

In the space of the characteristic the “chosen pair of points (x_i, x_j) a non-negative number α_{ik} can be assigned, referred to as the distance between these points.” [Hellwig 1995, p. 15]

Among the many options Euclidean distance metrics was chosen:

$$\alpha_{pi} = \left[\sum_{j=1}^n (z_{pj} - z_{ij})^2 \right]^{1/2}$$

α_{pi} = distance of i^{th} object from the pattern.

At this point it should be recalled that in the presented paper the pattern is the organisational structure of the incorporating enterprise (usually the holding takes over the steelworks).

The pattern is point X^* . Its coordinates correspond to predetermined conditions. As in the examined case we are interested in neutral values, i.e. the numbers for which both positive and negative deviations decrease similarity, then their coordinates are expressed by the formula:

$$X^* = (X_1^* \dots X_n^*)$$

Coordinates form a matrix

$$X_{kxl} = \{X_{ij}\} \quad i = 1 \dots k,; \quad j = 1 \dots j,$$

which is referred to as the data matrix and is the starting point for classifying the studied set of characteristics of steelworks and holdings organisational structures, and establishing order in this set.

Prior to construction of such matrix on the basis of the empirical data given it is necessary to establish the list of results shall be needed to achieve the objectives set in the paper:

- 1) Determine similarities (distances) between pairs of objects (integrated organisational structures).
- 2) Determine the similarity (distances) between all the objects of the set.
- 3) Classify organisational structures (division into similar and dissimilar).
- 4) Organise the structure in a linear way to determine the limits of integration susceptibility.
- 5) Calculate the similarities (distances) between modules of each structure.
- 6) Calculate the inter-modular similarities.
- 7) Examine the correlation between characteristics inside the modules and correlation between the modules.
- 8) Determine whether the structures form an aggregate and whether they are suitable for taxonomic analysis.

4.2 Similarity of organisational structures and their susceptibility to integration

The thesis adopted in this paper assumes that the basis for the successful integration of organisational structures is their similarity, manifested in correspondence of structures and their proper dimensions. Assuming, therefore, that organisational structures have a modular structure, study on their similarity cannot be limited to holistic comparisons, covering all their aspects at the same time. This

results from the conviction that the fundamental differences in the consolidated organisational structures are an obstacle to their integration, although this does not cover in full the issues of similarity.

The modular nature of the organisational structure requires its consideration at the level of the individual modules, which in this paper constitute features of the structure selected in terms of the integration susceptibility. It happens that organisational structures may be similar in type but differ significantly in the intensity of particular characteristics. This gives rise to the need to study similarity also by comparing modules (features). [Miśkiewicz 2017, p. 68 *et seq.*]

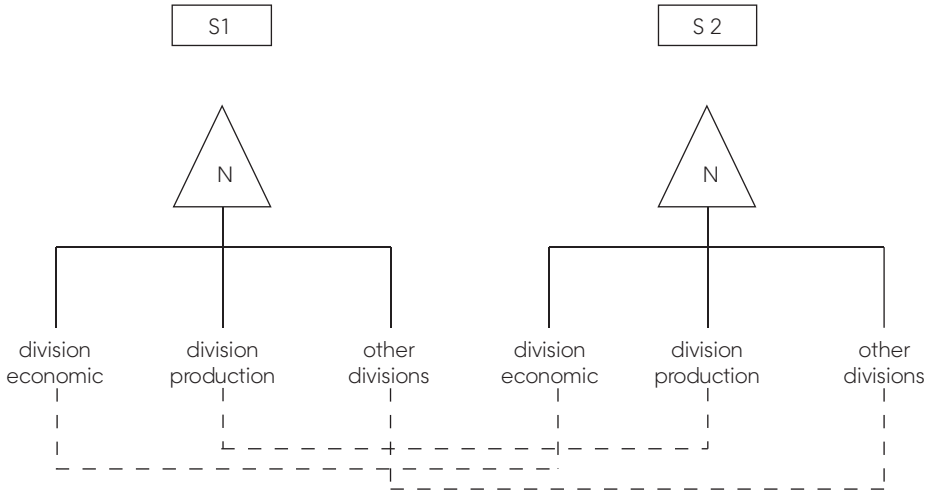
In many cases, features of the structure (evidently identical) differ in characterising those constituent variables (components). For example, two structures that are identically configured in terms of number and size of organisational units differ in the scope of operation, which can have a significant impact on the pace at which they are unified due to the numerous human and ambition issues. This results in the need for research at an even lower level: the characteristics that identify the similarity of component modules (components).

The foregoing considerations, concerning the analysis of organisational structures, give rise to the need for similarity at three levels: aggregates (entire organisational structures), modules, characteristics.

Aggregates are, in the case under study, entire organisational structures. The greatest similarity can be observed when comparing internal areas of structures of particular types, resulting from the division of labour on the basis of performed functions or the object of action.

In this paper, only two types of structures are covered by the research process: the departmental – a variation of the functional structure group (second level of management) and the divisional one, often found in holdings. Therefore, if there are particular steelworks in the consolidation process, then consolidation of fairly similar organisational structures takes place. In the case of incorporation of steelworks into a holding, the process of consolidation of different structures together is noticeable. This case is more frequent in the discussed scope and its procedure is reflected in Diagram 7.

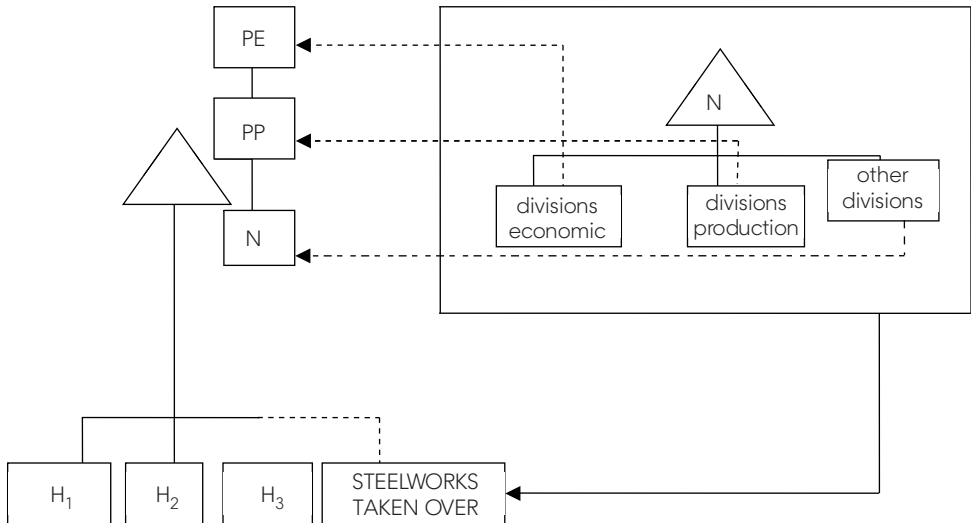
Diagram 7. Comparison of the particular types of organisational structures studied in the paper, in terms of their similarity



Source: own resource.

The consolidation process of steelworks a holding presents Diagram 8.

Diagram 8. Integration of organisational structures of holding and steelworks



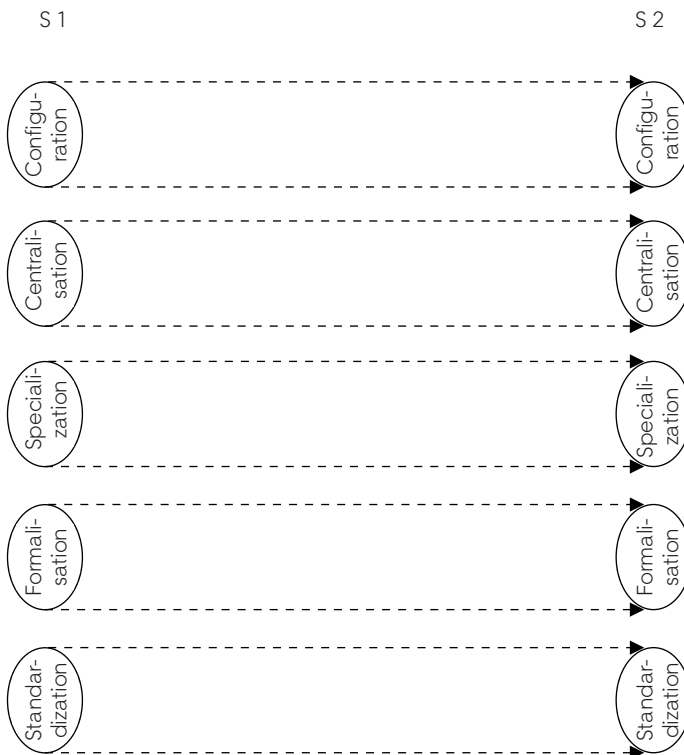
Legend:
H_{1...n} – steelworks (divisions),
PE – economic division,
PP – production division,
PI – other divisions,
N – Chief Executive Officer.

Source: own study

The examples presented in the diagrams clearly show that similar organisational structures, e.g. consolidation of steelworks usually having a departmental structure, do not cause as many organisational changes as incorporation of a steelworks into a holding, which in the metallurgical industry is characterised by a structure close to a divisional one. It should be added that any change constitutes extensive integration difficulty, resulting from violation of the interest of actuaries and conflicts between people, resulting from differences in procedures, standards, organisational culture, etc. [Potoczek 2016, p. 42; Mangeri 2015, p. 55 *et seq.*]

At the second lower level of the analysis, the similarity of characteristics (dimensions) of organisational structures, characterised by their respective indicators is assessed. Its course is shown in Diagram 9.

Diagram 9. Characteristics of various types of organisational structures studied in the paper, in terms of their similarity



Source: own study.

The diagram above presents the size of the differences between the selected features (functions) of the structure of the two integrated organisational structures in the steelworks. Dashed lines ending with arrows indicate the area of interaction of the overlapping features. The area outside them means lack of similarity. The larger the area, the greater the possibility of occurrence of the disintegration phenomena is.

While the differences in organisational structures of steelworks treated as an entirety are not particularly significant, differences in the structural features expressed by their modules can be clear, and to a large extent concern configuration of organisational units, their centralisation and specialisation. Horizontal dashed lines indicate differences. In the figure one can see that a significant part of the links within the listed features is contained in a set expressing their similarity (common part). At the same time it shows the size of the remaining, expressing difference (lack of similarity) value. Modular sizes recognised as aggregates of evaluation criteria, despite formal accounting equality, do not necessarily have to be similar. As a rule, they are different and even very different if one considers that the same value of the module can be achieved with different structure of component characteristics (evaluation criteria).

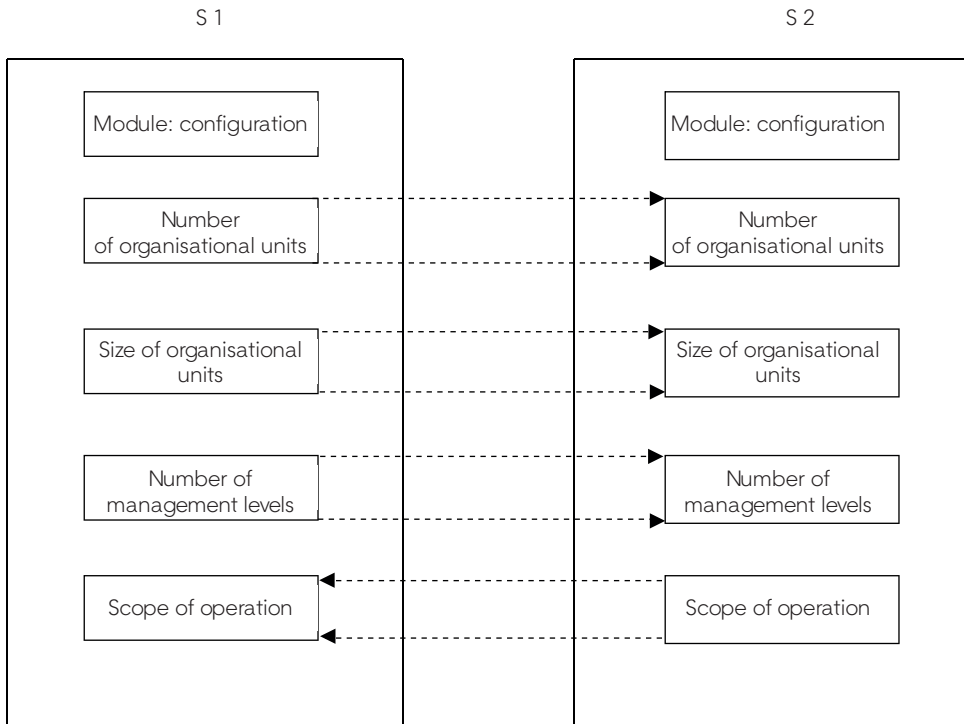
Examination of this phenomenon requires a transition to the lowest level: a study of the similarity of characteristics determining the value of a feature (module).

The diagram 10 indicates the similarity of characteristics for the integrated organisational structures.

The diagram shows that despite the equality of the two modules as aggregates, there may be internal differences (small similarity) between the characteristics defining the examined feature. For example, if there are fewer organisational units, there may appear a greater scope of operation and vice versa. In those situations where the integration seems to be relatively easy and straightforward, a difficulty may occur resulting e.g. from reduction in the number of managerial positions in the case of adapting processes that increase the scope of operation.

The similarity on three levels: structure types, similarity of features (their modules), and similarity of characteristics (preferential aspects) affect the susceptibility of structures to integration. Overlapping lack of or insufficient level of similarity from these three levels can make the structures largely incompatible (among each other). These general statements and figures concerning the structure are accompanied by the human factor. It should be noted, however, that regardless of what

Diagram 10. Diagram of similarity (differences) of the characteristics for the selected module of organisational unit configuration



Source: own study.

structural feature is considered, its change will always have an impact on integration of the people involved. Even such seemingly distant structural features, as formalisation and standardisation, affect the success or failure of the consolidation by the people who perform these functions. Reducing the level of formalisation can result, e.g. in staff redundancies, which becomes obsolete in de-formalisation of activities and decisions. The sum of all differences (lacks of similarity) will be referred to in this paper as the degree of organisational structures susceptibility to integration. On a normalised scale the objects placed near zero will be exposed to great integration problems and their integration susceptibility will be scarce and decision-makers should take this into account within the due diligence assessment, which will be discussed in detail later. However, if the analysis shows clearly that the evaluation will be close to unity, then a relatively easy process of integra-

tion of organisational structures should be expected. The research area from 0 to 1 is a continuum, defined points of which will rank the degree of integration susceptibility. Therefore, data on this scale will be the synthetic score indicators obtained in the analysis of preferences or specific values, resulting from taxonomic analysis placed on the scale as a result of the ordering the set of consolidated organisational structures or their characteristics. The terms used in paper by A. Stabryła on management strategy were used as markers of similarity degree. [Stabryła 2007, p. 123]

It foresees the following similarity relations (assuming that the pattern is a complete similarity, with the object designated as the „ S ” and the pattern by „ M ”).

