

PROJECT MANAGEMENT IN A DESIGN COMPANY: CASE STUDY IN THE PRODUCT DEVELOPMENT AREA

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Abstract

Project management can help a company to consolidate its position in the market. There are many cases in the literature detailing the positive results achieved via improvements in the project management process. Nonetheless, in the Design area, such examples are less frequent.

If a company wants to manage design, it has to acquire expertise and implement actions that contribute to the decision making process. Under the conditions presented herein, a research was conducted about how design firms develop their project management processes. The study involved design companies in Porto Alegre/Brazil. It aimed at improving project management processes; characterizing, analyzing them, as well as proposing positive modifications in the processes.

The research included a case study in a design company, in the product development area. The project management practices contained in the PMBOK (2004) were selected and used as reference, since they are widely recognized academically and professionally.

As a result, it became clear that the studied company utilized the stages of the PMBOK (2004). Moreover, the manner in which the practices were used depended on factors such as the project manager experience, normally a refined fruit of previously undertaken projects.

Keywords: Project Management, product development, design company

Summary

Project management can help a company to consolidate its position in the market. There are many cases in the literature detailing the positive results achieved via improvements in the project management process. Nonetheless, in the Design area, such examples are less frequent. Under the conditions presented herein, a research was conducted about how design firms develop their project management processes. The research included a case study in a design company, in the product development area. As a result, it became clear that the studied company utilized the stages of the PMBOK (2004). Moreover, the manner in which the practices were used depended on factors such as the project manager experience, normally a refined fruit of previously undertaken projects.

Keywords: Project Management, product development, design company

1. Introduction

Design management is an efficient tool to generate and implement a corporate culture and positively affects the organizational image. It contributes to the success of the enterprise, to sell products, to provide services for local and global markets, to ensure the quality in long-

term production, to motivate staff, to improve competitive advantage, to satisfy customer needs, as well as to foster a trustworthy image in the market [1]. According to [2], the company will only be able to manage design as long as it acquires as much knowledge as possible in this area. It has to incorporate the specialized support systems present in the market and use them to maximize its profits.

This context favors the development of scientific studies and the application of recognized management techniques from other areas. As a support, this study uses the knowledge areas in project management contained in the Project Management Body of Knowledge, PMBOK Guide [3] – a well recognized guide, largely utilized in various sectors. According to [4] “As an internationally recognized standard, the PMBOK guide provides a set of knowledge in project management, generally accepted in several specific areas of work”. For [5], the PMBOK presents a solid basis of standards. It is used to establish a project management culture.

The main object of this research is to conduct a case study in a design office in order to observe how project management is developed under the perspective of the [3]. The office deals with product development and it is located in the city of Porto Alegre, Rio Grande do Sul State, Brazil. The fact that this company operates in the product development area was the key factor for its selection, since such activity is one of the most publicly recognized [6], especially when it involves the design “stars”: fashion, furniture and automobile design.

2. Project Management

According [7], project management has become a mature discipline with great visibility not only within the civil construction or in defense strategies but also among the organizational development areas, product development, project legislation, educational, social and political projects, events, and in the many sectors of the economy.

According [3], “project management is the application of knowledge, skills, tools and techniques used to meet project objectives and its requirements”. For [5], project management could be defined as planning, programming and controlling of several interrelated activities in order to successfully achieve the objectives and benefit the participants. Valle describes project management as the application of concepts, skills and techniques applied to project activities with the aim of satisfying its requirements. Project management is accomplished through the integration of the processes of initiating, planning, executing, monitoring, controlling, and closing [4].

[8] sees project management as a process through which a project is successfully accomplished. He also points out that, in the traditional view, project management is defined as the knowledge involving tools and techniques. An alternative view, however, defines project management in terms of managerial processes that are necessary to develop a project in a predictable way. For [9], project management consists of a number of concepts, methods and tools that guide the process from the beginning up to the end, with resources oriented towards the realization of the objectives and result delivery.

Since the [3] is an internationally recognized standard for project development, this study used the knowledge areas in project management presented in this Guide. The knowledge areas in project management provided by the [3] are defined as follows: project integration management, project scope management, project time management, project cost management, project quality management, project human resource management, project communications management, project risk management, and project procurement management.

