A Case Study: Redesigning the Organizational Structure of a Project-Driven Company

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Abstract

The strategic management literature is replete with research related to organizational design and its relationship to firm profitability. This paper describes the organizational restructuring of a project-driven company, and its departments, in order to maximize efficiency and firm performance. Although this company had experienced rapid growth in the first five years of its existence there had been few significant changes to its organizational structure. Any changes that did take place to the actual and working organization structure evolved in an ad-hoc fashion, which directly contributed to the problems related to managing and controlling the processes within the organization. As a result, tasks and responsibilities of various departments were unbalanced in terms of number of personnel and volume of work, and in many cases departments had conflicting missions and overlapping responsibilities, resulting in inefficiencies and increased bureaucratic costs. Through the reorganization 36 main departments, 25 line departments and 11 staff departments, were transformed into a new organization with 17 main departments, 8 line departments and 9 staff departments. This revised organizational structure was much more effective and efficient satisfying the stakeholders of the company.

Key words: Organization Structure, Organization Design, Bureaucratic Costs, Project-Driven Organizations, Project Management

Introduction

There is a plethora of research within the strategic management literature that addresses organizational design and its relationship to organizational complexity and structure [1], [2], [3], [4]. One consistent finding of this research stream is that increased complexity increases the bureaucratic costs often due to additional communication and coordination [5]. And, because these costs negatively impact profitability, it has been suggested that unnecessary organizational complexity be minimized [6], [7]. What follows is a case study that undertook

the challenge of reorganizing a company's structure to reduce bureaucratic costs and improve performance.

To protect its identity the company studied in this paper will not be identified and will only be referred to as "the company". Their mission is designing, manufacturing, assembling, installing, and commissioning automotive production lines. Their main offerings include various production lines and logistic equipment required for auto manufacturing companies, including press lines, body assembly lines, paint shop equipment, casting lines, power train assembly lines, and final assembly lines. The company fulfills and supervises all activities required for each project, from the initial design work to the final commissioning phase. The primary customer of the company is an auto manufacturing company, always referred to as "the customer" in this paper. In recent years, the customer has been expanded, and the company has had an important role in this expansion, leading to significant growth of the company.

Rapid growth in five years resulted in a large increase in employees. After five years there were over six hundred employees. Also, during this time period, the number of projects contracted with different customers increased to eighty, and the volume of sales increased to approximately $350 million. The company's initially approved organization structure had remained unchanged during the 5-year time period. Meanwhile, the actual and working organization structure had been evolving in an ad-hoc fashion, which had directly contributed to problems, including increased bureaucratic costs due to managing and controlling this complex organization. Approximately 36 top managers worked directly with the CEO. The departmental workload and responsibilities were unbalanced in terms of number of personnel and volume of work and, in many cases, departments had conflicting missions and overlapping responsibilities. For example, similar projects were assigned to different departments with conflicting objectives.

After five years, when the CEO was replaced, the Organizational Development Department became dedicated to analyzing the company's needs and developing a new organizational structure design more suitable for a company of this size and type of business. This case study examines one company's struggle with organizational structure after a period of rapid growth resulting in increased complexity. We contribute to the strategy and organizational design literature by outlining this company's strategic process of redesigning an efficient and effective organizational structure, in an attempt to achieve a competitive advantage.

Literature Review

The extant strategy literature includes abundant research that delves into organizational design and firm performance [8], [9]. One stream of this research focuses on the effects of complex designs on organizational bureaucratic costs. Jones and Hill [5] address the issue of strategy and structure fit and determine that related diversification often requires a more complex structure due to increased coordination between commonalities within the firm. They conclude that the structural complexity of related diversification increases bureaucratic costs and therefore may negatively impact firm performance. A 1992 empirical study of vertical integration in the forest products industry by D'Aveni and Ilinitch [10] found support

for Jones and Hill's study [5] by suggesting that complexity created additional bureaucratic costs due to managerial inefficiencies stemming from increased control and coordination problems between interdependent units. In 1994 D'Aveni and Ravenscraft [11] built upon the 1992 study [10] by hypothesizing that while vertical integration can improve firm performance, it is for reasons other than efficiency because vertical integration increases costs due to the high level of coordination and communication between activities. Additional research concludes that vertical integration leads to a more complex organization, which in turn increases bureaucratic costs due to communication distortion [12], [13], [14]. Skaggs and Huffman [7] conducted an empirical study of service firms and concluded that while organizational complexity is sometimes needed in a firm, they should be careful not to be any more complex than is required because the associated bureaucratic costs may negatively affect firm performance.