S is identical to M

S is very similar to

S is moderately similar to M

S is scarcely similar to M

S is completely different from M .

The presented scale of qualitative relations of similarity refers to the situation when an entire set of integrated objects is examined. In case of comparing pairs of objects, the pattern in each case is the organisational structure of the incorporating unit, to which the similarity of the merged or acquired structure is referred. In this case, the degree of similarity is defined by a weak majority relation:

$$P_1 \leq P_2$$

where:

P_1 = organisational structure incorporated into the holding,

P_2 = incorporating organisational structure.

In certain cases, the following relation will be applied

$$P_1' \leq P_2' \text{ or } P_1' \geq P_2'$$

when organisational structures of two steelworks are integrated, then the pattern will be the stronger structure, deciding on the future shape of the consolidated organisational structures.

4.3 Methods of structure research in the context of susceptibility to integration

This issue has already been partially considered in the third chapter while considering the steps of the organisational structure research methodology. An attempt will now be made to systematise research methods of organisational structures in the context of their susceptibility to integration. First of all, the very concept of susceptibility to integration (the ability to integrate) should be defined. These are concepts intuitively understandable, but to clarify them, it is important to submit a precise definition. In the literature any attempts to define it have not been made so far, mainly because of the weak perception of this fragment of the integration issue. Managers dealing with integration of enterprises and organisational structures within mergers and acquisitions recognise that certain organisational structures are easier and others are more difficult to integrate. Importantly, this is not due to the achievements or mistakes in the process of implementation, but to the essence of the structures expressed by their particular characteristics.

Therefore, in this paper an attempt has been made to determine which characteristics are most favourable (susceptible) to integration, and which, on the contrary, hinder it. It has been noted that similar structures are easier to integrate, therefore the differences between them can be regarded as a measure of the ability to integrate. The organisational structure can be presented as a function of its dimensions:

$$y = f(x_n) \quad n = 1, 2 \dots 5$$

where:

- y = organisational structure,
- x = structural dimension,
- n = individual dimensions,

than

$$y = x_1 + x_2 \dots + x_5$$

while the function of the organisational structures susceptibility to integration will be:

$$f(x) = (x_1^1 - x_1^2) + (x_2^1 - x_2^2) + \dots + (x_5^1 - x_5^2)$$

and for „m” structures (assuming $m = 6$)

$$\sum_{m,p=1}^6 \sum_{n,r=1}^5 (X_m^n - X_p^r)$$

where:

$$m, p = 1,$$

$$n, r = 1,$$

and m, n, p, r denote the object and feature whose difference is compared.

Example:

Two organisational structures 1 and 2 and two characteristics (dimensions) of these structures are examined:

Table 14. Organisational structures and their characteristics (dimensions)

Object	Features (dimensions)				
	1	2	3	4	5
1	6	5	3	5	3
2	2	1	2	4	1
Differences of dimensions	4	4	1	1	2

Source: own study.

Indicator of susceptibility (sum of differences) = 12

In this way, differences can be established for individual pairs of structures. Once normalised, they can be ordered, according to their integration susceptibility.

Once the verbal definition and the index of organisational structures susceptibility to integration have been established, the research methods applicable to reaching these results have been established. It must be stated that the main goal is not determination of the susceptibility index for the entire group of consolidated

organisational structures in the iron and steel industry in Poland, but to create an accounting tool for testing the integration susceptibility of a specific pair or more of consolidated structures.

As previously mentioned, similarity assessment methods that are applied here can be divided into two groups. The first of these is the method resulting from the need to use materials of a directly non-measurable nature. These are the methods related to preference analysis. They can be thought of as of two types of proceedings: ranking and scoring.

Ranking involves determining location of the study object in the set in terms of the adopted preferential aspects and is used to compare and diagnose. For the purposes of this paper, the first reason is the most important. Ranking is done on a scale of natural numbers. The advantage of the method is the ability to compare non-additive dimensions of a structure through converting them into ranks. In the case of the structures validity research a multi-criteria ranking occurs in an aggregate form. The disadvantage of the method is conducting it only on the scale of natural numbers, which in cases of occurrence of bound values hinders discrimination of the set. In addition, the lack of the ability to use the quotient or division scale hinders multi-criteria evaluation and building aggregates.

In the scoring method, points are assigned to the objects, considering the context of their mutual relations. This method is particularly applicable in the comparative area of individual pairs of objects. Several scoring systems by awarding points exist:

- straight scoring,
- weighted scoring,
- point indicator scoring,
- threshold analysis. [Kaleta 2010, p. 145]

The weighted scoring seems to be the best to examine the dimensions of structure of unequal importance. The basis and determination of weights are the rates determined by experts. As for the variety of the applied evaluation criteria the value of features of the objects are normalized in order to compare them. The quotient normalisation applied in the paper has been described earlier. It was assumed that the examined features are neutral variables, since any deviation, either up or down, constitute an obstacle to integration. As it is clear from the above consider-

ations, having ranking and scoring methods at disposal the latter should have been chosen, as it definitely better suites the assumed target.

The second group of directly immeasurable indicators, such as the number of management levels or the scope of operation, is taken into account during the process of shaping the organisational structure.

Abandoning the idea of resigning from their use in segment analyses, to perform aggregate research there was a need to calculate them with a point scale, due to the uniformity of the data used. In addition to the use of preference analysis, taxonomic methods are used in the paper for their greater suitability in qualification and ordering the group. The results of the taxonomic studies also fulfil here the control function over the results of preferential analysis. There are many taxonomic methods. The table presents selected methods, among which there has been selected the one that most closely matches the studies on integration of organisational structures.

Table 15. Selected taxonomic methods of ordering objects

Method	Characteristic features of the procedure	Usefulness for the implemented project
nearest neighbour Johnson method	The method has a connecting nature. It involves finding items for which the distance is minimal.	The method exhibits simplicity. Applied in larger collections. Disadvantage of the method is consideration of only the smallest and the biggest differences.
method of the furthest neighbourhood Johnston method	The connection method (hierarchical). The furthest elements are sought.	Characteristics of the suitability and disadvantages of the method as above.
Czekanowski method	Diagrams of different colours or shades. Around the main diagonal fields representing the short distances are concentrated.	The method does not provide the ability to determine a particular position of the item between the first and the last one. In research on similarity of structures, this can be a significant obstacle. Non-formalised method and in this sense
on-line method	The method is based on the principles of the Czekanowski method. Unlike the prototype, not the classes are analysed, but the actual distances of the units (items).	Due to the use of real elements rather than classes more useful for research purposes of this paper.

Method	Characteristic features of the procedure	Usefulness for the implemented project
Wrocław taxonomy method the so-called shortest dendrite method	Dendrites are constructed by combining each object with an object similar to it, considering the condition that the sum of the distances is the smallest. The division of dendrites is performed successively, rejecting its shortest stretches. As a result, the most similar classes or elements are obtained.	It belongs to one of the most commonly used methods of hierarchical clustering. Inclusion of hypothetical or real patterns is practised. The pattern may, as a result of classification, be found in a homogeneous group, which facilitates interpretation. This corresponds to the aims of the paper.
Berry method	It differs from other methods through replacing a pair of nearest points by the midpoint for which the distance from other points is calculated.	This leads to reduction in size of the collection. Under the conditions where the output set of steelworks and holdings is small at the entry – the method is not appropriate.
gravity centre method	It involves grouping together into one set such two groups for which the distance between their centres of gravity is the smallest. The centre of gravity is understood as fictitious object described by the relevant variables.	It is doubtful whether there is a ready-made computer programme for this kind of calculations. Apart from that, it is necessary to consider the inadequacy of the method to a small examined group.
median method	It involves finding the smallest distance between two groups, measured as the median, and combining them into one group.	This concerns more groups than individual elements. In addition, in the conditions of significant differences between business structures, it may produce incorrect results.
group average method	It involves joining together two groups' whose average value is the smallest.	Similar reservations as above. The average may produce even more distorted results than the median in a small group of metallurgical enterprises.

Source: own study.

Because of the simplicity of interpretation and the availability of software, the shortest dendrite method (Wrocław taxonomy) has been used.

A very important step in application of the previously discussed methods is the selection of measure (metrics) of similarities. Set of measures has been chosen to assess similarity. Their more complete context, examples of distances used in the research having a specific pattern are presented in Table 16.

Table 16. Example measures (metrics) of similarity used in taxonomic studies (standard methods)

Value of the similarity measure	Formal representation	Designation
Euclidean distance when the pattern occurs	$d_{pi} = \left[\sum_{j=1}^n (z_{pj} - z_{ij})^2 \right]^{1/2}$	d_{pi} = distance of i^{th} object from the pattern z_{pj} = normalised value of j^{th} variable for positive development pattern z_{ij} = standardised value of j^{th} variable in the i^{th} unit
Hamming distance	$d^2_{pi} = \sum_{j=1}^n z_{pj} - z_{ij} $	d^2_{pi} = urban distance
Jeffrey's – Matusita distance	$d^3_{pi} = \sum_{j=1}^n (\sqrt{z_{pj}} - \sqrt{z_{ij}})^2$	d^3_{pi} = Jeffrey's – Matusita distance
"Canberra" distance	$d^5_{pi} = \sum_{j=1}^n \frac{ z_{pj} - z_{ij} }{ z_{pj} + z_{ij} }$	d^5_{pi} = "Canberra" distance
Clark's distance	$d^6_{pi} = \left[\sum_{j=1}^n \left(\frac{z_{pj} - z_{ij}}{z_{pj} + z_{ij}} \right)^2 \right]^{1/2}$	d^6_{pi} = Clark's distance

Source: own study.

It has been decided to study the so-called distance of objects (dimensions, characteristics) using Euclidean distance, i.a. due to its widespread presence in available computer software and ease of interpretation. After selecting the method of ordering results and the similarity measure, the procedure for performing taxonomic analysis is presented in Table 17. [[Bielecki, Pawłowicz 2015, p. 14 *et seq.*; Słowiński 2010, p. 47 *et seq.*]

Table 17. Stages of research using taxonomic methods

Order of the stage	Determining the stage	Activities conducted within the stage
I	Development of observation matrix	Selection of variables. Variables determined in the diagnostic process. If strong correlation of variables is stated, verification of the set and its possible reduction, Setting matrix variables.
II	Normalisation of variables due to the possible incomparability of data	Selection of standardisation method. A quotient formula is adopted. Standardisation calculations. Creation of a standardised quantities matrix.
III	Choice of similarity measures and construction of matrix of these measures	Selection of a similarity measure (set as the Euclidean distance measure), Calculation of the Euclidean distance for a measures matrix elements.
IV	Grouping and arranging elements of distance matrices	Choice of method (in the examined case is the shortest dendrite method), Connection of elements. Division according to the longest distance principle. Conclusions.

Source: own study.

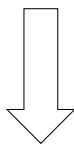
Regardless of methods directly applicable to the analysis of the organisational structures similarity in the context of their integration within mergers and acquisitions, supplementary methods were used. They were applicable by calculation of basic central measure indicators (arithmetic mean, median) and dispersion (standard deviation). It should be emphasised that these measures are obtained as extra results in the determination of the Euclidean distance, and therefore there is no need for additional calculations. Knowledge of the means and deviations allows to determine precisely the correctness of object similarity interpretation.

Summarising, it should be noted that the presented methodology of studies on organisational structures integration consists i.a. of: preference analysis, taxonomic studies, statistical complementary indicators, graphic illustration.

4.4 Identification of the diagnosis elements to determine the degree of organisational structures similarity within the due diligence analysis

Studying the organisational structures similarity as a determinant of their integration leads to the problem of locating it in the overall process of consolidation of the enterprises within the framework of mergers and acquisitions. Due to time in which the research should be conducted, this must take place prior to the decision on consolidation. In literature various processes are encountered – phases associated with this venture. For example, A. Herdan, distinguishes three phases: pre-acquisition, also referred to as preparatory; negotiation; post-acquisition, also referred to as integration.” [Herdan (ed.) 2008, p. 30] Similar solutions can be found by M. Bugdol and B. Goranczewski. [Bugdol & Goranczewski 2010, p. 155 *et seq.*] In the author’s interpretation, the preparatory phase is important as prior to the commencement of negotiations it is indispensable to know what structural difficulties will be encountered by the acquiring entity after acquisition of the enterprise. Hence, it has its own internal sequence of actions and priorities in the performance of activities, as shown in Figure 7.

Figure 7. Activities to be performed during the pre-acquisition phase



- defining a company strategy
- characteristics of candidates to consolidate
- involvement of counsellors
- identification and selection of candidates
- due-diligence
- identification and risk assessment
- identification of synergistic areas
- preparation of the schedule of activities

An important task of due diligence procedure is to estimate the risk associated with the planned activity (investment). Hence, the scope of this study is more extensive than the financial audit, which is often regarded as identical, as it is not limited to the study of the internal environment, but also includes an analysis of the external environment. [Wójtowicz 2007, p. 1] Therefore, the scope is determined by the potential investor and depends on its approach to investment risk, and often on its knowledge and experience, which is summarised in Table 18.

