ORGANIZATIONAL ALIGNMENT-BASED IMPROVEMENT OF PROJECT MANAGEMENT IN A SMALL FIRM

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This paper analyzes the change experienced by a small company that produces staircases to order, requiring both production and project management. It operates in an environment that has been in crisis since 2008; where on-time delivery is essential whereas the demand shows an unstable behaviour. Therefore, the company needed to improve its effectiveness. Considering both internal and market-based limitations, the alignment of the whole system was considered to be the best choice for enhancement. Starting with the initial situation of the company, this inquiry describes the implementation process, the initial results and conclusions, and the suggested future improvement lines. As a result, interesting findings related to the management of this kind of environments have been found.

Keywords: Project management; Theory of constraints; alignment; effectiveness; productivity

MEJORA DE LA GESTIÓN DE PROYECTOS DE UNA PEQUEÑA EMPRESA BASADA EN EL ALINEAMIENTO ORGANIZACIONAL

Este documento analiza el cambio experimentado por una pequeña empresa dedicada a la fabricación de escaleras bajo pedido, en un contexto que requiere la aplicación simultánea de prácticas de gestión de producción y proyectos. Esta organización opera en un entorno en crisis desde 2008, donde el cumplimiento del plazo es fundamental y la demanda es inestable. Consecuentemente, era necesaria una mejora de su efectividad. Teniendo en cuenta las limitaciones del mercado y las propias de la empresa, trabajar en el alineamiento de la organización se perfiló como la mejor opción de mejora. Partiendo de la situación inicial, este estudio describe el proceso de implementación seguido, los primeros resultados y conclusiones alcanzadas, y las líneas futuras de mejora sugeridas. Como resultado de ello se han alcanzado hallazgos de interés para su consideración en la gestión de este tipo de contextos.

Palabras clave: Dirección de proyectos; Gestión de proyectos; Productividad; Alineamiento; Teoría de las limitaciones

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Agradecimientos: The authors acknowledge the support of the Provincial Council of Gipuzkoa, through the Garaituz Program, without which the present study could not have been completed.

1. Introduction

Organizations guide their actions towards objectives through strategy (Johnson & Scholes, 1993). This ideally implies to adapt their resources to the current situation. However, manufacturing firms currently are exposed to very dynamic and uncertain environments, in which logistical factors such as delivery due date reliability or lead time among others are key to remain competitive (Lutz, Löedding & Wiendahl, 2003). Under these circumstances, it is very difficult to guarantee on-time delivery of products without a certain margin of capacity and a minimum of parts and raw materials.

It seems that companies do not understand the holistic, aligned approach needed to perform in entrepreneurial contexts, given the impact of these factors on the performance of the company (Abrantes & Figueiredo, 2015; Maylor, Turner & Murray-Webster, 2015). Unilateral decisions aiming to improve any of these will negatively impact on the others. In other words, decisions based in local perspectives may go against the overall system (Mabin & Balderstone, 2003). Similarly, Ellinger, Daugherty & Keller (2000) highlight the relevance of inter-functional integration, focusing on “the interaction and collaboration between different departments”.

As a result, adjusting resources may become very complex. The performance of a company is strongly influenced by its organizational and operating capabilities. Organisational Capabilities may be defined as the ability to solve effectively the organizational problems of a firm (Dosi, Nelson & Winter, 2000). In contrast, Operating Capabilities enable the firm to execute its main operating activities (Newey & Zahra, 2009), thereby strongly influencing its outcomes and performance (Inan & Bititci, 2015). In addition, Villa and Taurino (2013) state that the structure of the production system is an essential factor when setting a feasible production approach. They also emphasize the importance of two aspects: the presence (or not) of intermediate decoupling points (i.e. buffers), and the direction of internal work order transmission. The direction of the order flow determines if the system is “pull” (upstream) or “push” (downstream), whereas the insertion of buffers allows decoupling operations, that is to say, working independently to a certain extent. Considering the above, it is concluded that decoupling is especially useful for those contexts in which significant processing time differences between operations exist, as well as for bottleneck management.

