

Flexibility of Organizational Structure in a Context of Organizational Innovations and Modern Concepts of Enterprise Management

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Abstract—Flexibility of the organizational structure of enterprises depends, among others, on the organizational strategy of enterprise's management. Contemporary concepts of the management of knowledge based enterprises: learning, intelligent, virtual and agile, assume high level of organizational structure flexibility. The literature analysis indicates however that theoretical postulates are only partially confirmed by empirical studies and case studies. The analysis of particular dimensions of organizational structure shows important differences between theoretical postulates and empirical studies. As much as the results of comparison of Configuration and Centralization dimensions' flexibility are consistent, the comparison of dimensions Specialization, Standardization and Formalization brings inconsistent conclusions. Author's own research on the organizational structure of Polish enterprises based on two large empirical research projects undertaken at the Faculty of Engineering Management of Poznan University of Technology, the first project conducted in 2012, called "Adjustment of enterprises' management systems to knowledge-based economy", and the second one in 2014, called "Determinants of implementing modern methods and technics of management in Polish enterprises" Both these empirical studies included surveys of 150 enterprises representing Polish economy. The results of these studies confirm the low level of organizational structure flexibility with regard to dimensions of Specialization, Standardization and Formalization. Moreover it was proven that for all dimensions of organizational structure, the level of flexibility depends on the functional area of the enterprise (marketing and sales, research and development, operational activity, administration).

I. INTRODUCTION

There are two main streams of organizational structure interpretation: classic (traditional) and contemporary. Classic interpretation reduces the issue of shaping the structure to organizational chart and the scope of duties and responsibilities of posts and organizational units. Contemporary interpretation assumes that organizational structure encompasses everything which limits the behavior latitude of people in organization. Changing the latitude of elements can be done in many different ways, and each of them is treated as a new dimension of organizational structure. Multidimensional concept of organizational structure is commonly accepted in literature although a number of suggested dimensions differs (Pugh and Hinings [18], Mrela [8],[9], Mintzberg [7], Strategor [22]). The broadest interpretation was proposed by "Aston school" (Pugh and Hinings [18]). Their concept includes five dimensions: configuration, specialization, centralization, standardization, formalization. Classic organizational structure theory focuses on the dimensions of configuration

and specialization, treating all other as an obvious results of those two. But the empirical research proved low coherency between all five dimensions (Pugh and Hinings [18], Mrela [9]). Therefore it is possible to change them relatively separately and thus create a wider area of organizational solutions exceeding the stiff classic structures. Theoretically, two extreme cases are possible. First, in which the latitude of elements equals zero. It reflects the model of an extremely bureaucratic organization. Elements are totally subordinate to one central unit and function according to formalized standards and commands. The behavior of elements and entire organization is entirely predictable, and therefore the organization is easy to control. The problem is low or zero level of using employees intelligence. Second case – full latitude of organizational elements. Everybody can do what, where, how and when they want. It is an image of an organizational chaos leading to disintegration of an organization into independent elements. Between these two extremes of rigidity and freedom (see Fig.1), there is a huge space of structural solutions shaped in five dimensions: configuration, specialization, centralization, standardization and formalization.

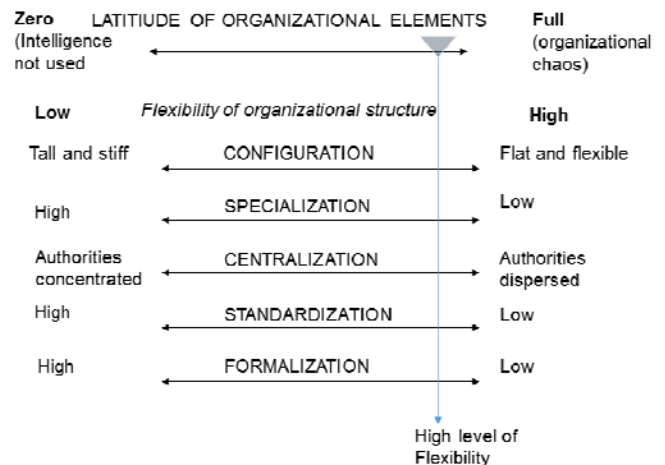


Fig.1. Organizational structure dimensions and flexibility of structure. Source: own elaboration

The development of contemporary concepts of enterprise management, including the concept of knowledge based enterprise, follows the trend of increasing the flexibility of organizational structures. Literature of the subject however does not provide a unequivocal description of these trends. Theoretical postulates demand radical increase of flexibility in all dimensions of organizational structure. On the other hand, the empirical studies and case studies described in the

literature confirm these postulates only partially. The research objective of this work is to make a summary comparison between hitherto results of theoretical and empirical studies on flexibility of organizational structures in the context of the development of concepts of knowledge based enterprises, as well as to present against this background the results of own empirical studies.