3. Research Method

During the development of the research method it became evident the need of an understanding of how project design offices and services providers from Porto Alegre/Brazil managed their projects. A diagnosis was then conducted through an in-depth interview with a design office with ten years of experience in the segment. The analysis of the results indicated poor knowledge of project management.

Further investigation was necessary to analyze the adherence between the nine areas of knowledge in project management from the [3] and the practices of project design management employed in the office. The Case Study was adopted as research strategy. For [10], this method should be chosen when the researcher is attempting to find answers for “how’ and “why” type of questions. Case studies are also advised when the investigator has little control over the events. The outcomes from case studies can be generalized to theoretical propositions. [11] also emphasizes that case study researches may include both single and multiple cases. According to this author, since the multiple-case studies are based on more than one object of study, they are less vulnerable and, therefore, susceptible to replication.

In an interview conducted during September 2008, relevant aspects in the project management process of a design service provider were analyzed. The interviewee has been operating in this segment in the city of Porto Alegre/Brazil for more than twenty years and has an academic degree in Arts.

In order to participate in the interview, the company was requested to prove its practices in design project management – through documents, archive registries, interviews with collaborators other than the interviewee, direct observations, participative observations or, even, material proofs in the form of the artifacts produced [11]

4. A Proposal of an Indicator for the Adherence Analysis of the PMBOK (2004)

This item presents a tool for the analysis of project management in the product design office. The tool consists of a spreadsheet that details the management practices from the [3]. The spreadsheet is presented in Table 1. Column A shows aspects from Design Management which are related to project management best practices from the [3].

Column B allows us to register whether the office employs the knowledge areas presented in the [3]. A 0 (zero) score was attributed to this column. Column C is entitled Informal Use; a 1 (one) score was attributed to this column. Column D was named Partial Formalized Use and received a 2 (two) score. Column E is called Formal Use. A 3 (three) score was attributed to it, based on the outcomes from the interviews conducted within the company.

Column F is entitled “Scores for the Design Management. This column provides a summary of the scores obtained by the office in the nine aspects. The sum of the line scores reflects the total score obtained by the office in relation to the nine aspects of Project Design Management. The maximum score in this case is 27, that is, nine aspects multiplied by the maximum score (3). Following this, an indicator was defined: the DAP – Degree of Adherence to the [3] Practices, which is a value from 0 to 10 based on the applicability of the practices from the *Project Management Institute* in the office. The adherence degree is measured through the equation shown in equation 1.

A	B	C	D	E	F
ASPECTS APPROACHED IN DESIGN MANAGEMENT	NOT IN USE (0)	INFORMAL USE (1)	PARTIAL FORMALIZED USE (2)	FORMAL USE (3)	SCORES FOR DESIGN MANAGEMENT ACHIEVED BY THE OFFICE
Integration Management		X			1
Scope management				X	3
Time management				X	3
Cost management				X	3
Quality management			X		2
Human resource management				X	3
Communications management	X				0
Risk management			X		2
Procurement management				X	3
Possibe Maximum Score	27	Obtained scores	20		

Table 1 – The spreadsheet developed in this study; an example of its application

$$DAP = \frac{\text{Scores obtained in the evaluation} \times 10}{27} \quad (1)$$

With the scores obtained in each area of the [3] it is possible to draw a radar chart, which allows us to draw inferences and improvement suggestions for the management process employed in the office.

The spreadsheet was designed and sent to the office to be filled with information about design project management practices and how they are used. The information provided in the spreadsheet allowed us to confront the researcher's view with the office's view and its practices. Afterwards a new contact was established with the office and a final spreadsheet was developed in consensus. The studies based on the spreadsheet, on the DAP and on the radar chart, filled in consensus, provide us with the definite degree between the management processes practiced in the office – the object of this study – and the practices presented in the [3]. The use of project management practices and the level of the interviewee's theoretical knowledge about the topic were analyzed. The participants in this study received the following information as feedback:

- a) a description of their design processes, including stages and sub-stages of the processes;
- b) an analysis of their practices for each aspect of project management presented in the [3], highlighting the areas to improve utilization and level of formalization.