Table 18. Scope of due diligence procedure

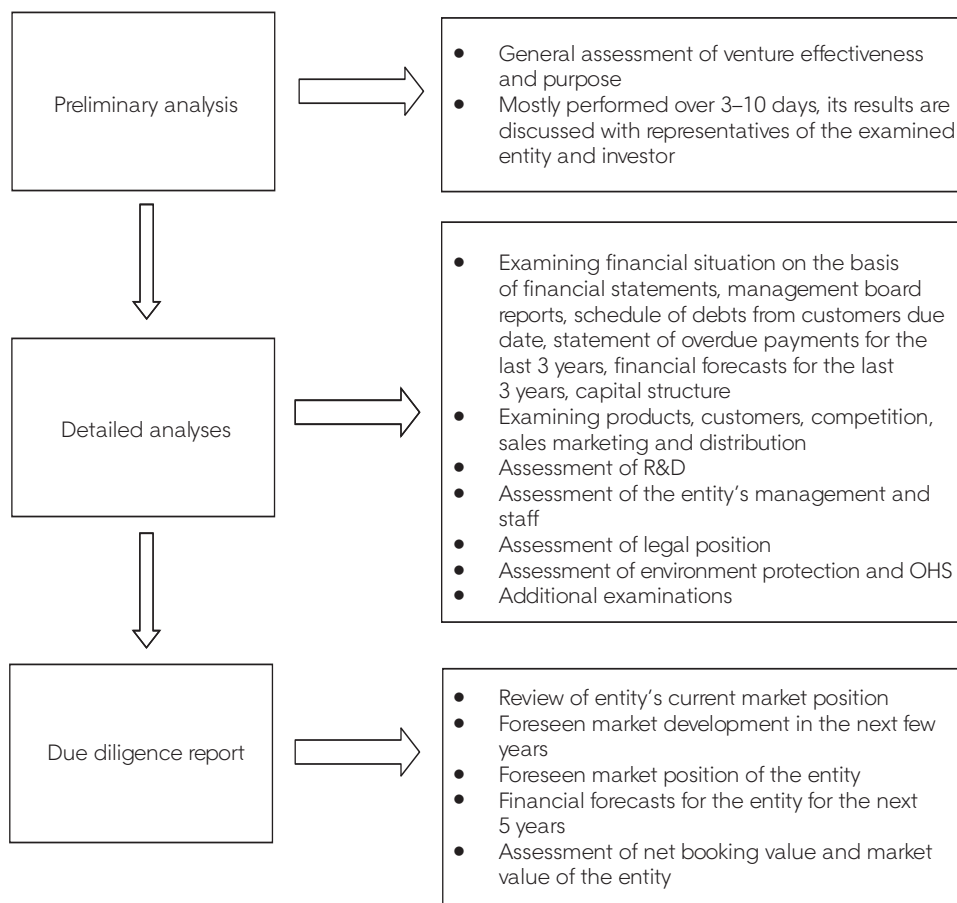
Scope of due diligence[1]	
Sphere	Explanation
Financial analysis	Assessment based on financial statement data: balance sheet, profit and loss statement, cash flow statement, additional information, analysis of changes in equity.
Legal analysis	Evaluation of the history and current status of the project, property rights, contracts entered into, possessed licenses, permissions, criminal, judicial, and administrative proceedings.
Real estate analysis	The legal status of properties, their technical condition based on the opinions and analyses of property experts.
Analysis of the tax burden	Assessment of the degree of tax liability settlement and the resulting control effects. Assessment of the tax shield used.
Analysis of human capital management	Analysis of personnel structure according to selected criteria. Assessment of individual career path procedures.
Technical analysis	Assessment of the degree of modernity and universality of the productive potential and its efficiency.
Organisation analysis	Identification and evaluation of organisational structures and their effectiveness.
Analysis of psychological and ethical-moral aspects	Evaluation of interpersonal relationships, employee and ownership attitudes.
Analysis of information flow	Evaluating the efficiency of collection and flow of information and identification of barriers and inefficiencies.

Source: Mączyńska 2001, pp. 3–4.

When candidates are known and identified, a “preliminary due diligence” procedure takes place, based on publicly available data, usually concerning financial matters that are not subject of interest in this paper. If the analysed entities do not meet the established assumptions, they are eliminated from the list. The so-called

short list is created. A candidate is selected as a result of strategic analysis, capability to generate profit and company leadership assessment. As a result of a possible decision and making contact with the candidate company, companies taking part in merger or acquisition draw a letter of intent to which they attach a due diligence analysis. A standard process of such nature is shown in Diagram 11.

Diagram 11. Standard course of due diligence procedure



Source: own study based on: Mączyńska 2001, pp. 4–5; Johnson 2000, pp. 76–80.

Being based on the previous study and A. Herdan's suggestions, it is worth noting that the due diligence analysis usually includes the following items: "purpose of due diligence, rules for conducting due-diligence, areas covered by due-diligence,

description of the set of necessary documentation, list of people who will conduct due diligence, description of the premises in which the due diligence will be conducted, schedule of conducting examinations and analyses, list of assigned contact people, reporting methods, list of people responsible for information, additional sources of information.” [Herdan 2008, p. 34] The statement clearly shows that from the activities listed above, from the methodological point of view of this paper, four factors are important: purpose of due diligence, areas covered by due diligence, description of the set of necessary documentation, additional sources of information.

The purpose of the analysis is to reduce the risk. According to K. Brzozowska, it should provide: identification and assessment of risks associated with future investment, determination of the specific nature of the enterprise and industry functioning, including cost structure, market structure, suppliers and customers, etc., development of a negotiation strategy with the contractor, planning transaction schedule, increasing chances for successful conduct of transaction and subsequent integration of the consolidated enterprises (in case of merger or acquisition). [Brzozowska 2011, p. 18 *et seq.*] While among the objectives set for the due diligence analysis the issues related to the organisational structure are not *expressis-verbis* listed, the risks of serious difficulties arising from incompatible structures deserve attention and should be included in their set. [Brinlee, McClure Franklin, Bell & Bullock 2004, p. 274]. It is worth adding that many authors, listing areas of interest in due diligence analysis, point to organisational issues. For example, W. Frąckowiak mentions analysis of an organisation and information system and with reference to organisational structure indicates its type and dimensions (configuration, centralisation, formalisation, standardisation). [Frąckowiak 1998, p. 177] This is exactly the same list that has been chosen and is being investigated in the paper.

The next items that in the due diligence analysis concern the organisational structure are: documentation description and additional sources of information. In general, documentation is understood primarily as accounting and financial documents. It should also be inferred that the organisational chart and the service books or activity and responsibility cards may be an interesting source of knowledge on integration difficulties. Consequently, it would be needed to put them in the set of documents required for analysis. [Aernoudt 2005, p. 369] As additional information regarding the integration susceptibility of organisational structures, one should associate with calculations of the inte-

gration capacity (susceptibility) index and analytical data related to the analysis of preferences and taxonomy arrangements. [Paul, Whitham & Johnson 2003, p. 320; Brzozowska, p. 23 *et seq.*]

In the research procedure a question arises, whether the issue of organisational structure research is relevant and important enough as to be included in the due diligence analysis plan. Mergers and acquisitions are always associated with a greater or lesser change in the organisational structure, mainly in the „weaker” unit. Theoretical and practical approach to the issue in question clearly show that these new organisational solutions are for the majority of people rather difficult to tackle and they are often perceived as a threat. The change causes a violation of the equilibrium expressed by the inertia of the acting forces. In organisational matters it is extremely important to estimate the magnitude of resistance to change. [Herdan 2008, p. 107; Wyrwicka, Grzelczak & Krugielka 2010, p. 119]

Dimensions of structures that define states, activities, specialisation, etc., reflect areas in which the power of inertia and resistance to change can be very strong. Hence, the importance of these analyses and the practice of refining conclusions, also in quantitative form. In these cases it is extremely beneficial and even necessary to use organisational diagnosis. Presenting them in descriptive terms should become an integral part of due diligence analysis. This is an exact outcome of the further presented study of empirical material on the integration of consolidated metallurgical industries.

4.5 General characteristics of methods and techniques for diagnosing similarities of organisational structures of consolidated enterprises

The previous findings concerning the diagnosis of the organisational structures similarity allow to formulate certain generalisations. They refer to the fact that the basis of the study is undoubtedly the general and universally recognised principles of conducting organisational structure diagnosis. However, the principles of management system efficiency and system effectiveness are regarded as the exception. Generally, when these rules are present, the organisational structure is considered to be correct. If the purpose of the study is to repair the structure these rules are

adequate to it, whereas if the goal is to analyse the similarity of organisational structures, then they are irrelevant in relation to these needs. In such cases, they are not tested for their degree of correctness but degree of compatibility in the consolidation process.

It may happen, in fact, that organisational structures, even with certain defects, are easier to integrate when they are similar. If the organisational structure is the subject of a diagnosis, this item may be defined as: composition of components and the system of relations between these components; a set of an organisational structure variants based on a different set of components; management tool; structural functions that set the direction of the study; structural studies, in static approach and separated from processes. [Stabryła (ed.) 1991, p. 64]

The differences are found while the list of detailed tasks is specified, and A. Nalepka believes that these are: analysis and evaluation of the classification of objectives, analysis and evaluation of the selection of components and correctness of organisational positions creation, analysis and evaluation of grouping positions in organisational units, analysis and evaluation of functional dependencies, analysis and evaluation of communication capacity and organisation of management parts, analysis and evaluation of decision-making powers distribution and division of the scope of responsibility, analysis and evaluation of the executive system formalisation. [Nalepka 2001, p. 212–213]

The scope of diagnostic tasks in the paper differs considerably from the given above. In the first point, the detailed specification of the partial tasks does not include the analysis of the organisational structures similarity, which is the sole purpose of the diagnosis in this case.

On the other hand, in the second point and in the next ones, the scope of analysis is similar, but it refers to the comparison of two structures. This is not about their correctness but their adaptability. So, for example, by examining all the data about the scope of tasks, powers and responsibilities, their correctness is not checked in relation to the rules of the organisation but in relation to the second organisational structure a quasi-pattern.

The same concerns the third point, but it is particularly important to emphasise those tasks that discuss the unit merging criteria and their stability and flexibility, which can have a strong influence on consolidation with similar or inversely, incompatible units forming another organisational structure.

Similarly, the situation in point four with functional dependencies is very similar, as due to the divisional character of metallurgical holdings and rather func-

tionally (integrated divisions) constructed organisational structures of steelworks, undoubtedly arise serious integration problems.

In point five, while considering the analysis of hierarchical relations, the tasks in the process of diagnosis, let us call it a classic one, and the specialised diagnosis foreseen in the paper, are very similar. These issues are very important in the process of steelworks integration into holdings, because on the one hand a very significant reduction in the level of management in incorporated units occurs and, on the other hand, changes in subordination are often quite different in terms of the competence of management units.

The sixth point is an addendum to the earlier one, and the diagnosis coincides with the one performed in the paper, but is significantly narrower in the scope. Particularly important for integration difficulties is to increase the hierarchical distances between the place of presenting the problem and the place of its solution. The study of formalisation is consistent with the restructuring diagnosis in enterprises, but only as to the scope of examination and data. The correctness is not relevant. The differences in the degree of formalisation and their impact on the integration process of organisational structures are of great importance here.

Apart from the purpose and object of the study, an important part of the research methodology used in practical diagnosis of organisational structure are the detailed methods and techniques of assessment. Among many tools listed there are i.a.: tables containing separate sets of criteria for each of the research task. In this case the research task covers features and dimensions of integrated organisational structures, and evaluation criteria, their characteristics described in previous chapters of the paper, questionnaires used to acquire information, according to the above described data on organisational structures, containing also references to sources of the obtained data. This creates a problem of constructing a questionnaire in such a manner that it induces provision of information without considerable workload of the people answering the questions. [Nalepka & Kozina 2007, pp. 163–168]

This proposal requires adaptation to the needs arising from topic of the paper. A more elaborate version of the so-called Check-list is in the paper written by A. Nalepka [2001, pp. 246–250]. Apart from providing information according to proper symbols, relating in the examined case to characteristics of assessment, final state differentiators have also been indicated. The latter do not apply here, due to an unequivocal assumption that the pattern, „benchmark”, is the organisational structure of the acquiring entity.

Thus, a need to build a set of questions arises, addressed to the management of an enterprise, regarding information on the unit's organisational structure. For the purposes of this paper an example (excerpt) has been generated from a set of selected features (dimensions) concerning: organisational structure configuration, centralisation (autonomy) of organisational structure elements, organisational structure formalisation and standardisation. Therefore, the following check-list questions concern the organisational structure configuration, as shown in Table 19:

Table 19. Check-list. Questions regarding configuration of organisational positions and units indispensable to examine the suitability of an organisational structure for integration

	What is the overall number of organisational units in the enterprise?
	What is the number of organisational units and independent positions in the enterprise's management?
	What is the number of organisational units with functional character?
	What is the number of advisory (staff) units?
	What is the number of organisational (executive) units, involving plants or departments?
	What is the total number of organisational unit groups?
	What is the overall number of organisational units' groups ref. product e.g. in a steel plant, rolling mill, etc.?
	How many levels of organisational structure are there?
	What is the scope of operation in organisational units (average)?
	What is the scope of operation in hierarchical (linear) units?
	What is the scope of operation in advisory (staff) units?
	What is the scope of operation in specialised units?
	What is the scope of operation in other organisational units?
	What is the overall size of employment?
	What is the size of employment in linear organisational units?
	What is the size of employment in advisory units?

Source: own study.

In the area of centralisation the check-list involved decision-making powers, as shown in Table 20.

Respondents were asked to provide an opinion from the range of 1 to 10. The substantial development is presented in Table 21.

Table 20. Check-list – decision-making authority

Level	Scope of decision-making powers		
	Independent execution of tasks	Independent disposal of resources	Freedom to perform tasks
II			
Intermediate			
Executive			

Source: own study.

When compiling this list (1–10 scale), it was appropriate to ask questions that evaluated the correctness of hierarchical subordination (unity of order); system of dependencies, whether it is adequate to the specificity of the manufacturing process; and finally what is the degree of conformity of the scope of tasks, powers and responsibilities of managerial positions?

Table 21. Check-list. Questions regarding specialisation of the organisational structure

1.	What is the type of organisation structure in an enterprise?
2.	What is the number of specialised organisational units?
3.	What is the number of specialised posts within organisational units?
4.	What is the number of organisational units of specialised character?
5.	What is the overall size of employment in specialised units?
6.	<p>Please specify the product specialisation in the enterprise, according to the following division:</p> <p>Unit code</p> <p>Annual production value of departments in PLN million:</p> <p>Agglomerating plant</p> <p>Pig iron</p> <p>Steel</p> <p>Rolled products</p> <p>Sintering plant</p> <p>Other</p> <p>Total</p>

Source: own study.

Table 22. Check-list. Questions regarding formalisation and standardisation of the organisational structure

1.	Please estimate approximately the percentage of activities formalised in the enterprise (number actions formalised to the total number)?
2.	Which of the basic types of documents are often used in an enterprise: statute, organisational chart, organisational rules, unit (organisational cell) task chart, work post task card, organisational instructions, detailed instructions (e.g. document flow), internal circulars?
3.	How is the correctness (formal and methodological correctness) of the documentation in the adopted scale from 1 to 10 assessed?
4.	Is the frequency of drawing documentation accurate?
5.	Is the timeliness of drawing documentation kept (scale as above)?
6.	Is the content of the documentation complete?
7.	Does the documentation cover all relevant aspects of a given data or object?
8.	Is there documentation coherence in the company?
9.	Is the documentation up to date?
10.	Is the documentation clear and communicative?
11.	To what extent preparation of documentation is labour intensive ?
12.	Please rate how typical are in terms of employment and performed activities the corporate organisational units?
13.	To what extent have typical document flow procedures been implemented?
14.	To what extent is the scope of activities in organisational units uniformed?
15.	What is the size differences in the typicality of states and activities are in organisational structure groups (e.g. in divisions and sections)?
16.	Are the standards in material management and fixed assets management implemented? To what extent?