II. LITERATURE REVIEW

A. Modern management concepts as a context for organizational structure flexibility

Organizational structure depends on: strategy, external environment, technology of operational process, and size of an enterprise. Organizational strategy, as a part of an enterprise's strategy, develops the business model of an enterprise. There are four complementary concepts of a modern enterprise: learning, intelligent, virtual, and agile. These concepts, appeared at the end of twentieth century as a result of three main trends in economy and practice of management sciences in the 80's [14]:

1. heuristics, knowledge management, and quality management,
2. development of flexible organizational structures and external network structures,
3. development of electronic communication technology,

The development of knowledge management, quality management, and heuristics was the inspiration for the concept of a learning organization (Peter Senge [19],[20], Ikujiro Nonaka [10], Nonaka, Takeuchi [11]), and a competitive learning organization (Ashok Jashapara [4]). The next concept of knowledge-based organization on another, higher level is an intelligent organization (Grudzewski, Hejduk, [2], B. Mikuła, A Pietruszka – Ortyl and A. Potocki [5], [6]). The tendency to increase flexibility of internal organizational structure, and tendency to create external business architectures using modern IT technologies, formed the basis for a virtual organization. Close to the knowledge management stream is the concept of agile organization. Organization's agility depends on knowledge, experience and innovativeness of its members and their access to information. Agile organization, because of its structure and management process, quickly and fluently activates its social capital to create values for customers when market opportunities occur (Goldman, Nagel, Preiss, 1995, p.42-43). S. Trzcielinski [23 p.12-16] explains a model of agile enterprise by four components: 1. Shrewdness of the enterprise, which is a function assigning to the turbulent environment a string of potential market opportunities. 2. Resource flexibility of the enterprise transforms the string of potential opportunities into a string of resource available opportunities. 3. Enterprise's intelligence as an ability to understand situations and find deliberate reactions to them, that is to activate proper resource to weaken the threats or make use of the opportunities. 4. Smartness of the enterprise

is an ability to quickly use the opportunities in a benefit bringing manner.

B. Flexibility of organizational structure as a subject of theoretical, empirical, and case studies trends

An organizational structure is one of the most important element that characterizes the concept of learning, intelligent, virtual and agile enterprise. The role of organizational structure in that context, and the levels and types of flexibility in particular, are considered from the perspective of three trends:

1. theoretical-normative trend, focused on the creation of a model described by postulated attributes of such enterprise.
2. theoretical-empirical trend, focused on empirical verification of the model.
3. trend based on case studies.

Theoretical-normative models of knowledge based enterprises, particularly the concepts of intelligent organization, also indicated as perfect organizations, aim to the right in all five dimensions, toward maximum freedom. It is an extremely flat organization, free of official hierarchy, based on horizontal coordination relationships and variable hierarchy of goals, blended into external economic networks, completely decentralized, based on wide specialization of employees, and very low level of standardization and formalization. Such shifting of all dimensions extremely to the right, creates a narrow bundle of structural solutions and there are no theoretical reasons nor empirical proofs, to consider them the best from the perspective of organization's efficiency and survival ability. Case studies and empirical studies indicate that in practice more diversified structural solutions are being used.