In sum, there is conclusive evidence that firms should strive to minimize complexity to a required level as additional bureaucratic costs, due to increased level of control and coordination between business units, are likely to have a negative impact of firm performance. This study took place because the company recognized that their organizational design increased their bureaucratic costs.

Organizations perform work to achieve a set of objectives. Generally, work can be categorized as either projects or operations [15]. Projects and operations differ primarily in that operations are ongoing and repetitive, while projects are temporary and unique [15]. A project is a temporary endeavor undertaken to create a unique product, service, or result [15].

Projects are frequently divided into more manageable components or subprojects, although the individual subprojects can be referred to as projects and managed as such [15]. Subprojects are often contracted to an external enterprise or to another functional unit within the organization [15]. Examples include subprojects based on the project process, such as a single phase of the project life cycle, subprojects based on employee skill requirements, such as plumbers or electricians needed on a construction project, and subprojects involving specialized technology, such as the automated testing of computer programs for a software development project [15]. On very large projects, the subprojects can consist of a series of even smaller subprojects [15].

A project portfolio is a collection of projects that are grouped together to facilitate effective and efficient project management in order to meet strategic business objectives [15]. Project-oriented (Project-driven) organizations simultaneously perform a number of different projects. Actually they hold a portfolio of projects [16].

In order to cope with intensified competition, changes in customer preferences, increased demands for shorter lead times, demand for lower prices, and improved technical quality in products, companies often need to change and or rearrange old and ineffective structures to new and more effective structures [17], [18]. Since project-driven organizations fulfill a portfolio of projects and projects have temporariness and uniqueness properties, their environments are more dynamic than operational organizations. So change in organization structures is more essential and critical for project-driven organizations.

Nobeoka and Cusumano [19] describe the objectives and outcomes of changes in Toyota's product development department. They suggest that this reorganization was the most fundamental change in their product development process that Toyota has implemented since it established the organization around 1965. The new organizational structure focused on multi-project management. With respect to their structural innovation, Toyota has led the way in establishing a project-based management system, aimed at coordinating and integrating activities between different functional areas in order to develop well-integrated new products. Previously they had many problems with the old organizational structure. Nobeoka and Cusumano [19] suggest that most of these organizational problems were caused by Toyota's rapid growth which created difficulties with both project integration and inter-project coordination. They go on to assert that there were too many functional engineering divisions with narrow specialization of engineers and there were too many vehicle projects for each functional manager to manage both the engineering details of each project and the inter-project coordination. Through the reorganization, Toyota was able to divide all of its new product development projects into three centers. The center structure focuses on grouping projects based on the similarity in platform design. Center 1 is responsible for rear-wheel-drive platforms and vehicles, while Center 2 is based on front-wheel-drive platforms and vehicles, and Center 3 is grouped around utility vehicle/van platforms. The new structure improved both project integration and inter-project coordination. Important features of this reorganization include reduction in the number of functional engineering divisions, reduction in the number of projects for each functional manager, changes in the roles of the center head for multiple vehicle projects, establishment of planning divisions in each center, and adoption of a hierarchical organization for chief engineers in related projects. They concluded that while it may seem that a traditional function-oriented, rather than project-oriented, organization is appropriate to manage inter-project interdependencies, this type of structure is weak at cross-functional integration. Functional structures also lack a mechanism to ensure that individual products retain distinctive features and a high degree of what has been called product integrity. Therefore, organizations should aim at achieving both cross-functional coordination and inter-project coordination simultaneously through the way they organize and control multiple projects. This goal cannot be achieved by either traditional project-oriented or function-oriented organizations. The inter-project interdependencies must be coordinated within the context of a specific project as an integrated system. To share components while retaining the distinctiveness of individual products, firms also need organizational structures and processes that enable system-level coordination across multiple projects.