5. Description of the product development process in the company

The first step of the product development process begins when the company realizes that there is an opportunity in a certain niche market. This is formalized through a PDRF (Product Development Request Form). Once the PDRF is finished, the Research stage begins. It is on

this phase that the benchmarking technique is used to assess what already exists in the market. In this stage, the analysis focuses on what has been used by competitors in a certain segment. Design proposals and types of product typology from competitors are also studied during this stage. Appearance, price, functionality, among other parameters are also considered. These parameters help the commercial department to decide what can be done to achieve a product that will overcome its competitors.

The view that only benchmarking and meetings are not enough is also discussed with the commercial department of the company. According to the office, during the Research stage it is possible to detect nothing more than the minimal requirements of the project. However, the need for an understanding of aesthetics, values and specific behavior of each target remains. Therefore, a behavior survey of the target is conducted. In the latest successful cases developed in the office, an ethnographic survey was used. [2] corroborates this procedure when he says that the first step to be taken in the process of developing a new product is its real definition, which is achieved through market studies.

As soon as the Research stage is accomplished, the Creation stage begins. This is the phase when some models and sketches are made with the use of 3D modeling tools. According to the interviewee, these tools make the task of modeling and virtual modeling presentation easier and simpler.

After the solution is created, there is a sub-stage called Proposal Presentation and Defense, when the whole creation is defended in order to receive a pre-approval. The technique here is the same used in the research phase – the ethnography. This technique uses the reports of those who had been in contact with customers and were able to identify certain needs behind the proposed solution.

During the Proposal Presentation and Defense sub-stage and also throughout all development phases, everyone in the company is entitled to manifest their opinions, although the final decision lies on the hands of the person in charge of the project. According to the interviewee, this is the moment when the designer's common sense and judgment skills are decisive to perceive which opinions are potentially relevant.

Once the project was pre-approved, the Designer sends some preliminary data to the engineering, including the number of components, dimensions and weights in order to have an estimate of the investment and the production's industrial cost.

Once the production is estimated, it is time to gauge the investment return time, based on the expected profit margin and on the sales estimate. In this phase, the project is approved and sent back to the negotiation tables. If it returns, some product requirements are abandoned or the development is aborted. The next stage – Construction – will only begin if the "payback" is reasonable.

The Construction stage comprises three steps that occur concomitantly: development of marketing support material (packaging, tags, folders, sales material, advertisement, among others); design and tool making (usually outsourced); and prototype making.

After the commercial and financial viability issues are discussed and solved, the designer focuses his efforts on the prototype as way to solve technical problems. Once the financial resources for the prototype are released it is necessary to establish a schedule for the prototype's making process, as well as for the necessary tests, production tools, adjusts, pilot production and quality tests. It takes at least a month to calibrate the tools; only after that the production will actually begin.

The schedule is sent to the commercial area informing when the products will be ready for sale. Besides providing information on how the tools are being made and on when they will be available, this schedule also allocates some time for calibration and any other necessary adjustments.

When the prototype is ready, the Quality Engineering Testing begins. According to the office, the quality engineering department has such high requirement level that, in some cases, it seems that there are interpersonal problems between the quality team and the project team. However, it becomes clear that certain requirements are inherent to the process and are all necessary.

Once the production tools are delivered, the first pieces are created. The calibration is performed to check the perfect adjustment so that the tooling can enter the production line. A pilot batch is then prepared. Three hundred pieces are produced according to the ISO 9001 standard. If up to 1% of the pieces in a batch is not faulty the product is approved. If more than 1% of the total number of pieces presents any kind of problem, the whole project is reviewed. In these cases, attention is mainly focused on production tools. The search for a solution involves, besides the Designer, the quality supervision, the chief engineering, the tooling supervisor, a methods and processes technician and, sometimes, the production manager. When the problems are solved, and they usually are, other 300 hundred pieces are then produced and the checking process returns to the starting point. If the problem level remain under 1% of the produced batch, the Production and Sales stage begins.

For [2], design, as a service, can be controlled via ISO 9000/4 standard, which connects design to quality and establishes the procedures to be followed by design processes in order to achieve high quality products.