Theoretical-empirical research presents the organizational reality rather distant from extreme normative model. A. Zgrzywa-Ziemak [24, pp. 91-92, 155-156] conducted theoretical and empirical studies on the factors shaping the Polish enterprise's ability to learn at the beginning of this century. A model of enterprise's learning ability was described with 10 main hypotheses, and one of them was the influence of innovative organizational structure. Analyzing the dimension of configuration in a learning enterprise, she states that enterprises' learning is favored by flat structures, hierarchical and official bonds should be replaced with cooperation bonds, hierarchical dependencies should be a result of hierarchy of goals and not the hierarchy of positions [24, p. 91-92, 155-156]. The hypothesis: the lower the specialization level the more likely innovative organizational structure was to be partially rejected, as it proved irrelevant in regard to the task distribution details, however the flexibility of task distribution in enterprise was important [24, p.156]. The level of centralization was considered as an irrelevant factor for the influence on enterprise's learning ability. The lower the level of formalization and standardization, the more we are dealing

with innovative organizational structure. The smaller number of behaviors in an enterprise is controlled by regulations and the less rigorous these regulations are, the more flexible the behavior of its workers is. Enterprise's learning is also favored by acceptance of different manners of activity and behavior [24, p.156]. Adam Stabryła and team [21] have done a study of the flexibility of organizational structure in knowledge-based organizations in Poland. Empirical studies conducted by the team [21, p.296-312] showed that enterprises with the highest index of knowledge potential present the assumed tendencies of configuration, however at lower than expected level:

- they have rather flat structures (half of these enterprises had three-level structure) and they assess that such structures are well adjusted to goals and strategies of the company,
- the most frequently used types of teams are: task, project and advisory,
- as a basic form of coordination they use an organizational hierarchy, although half of the surveyed enterprises also use the coordination through plans and goals and through rules and procedures,
- the scope of various subordinations increases (in over 30% of enterprises workers report to more than one superior), however the unity of command is still dominant (over 50% of enterprises).

In regard to dimension of specialization, in 68% of enterprises which qualified to the group of the highest index of knowledge potential, wide specialization occurs [21, p.302]. In the group of the highest index of knowledge potential, 78% of enterprises declare high degree of decentralization. At the same time, 84% of all surveyed enterprises stated that the scope of authority and responsibility of managers is clearly and unequivocally defined. Enterprises with the highest index of knowledge potential usually have full organizational documentation: articles of associations (80% of companies), organizational regulations, organizational structure chart, job description and job duty (74% of companies), plan of employment and guidelines for document's flow (less than 50% of companies). Convergence between the tasks of organizational cells actually performed with the tasks described in organizational regulations is very high (95% of companies). In 79% of companies however, there is a need to give employees the tasks not included in their scope of responsibilities. Concluding the results of research the authors point at the petrification of organizational structures as barrier to adjustment of enterprise to the requirements of knowledge-based economy [21, p.308-312].

Trend based on case studies - includes descriptions and analyses of many American, Japanese and European companies (Peters, Waterman [17], Hammer and Champy [3], Senge [19],[20], Jashapara [4], Nonaka, Takeuchi [11], Grudzewski, Hejduk [2]). Certain weakness of these analyses is their fragmentation, focusing attention only on selected

aspects of enterprise's activity. These descriptions present many innovative structural solutions, however we are not familiar with any cases confirming complex functioning of extreme normative models. On the contrary, it seems that structural tendencies described by T. Peters and R. Waterman [17, p. 46-50] are still largely up-to-date. American successful companies from the 80's were characterized by:

- autonomy and initiative, allowing the research departments and laboratories for unrestricted, independent research activity, creativity and right to risk,
- simplified structural form and small administration, flat structure,
- combination of flexible and rigid organizational forms; authors indicate that perfect companies are both centralized and decentralized; autonomy in some areas, brought to the verge of chaos, and on the other hand a total centralization in regard to primary values and strategic goals; people should be given the autonomy and freedom of activity and at the same time the rigorous discipline must be kept.

Similar principles and their examples were described by M. Hammer and J. Champy [3, p. 51-64]:

- hybrid centralization and decentralization of operations, decentralization regarding all positions,
- multi-variant standards of processes enabling their use in various conditions,
- control reduced to economically justified level,
- limiting excessive division of work and specialization.

Analyses of cases presented above, and many other, resulting from own experience, lead to a certain, more general thought. It seems that contemporary successful enterprises have resigned from unification of organizational solutions. Organizational principle don't have to apply to everyone in the same degree. Freedom, close to chaos, in the area of research and development, promotion, advertising and marketing, usually brings splendid results in form of innovativeness level. This level of freedom is usually uncommon in routine service processes (administration, finances, accounting, human resources), where iron discipline generates better results. And so, freedom bordering with chaos coexists with iron discipline.