Danilovic and Borjesson [20] used Dependence Structure Matrix (DSM) methodology based on an empirical case showing how a systemic relations and dependence analysis can identify clusters of engineering tasks that form an integrated project structure. The DSM analysis is also used to identify relationships between the new project structure and the prevailing basic organizational structure in order to identify where coordination and integration is needed between the temporary project-based structure and the basic organizational structure. The results of this research show how DSM methodology can be used to create a project portfolio by analyzing a business portfolio and engineering tasks to form a multi-project structure. They searched for relations between the exchange of technical information needed to design a proper multi-project structure and the departments in the basic organization at Saab

Aerospace AB, a Swedish aircraft manufacturing company (labeled Material Groups, as these departments follow the technical logic of the aircraft such as hydraulic and air systems). They attempted to show how DSM analysis can be used to design a structure for a project-driven organization on the basis of a relation's analysis. The results indicated that a series of business decisions and engineering tasks conducted on the functional basis could be reorganized into projects following business logic and deliverables to the customer.

Based on the aforementioned studies, the team began the process of reorganizing the company's organizational structure. In the following sections, all steps and activities are illustrated.

Recognizing the Working Organization

Since the working organizational structure of the company and its departments had changed over the years but had not been clearly recognized and documented, the first task was to perform an assessment of current organizational structure. This process included an analysis of mission, processes, and structures of all departments, duties and responsibilities of departments and sub-departments, and the reason for conflicting goals and objectives. This was accomplished by initiating dialog with all managers and engineers to gain an in-depth understanding of work process, documentation, and reporting relationships within the company.

Concurrently, some of the completed and current projects were reviewed, and one or two projects within each category of similar projects were selected. For example, the team visited several press lines, a body assembly line, a paint shop, a casting line, an axle assembly line, an engine assembly line, and a final assembly line. These lines largely utilized robotic systems and logistic systems. Approximately 15 project worksites were examined and analyzed.

Developing the New Organizational Structure

In general, each main project (contracted with a customer) was allocated to one department that was responsible for reporting to the customer. The project was then divided into subprojects and was subcontracted to other departments within the company. The subcontracting often continued to expand and branch out to more departments.

As part of restructuring process, the team analyzed the relationships between projects (past and present) and the line departments by using a Project-Department Relationship Matrix shown in Table 1. The matrix is a From-To matrix in which the number of subprojects given by each department to another department can be seen. In Table 1, the list of line departments that were directly reporting to the CEO in the old organizational structure is shown. It should be noted that row 19 in Table 1 represents five separate departments that were responsible for five distinct paint line projects. Basically, 25 line departments, directly reporting to the CEO, existed in the old organizational structure. In Table 1, the number of main projects of each department is shown in the last column.

Table 1: Project-Department Relationship Matrix

	From / To	Design & Engineering	Material & Tools Engineering	Body	Press & Die	Robotic Welding & Material Handling	Robotic Cells	Robotic Installation & Maintenance	Logistics & Final Assembly	Conveyor	GPS Project	Vision & Instrumentation	Monitoring & CCR Systems	Control Systems	Building Technology	Body Lines Electrical Systems	Painting Lines Electrical Systems	Material Handling Equipment Elec. Sys.	Special-Purpose Machines Elec. Sys.	Paint Projects (5 Paint Projects)	Car X Axle Project	Car X Engine Project	**No. of Subprojects**	**No. of Main Projects**
1	Design & Engineering		7	1	1				7			2								1	4	3	**26**	**29**
2	Material & Tools Engineering				1	2																	**3**	**20**
3	Body				1		2							1									**4**	**25**
4	Press & Die																						**0**	**18**
5	Robotic Welding & Material Handling		1	8	4		4		4														**21**	**22**
6	Robotic Cells		1	1		2			5											3	2	3	**17**	**5**
7	Robotic Installation & Maintenance			1		2	7																**10**	**2**
8	Logistics & Final Assembly																			1		3	**4**	**11**
9	Conveyor		1	3		1			7											2	1	1	**16**	**11**
10	GPS Project																						**0**	**1**
11	Vision & Instrumentation			1		2	3		1						1	1				1	1		**11**	**2**
12	Monitoring & CCR Systems			3				1	3									1		3		1	**12**	**0**
13	Control Systems	7	1	2	2				6	1												1	**20**	**3**
14	Building Technology	1							3											1		1	**6**	**2**
15	Body Lines Electrical Systems			5	7	6			1														**19**	**0**
16	Painting Lines Electrical Systems						2		2											3			**7**	**0**
17	Material Handling Equipment Electrical Systems						2		4	7												1	**14**	**1**
18	Special-Purpose Machines Electrical Systems	1					5			1											3	2	**12**	**0**
19	Paint Projects (5 Paint Projects)						1																**1**	**14**
20	Car X Axle Project																						**0**	**2**
21	Car X Engine Project																						**0**	**2**
	Total	**9**	**11**	**25**	**16**	**15**	**26**	**1**	**43**	**9**	**0**	**2**	**0**	**1**	**1**	**1**	**0**	**1**	**0**	**15**	**11**	**16**	**203**	**170**