Source: own study.

To make the content for the reader clear, the author of the study introduced, in relation to the questions submitted in the check-list questionnaire, the following comments which resulted from two substantive grounds.

Firstly, the questionnaire did not include indicators that were calculated after obtaining the output data, for example, of various types of intensity indicators. Thus, respondents were not asked to calculate the number of employees per organisational unit, or to determine the dominant size of organisational units or their range. They were also not asked to calculate the scope of operation at various man-

agement levels, etc. The purpose was not to engage the cooperating institutions with the additional transfer of data to computers. Obviously, the later defined indices were not calculated only for one steelwork. These were added for the entire group.

Secondly, the research has been used to calculate the differences in data and indicators. These particular steelworks could not employ this procedure or did not have all the data available. Nevertheless, these differences are the essence of research of this paper because they express the degree of similarity of objects, and after some processing, the susceptibility of organisational structures to consolidation.

Generally, characterising the methods and techniques for diagnosing the similarity of integrated organisational structures based on the above-mentioned materials, it must first be stated that the use of known diagnostic methods was selective and that the methods and techniques themselves were significantly modified. It is worth noting that it is impossible to transfer all valid objectives, techniques and methods of diagnosis to research on the similarity of organisational structures, but in relation to their situation within consolidation of enterprises. Differences in the diagnostic test that occur between the diagnosis aimed at improving the organisational structure and aimed at explaining the effect of differences (similarity) of organisational structures on their integration, as presented in Table 23.

The presented comparison can be commented as follows: construction of supplementary tools for making decisions on consolidation of enterprises is based on the basic principles of diagnosis used in the process of improving organisational structures. However, this does not mean accepting them entirely, because the purpose of diagnosis at work is very limited. The work must be done quickly and conclusions must be concise for the beneficiaries (mainly the managers of the acquiring companies).

The particular feature of this transformed procedure is the use of predefined patterns and determination of differences in organisational structures that have a significant impact on the course of organisational process.

The last step is to determine the chances of integration with as small as possible amount of conflict factor.

Table 23. Differences in diagnosis of organisational structures according to purpose of the study

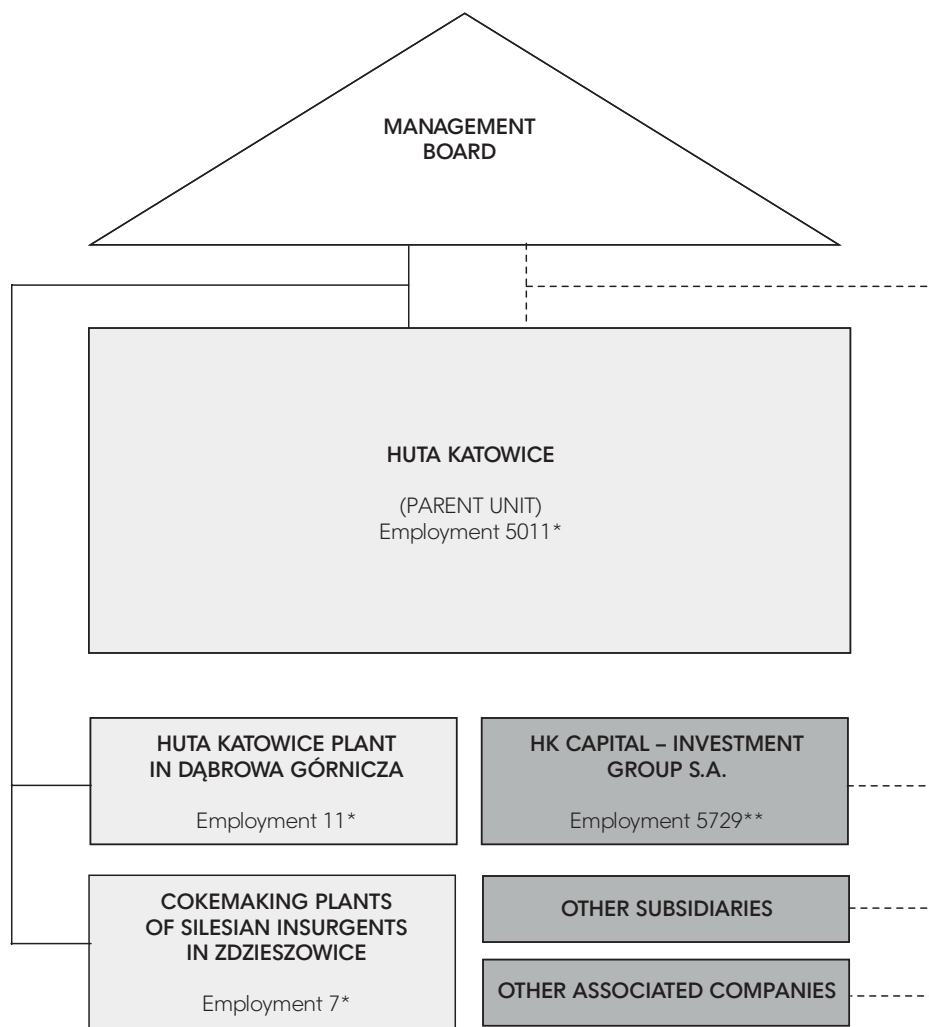
Subject of diagnosis	Diagnosis of organisational structures targeted at	
	perfecting	conditions of conscious integration
Objective	Disclosure of the strengths and weaknesses of organisational structures, their causes and their impact on business efficiency	Detection of differences (similarities) affecting the course of integration
Subject of test	Enterprise – its organisational structure	Two or more companies – the degree of similarity (differences) of their organisational structures
Evaluation criteria	Concerns strengths and weaknesses	Important due to the impact on structural differences
Nominal rating	Wide	Narrow
Normalisation of evaluation criteria	Differentiated according to the nature of evaluation criteria (stimulants, dominant factors, neutral variables)	Only neutral variables
Patterns	Different methods of setting patterns: simulation, forecasting: expert method, comparative analysis, etc.	Patterns predetermined – the pattern carrier is the organisational structure of the incorporating enterprise
Spatial research	Identical	Identical
Dynamic studies	Detection of changes after or during the process of organisational structures improvement – the test may be repeated in stages	Detection of changes after integration of organisational structures – a single test in principle
Cause analysis	An indispensable stage of diagnosis	Lack of analysis of structural differences – the aim is not to repair but to assess the risk of integration
Diagnostic findings	An exhaustive description of the irregularity and repair project	Brief description of structural differences and assessment of the chances of successful integration for decision making purposes

Source: own study.

4.6 Integration of organisational structures of enterprises consolidated in the metallurgical industry

In order to solve the basic problem of this paper i.e. the susceptibility of the metallurgical enterprises' organisational structures to integration, their state at the starting point should first be presented i.e. the situation in the period prior to consolidation and integration. The organisational structure configuration is best read from the organisational chart. However, it should be borne in mind that the image depicted in the chart allows only to a limited extent to take into account the conclusions concerning the depth of decision centralisation, specialisation of the organisational structure or the degree of its standardisation. To a lesser extent this concerns the feature of formalisation. Configuration of the structure is discussed in the order of the steelworks incorporated into PHS S.A. as well as in certain cases integrated with each other. The latter concern the structures of Florian and Batory steelworks, which prior to incorporation into PHS S.A. were integrated with the organisational structure of the Huta Katowice. Discussing the configuration was commenced with presentation of the organisational chart of the Huta Katowice prior to its inclusion in PHS S.A. i.e. from March 2002. The scheme includes two approaches. The first one is of a general nature and concerns location of the Huta Katowice as a parent unit in the organisational structure of the Huta Katowice as an entirety as presented in Diagram 8. [Miśkiewicz 2017, p.]

According to the presented diagram in the general version, the Management Board of the enterprise represented by the General Director was directly managing only the Huta Katowice (parent unit) and Zakłady Koksownicze [*coking plants*] (in the organisation stage). The existence of the post of General Director raises organisational structure of the Huta Katowice by an additional level. Its configuration of the organisational structure can be traced in Diagram 13.

Diagram 12. framework of the organisational structure of the Huta Katowice S.A.

AGREED MARKING

———— FUNCTIONAL SUPERVISION

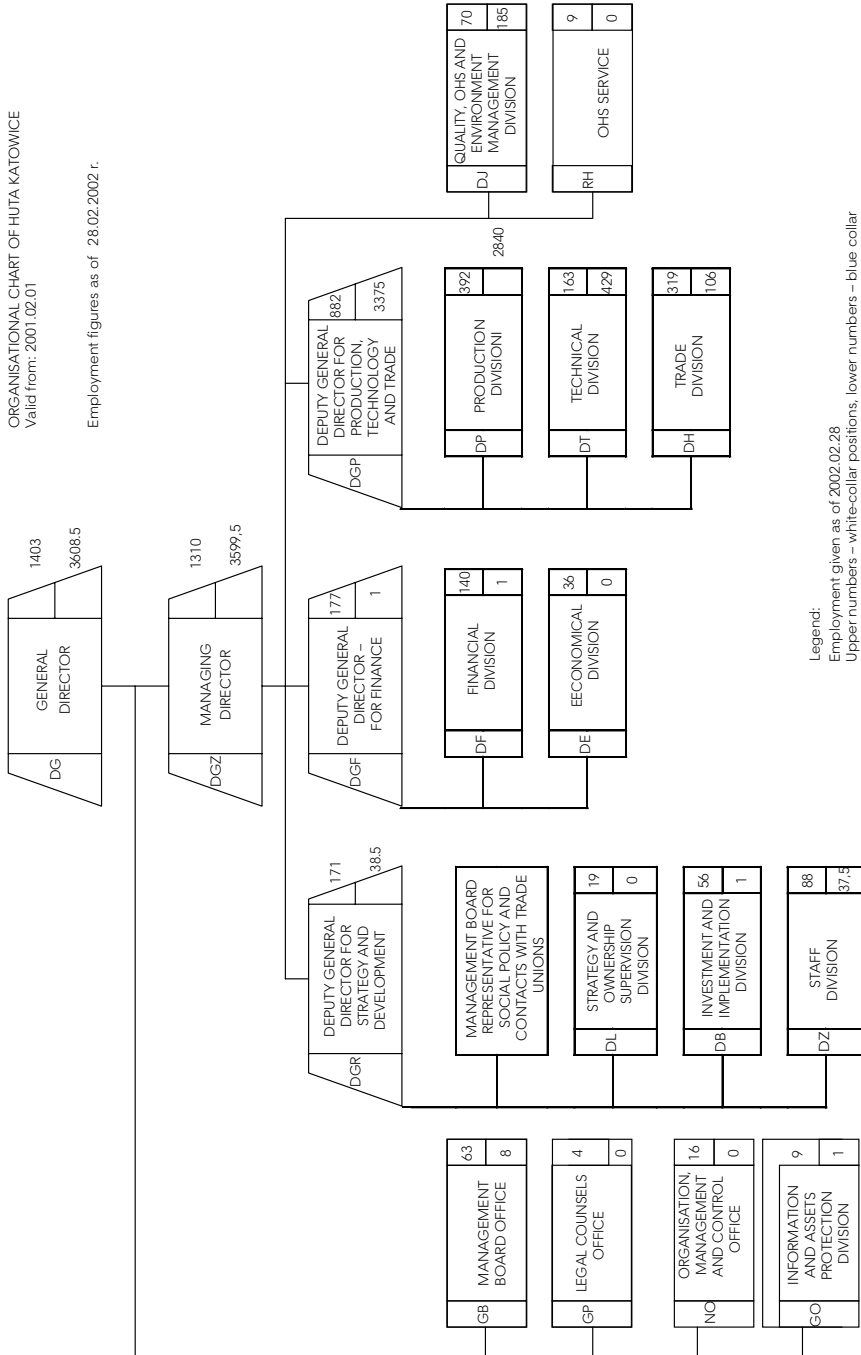
----- OWNERSHIP SUPERVISION

* Given numbers present employment figures of Huta Katowice and Plants of the Company as of 28th February 2002.

** state as of 31st December 2001.

Source: appendix No. 2 to the Regulations of the Company Huta Katowice S.A.

Diagram 13. Organisational Structure of the Huta Katowice



Source: appendix No. 3 to the Regulations of the Company Huta Katowice.

According to the functional criterion at the third level of the hierarchy appears departmentalisation of the management. The division due to the objects occurs at the fourth level of management within the Division of Deputy Director for Production, Technology and Commerce. There is a division into individual branches, covering individual production units, such as furnaces, steel plant, rolling mills, etc. This does not apply to executive members, therefore its detailed version is not visible in the diagram. This is a slightly different situation than the one commonly encountered when the division of labour occurs at the second level of the organisational hierarchy. This is simply a result of the enterprise size. In this arrangement, the CEO manages the company via the Managing Director, thereby creating an extra level of management. Strategic and operational activities are subordinated to the respective divisions under the Chief Executive Officer.

According to the diagram there are four management departments, subordinate to the CEO. These are departments of strategy and development, finance, production, technology and commerce, as well as quality management, health and safety and the environment. Each deputy Director has functional divisions serving the various spheres of the enterprise operations. In total, there are 9 departments and parallel groups that are not formally recognised as departments. The production department dominates with its subordinate divisions (units). This division, employing 3375 blue collar employees and 392 white-collar employees, employs about 93% of the entire workforce and 28% of all non-worker positions. The managers of the divisions use the help of staff (advisory) units, identified as departments. They were shown in the diagram considering the need for a clear mapping of the organisational structure of the management divisions, where the essential division of labour occurs. In general it can be stated that it is not typical for the metallurgical industry in Poland. This is mainly due to the size of the enterprise as well as the manner of its enlargement by means of successive acquisitions of other metallurgical entities within consolidation prior to their sale to the strategic investor.

A metallurgical enterprise is characterised by a high degree of decision-making centralisation powers. Almost all regulatory decisions are taken at high levels of hierarchical management. The reason for this is probably the need to maintain strict organisational discipline and a unified approach in an industry characterised by the necessary technological discipline and a significant threat to occupational safety. Certain interest in such a state of affairs from some higher levels of the hierarchy cannot be excluded. [Podczarski 2016, p. 13 *et seq.*]

The scope of authorisation of lower management levels entails mostly self-reliance in task performance and to a certain extent, defining the method of their implementation, while the disposal of resources is strongly centralised. Due to the operation of up to five basic management departments headed by general manager deputies, the Huta Katowice should be characterised by high specialisation of the organisational structure.

