

Designing the Organizational Structure of Enterprises Operating in a Highly Turbulent Environment

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ABSTRACT

The subject of this article is the methodology of designing the organizational structure of the enterprise. The general principles of structure design are common to different enterprises. However, the context of the enterprise's internal and external conditions and its strategy differentiate the importance of these principles and the structural tools we create. In the Faculty of Management Engineering of Poznan University of Technology, a methodology for designing organizational structures has been created for many years. As a result, a multidimensional structure design space was developed, which provides a methodological basis for more specific methodologies. This article focuses on the designing of organizational structures of enterprises operating in a highly changeable, turbulent environment. The methodological concept presented here includes a methodology for modelling the organizational structure, design principles and examples of design documents.

Keywords: Organizational structure, Turbulent environment, Design

INTRODUCTION

The subject of this article is the methodology of designing the organizational structure of the enterprise. The aim of the research is to summarize many years of theoretical and empirical research on the organizational structures of enterprises and the methodology of their design, especially the design of organizational structures of enterprises operating in a turbulent environment. This research has been carried out for more than two decades at the Faculty of Management Engineering of Poznan University of Technology. Theoretical research has led to the definition of a multidimensional organizational structure design space (Pawlowski E., 2009). In parallel, this multidimensional concept was used to develop an organizational structure design methodology for Agile Enterprises (Pawlowski E., Pawlowski K., 2008). The next step was to develop a methodology for designing an organizational structure in the context of the Knowledge Based Economy (Pawlowski E., 2010). In 2015-2016, an empirical study was conducted on the flexibility of the organizational structure of Polish enterprises (Pawlowski E., 2016). In 2018-2020, a methodology for designing organizational structures was developed for the Management Systems of Intelligent, Autonomous Environment (Pawlowski E., Pawlowski K. 2020). This article focuses on the design of organizational

structures of enterprises operating in a highly changeable, turbulent environment. The methodology is described in a five-dimensional design space: 1. Interpretation of organizational structure, 2. Methodology of organizational structure modelling, 3. Methodological approach to organizational design, 4. Procedures of organizational structure design, 5. Principles of organizational structure design.

ORGANIZATIONAL STRUCTURE AND ITS INTERNAL AND EXTERNAL CONTEXT

The issue of organizational structure is considered from three aspects: 1) What is organizational structure (interpretation), 2) What does organizational structure depend on. 3. what is the impact of structural solutions on organizational efficiency (see Figure 1). Organizational structure is interpreted differently both in science and in business practice. The modern scientific interpretation of organizational structure originates from sociological organization theory - and mainly from the “Aston concept”, which describes organizational structure in five dimensions: Configuration, Centralization, Specialization, Standardization, Formalization (Pugh and Hinings, 1971, Hinings and Lee, 1976, Mrela and Pankow, 1980, Mrela 1983). Organizational practice is still dominated by a simplistic approach focusing on the first three dimensions: 1. structure chart (the equivalent of Configuration), 2. responsibilities (the equivalent of Specialization), and 3. the scopes of decision-making authority (the equivalent of Centralization). Internal conditions of the enterprise that affect the adopted structural solutions are: 1. the size of the enterprise, 2. the technology of operational processes, 3. the strategy of the enterprise, 4. the organizational culture and traditions, 5. the professional and operational competence of employees. The second independent variable for organizational structure is external conditions, which mainly include the variability of the environment in which the company operates.

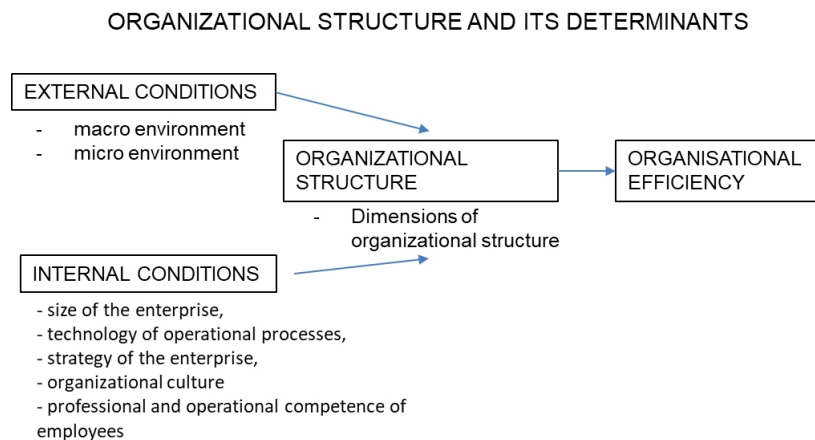


Figure 1: Organizational structure and its determinants (own elaboration).