The process continued by consolidating and categorizing the old departments into seven new departments. The list of new departments is shown in Table 2. The criteria for this categorization were as following:

a) Product types
b) Interactions between departments (based on the matrix shown in Table 1)
c) Department specialties
d) Balancing departmental personnel and work load

As shown in Table 2, the Press & Die department hadn't received any subprojects from any department but had contracted out many subprojects to other departments. So the Press & Die department was identified as a department in the new organizational structure. Similarly, the Body department, which supported body assembly line projects, had received a few small subprojects but had contracted out many subprojects to other departments. So it was also identified as a department within the new structure.

The Design & Engineering department was supporting two types of projects; engine assembly-line projects and special-purpose and ancillary machines subprojects (these special-purpose and ancillary machines are required in different types of production lines). However, at that time, the majority of its workforce was assigned to engine assembly-line projects with just a few of their personnel working on special-purpose and ancillary machines subprojects. Also most of the projects in the Material & Tools Engineering department were centered on developing engine block casting lines. These two departments were merged together along with Car-X Axle project and Car-X Engine project to form a new department called Power Train department.

Five separate painting projects were merged together to form the Painting department. At that time, the old Logistics & Final Assembly department was responsible for final assembly line projects as well as logistics projects such as ASRS (Automated Storage & Retrieval System). By analyzing the process of final assembly line projects, it was discovered that a considerable portion of final assembly line projects were composed of different types of conveyors and material handling equipment. As shown in Table 2, the Conveyor department had received many subprojects from the old Logistics & Final Assembly department. However, the old Logistics & Final Assembly department had not contracted out some conveyor subprojects to the Conveyor department. The work was performed in-house. To increase efficiency these two departments were merged to a single department called Logistics & Final Assembly department.

The Robotic Welding & Material Handling department, the Robotic Cells department, and the Robotic Installation & Maintenance department had had many interactions with each other and all their work was focused on robots in different types of production lines. As a result, they were consolidated to form a new department called Robotic Systems department.

Table 2: Categorized Project-Department Relationship Matrix

		Press & Die	Body	Power Train				Painting	Logistics & Final Assembly		Robotic Systems			Electrical Systems									No. of Subprojects	No. of Main Projects
	From / To	Press & Die	Body	Design & Engineering	Material & Tools Eng.	Car X Axle Project	Car X Engine Project	Paint Projects (5 Paint Projects)	Logistics & Final Assembly	Conveyor	Robotic Welding & Material Handling	Robotic Cells	Robotic Installation & Maintenance	GPS Project	Vision & Instrumentation	Monitoring & CCR Systems	Control Systems	Building Technology	Body Lines Electrical Systems	Painting Lines Electrical Systems	Material Handling Equipment Elec. Sys.	Special-Purpose Machines Elec. Sys.		
Press & Die	Press & Die																						0	18
Body	Body	1										2					1						4	25
Power Train	Design & Eng.	1	1		7	4	3	1	7						2								26	29
	Material & Tools Eng.	1									2												3	20
	Car X Axle Project																						0	2
	Car X Engine Project																						0	2
Painting	Paint Projects (5 Paint Projects)											1											1	14
Logistics & Final Assembly	Logistics & Final Assembly						3	1															4	11
	Conveyor		3		1	1	1	2	7		1												16	11
Robotic Systems	Robotic Welding & Material Handling	4	8		1				4			4											21	22
	Robotic Cells		1		1	2	3	3	5		2												17	5
	Robotic Installation & Maintenance		1								2	7											10	2
Electrical Systems	GPS Project																						0	1
	Vision & Instrumentation		1			1		1	1		2	3						1	1				11	2
	Monitoring & CCR Systems		3				1	3	3				1								1		12	0
	Control Systems	2	2	7	1		1		6	1													20	3
	Building Technology			1			1	1	3														6	2
	Body Lines Electrical Systems	7	5						1		6												19	0
	Painting Lines Electrical Systems							3	2			2											7	0
	Material Handling Equipment Elec. Sys.						1		4	7		2											14	1
	Special-Purpose Machines Elec. Sys.			1		3	2			1		5											12	0
Total		**16**	**25**	**9**	**11**	**11**	**16**	**15**	**43**	**9**	**15**	**26**	**1**	**0**	**2**	**0**	**1**	**1**	**1**	**0**	**1**	**0**	**203**	**170**