During the Production and Sales stage, emphasis is put on the commercial aspects. Market receptive return is also important since a product can be reviewed, redesign or even cancelled based on its commercial return.

6. Project management process in a product design company

Integration management initially occurs with the integration between the service provider (in this case, the office) and the marketing department of the contracting company. It is in this sector of the company that the information is centralized and analyzed through a document that explains the stages, the people, the departments and instruments to be integrated so that the whole process follows a certain order, with the most effective use of resources. Differently from few industries or large corporations, the office has an informal routine for integration; it lacks a specific integrating planning. In the office opinion, small companies do not need to follow a specific tool for this kind of management, since the Designer is responsible for any and all information from the very beginning of the project.

The scope management occurs as soon as the PDRF is signed by the commercial department. From that point onwards the scope of the work is officially formalized and meetings are set on a weekly basis with the multidisciplinary development team. A minute is taken to register the development stage.

There is also a weekly meeting with the people responsible for each area involved in the project; they should provide updated information about the tasks of which they are in charge. In case an expected event occurs, it is possible to review the scope and the schedule. By contacting the target, the Designer is able to perceive the future product under different points of view; in these cases, it is possible to modify the formalized initial scope.

As for time management, the office states that the development time span is closely connected to the approved financial value of the project. It is monthly measured through a report which provides the amount of time (worked hours) and on which project this time was spent. People usually work simultaneously on more than one project. The interviewee alternates among projects by distributing tasks. The number of hours is recorded in an agenda so that it is possible to identify the project in which each technical hour was used.

According to the office, however, it is quite difficult to predict the number of hours that will be spent on future projects.

Regarding cost management, it is taken for granted that the designer has to be aware of the financial values involved in the project – sometimes large amounts from third parties. The increase in responsibility, according to the interviewee, is directly proportional to the values involved in the project. Cost management in product management should begin in the PDRF. One of the basic parameters in management is the sales price. In this case, the product to be developed cannot reach the point of sale costing more than a determined value. This aspect becomes a requirement of the project and this condition should be considered. According to the interviewee, however, when cost management becomes a requirement, it is up to the Designer to solve the issue.

The quality of information from the project's initial requirements is always checked through surveys conducted by the office. In most cases, the initial information lacks the sort of quality that is necessary to start the design. Therefore, a good prototype – tested and approved in accordance with the ISO 9001 standard – ensures a great deal of quality for the proposed solution.

As for human resources management, according to the office's view, human relations should be built throughout the projects. They should be seen as a necessary element for the development of a design activity. For the interviewee, as time goes by, it becomes easier to identify the people on whom the Designer can rely and those with interpersonal difficulties. A characteristic appointed by the office as a strategy to make everyone cooperative is to be friendly to all staff from the contracting companies. In many cases the Designer needs to accomplish a task that is under the responsibility of others; that's why it is so important to maintain a good relationship with everyone. Sometimes, for example, it is necessary to interrupt the operation of a machine in order to conduct a test. Based on the experience, the Designer knows that it is most likely that the supervisor will refuse to stop the machine. A way to solve the issue is to talk directly to the shop floor worker, the person with whom the Designer has already established a friendly relationship.

As for communication management, it was observed that the office has partial formalization, that is, most information is kept, but not all information is contemplated. There is not a specific computer system to facilitate the project management process. Only e-mail software, CAD, and Media Player are used. The office believes that project management software is necessary for large companies, with complex products.

Regarding risk management, the interviewee identified the commercial risk of the project as the main risk in the company. Due to some unsuccessful experiences, this risk was partially minimized with the implementation of a survey conducted before the project is launched. According to the office, during the research stage, the Designer significantly contributes to reduce the risks of releasing a product without market acceptance. Other risks are managed within the contracting company – the risk of product breakage or the risk of hurting the customer. These are events that must be foreseen by the Designer as well as by the quality engineering. The instruction manual is another document that helps to diminish risks during product usage. The manual is a joint effort of the law, marketing and graphical design departments.