International Conditions as the Main Factor of Environment Changeability in the Design of Organizational Structure

The environment of a company is usually considered in two cross-sections: macro and micro. The macro environment includes four spheres common to many sectors of the economy: 1. economic, 2. political and legal, 3. social, 4. Technological.

The micro environment focuses on the sector and identifies the competitive forces present in the sector: 1. Competitive rivalry in the sector, 2. The bargaining power of suppliers, 3. The bargaining power of customers in the sector, 4. The treat of new entrants, 5. The threat of substitute products or services. (Porter, 1980). Combining the macro and micro environment, we get a picture of external forces commonly called uncontrollable forces: (Ball and McCulloch, 1996):

1. Competitive (Competitors, Distributors & Clients, Suppliers)
2. Economic (GNP, unit labor cost, personal consumption expenditure)
3. Socioeconomic (characteristic and distribution of human population)
4. Financial (interest rates, inflation rates, taxation)
5. Legal (domestic and foreign laws by which firms must operate)
6. Physical (topography, climate, natural resources)
7. Political (political climates, government, international organizations)...
8. Sociocultural (attitudes, beliefs)
9. Labor (composition, skills, attitudes of labor)
10. Technological (technical skills and equipment)

In the strategic analysis of the enterprise, opportunities and threats from the environment are identified and sectors are sought in which to gain a competitive advantage. The adopted strategy will be the basis for adaptation of the organizational structure of the enterprise. It is relatively simple when a company operates mainly in the domestic market and, using an ethnocentric strategy, enters one foreign market similar to the domestic one. However, if the company applies polycentric, global and dual strategies, operating in dozens of markets, then the complexity and unpredictability of external situations is radically greater. Although we are still operating with the same today's five environment variables, the combination of their values and trends of change in individual markets multiplies the possible scenarios. It is necessary not only to adjust the organizational structures in each market individually, but also to ensure intra-organizational consistency and controllability of the entire corporation.

CONCEPT OF METHODOLOGY FOR DESIGNING ORGANIZATIONAL STRUCTURES UNDER CONDITIONS OF HIGH ENVIRONMENT VARIABILITY

1. The basis for the development of this methodology concept is the five-dimensional design space developed at the Department of Management Engineering, Poznan University of Technology (Pawlowski, 2009), presented below in 2 stages:

2. Defining the first two dimensions:
 - a. Interpretation of the organizational structure - 5 dimensions were adopted in accordance with the Aston concept
 - b. Modeling of the organizational structure - five modeling stages were adopted as in Figure 2.
3. Defining dimensions 3,4, and 5.
 - a. Methodological approach to design (dimension 3)-it was assumed that both diagnostic and anticipation approaches could be used depending on the previously chosen strategy (cost strategies, development strategies)
 - b. Development of a detailed design procedure (dimension 4) and design principles (dimension 5) - is an extension and detailing of the structure modeling procedure (adding preliminary stages - concerning the analysis of the company's strategy, and final stages related to the implementation of the project).

Methodology for Modeling Organizational Structure

The structure modeling methodology is shown in Figure 2.

The modeling of the organizational structure is carried out in five stages:

1. **Designing an Enterprise Function Plan.** A function plan is a set of enterprise business processes structured in a tree-type graph. The main function of the corporation (e.g., 0. Meeting the demand for automotive products) is divided into lower-level sub-functions representing functional subsystems (e.g., 1. Marketing and sales, 2. Product and process