In fact, this is not the case, because in each management department there are divisions completely incompatible with each other, having totally different tasks ahead. For example, the same management department simultaneously covers the production and trade divisions. Another department is at the same time managing the strategic and employee affairs. While some links between these issues can always be found, they are very distant in practice. More specialised are individual divisions, but also here the criteria for amalgamation were perhaps personal factors, rather than the main ones – concentrating, e.g. the quality and safety and health services in one division does not seem to be essential. The proper specialisation of the organisational structure appears only at the level of the division (branch), where specialisation of the organisational structure corresponds to the individual phases of metallurgical production.

The organisational structure of the Huta Katowice is highly formalised. This is a result of both special nature of the heavy industry and the history of metallurgical industry consolidation, first of all by means of incorporation of individual smaller metallurgical enterprises and then the establishment of the Polish Steelworks holding. The problem of the organisational structure standardisation seems to be of slightly different nature. Individual steelworks which constitute part of the Huta Katowice had specific organisational standards, adapted to the size and nature of production, often deriving from their long history as described in the previous chapter of this paper. The Huta Katowice was re-established and created more modern organisational standards. As a result, a particular “conglomerate” of organisational solutions emerged, which was not an element favouring the integration. Particularly, this phenomenon occurred in units which names, scope of activities and powers, as well as subordination to higher levels of management, were very different in the higher organisational structures of steelworks being part of the Huta Katowice after subsequent incorporations. Even more dissimilar were the organisational procedures.

Another subject of preliminary analysis will be the organisational structure of Tadeusz Sendzimir Steelworks in Kraków. It is built on a linear-functional princi-

ple and is a hybrid structure, consisting of holding and integrated division components. Its organisational structure is quite similar to the previously discussed Huta Katowice. Hence, a number of comments and conclusions previously formulated apply to it as well. The main similarity occurs in configuration of the organisational structure. In both steelworks the nature of labour division is established at the third level of the steelworks management. The exception here is a functional group of units subordinate to the General Manager, who appears at the first level of the structure. Management levels do not include the steelwork's authorities: The General Assembly and the Supervisory Board. This situation is illustrated in organisational Diagram 14.

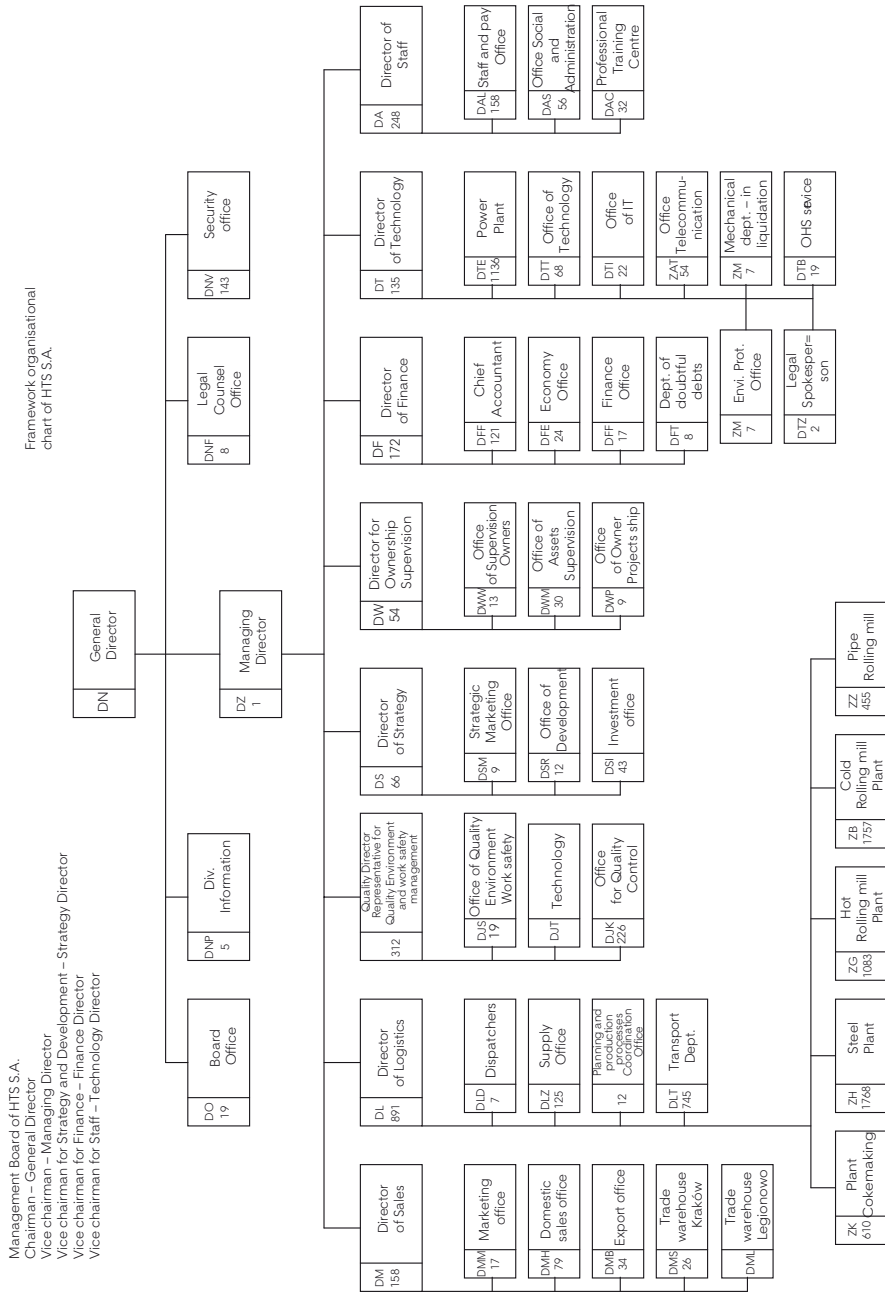
The authorities of HTS S.A. are: The General Meeting, Supervisory Board, and Management Board of the Company. As of 20th January 2002, the Management Board of HTS S.A. comprised 5 people and consisted of:

- Chairman of the Management Board of HTS S.A. – General Director,
- Vice chairman of the Management Board of HTS S.A. – Managing Director,
- Vice chairman of HTS S.A. Strategy and Development – Strategy Director,
- Vice chairman of HTS S.A. Finance – Financial Director,
- Vice chairman of HTS S.A. Technology – Staff Director.

In organisational structure of the Company there is a two-level management system: the Management Board and Operational Management. In the structure of HTS S.A. 9 functional divisions are specified. By contrast, the division of work due to objects takes place only at the fourth level of management. It is expressed in establishing of specialised plants according to the type of production, constituting technological chain from production of coke by the steel plant to the two rolling mills – cold and tube mills. However, it should be emphasised that the organisational structure of T. Sendzimir Steelworks is less developed.

Divisions are more uniform in terms of scope of operations. The structure is characterised by a significant concentration of management powers at the high levels of hierarchy, which results from the range of activities of individual divisions. Although the divisions functioning in the structure do not manage the plants directly, but they take from them all functions related to long-term activity. As in the Huta Katowice, the lower levels are most often autonomous in the performance of tasks and partly in the methods of their implementation, while the disposal of means is strongly centralised through their budgeting [regulation].

Diagram 14. Organisational structure of HTS S.A.



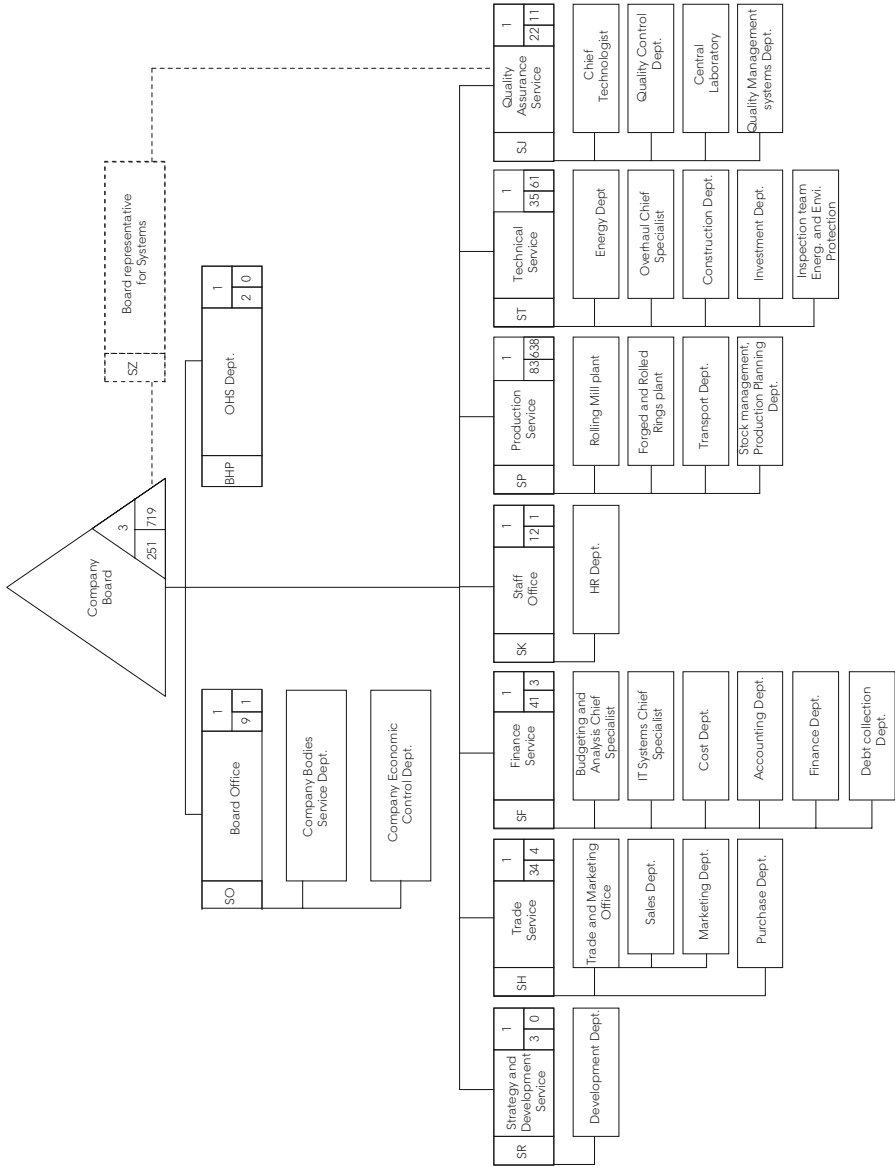
Source: the Huta Katowice organisational regulations.

Some differences are observed as far as the scope of the organisational structure specialisation is concerned. Specialisation of divisions is much larger in the structure of HTS S.A. than in the Huta Katowice. The divisions are very homogeneous and only within the division of the Technical Director the environmental protection office does not seem to fit this specialisation. This results in greater homogeneity and there is no interference as far as giving orders is concerned. Specialisation of the structure *sensu stricto* appears only at the plant level, which is mainly related to technological requirements. Formalisation level in HTS S.A. organisational structure is high, which is basically the standard in the iron and steel industry, although there are differences between steelworks. The tradition of detailed and written assigning the tasks in steelworks goes back to the period when they were the property of foreign capital, German in the decisive part. The custom of broad and precise assignment of tasks and powers was transferred to the Huta Katowice from other steelworks, employees of which were founding employees of both Huta Katowice and HTS S.A. []

Standardisation of organisational structure in HTS S.A. differs from the one existing in the structure of the Huta Katowice. This is mainly due to the fact that the phenomenon of joining other steelworks to the parent entity does not occur, and therefore major configuration differences do not appear. Hence, the integrated divisions in HTS S.A. are more homogeneous and the organisational units' powers are similar in terms of responsibilities, though different in substantial terms. There are no large differences in the number of posts in each department indicating that the principle of not exceeding reasonable scope of operation is preserved. Nevertheless, placing plants (e.g. energy or mechanical) in the sphere of management at the same level as the staff (advisory) deviates the typical standard. This violates to a certain extent the common standards.

Organisational structures of HTS S.A. and the Huta Katowice S.A. differ from the corresponding ones in smaller steelworks significantly. A general overview of the organisational structures of the other smaller steelworks started with the Huta Bankowa in Dąbrowa Górnicza. The organisation of Huta Bankowa sp. z o.o. [Ltd.] before it was incorporated by PHS S.A. presents itself as in the following diagram.

Diagram 15. Organisational Structure of the Huta Bankowa



Source: own study based on organisational documentation of Huta Bankowa S.A.

Unlike the previously discussed enterprises, Huta Bankowa is characterised by a small number of management levels, covering 3 levels excluding the production. The number of integrated divisions recognised here as services is smaller and equals to eight, along with the division of the company management. There were 26 organisational units in the steelworks, and their scope of decision-making powers was presented in Diagram 16.

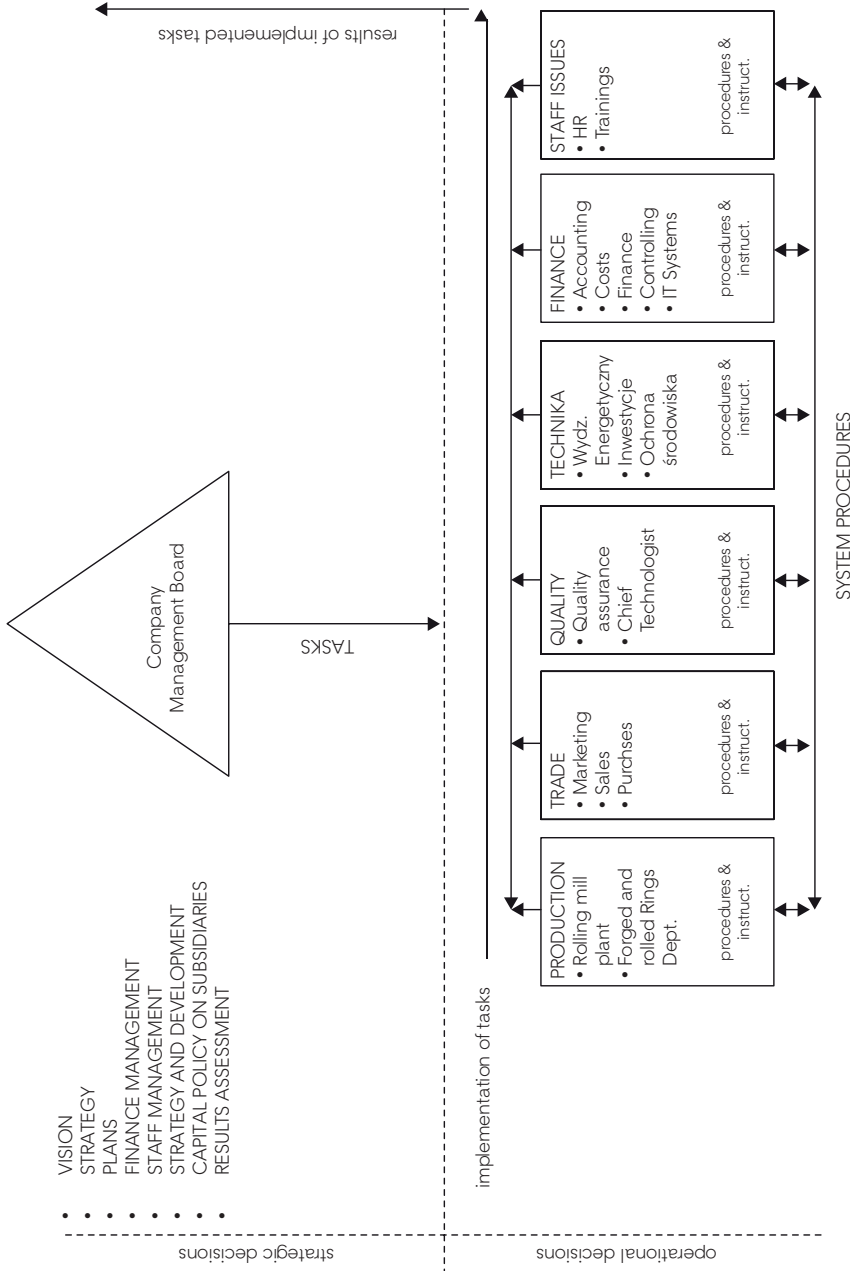
From the data above it can be inferred that strategic management in the Huta Bankowa is very limited and concentrated in the service with only one department at its disposal. It is not however, easy to understand why the strategic problems are placed in the operational sphere. Perhaps it stems from the desire to set the standard in shaping the divisions. It seems, however, that this service should be placed in a division directly under the head of the company's management board.