Taking into account the features of this study, another two factors are relevant to define the context: the production approach and the size of the company. The company herein analysed has to provide unique but similar products, thereby having adopted project manufacturing or Engineering to Order (ETO) approach. For this purpose, it is essential to integrate manufacturing, logistics and project management (Caron & Fiore, 1995). This is a suitable approach for these contexts (Yang, 2013), demand driven and in which orders are managed as projects. On the other hand, according to Inan and Bititci (2015) the general characteristics of a company are strongly influenced by its size. They conclude that due to their characteristics, smaller firms “should have focused clear and concise strategies” and that “these strategies should be clearly deployed to operational activities of the business”. Indeed, Small and Medium Enterprises (SMEs) and micro enterprises have specific features, different from each other, and managers of SMEs have to fight to attain objectives that frequently are mutually incompatible (Villa & Taurino, 2013). Inan and Bititci (2015) conclude that the existing literature does not clearly differentiate micro enterprises from the rest, thereby suggesting a size based categorisation.

Thus, the present study analyses the case of a manufacturing company which, in the context described above, addressed a change process aiming to improve its overall performance. This paper begins by introducing the research methodology. It then goes on to the features of the case study. The fourth section deals with the results. These results and their

implications are discussed in section five. Finally, the overall conclusion of the research is summarised.

2. Research Methodology

The singularities of Management Research, such as the dual dependence on both the physical and the human elements of an organization, often prevent the researcher from taking control of the events (Drejer, Blackmon & Voss, 2000). Therefore, the researcher has to adapt the study to the conditions of the context. In these conditions case study based research is considered to be a more suitable approach than positivist methods (Easterby-Smith, Thorpe & Lowe, 2002; Yin, 2009), especially in real life situations in which experimental or survey-based methodologies do not warrant a proper response (Guide Jr & Srivastava, 2000; De Massis & Kotlar, 2014).

Additionally, case studies provide direct access to information, achieving deep knowledge of the context analysed (Rowley, 2002; Wacker, 1998). When the research is concurrent with action in which the researcher participates, case studies may be conducted by means of a specific form called Action Research. This action oriented perspective is appropriate to test specific approaches (Benbasat, Goldstein & Mead, 1987; Gummesson, 2000; Coughlan & Coghlan, 2002; Easterby-Smith, Thorpe & Lowe, 2002). It is also helpful for process understanding, and overcoming limitations of other methods when addressing real world problems (Platts & Gregory, 1990).

According to Yin (2009), one reason to develop a single case study is to analyse a representative or typical case. Additionally, holistic case studies examine the global nature of an organization or program. Hence, the objective of the approach of this research is to capture the main features of the situation, as the lessons learned may be relevant for similar projects. To improve the management of the project a phase based structured framework was defined (see figure 1), which also was used as the basis to design the research. According to the Action Research approach, the researcher develops the study through planning, acting, observing and reflecting. Therefore, this cycle was applied to all three stages composing the project.

In brief, this study is defined as a holistic case study, conducted through Action Research approach, and whose unit of analysis is the whole company. The process used as framework is described in the next section, also providing information on the phases.

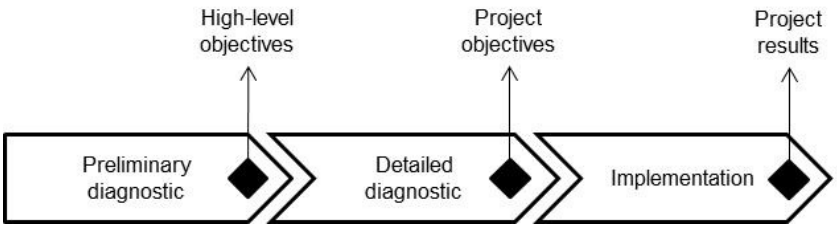
3. Case Study

The present case study analyses a small company that produces wood and metal staircases to order for construction industry, an environment that has been in crisis since 2008. It takes place is a manufacturing company with less than 20 employees. It is thereby consistent with the definition of micro enterprise provided by Inan and Bititci (2015), as well as with some of the general characteristics they pose: command and control based management, inexistence of formal procedures, almost no training and staff development activities, and no knowledge or understanding of operational improvement activities.