This observation referring to the trend of theoretical-empirical studies and case studies leads to formulation of the following hypothesis: Measurement of structural variables at the level of enterprise as a whole is insufficient to explain the flexibility of organizational structure in KBO. A structuring of variables to the level of particular areas of business process is necessary. Such approach can partially explain the discrepancies in results of hitherto empirical studies.

III. OWN RESEARCH

A. Methodological assumptions of the research from 2012

The research on flexibility of organizational structure of

the enterprise was a part of a bigger project named “Adjustment of enterprises’ management systems to knowledge-based economy”. The project was realized in the Faculty of Engineering Management of the Poznań University of Technology. The material scope of examinations in the project included: the strategy, organizational structure, IT technology and human capital. The survey was made in 2012. A method of direct interviews with owners of companies or the general management (chairmen, vice chairmen or directors) was applied. The study was conducted in 150 enterprises. Criteria for the selection of the sample were defined in the preliminary stage of the project (30% of small business, 40% medium and 30% large enterprises).

In regard to the analysis of trends, two points in time were defined: year 2007 (as the beginning of implementation of the Lisbon Card in Poland, which meant the beginning of knowledge-based economy) and the year 2012 – in which the research was conducted. The following hypotheses in the area of research on organizational structure flexibility of enterprises were formulated:

1. The organizational innovation of enterprises increased in the period 2007 – 2011 both in the aspect of their structure and from the perspective of processes.
2. Structural innovation manifests itself with and increased flexibility of organizational structures.
3. The flexibility of the organizational structure is different in different functional areas of the company.

4. The innovative character of enterprises depends on the size of the company.

B. The research findings from 2012

The level of organizational innovative activity of examined enterprises is on medium level and reaches value of 2.7 in the five point scale. There is an explicit differentiation of innovative activity depending on the size of the company. The highest innovative activity was reported in large companies (indicators from 3.6 to 3.8), followed by medium enterprises (indicators from 2.5 to 2.6) and small companies (indicators from 1.9 to 2.0), (see Tab.1.).

Table 2. presents results of research concerning changes of innovation in companies with respect to their organizational structures in years 2007 -2012. Changes in the organizational structure were examined in five dimensions of the organizational structure: configuration, centralization, specialization, standardization and formalization. In view of the dimension of configuration, the question did not refer directly to the type of the applied organizational structure because pilot survey presented a poor knowledge of the management of enterprises on the modern taxonomy of organizational structures. This led to questions about the range of implementations of flexible structural forms, such as task, project-based or matrix structures. The table included the percentage share of numbers of companies that observed an increase or decrease of values of particular dimensions of the organizational structure.

TABLE 1. THE ORGANIZATIONAL INNOVATION ACTIVITY IN POLISH ENTERPRISES IN THE YEAR 2011. THE EVALUATION REPRESENTING THE AVERAGE VALUES ON THE SCALE: 0 – 5 (0 – LACK OF IMPLEMENTATION, 5 – FULL IMPLEMENTATION). SOURCE: PERSONAL ELABORATION

Organizational innovations	Total (N=150)	Small firms (N=45)	Medium firms (N=60)	Large firms (N=45)
Assessment of actual state and changes in organizational structure	2,7	1,9	2,6	3,6
Assessment of actual state and changes in organizational procedures	2,7	2,0	2,5	3,8

TABLE 2. CHANGES IN FLEXIBILITY OF ORGANIZATIONAL STRUCTURES OF POLISH ENTERPRISES IN THE PERIOD 2007 – 2012. SOURCE: OWN ELABORATION

	Total (N=150) Increase / decrease [%]	Small firms (N=45) Increase / decrease [%]	Medium firms (N=60) Increase / decrease [%]	Large firms (N=45) Increase / decrease [%]
Configuration: Number of task teams	25 / 2	22 / 4	13 / 2	42 / 0
Configuration: Number of Product / Project / Client Managers	17 / 0	11 / 0	8 / 0	36 / 0
Configuration: Number of managerial levels	11 / 6	11 / 4	3 / 5	20 / 9
Centralization: Decentralization level	16 / 1	9 / 0	18 / 0	20 / 4
Specialization: of organizational units and posts	29 / 0	22 / 0	20 / 0	49 / 0
Standardization	19 / 1	13 / 0	18 / 0	27 / 4
Formalization	15 / 6	11 / 4	13 / 7	20 / 7
Overall assessment of organizational structure flexibility	40 / 47	29 / 53	40 / 48	51 / 38