The managerial powers and decisions in the Huta Bankowa are more decentralised than in the previously discussed large metallurgical organisations. Its organisational structure is characterised by consistent specialisation. Services (divisions) are built logically and they are specialised, without the phenomenon of mutual interpenetration in terms of tasks and powers. This also applies to individual organisational units.

Formalisation, however, is apparently wider and deeper than in old steelworks, which remained relatively unchanged from the inter-war period. It is noteworthy that, despite stringent provisions, the actual documentation was incomplete in terms of its correctness. It was also different from theoretical organisational assumptions. On the other hand, standardisation of the structure is carried out consistently. The size of units is similar in the number of FTEs and is at the level ensuring the right scope of operation.

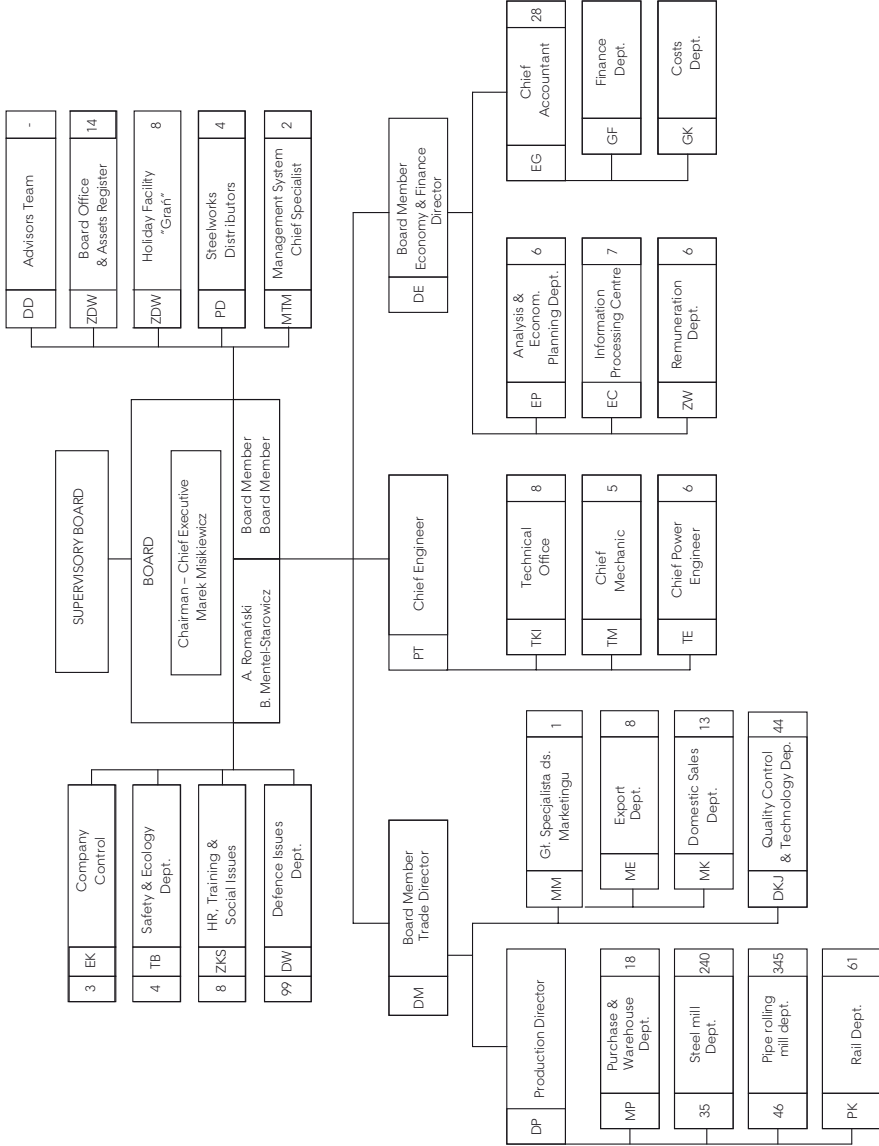
Huta Batory S.A. with the production part constitutes a separate enterprise, is organisationally close to the Huta Bankowa, which has an influence on integration of their organisational structures during the pre-sales consolidation in the PHS S.A. holding. The organisational structure configuration results directly from the organisational chart. Diagram 17 does not contain, for reasons previously described, the structures of production departments.

Diagram 16. Decision structure of the Huta Bankowa



Source: organisational rules of the Huta Bankowa.

Diagram 17. Organisational structure of the Huta Batory



Source: organisational regulations.

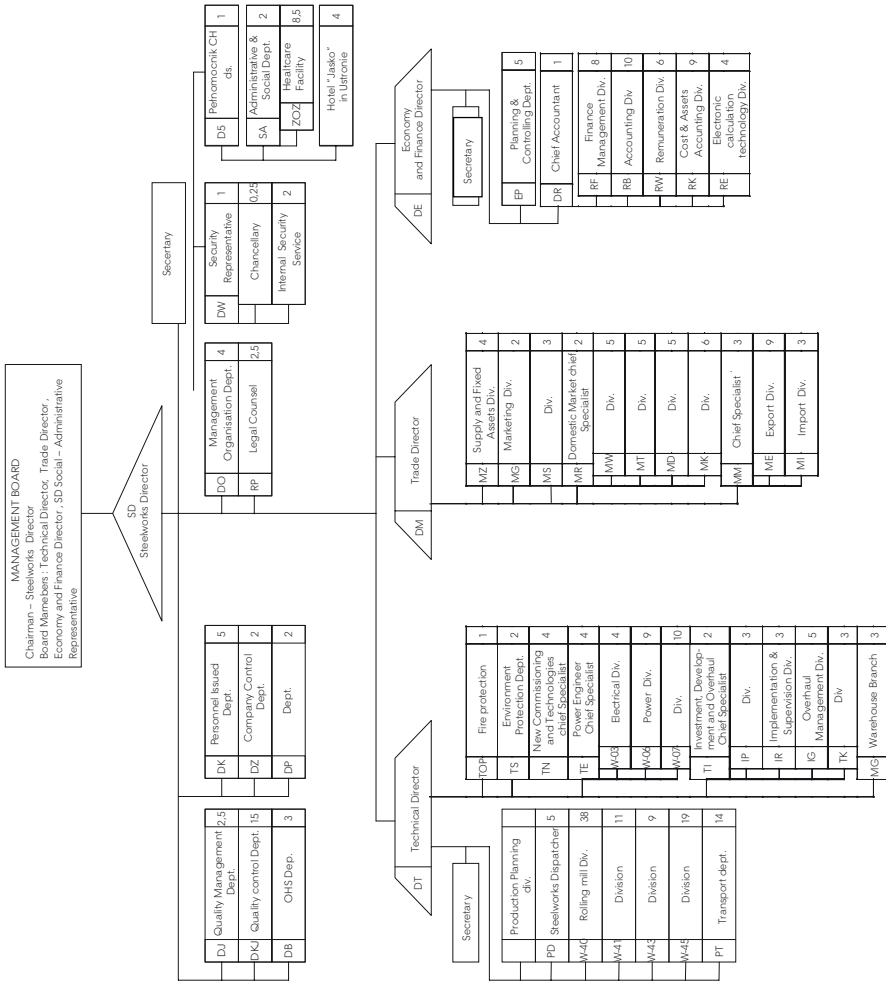
According to the diagram, in the organisational structure of Huta Batory there are seven functional divisions. Their functional division occurs at the second level of management, which is regarded as a novelty.

The Huta Cedler also belongs to a group of smaller steelworks with a similar organisational structure to the two previously presented. Its organisational structure is shown in Diagram 18.

In the organisational structure of Huta Cedler, a generally accepted practice is applied that members of the Management Board are also directors of divisions, except for a member of the board heading the Department of Social and Administrative Affairs in the Chief Executive Officer division. This allows to avoid excessive “slimming” of its structure by creating a separate management level for management board members. The division of labour, similarly to the previous cases, occurs at the second level of steelworks management. Configuration of the organisational structure indicates creation of very strong five integrated divisions. This is the lowest number of divisions so far. On the other hand, the number of organisational units in each of them is very large, which can well exceed the optimal scope of operation of such teams. It is interesting and unique, as far as steelworks are concerned, that two divisions are subordinate to one director – the technical director heads both the production division and the technical division, which seems to be the right solution because of the close connection between spheres of the two divisions, albeit not used in other steelworks. The number of organisational units in the total number of 50 is the result of limiting the number of divisions and increasing the scope of operation. This figure compared to 26 in the Huta Bankowa and 26 in the Huta Batory constitutes a significant difference. Therefore, in the integration process problems may also occur in establishing powers and subordination as well as in standardising the scope of formalisation as well as the process of standardisation of the organisational structure in the consolidated steelworks. The scope of formalisation is similar to that of other old steelworks, although differences in configuration and centralisation may play a significant role in integration, e.g. circulation of documents within the consolidated organisation.

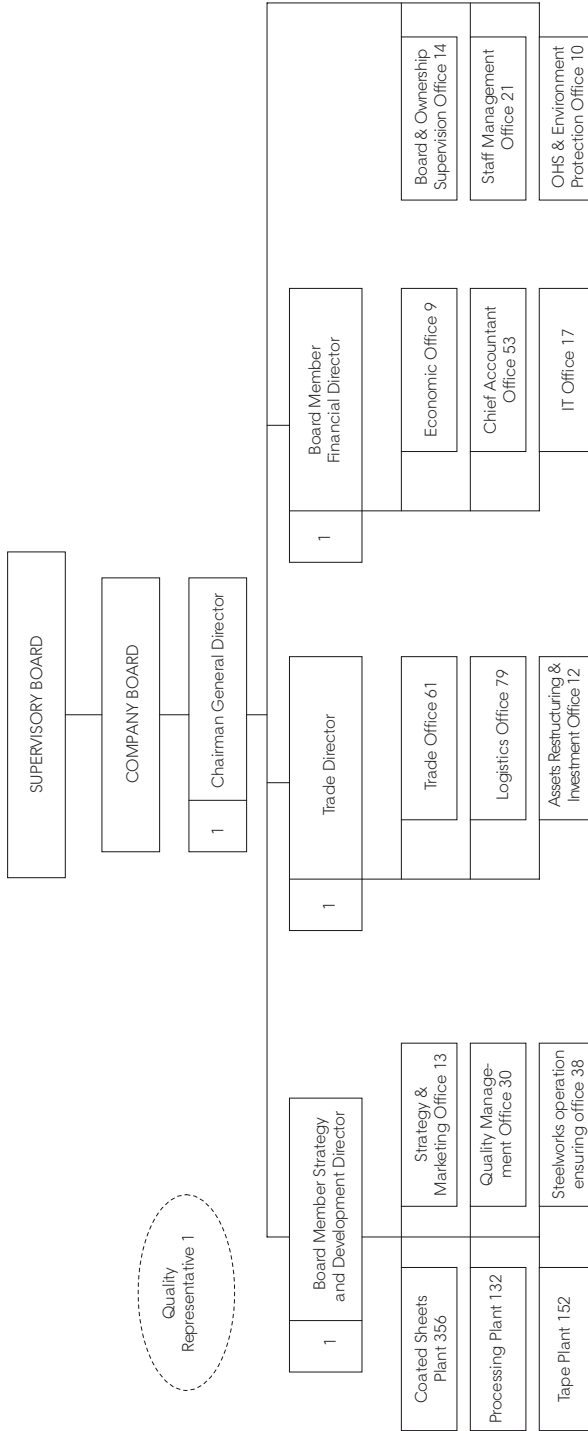
Huta Florian belongs to those that were directly incorporated into the PHS S.A. as the first ones. Its internal organisational structure in an orderly manner is presented in Diagram 19.

Diagram 18. Organisational structure of the Huta Cedler



Source: organisational regulations.