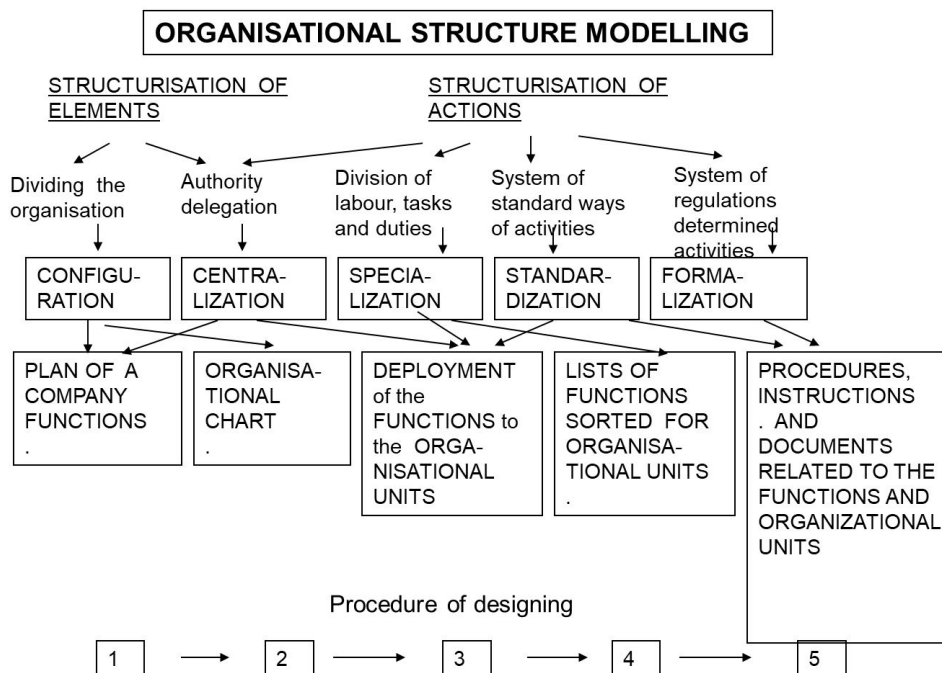


Figure 2: Diagram for modeling the organizational structure (own elaboration).

design, 3. Production and services) or business units (e.g., 1. Bus manufacturing, 2. Passenger car manufacturing, 3. Truck manufacturing). At each level of the division into subsystems, control (management) functions are distinguished that maintain the consistency of the divided subsystems (e.g. 0.#.01. Strategic management of the Corporation, 0.#.02. Tactical management of the Corporation 0.#.03. Organizational development). In practice, the function tree of a corporation contains from several hundred to a thousand functions.

2. **Designing an organizational structure chart.** The organizational structure diagram is a graphical representation of the Configuration dimension. The evolution of organizational structures in the context of the variability of internal and external conditions of the enterprise and their impact on the complexity of the management information system is shown in Figure 3. The effect of these relationships is the increase of the complexity of the information system to the level of loss of controllability. A change in the management system is required, including a change in structure, a change in information and computer systems. Subsequent forms of organizational structures have responded to such demands. The simplest linear structures, based on the quantitative division of management work, were replaced by line-staff structures, based on the qualitative division of work and specialization of managerial members. Divisional structures enabled the decentralization of management through the introduction of profit centers. Task, project and matrix structures enabled management control of the entire process (referenced to project, product, customer) across the traditional functional departmentalization of the enterprise. Fractal, network and virtual structures

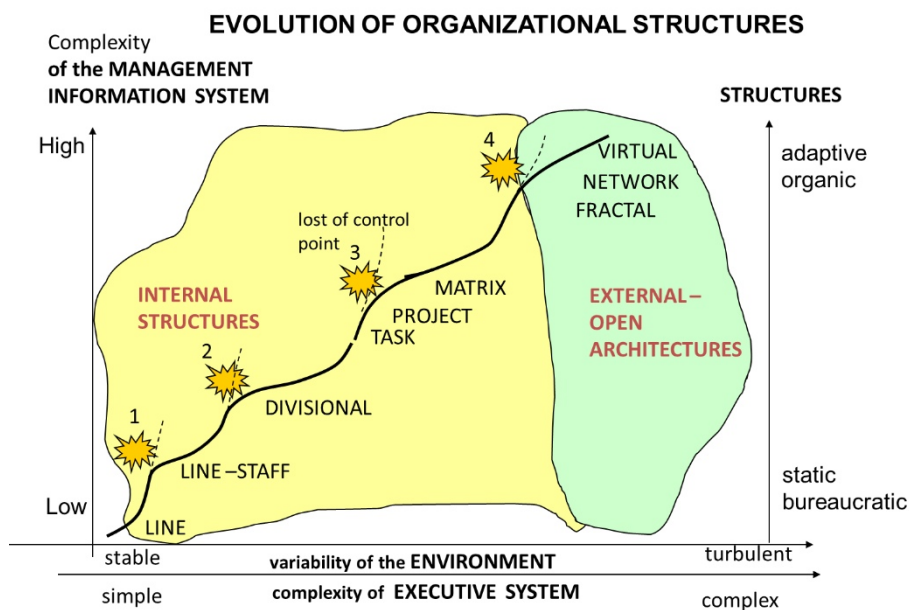


Figure 3: Evolution of organizational structures (own elaboration).