In the entire group of examined enterprises, 40% of them stated that the total flexibility of the structure increased, but 47% declared that it dropped. The result of evaluation of individual dimensions was also not explicit. The rise of the number of task teams, project managers and product managers (for projects or for clients) speaks only for the increasing flexibility of the configuration dimension. However, the number of levels in the hierarchy also grows. On the other hand, one can observe the loss of flexibility in the area of dimensions of specialization, standardization and formalization. The size of the company has a significant impact on its changes in the structural innovation. The total indicator of flexibility for large enterprises shows a positive trend (51% firms declare an increase of flexibility and 38% a decrease). However, in the sector of medium and small enterprises the tendency is opposite: the majority of these companies assess that the structural flexibility has decreased. The high level of implementation of task structure and matrix structures, as well as growing level of decentralization, is characteristic for big enterprises. An increase of the level of specialization, standardization and formalization was observed in all sizes of enterprises.

The flexibility of the organizational structure is different in different functional areas of the company (see chart 1). The most significant changes are in main operations of an

enterprise (production or service) and in marketing and sales. Such trend is more typical for Agile than for Lean strategy of enterprise.

C. Empirical own research from 2014

The research data presented here are derived from the larger research project undertaken in 2014 at the Faculty of Engineering Management of Poznan University of Technology called “Determinants of implementing modern methods and technics of management in Polish enterprises” (Pawlowski 2014, Pawlowski, Pawlowski 2015). This empirical study included a survey of 150 enterprises representing Polish economy. One of determinants considered within the project was flexibility of organizational structure. The results of this research (from 2014) compared with results from the previous research (2012) are presented in tab. 3. The changes in particular dimensions of organizational structure in 2014 present similar trends to the trend from 2012: the increase of flexibility in configuration and centralization, and decrease in specialization, standardization and formalization. The smaller differences between increase and decrease of dimensions might be the effect of different retrospect of research (four years – 2007-2011, and one year 2014), or the stabilization.