Diagram 19. Organisational structure of the Huta Florian

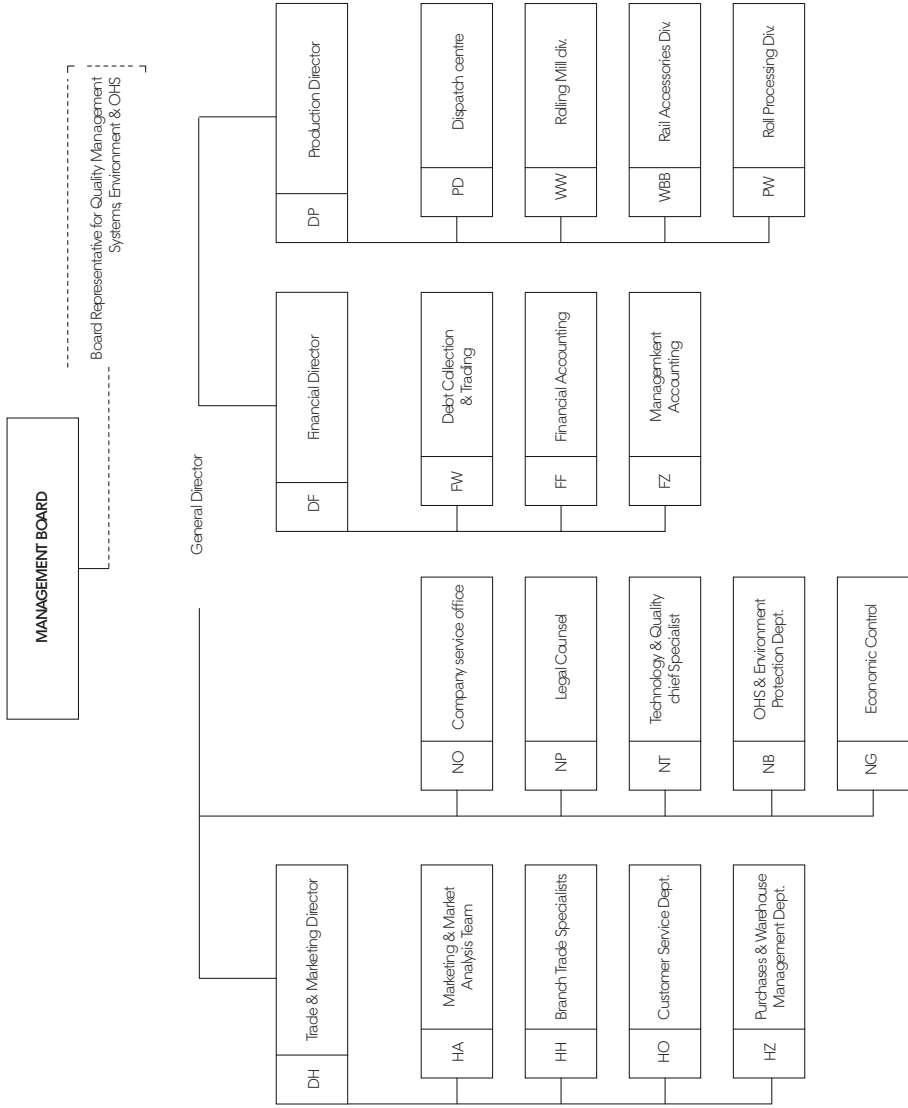


Source: organisational regulations the Huta Florian.

From the diagram shown, it is clear that the configuration of the organisational structure is the least developed in relation to other steelworks. The enterprise is managed on three levels. Although there is an additional management level in the form of „Management Board”, but the members of the management board are at the same time directors of divisions, therefore its role is limited to a few decisions taken in a collegial manner. The organisational structure of the Huta Florian is, therefore, basically flat. This is partly due to the small size of the workforce, and the three production plants, i.e. covered sheets, processing, and tapes. They employ less than 600 employees in total. In this situation, “slimming” the structure would be pointless. In addition, the divisions are strongly integrated, scarce and specialised. This consequently results in a high degree of decision centralisation at senior management levels. This corresponds with high level of structure formalisation. The standardisation of units is scarce, because with only 15 organisational units that perform very diverse functions, it is difficult to classify them. The drawback is the fact that differences in employment in individual organisational units are frequent.

The organisational structure of the Huta Królewska in Chorzów was slightly differently shaped. Although configuration of the structure was also three-levelled as in the previously discussed steelworks, but the employment rate of the white-collar posts was twice lower. This was a result of outsourced accounting, IT, human resources, maintenance and transportation services, which significantly reduced the scope of operation at the second level of management and in organisational units. These tasks were taken over by the parent unit of Huta Kościuszko, from which the Huta Królewska was created. However, the principle of functionalisation in the division of labour has been preserved at the second level of management. The organisational structure of the Huta Królewska is shown in Diagram 20.

Diagram 20. Organisational structure of the Huta Królewska



Source: organisational regulations the Huta Królewska.

Due to the lack of data on employment in individual divisions and organisational units, only an overall employment status prior to consolidation has been given. Hence, for the total number of 830, 684 people worked in the production and 146 were employed as white collars.

In total, there are four organisational divisions in the Huta Królewska, characterised by consistent specialisation. The number of organisational units is not big, (16) but as it has been described above it results from the move of four essential services outside the enterprise. Decisions are heavily centralised. The typical character of organisational units is difficult to be established due to the lack of data on employment in individual units, both in terms of number of full-time staff and specialised posts. Hence, when the level of standardisation is discussed, it is difficult to submit a precise evaluation. It should be assumed that it is on a similar level as in other steelworks.

The above presented overview of organisational structures in the steelworks prior to their consolidation with each other and within the holding helps to comprehend the situation regarding the degree of their similarity.

CONCLUSION

The analysis of the organisational structure functioning in the integration process does not apply to all problems connected with functioning of integrated divisions in consolidated metallurgical enterprises. However, it sets the direction for further research and rational solutions. Nevertheless, at this stage of the study on integrated divisions, several conclusions may be formulated.

In the due course of the research and while analysing the obtained results, it was confirmed that there is a considerable variation in integrated divisions created on the basis of the principle of departmentalisation, especially in management departments in the organisational structures of metallurgical enterprises. This indicates [Cyfert 2012] that there is a necessity for changes within three organisational areas: definitional which determines the desired pattern of organisation development; regulatory, defining operational standards and patterns valid in the organisation, and performance, indicating the means of performing operational activities.

The preliminary comparative analysis of the integrated division model in the audited enterprises confirms that it was quite similar. However, taking into account the range of actual functions performed by means of determining the degree of their „blurring”, diversity was considered to be significant.

In the process of mergers or acquisitions, the differentiation of management departments (in this case especially the integrated divisions), affects the integra-

tion susceptibility of organisational structures. The research conducted by the author shows that the differences in configuration of consolidated structures are often a source of conflicts, slowdown in decision-making processes, creation of additional costs and competition in the management departments of enterprises.

It was considered that departmentalisation, especially of integrated divisions in metallurgical enterprises, is a type of structure that is universally binding and is important in integration processes. Cooperation between departments allows for proper communication and obtaining feedback. To avoid appropriation of innovation between departments, it should be run as a common element of several departments. Therefore, teamwork should be organised in the form of workshops in order to increase teamwork skills and collaboration between company departments.

A well-organised control system is an important link in the merger or acquisition process. When executing it, managers assess whether structures and strategies play their part, whether they are useful and whether they can be changed if needed. The design of an effective communication system enables stimulating the formation of information channels, thus contributing to the greater effectiveness of undertaken innovation changes. Improving the flow of information requires, above all, a greater emphasis on teamwork and standardisation of existing processes. This will allow for faster exchange of information and experience in a team, as well as to stimulate employees to constructive analysis of creativity and collaboration problems.

BIBLIOGRAPHY

- Ackoff, R. (1999), *Re-Creating the Corporation: a design of organizations for the 21st century*, Oxford Univ. Press, New York.
- Aernoudt, R., Erikson, T. (2003), *Business Angels Networks: A European Perspective*, "Journal of Enterprising Culture" No. 3.
- Aernoudt, R. (2005), *Executive Forum: Seven Ways to Stimulate Business Angels' Investments*, "Venture Capital" No. 4.
- Alonso, R., Dessen, W., Matouschek, N. (2008), *When does coordination require centralization?* "The American Economic Review" No. 98(1), pp. 145–179.
- Arendt, Ł. (2015), *Produktywność jako kategoria badawcza* [in:] Arendt, Ł., Kryńska, E. (ed.), *Technologie informacyjne i komunikacyjne a produktywność w Polsce i krajach Europy Środkowo-Wschodniej*, Łódź.
- Bielecki, J.K., Pawłowicz, L. (red.) (2015), *Odbudowa wartości przedsiębiorstwa w kryzysie*, [w:] *Zarządzanie wartością spółki kapitałowej*, Warszawa.
- Bielski, M. (2002), *Podstawy teorii organizacji i zarządzania*, Warszawa.
- Bitkowska, A. (2013), *Zarządzanie procesowe we współczesnych organizacjach*, Warszawa.
- Blau, P.M. (1974), *On the Nature of Organizations*, John Wiley, New York.
- Blau, P.M., Wolf, V. Heydebrand, R., Stauffer, E. (1968), *Wechselbeziehungen*, Cologne.

- Brdulak, J.J. (2005), *Zarządzanie wiedzą a proces innowacji produktu. Budowanie przewagi konkurencyjnej firm*, Warszawa.
- Brinlee, J.B., McClure, F.G., Bell, J.R., Bullock CH.A. (2004), *Educating entrepreneurs of Angel and Venture Capital*, "Financing Options", www.sbaer.uca.edu/research/asbe/2004
- Brzozowska, K. (2011), *Due diligence jako źródło informacji w procesie podejmowania decyzji inwestycyjnych*, „Zeszyty Naukowe SGGW” No. 91.
- Bugdol, M., Goranczewski, B. (2010), *Projakościowe usprawnianie organizacji oparte na procesach. Koncepcje, metody, narzędzia*, Oświęcim.
- Bungay, S. (2012), *Jak z sukcesem wdrożyć strategię*, „Harvard Business Review Polska” No. 115.
- Chandler, A.D. (1962), *Strategy and Structure*, Cambridge.
- Cyfert, S. (2012), *Granice organizacji*, Poznań.
- Davenport, T.H. (2007), *Zarządzanie pracownikami wiedzy*, Kraków.
- Drucker, P. (2009), *Menadżer skuteczny*, Warszawa.
- Drucker, P. (1999), *Spółeczeństwo pokapitalistyczne*, Warszawa.
- Encyklopedia PWN* (1995), Warszawa.
- Fayol, H. (1947), *Administracja przemysłowa i ogólna*, Poznań.
- Flaszewska, S. (2016), *Projektowanie organizacyjne w zarządzaniu wiedzą*, Warszawa.
- Flaszewska, S., Zakrzewska-Bielawska, A. (2013), *Organizacja z perspektywy zasobów – ewolucja w podejściu zasobowym* [in:] Adamiak, A. (ed.), *Nauka o organizacji. Ujęcia dynamiczne*, Warszawa.
- Flaszewska, S., Zakrzewska-Bielawska, A. (2013a), *Organizacyjne uczenie się jako atrybut przedsiębiorstwa sektora high-tech*, „Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu” No. 310.
- Frąckowiak, W. (1998), *Fuzje i przejęcia przedsiębiorstw*, Warszawa.
- Frese, B. (2016), *Cool: A human history*, New York.
- Freund, J.E. (1968), *Podstawy nowoczesnej statystyki*, Warszawa.
- Gajdzik, B. (2016), *Sieciowa organizacja grup kapitałowych w krajowym sektorze hutniczym*, „Organizacja i Zarządzanie” No. 1/33.
- Grajewski, P. (2012), *Procesowe zarządzanie organizacją*, Warszawa.

- Grudzewski, M.W., Hejduk, J. (2004), *Zarządzanie wiedzą w przedsiębiorstwie*, Warszawa.
- Hall, R.H. (2005), Tolbert, P.S., *Organizations. Structures, Processes, and Outcomes*, Pearson, Prentice Hall, Upper Saddle River.
- Hammer, N., Stanton, S. (1999), *How Process Enterprises Really Work*. "Harvard Business Review".
- Hamrol, A. (2016), *Strategie i praktyki sprawnego działania. Lean, six sigma i inne*, Warszawa.
- Hatch, M.J. (2002), *Teoria organizacji*, Warszawa.
- Herdan, A. (ed.) (2008), *Fuzje, przejęcia. Wybrane aspekty integracji*, Kraków.
- Hofstade, G. (2000), *Kultury i organizacje. Zaprogramowanie umysłu*, Warszawa.
- Hopej, M. (1999), *Podstawy zarządzania*, Wrocław.
- Hopej, M., Martan, L. (ed.) (1999), *Przedsiębiorstwo*, Wrocław.
- Ignacy, J., Wołczek, P. (2014), *Forma strategii* [in:] Scien, E., Kaleta, A., *Ewolucja zarządzania strategicznego w trakcie rozwoju przedsiębiorstw*, Warszawa.
- Jaszek, J. (1984), *Doskonalenie struktury organizacyjnej przedsiębiorstwa*, Katowice.
- Kaleta, A. (2010), *Zarządzanie strategiczne w praktyce i teorii*, Wrocław.
- Kalinowski, T.B. (2011), *Modele oceny dojrzałości procesów*, „Acta Universitatis Lodzianis Folia Oeconomica” No. 258.
- Kieżun, W. (1980), *Podstawy organizacji i zarządzania*, Warszawa.
- Kłak, M. (2010), *Zarządzanie wiedzą we współczesnym przedsiębiorstwie*, Kielce.
- Kotarbiński, T. (1965), *Traktat o dobrej robocie*, Wrocław.
- Koźmiński, A.K., Jemielniak, D. (2008), *Zarządzanie od podstaw*, Warszawa.
- Krupski, R. (ed.) (2005), *Zarządzanie przedsiębiorstwem w turbulentnym otoczeniu*, Warszawa.
- Krzakiewicz, K., Cyfert, S. (2013), *Teoretyczne problemy zarządzania organizacjami*, Poznań.
- Krzakiewicz, K., Cyfert, S. (2015), *Podstawy zarządzania organizacjami*, Poznań.
- Krzyżanowski, L. (1992), *Podstawy nauk o organizacji i zarządzaniu*, Warszawa.
- Leksykon Zarządzania*, Adamska, M. (ed.) (2004), Warszawa, pp. 514–515.