Although the GPS Project, the Vision & Instrumentation department, the Monitoring & CCR Systems department, the Control Systems department, the Building Technology department, the Body Lines Electrical Systems department, the Painting Lines Electrical Systems department, the Material Handling Electrical Systems department, and the Special-Purpose Machines Electrical Systems department had a few interactions with each other, most of the work done by these departments was centered around electrical and electronic systems. So they were grouped into Electrical Systems department.

Since the company specializes in designing and manufacturing robot applications and robot installation, customers usually prefer to receive robot maintenance services directly from the company. This work had been traditionally performed by the Robotic Installation & Maintenance department. Meanwhile, other departments provided services to customers in many other areas of production line maintenance. However, a non-centralized system of providing maintenance services had resulted in several inconsistencies. It appeared that customers preferred to outsource all maintenance services of various types of machines and equipment within a production line (such as electrical equipment, robots, and conveyors) under one contract. So, to satisfy this demand an independent Maintenance department was created with centralized responsibility for all maintenance activities. So, as the eighth new line department, the Maintenance department was added to the seven new departments shown in Table 2.

In all, eight new line departments were created, including the Press & Die department, the Body department, the Power Train department, the Painting department, the Logistics & Final Assembly department, the Robotic Systems department, the Electrical Systems department, and the Maintenance department.

While working through the organizational structure analysis process, it was discovered that some departments were duplicating efforts with regard to similar projects. So overlaps were identified and isolated and some activities and specialties were shifted from one department to another. So in addition to merging missions, the missions of some departments were altered.

In Table 3, interactions of old departments were summed up based on new departments' configuration. As shown in Table 3, the Press & Die department doesn't receive any subproject from other departments. The Body department also rarely receives subprojects from other departments (the previous subprojects were usually very small and old). Also the Painting department usually does not receive any subproject from other departments. The Power Train department receives some subprojects from other departments; these subprojects are usually special-purpose and ancillary machines subprojects. The Logistics & Final Assembly department receives some subprojects from other departments; the subject of these projects is usually conveyors. The Robotic Systems department receives many subprojects from other departments. The Electrical Systems department also receives many subprojects from other departments. Obviously, the interactions between similar new departments would be eliminated in the new organization; the related cells are shaded in Table 3.

Table 3: Summarized Project-Department Relationship Matrix

From / To	Press & Die	Body	Power Train	Painting	Logistics & Final Assembly	Robotic Systems	Electrical Systems	**Number of Subprojects**	**Number of Main Projects**
Press & Die								**0**	**18**
Body	1					2	1	**4**	**25**
Power Train	2	1	14	1	7	2	2	**29**	**53**
Painting						1		**1**	**14**
Logistics & Final Assembly		3	6	3	7	1		**20**	**22**
Robotic Systems	4	10	7	3	9	15		**48**	**29**
Electrical Systems	9	11	20	8	29	21	3	**101**	**9**
Total	**16**	**25**	**47**	**15**	**52**	**42**	**6**	**203**	**170**

In Table 3, if the number of subprojects in the shaded cell in every row is subtracted from the total number of subprojects of each department, it is concluded that the Press & Die department, the Body department, the Power Train department, the Painting department, and the Logistics & Final Assembly department fulfill main projects rather than subprojects. This conclusion was reached after considering the numbers of subprojects and main projects done by each department and the budget of their projects (based on calculations, the budgets for their main projects tended to be much higher than the budget of their subprojects). In actuality, the structure was reorganized based on product families. The proper purpose of an organization's structure is to identify and channel the value stream for a family of products so that value flows smoothly to the customer [21]. Womack [21] suggests that in order to transform an enterprise to a lean enterprise, one of the steps is reorganizing the organizational structure based on product family. A product family is usually a group of products that need the same set of processes or procedures.

Conversely, the Robotic Systems department and the Electrical Systems department fulfill subprojects rather than main projects. This conclusion was reached after considering the numbers of subprojects and main projects done by each department and the budget of their projects (based on calculations, the budget of their subprojects was much higher than the budget of their main projects).