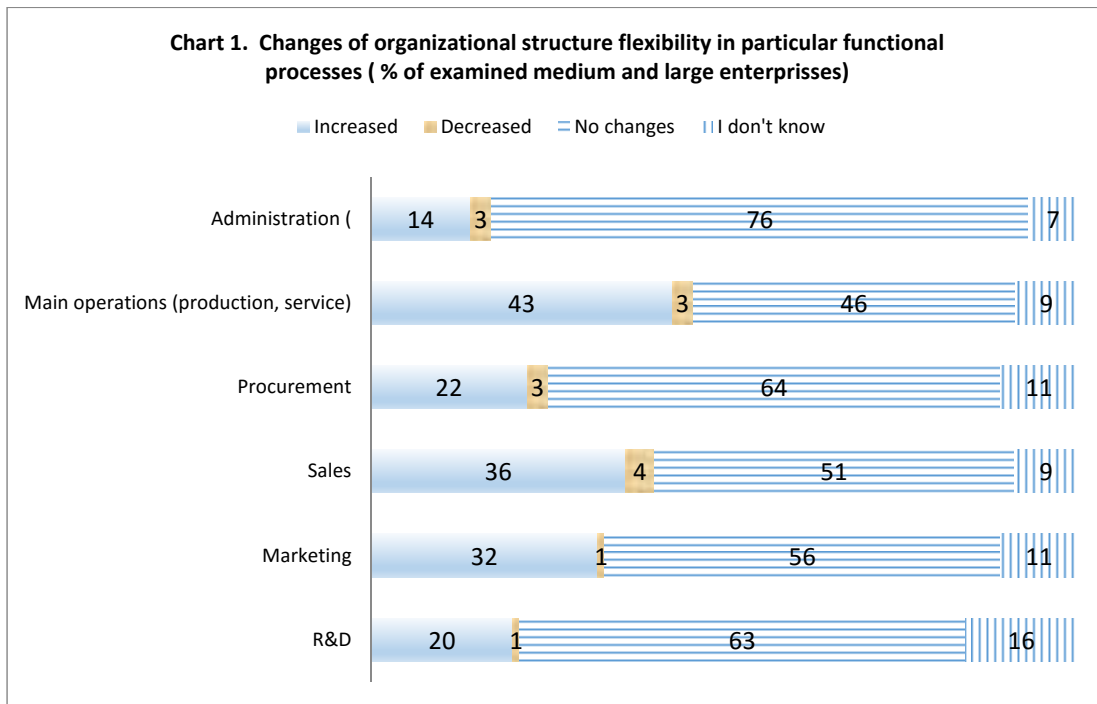


Chart 1. Changes in organizational structure flexibility with reference to functional subsystems of enterprises (2007-2011). Source: own elaboration

TABLE 3. CHANGES IN FLEXIBILITY OF ORGANIZATIONAL STRUCTURES OF POLISH ENTERPRISES IN THE PERIODS 2014, AND 2007 – 2012. SOURCE: OWN ELABORATION

	Research 2014 (Changes in 2014) (N=150) Increase / decrease [%]	Research 2012 (Changes in 2007-2011) (N=150) Increase / decrease [%]
Configuration: Number of task teams	19 / 6	25 / 2
Configuration: Number of Product / Project / Client Managers	15 / 9	17 / 0
Configuration: Number of managerial levels	10 / 8	11 / 6
Centralization: Decentralization level	17 / 6	16 / 1
Specialization: of organizational units and posts	21 / 9	29 / 0
Standardization	11 / 9	13 / 0
Formalization	12 / 7	11 / 4

IV.SUMMARY AND CONCLUSIONS

Research objective of this work was to analyze and summarize the current state of knowledge regarding the flexibility of organizational structures in the context of modern concepts of enterprise management. This paper features the analysis of the literature of the subject and the results of author’s own empirical studies. In the summary of the results, the following conclusions can be drawn:

1. Organizational innovations can be realized in two forms: structural (organizational structure changes) and procedural (organizational processes changes). Organizational structure is interpreted in five dimensions: configuration, specialization, centralization, standardization, and formalization. These five dimensions create a wide space for organizational solutions. The greater the latitude of organizational elements, the more flexible the organization becomes.
2. Theoretical postulates for modern enterprises (intelligent, perfect organizations) aim to the right in all five dimensions, toward maximum freedom. It is an extremely flat organization, free of official hierarchy, based on horizontal coordination relationships and variable hierarchy of goals, blended into external economic networks, completely decentralized, based on wide specialization of employees, and very low level of standardization and formalization. An analysis of case studies shows that contemporary successful enterprises have resigned from unification of organizational solutions. Organizational principles don’t have to apply to everyone in the same degree. Freedom, close to chaos, in the area of research and development, promotion, advertising and marketing, usually brings splendid results in form of innovativeness level. This level of freedom is usually uncommon for routine service processes (administration, finances, accounting, human resources), where iron discipline generates better results. And so, freedom bordering with chaos coexists with iron discipline.

3. Also empirical research presents the organizational reality rather distant from an extreme normative model. The research conducted by A. Zgrzywa-Ziemak and A. Stabryla confirm positive changes in configuration, and partly in centralization, but at the same time negative trends in specialization, standardization and formalization.
4. Lisbon Strategy and the Development Strategy of Poland – 2020 created new opportunities for knowledge based economy. It was an inspiration for the own research inquiry if, and to what extent, have Polish enterprises changed their organizational structures towards the knowledge based enterprise model. The empirical research has been conducted for 150 polish enterprises. The results of this research confirmed moderate trend to knowledge based enterprise, but still very different from the normative model. An important conclusion coming from the research is the confirmation of the hypothesis that flexibility of organizational structure is different in different functional areas of the enterprise. Therefore positive changes in the organizational structure in some functional areas of the enterprise may be unnoticeable, if the assessment of structure’s flexibility is done only in form of average values for the entire enterprise.
5. This work shows that there are significant discrepancies between normative models of knowledge based enterprises and models obtained in the empirical research and case studies. A postulate to make an attempt to verify the normative model of knowledge based enterprise, at least in terms of organizational structure, appears to be reasonable.

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