- Lichtarski, J.M., (2007), *Bariery rozwoju i upowszechniania się nowoczesnych struktur organizacyjnych* [in:] Przybyła, M. (ed.), *Zarządzanie – kontekst strategiczny, kulturowy i zasobowy*, Wrocław.
- Lichtarski, J., Haus, B., Jagoda, H. (1999), *Struktura organizacyjna przedsiębiorstwa i jej kształtowanie* [in:] *Podstawy nauki o przedsiębiorstwie*, Lichtarski, J. (ed.), Wrocław.
- Łobos, K. (2003), *Teorie struktur organizacyjnych. Stan i perspektywy*, Wrocław.
- Matusiak, K.B. (2010), *Budowa powiązań nauki z biznesem w gospodarce opartej na wiedzy. Rola uniwersytetu w procesach innowacyjnych*, Warszawa.
- Mączyńska, E. (2014), *Liberalismus – Neoliberalismus – Ordoliberalismus. Orientierungen zur Wirtschafts – und Gesellschaftspolitik*, (współautor).
- Miczka, M. (2009), *Skutki globalizacji kryzysu gospodarczego dla hutnictwa żelaza i stali*, „Prace Instytutu Metalurgii Żelaza” No. 2.
- Mikuła, B. (2005), *Geneza przesłanki i istota zarządzania wiedzą* [in:] Perechuda, K. (ed.), *Zarządzanie wiedzą w przedsiębiorstwie*, Warszawa.
- Mikuła, B., Pietruszka-Ortyl, A., Potocki, A. (2002), *Zarządzanie przedsiębiorstwem XXI wieku*, Warszawa.
- Miśkiewicz, R. (2009), *Wykorzystanie podobieństwa struktur organizacyjnych w procesie przekształcania organizacji przedsiębiorstw*, „Zeszyty Naukowe Małopolskiej Wyższej Szkoły Ekonomicznej w Tarnowie” No. 1/12.
- Miśkiewicz, R. (2012), *Profile wiedzy w kontekście jej transferu w procesie fuzji*, Katowice.
- Miśkiewicz, R. (2012), *Zróżnicowanie struktur organizacyjnych ze względu na układ pionów scalonych na przykładzie przedsiębiorstw hutniczych*, Warszawa.
- Miśkiewicz, R. (2016), *Problem oceny struktur organizacyjnych w kontekście ich podobieństwa*, „Zeszyty Naukowe Politechniki Śląskiej” „Organizacje i Zarządzanie” Vol. 78, Zabrze.
- Miśkiewicz, R. (2017), *Knowledge transfer in processes of mergers and acquisitions of metallurgical enterprises*, Warszawa.
- Moszkowicz, K. (ed.) (2015), *Wdrażanie strategii w polskich przedsiębiorstwach*, Warszawa.
- Mreła, K. (1988), *Struktury organizacyjne. Analiza wielowymiarowa*, Warszawa.
- Nalepka, A. (2001), *Struktura organizacyjna*, Kraków.

- Nalepka, A., Kozina, A. (2007), *Podstawy badania struktury organizacyjnej*, Kraków.
- Nelson, D.L., Quick, J.C. (2002), *Understanding Organizational Behaviour. A Multimedia Approach*, South Western, Ohio.
- Noga, A. (2009), *Teoria przedsiębiorstwa*, Warszawa.
- Nogalski, B., Kowalczyk, A. (2006), *Skuteczność zarządzania wiedzą w przedsiębiorstwach wiedzy* [in:] Jagoda, H., Lichtarski, J. (ed.), *Nowe kierunki w zarządzaniu przedsiębiorstwem – celowość, skuteczność, efektywność*, Wrocław.
- Nowak, D. (2012), *Zarządzanie międzyorganizacyjnymi relacjami kooperacyjnymi w przedsiębiorstwach przemysłowych*, Poznań.
- O’Connell, J., Pyke, J., Whitehead, R. (2006), *Mastering Your Organization’s Processes. A Plain Guide to Business Processes Management*, Cambridge University Press.
- O’Reilly, C.A., Tushman, M.L. (2009), *The ambidextrous organization*, “Harvard Business Review” Vol. 82, No. 4.
- Ober, J. (2007), *Informacja i komunikacja w zarządzaniu*, Gliwice.
- Ober, J. (2013), *Funkcja i rola efektywnej komunikacji w zarządzaniu*, Katowice.
- Olszewska, B., Czarnecka, M., Piwoni-Krzeszowska, E. (ed.), *Przedsiębiorstwo jako organizacja ucząca się*, Wrocław.
- Pańków, W. (2014), *Instytucje i organizacje*, Warszawa.
- Paul, S., Whitham, G., Johnson, J.B. (2003), *The operation of the informal venture capital market in Scotland*, “Venture Capital” Vol. 5, No. 4.
- Piotrowicz, A. (2009), *Typy struktur organizacyjnych i ich znaczenie dla zarządzania współczesnym przedsiębiorstwem*, Toruń.
- Podczarski, S. (2016), *Efektywność ekonomiczna procesów restrukturyzacji przedsiębiorstw przemysłowych. Na przykładzie hut żelaza w Polsce*, Warszawa.
- Polak, A. (2012), *Nauczanie organizacji przedsiębiorstw za pomocą mapy wiedzy*, “Przegląd Organizacji” No. 3.
- Porter, M. E. (2001), *Porter o konkurencji*, Warszawa.
- Porter, M.E. (1992), *Strategia konkurencji. Metody analizy sektorów i konkurentów*, Warszawa.
- Potocka, A. (2001), *Wiedza – główny czynnik konkurencyjności przedsiębiorstwa*, Szczecin.

- Potoczek, N. (2016), *Zarządzanie zasobami ludzkimi w organizacji zorientowanej procesowo*, Warszawa.
- Prasad, D., Bruton, G.D., Vozilis, G. (2000), *Signalling value to business angels: the proportion of the entrepreneur's net worth invested in a new venture as a decision signal*, "Venture Capital" Vol. 2, No. 3.
- Pugh, S., Hickson, D.J., Hinnings, G.R., Turner, C. (1969), *The context of Organizations Structure*, "Administrative Science Quarterly" No. 4.
- Pyka, J. (2010), *Nowoczesność przemysłu i usług. Współczesne wyzwania i uwarunkowania rozwoju przemysłu i usług*, Katowice.
- Ranson, S., Hinings, B., Greenwood, R. (1980), *The Structuring of Organizational Structures*, "Administrative Science Quarterly" No. 25.
- Raps, A. (2005), *Handbook of Business Strategy*, Emerald Group Publishing Limited.
- Robbins, S.P., Coulter, M. (2005), *Management*, New York.
- Romanowska, M. (2015), *Planowanie strategiczne w przedsiębiorstwie*, Warszawa.
- Sarvary, M. (1999), *Knowledge Management and Competition in the Consulting Industry*, „California Management Review” No. 2.
- Schaff, A. (1983), *Szkice o strukturalizmie*, Warszawa.
- Sikorski, C. (2005), *Kierunki ewolucji rozwiązań strukturalnych* [in:] Błaszczyk, W. (ed.), *Metody organizacji i zarządzania. Kształtowanie relacji organizacyjnych*, Warszawa.
- Sikorski, C. (2002), *Kultura organizacyjna*, Warszawa.
- Skorupińska, A. (2015), *Czynniki komplementarne wobec TIK a produktywność w krajach Europy Środkowo-Wschodniej* [in:] Arendt, Ł., Kryńska, E., *Technologie informacyjne i komunikacyjne a produktywność w Polsce i krajach Europy Środkowo-Wschodniej*, Łódź.
- Słowiński, B. (2010), *Inżynieria zarządzania procesami logistycznymi*, Koszalin.
- Śnieżek, E., Wiatr, M. (2014), *Przepływy pieniężne*, Warszawa.
- Sopińska, A. (2015), *Znaczenie i uwarunkowania zarządzania wiedzą w organizacjach sieciowych* [in:] Bojewska, B. (ed.), *Innowacyjność organizacji sieciowych w gospodarce opartej na wiedzy*, Warszawa.
- Stabryła, A. (ed.) (2009), *Doskonalenie struktur organizacyjnych przedsiębiorstw w gospodarce opartej na wiedzy*, Warszawa.

- Stabryła, A. (2006), *Zarządzanie projektami ekonomicznymi i organizacyjnymi*, Warszawa.
- Stelmaszczyk M., Karpacz J. (2016), *Związek między dzieleniem się wiedzą a innowacjami mediowany zaufaniem - poziom indywidualny*, Wrocław.
- Stewart, D.W., Shamdasani, P.N. (2014), *Focus groups: Theory and Practice*, Los Angeles, London, New Delhi, Singapore.
- Strategor (2001), *Zarządzanie firmą*, Warszawa.
- Świtalski, W. (2005), *Innowacje i konkurencyjność*, Warszawa.
- Szpunar, P. (2000), *Polityka pieniężna. Cele i warunki skuteczności*, Warszawa.
- Taylor, F.W. (1947), *Zarządzanie warsztatem wytwórczym*, Poznań.
- Toffler, A. (2003), *Zmiana władzy. Wiedza, bogactwo i przemoc prognozy XXI wieku*, Poznań.
- Trzcieliński, S. (2001), *Kultura sprzyjająca uczeniu się organizacji – krok w kierunku przedsiębiorstwa przyszłości*, "Zeszyty Naukowe Politechniki Poznańskiej" No. 30.
- Trzmielak, D. (2013), *Komercjalizacja wiedzy i technologii: determinanty i strategie*, Łódź.
- Van Osnabrugge, M.A. (2000), *Comparison of Business Angel and Venture Capitalist Procedures: an Agency Theory-Based Analysis*, "Venture Capital" No. 2.
- Waterman, R.H., Peters, T.J., Phillips, J.R. (1980), *Structure is not organization*, "Business Horizons" Vol. 23(3).
- Weber, M. (1947), *The Theory of Social and Economic Organization*, London.
- Włodarski, A., Grzesiuk, E. (2002), *Wpływ struktury organizacyjnych na sprawne zarządzanie przedsiębiorstwem*, Ostrołęka.
- Wójtowicz, J. (2007), *Due diligence, czyli ryzyko pod kontrolą*, www.ipo.pl
- Wyrwicka, M.K., Grzelczak, A.U., Krugielka, A. (2010), *Polityka kadrowa przedsiębiorstwa*, Poznań.
- Zakrzewska-Bielawska, A. (2007), *Struktura organizacyjna przedsiębiorstw w ujęciu klasycznym, współczesnym i przyszłym* [in:] Czekaj, J. (ed.), *Tradycja i współczesność w metodologicznym nurcie zarządzania*, Kraków.
- Zakrzewska-Bielawska, A. (2012), *Typy struktur organizacyjnych* [in:] Zakrzewska-Bielawska, A. (ed.), *Podstawy zarządzania. Teoria i ćwiczenia*, Warszawa.

LIST OF DIAGRAMS, FIGURES AND TABLES

Diagram 1. Issues to be considered while the process of creation of the organisational structure	24
Diagram 2. Dominant structural orientations	27
Diagram 3. Organisational structure of integrated units	28
Diagram 4. Sample organisational structure of steelworks	29
Diagram 5. Organisational layout of the divisional structure	31
Diagram 6. Network structure	32
Diagram 7. Comparison of the particular types of organisational structures studied in the paper, in terms of their similarity	91
Diagram 8. Integration of organisational structures of holding and steelworks	91
Diagram 9. Characteristics of various types of organisational structures studied in the paper, in terms of their similarity	92
Diagram 10. Diagram of similarity (differences) of the characteristics for the selected module of organisational unit configuration	94
Diagram 11. Standard course of due diligence procedure	105
Diagram 12. framework of the organisational structure of the Huta Katowice S.A.	116
Diagram 13. Organisational Structure of the Huta Katowice	117
Diagram 14. Organisational structure of HTS S.A.	121
Diagram 15. Organisational Structure of the Huta Bankowa	123
Diagram 16. Decision structure of the Huta Bankowa	125
Diagram 17. Organisational structure of the Huta Batory	126
Diagram 18. Organisational structure of the Huta Cedler	128
Diagram 19. Organisational structure of the Huta Florian	129
Diagram 20. Organisational structure of the Huta Królewska	131

Figure 1. Organisational structure in the light of classical definitions	13
Figure 2. Leavitt's system model	19
Figure 3. Model 7S	19
Figure 4. Onion model	20
Figure 5. Hierarchy of knowledge	40
Figure 6. The path of relations between objectives and their components	55
Figure 7. Activities to be performed during the pre-acquisition phase	103
Table 1. Development trends in organisational structures	14
Table 2. Functions of the organisational structure	16
Table 3. Features of structure by different authors	17
Table 4. Factors determining the organisational structure by different researchers	21
Table 5. List of areas and elements of enterprise organisation knowledge	38
Table 6. List of areas and elements of enterprise organisation knowledge	41
Table 7. Knowledge components in business consolidation process	50
Table 8. List and sum of knowledge components with repetitions	52
Table 9. Comprehensive summary of the share of knowledge in the objectives for mergers	55
Table 10. Selected definitions of the organisational structure	57
Table 11. Factors conducive to centralisation and decentralisation	60
Table 12. Characteristics and measures chosen to examine the susceptibility of organisational structures to integration	68
Table 13. Weights assigned to parameters (preferential aspects of features of integrated organisational structures)	73
Table 14. Organisational structures and their characteristics (dimensions)	97
Table 15. Selected taxonomic methods of ordering objects	99
Table 16. Example measures (metrics) of similarity used in taxonomic studies (standard methods)	101
Table 17. Stages of research using taxonomic methods	102
Table 18. Scope of due diligence procedure	104
Table 19. Check-list. Questions regarding configuration of organisational positions and units indispensable to examine the suitability of an organisational structure for integration	110
Table 20. Check-list – decision-making authority	111
Table 21. Check-list. Questions regarding specialisation of the organisational structure	111
Table 22. Check-list. Questions regarding formalisation and standardisation of the organisational structure	112
Table 23. Differences in diagnosis of organisational structures according to purpose of the study	114



Radosław MIŚKIEWICZ PhD is an outstanding manager with extensive experience in managing companies from the metallurgical sector. The precursor of many unconventional solutions concerning new public policy and sustainable use of environmental resources. He led numerous R&D projects, result of which are innovative technologies, new products and the possibility to use modern, contemporary technologies to protect the environment. He delivers his knowledge on the most important international forums for the metallurgical and financial sectors, including: PDAC in Convention in Toronto, Mines & Money events, Commodities Research Unit, Metal Bulletin, Eurofinance M&A, M&A at Gateway Conference or LME weeks. He takes an active part in promoting modern, creative human resources for the economy by passing on his knowledge and experience to students, academics and business. He is the author or co-author of numerous scientific publications i.a. on organisational structures of metallurgical enterprises, processes of their transformation. In the field of knowledge transfer in the process of mergers and acquisitions, his works fill the gap in Polish and international scientific and economic literature. This is illustrated by i.a. numerous publications, including: *Knowledge transfer in mergers and acquisitions processes in the metallurgical industry*. PWN, Warsaw 2016; *Transfer wiedzy w procesach fuzji i przejęć przedsiębiorstw w branży hutniczej*. Monograph. Wydawnictwo Naukowe PWN, Warszawa 2017; *The problem of organisational structures evaluation in the context of their similarity*. Scientific Papers of Silesian University of Technology, Organisation and Management vol. 78, Zabrze 2016; *Knowledge profiles in the context of its transfer in the merger process*. Collective work edited by Jan Pyka. TNOiK, Katowice 2012 and others.

He is a member of Scientific Committees (Scientific Councils), magazines dealing with dissemination of scientific achievements of Polish and international economy, management sciences researchers, including: Progress in Economic Sciences; European Cooperation Scientific Approaches and Applied Technologies.

Cena 42 zł

ISBN 978-83-8085-471-0



9 788380 854710

Difin

ul. F. Kostrzewskiego 1
00-768 Warszawa
tel. 22 851 45 61, 22 851 45 62
fax 22 841 98 91
www.difin.pl