Also some changes were made in the structures of staff departments to improve communication and coordination throughout the organization. The Computer, Technical Archive, and Organizational Development departments were merged to create the Organizational Development & Systems department. The Industrial Relations department which was previously under the direction of the CEO was transferred to the Commercial department. In addition, since the company's strategy included a focus on exports, it needed to have a more powerful Public Relations department. Therefore the Public Relations department, which was previously under the Administration Affairs department, was moved to the direct prevue of the CEO.

In summary, the company's organizational structure was transformed from 36 main departments (25 line departments and 11 staff departments) into a more efficient and effective structure that now includes only 17 main departments (8 line departments and 9 staff departments).

Developing Departmental Structures

After the top level organizational structure was designed, attention was focused on the development of appropriate departmental structures. Based on the information obtained through previous steps, and in collaboration with top management, departmental missions, structures, and section duties were defined.

Since project completion and delivery is emphasized in all line departments, similar functions are applied in different projects, and the portfolio of projects changes frequently (some projects finish and some projects start during the time), it was suggested that a matrix structure would be the best structure for the line departments.

A generic matrix structure for a line department includes several functional units (sections), such as design, manufacturing, and installation and commissioning. Each unit has a manager who oversees a group of employees.

In addition to unit managers, several project managers directly report to the department manager. Project managers are responsible for coordinating all project tasks in order to provide project deliverables on time, within budget, and with determined quality to the customer. Each project manager handles one or several projects. Based on the agreement between the project manager and unit managers, one or several employees from each unit are temporarily assigned to each project. As the project ends, those employees will be released and can be assigned to other projects. It should be noted that in a matrix structure each employee in a functional unit can be assigned to more than one project. Therefore, one advantage of the matrix structure is that employee utilization is increased. In order to implement a matrix structure, department managers categorized their projects based on types of projects and assigned each type to one project manager. Using this type of structure, specific knowledge is stored in functional units and project managers guarantee project delivery.

The matrix structure is useful when an organization structure needs to be multi-focused in that both projects and functions are emphasized at the same time [22]. Using a matrix structure, resources (people, equipment) can be flexibly allocated across different projects and the organization can adapt to changing external environment [22]. Volberda [23] believes that organizational flexibility plays an important role in the success of organizations in hypercompetitive environments. He indicates that the market-oriented grouping of people and the use of project teams with interchangeable personnel and equipment suggests structural flexibility. He asserts that the matrix organization form is one of the organic organization structural forms. In organic structures, planning and control systems are predominantly performance oriented instead of means oriented [23]. Organic structures provide substantial leeway for structural flexibility [23].

Approving the New Organizational Structure

Since a new organizational structure requires the approval of the top management team and the Board of Directors, the proposed new organizational structure of this company along with the proposed departmental structures were presented to the board. A summary of the analysis and the steps taken leading to the recommendations were explained and discussed. The Board of Directors approved the structural redesign. The implementation of a redesigned organizational structure requires the supervision and coordination of many activities. The implementation of a major structural reorganization is a daunting undertaking. For the company in this study the process took about six months. Important activities in the implementation process included the selection of top and middle management, authority distribution planning, defining the location of employees in the new structure, transferring employees among departments or sections (units), changing human resource and financial information systems' data (data associated with the organization's structure), and even the physical relocation of many of the company's departments. After 6 months the organizational structure redesign was successfully implemented without the reduction of workforce personnel.

Conclusion

In this paper the process of an organizational restructuring performed for a project-driven company is discussed. Based on the strategy literature discussed in this paper, a restructuring and simplification of this company's organizational design is indicated in order to minimize the bureaucratic costs that arise from duplication, increased coordination, and communication distortion [5], [12], [13], [14]. Due to rapid growth, the company needed to redesign its organizational structure along with departmental structures. After studying and analyzing the structure, the new structure was developed to resolve conflicts and overlaps within the organization and to satisfy the company's stakeholders. The organizational structure was transformed from a 36 department structure to a 17 department structure. After implementation of the new structure, the controllability of organization has increased by decreasing the number of top level managers and departments. Conflicts and overlaps of missions and responsibilities have been removed. The number of subprojects has decreased and as a result extra and unneeded bureaucracy has been eliminated. Personnel assignment to projects has been facilitated by using flexible matrix structures, and personnel capacity has

been utilized more efficiently. Storage of specific knowledge has been facilitated by integrating departments and organizing matrix structures for line departments. Project managers have gained official job titles making each of them more responsible and accountable. Some authorities and responsibilities have been distributed to middle managers as a result of having a multi-level structure. Departments are more balanced in terms of number of personnel and work volume as many small departments, previously under the supervision of CEO, were merged with other departments. And, so many organizational affairs, such as performance appraisal, budgeting, reporting, and personnel training and planning, have been facilitated by building a multi-level organization structure with fewer departments.