Table 1. Example of a function plan and a table of function deployment to organizational units.

The Company Functions Plan							
Number of Function	Function	L	Responsible for result	Main Executor	Supervisor	Cooperation	Connected Documents
1	2	3	4	5	6	7	8
00.	External Function						
00.#.03.	FINANCE AND ACCOUNTING	S T	PE	PE	PZ	ZE EF	
00.#.03.01.	INVESTMENT MANAGEMENT	S	PZ	PZ	RN ZW	PE	
00.#.03.01.01.	Planning of capital investment	S	PZ	PZ	RN ZW	PE	
00.#.03.01.02.	Investment project developing (analysis: costs - profit)	S	PE	PE	PZ	ZF DF	
00.#.03.01.03.	Estimating of investment decisions	S	PZ		RN ZW	'PE	
00.#.03.01.04.	Management of working capital net (Current assets - current liabilities)	T	DEF	DEF	PE	ZF DF	
00.#.03.01.04.01.	Inventories management	T	PH	PH	PZ	ZF	
00.#.03.01.04.02.	Receivables Management	T	DEF	EF	PE	Sales Assistant	
00.#.03.01.04.02.01.	Receivables control	O	EF 1	EF1	DEF	Sales Assistant	
00.#.03.01.04.02.02.	Reports concerning receivables control	O	DEF	EF1 DEF	PE	EF3	

Table 2. Example of job duties.

FINANCE DEPARTMENT MANAGER							
A - Responsible for the results of the following functions							
Number of Function	Function	L	Responsible for result	Main Executor	Supervisor	Cooperation	
1	2	3	4	5	6	7	
00.#.03.01.04.	Management of working capital netto (Current assets - current liabilities)	T	DEF	DEF	PE	ZF DF	
00.#.03.01.04.02.	Receivables Management	T	DEF	EF	PE	Sales Assistant	
00.#.03.01.04.02.02.	Reports concerning receivables control	O	DEF	EF1 DEF	PE	EF3	
00.#.03.01.04.02.03.	Preparations of loans police assumptions	T	DEF	DEF ZF	PE	PZ	
00.#.03.01.04.02.04.	Creating of systems of estimating clients finance credibility	T	DEF	DEF	PE	DF ZP	
00.#.03.01.04.02.05.	Policy of collecting receivables	T	DEF	DEF	PE	DHT DHB	
00.#.03.01.04.03.	Cash management	T	DEF	DEF	PE		

by incorporating external business units into their own business enable both large and small companies to expand internationally and globally. Recommendations for companies operating in a turbulent environment are adaptive, organic solutions as various forms of virtual structures and their combination with divisional structures.

3. **Deployment of functions to organizational units.** This stage is a conjunction of the previous two parts of the configuration dimension. Allocation is based on indicating who participates in the performance of the function and to what extent. An example form of such an allocation is presented in Table 1. In column 3 - Level - the level of management is specified (S- Strategic, T-Tactical, O- Operational). In the allocation table, the symbols of organizational units and management positions included in the organizational structure diagram are entered.
4. **Designing responsibilities for organizational units and management positions.** The responsibilities are created in four levels: Main Executor, Responsible for the Result, Supervision, Cooperation. The sorted functions form a Job Duties Description Sheet as in Table 2.
5. **Designing documents related to the performance of functions.** Business processes have varying degrees of standardization and formalization. In column 8 in the Function Plan, links to documents related to the function are inserted. In this way, a continuity of business process description is created.

Documentation of the organizational structure should be placed on the intranet. This allows quick updating of the function plan, responsibilities and related documents, as well as quick, direct access for employees.

CONCLUSION

Designing organizational structures of enterprises operating in a highly changeable environment is among the most difficult design cases. The changeability and unpredictability of such an environment requires enterprise managers to have the ability to anticipate the future. On the other hand, designers of organizational structures are expected to be able to incorporate into the organizational structure appropriate mechanisms of flexibility, speed of response to changes and mechanisms of organizational learning. These mechanisms should appear in the plan of business functions, in a properly adjusted configuration (chart) of the organizational structure, and allocation of functions ensuring hybrid centralization and decentralization of management.

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