In respect to procurement management, it begins through an Investment Request (IR). According to the office, this occurs at the moment the prototype is needed. This stage is only achieved after the client has approved the payback time. Procurement quality is personally checked by the chief engineer in the presence of the interviewee. They should visit the suppliers' facilities to check their installed capacity and analyze whether the supplier possess all the necessary conditions to operate without compromising any stage of the project. Some of the suppliers that currently work for the office have been jointly developed with the

engineering area. According to the interviewee, it is a relationship that has to be very close. Some acquisitions are formalized, but others, similarly to the way some suppliers are developed, are also conducted in an informal manner.

7. Adherence analysis to the PMBOK practices in the project design company

Once the interviews were finalized, the data were organized with the use of the spreadsheet, the DAP and the radar chart. Improvement opportunities and the adherence to the nine knowledge areas in project management from the [3] were also analyzed. Table 2 was developed based on the results of the case study. It presents the actual stage of design management in the office and the nine areas of knowledge in project management from the [3].

Good project management was inferred, since none of the analyzed areas is informally managed. The project management practices could be entirely formalized with the use of documents and digital files, a practice that would enhance the management process in the office. The office scored 22 points out of 27, resulting in a DAP (Degree of Adherence to the PMBOK) of 8.14.

APPROACHED ASPECTS	Researcher's View	Office's View	Consensus View
Integration management	2	2	2
Scope management	3	3	3
Time management	2	3	2
Cost mangement	3	3	3
Quality management	3	2	3
Human resources management	2	2	2
Communications management	3	2	2
Risk management	3	3	2
Procurement mangement	3	2	3
Possible Maximun Score = 27	24	22	22

Key for the Scores: 0 = The office does not employ established procedures to manage a given aspect in Design Management. 1 = The office has established informal procedures to manage a given aspect in Design Management (without physical or digital records) 2 = The office has established partially formalized procedures to manage a given aspect in Design Management (with some records). 3 = The office has established totally formalized procedures to manage a given aspect in Design Management (with all records available for consultation).

Table 2 – Product design management practices

The chart presented in Figure 1 was based on the results obtained from a case study in a product design company. Integration, time, risk and human resources management indicated opportunities for improvement.

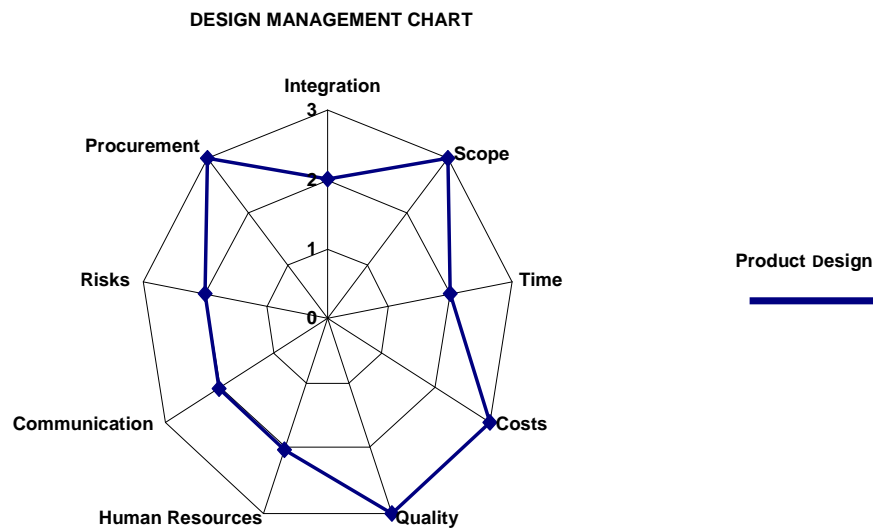


Figure 1 – A radar chart – product design management.

8. Final Considerations

The stages of the product development process, even though not formalized, help us to estimate the time to be spent, the resources needed, potential bottlenecks, and conditions to devise contingency plan to minimize project risks. The office is well aware of the responsibilities held by the designer who is responsible for developing a project. Large amounts are involved in a project and this money has to generate returns for the company. Therefore, solutions which were not market-based should be strongly avoided. Design management is dealt in a substantial, but sometimes informally way. It is possible to perceive that this occurs due to the responsibilities that are inherent to product design or, even, the amount of data involved in the solution. This is necessary in order to prevent the Designer from getting lost in a tangle of tasks to be developed, each one with its deadline, minimum requirements and established resources.

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