References

[1] Butler, R. (1983). Control of Workflow in Organizations: Perspectives From Markets, Hierarchies, and Collectives. *Human Relations*. 36(5).

[2] Deshmukah, A., Talavage, M., & Marash, M. (1998). Complexity in Manufacturing Systems, Part I: Analysis of Stratic Complexity. *HE Trans*. 30, 645-655.

[3] Kavcic, K., Bertoncelj, A. & Gosnik, D. (2010). Managing Organizational Complexity. *Managerial Challenges of Contemporary Society*. Faculty of Economics and Business Administration. Babes-Blyai University.

[4] Moldoveanu, M. & Bauer, R. (2004). On the Relationship Between Organizational Complexity and Organizational Structuration. *Organization Science*. 15(1), 98-118.

[5] Jones, G. & Hill, C. (1988). Transaction Cost Analysis of Strategy-Structure Choice. *Strategic Management Journal*. 9, 159-172.

[6] Elliott, G. (2002). Organizational Complexity: A New Perspective. *Industrial Management*, 44(4). 8-11.

[7] Skaggs, B. & Huffman, T. (2003). A Customer Interaction Approach to Strategy and Production Complexity Alignment in Service Firms. *Academy of Management Journal*. 46(6), 775-786.

[8] Tushman, M. & Nadler, D. (1978). Information Processing as an Integrating Concept in Organizational Design. *Academy of Management Review*. 3(4), 613-624.

[9] Williamson, O.E. (1979). Transaction Costs Economics. *The Journal of Law and Economics*. 22(2).

[10] D'Aveni, R. & Ilinitch, A. (1992). Complex Patterns of Vertical Integration in the Forest Products Industry. Systematic and Bankruptcy Risk. *Academy of Management Journal*. 35, 596-625.

[11] D'Aveni, R., & Ravenscraft, D. (1994). Economies of Integration Versus Bureaucracy Costs: Does Vertical Integration Improve Performance? *Academy of Management Journal*. 37(5). 1167-1206.

[12] Albaum, g. (1964). Horizontal Information Flow: An Exploratory Study. Academy of Managemnt Journal. 7(1), 21-33.

[13] Mahoney, J. T. (1992). The Choice of Organizational Form: Vertical Ownership versus Other Methods of Vertical Integration. *Strategic Management Journal*. 13, 559-584.
[14] Williamson, O.E. (1967). Hierarchical Control and Optimum Firm Size. *Journal of Political Economy*. 75(2), 123-138.
[15] PMBOK. (2013). *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*. Project Management Institute. Fifth Edition.
[16] Gareis, R. (2002). Professional Project Portfolio Management. *IPMA World Congress.* Berlin.
[17] Buhler, P. (2011). Changing Organizational Structures and Their Impact on Managers. *Organizational Change*. 72(2). 24-26.
[18] Zell, D., Glassman, A., & Duron, S. (2007). Strategic management in Turbulent Times: The Short and Glorious History of Accelerated Decision Making at Hewlett-Packard. *Organizational Dynamics*. 36(1). 93-104.
[19] Nobeoka, K., M. A. Cusumano. (1995). Reorganizing for Multi-Project Management: Toyota's New Structure of Product Development Centers. *IMVP Research Briefing Meeting*.
[20] Danilovic, M., H. Borjesson. (2001). Managing the Multiproject Environment. *Proceedings of the Third Dependence Structure Matrix (DSM) International Workshop.* Massachusetts Institute of Technology (MIT), Massachusetts, Boston, Cambridge, USA.
[21] Womack J. P., D. T. Jones, (2003). *Lean Thinking,* New Ed edition. Free Press.
[22] Daft, R., L. (2012). *Organization Theory and Design*. Cengage Learning. Eleventh Edition.
[23] Volberda, H. W. (1996). Toward the Flexible Form: How to Remain Vital in Hypercompetitive Environments. *Organization Science.* 7(4), 359-374.

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