The main market for the company is Europe, particularly France and Spain. On time delivery is essential as it is an ETO context characterized by the unstable behaviour of demand. Additionally, customers configure their product in accordance with the existing catalogue, which includes standard staircase models and customisation options. Then, the product is designed. Thus, the whole process is composed of Basic Design (BD) to be validated by the customer, Detailed Design (DD), and manufacturing, performed by the Production Department. Supply of materials and components is also required and, occasionally, subcontracting special jobs for some models too. Therefore, orders require combining both

production management and project management approaches. Apart from the sales force and support staff, the workforce is composed of two designers and six employees from the Production Department.

Figure 1: Framework of the change project



This inquiry describes the result of a change process conducted over a six-month period. The multi-stage procedure followed is also the basis for the research process, as summarised in figure 1. The diagnostic and implementation phases are explained below, an additional stage to analyse results is also included.

Preliminary Diagnostic

The purpose of the preliminary diagnostic was to reach an agreement on the high level scope and objectives of the project, serving as the basis for the detailed diagnostic. An additional objective was also aimed at: to engage staff involved in project management in the definition and execution of the change. Thus, this stage was conducted according to a pre-established process composed of individual interviews and questionnaires, as well as working sessions, requiring participation of the key staff involved in projects. Initial interviews of the management of the company provided a general perspective of the company and its environment. Then, key participants completed a semi-structured questionnaire to gather problems and relevant information related to the performance of the company. The data obtained were processed and the result was the basis for the working sessions, in which all the respondents participated. These group meetings, conducted by the researchers, served as means to develop a common understanding of the global context, encouraging discussion. As a result, an agreement on the high level objectives and scope of the change project was reached.

Detailed Diagnostic

The purpose of the detailed diagnostic was to achieve a comprehensive understanding of the company and its context. This included identifying problems and limitations of the general management, of each stage and related to the Design and Production contexts in particular. This stage was addressed as follows: firstly product, process and capacity analysis of both Production and Design contexts were carried on through facilitated working sessions. The partial findings achieved enabled a global analysis of the overall procedure. This approach allowed the definition of detailed objectives for the improvement project as well as the elaboration of an implementation plan oriented towards reaching these objectives.

Implementation

The implementation of changes aimed to provide the company with the means to comply with deadlines. It was performed starting from the last stage of the process and going backwards. That way, the inputs needed for each phase were progressively identified,

thereby setting the output required at the previous stage. Additionally, the support necessary for this approach was also identified, created and tested in the real environment, phase by phase.

This section has briefly described the contents of those phases composing the change project. The next part of this paper goes into detail about the work performed, the findings and the results. Given the progressive nature of the change procedure, the realization and results of each phase are reported one by one to gain a better understanding.

4. Results

4.1 Preliminary Diagnostic

The interviews with the managers of the company revealed significant information about the company and its management. Once placed, orders had to be accomplished within 5 weeks. There was a meeting based framework, with purposes and frequencies: order launching, workload management, order management, etc. Supposedly orders were consistently managed, thereby achieving a high on-time delivery performance. For this reason, the general manager expressed an overall objective as key for survival: “to improve the process from ordering to payment”. Moreover, the result of this process was a total agreement with the general objective stated by the management. Indeed, the group coincided in that several problems arise throughout the process, causing more and more uncertainty downstream. Nevertheless, there were different perceptions about the underlying causes and their impact. The main problem categories identified at this stage are the following:

- Consistent management of priorities, projects and capacity.
- Lack of support: historical information, method and tools.
- Customer management (approval of proposal and validation of delivery).
- Management of unexpected events (urgencies, changes of priority, etc.).

As a result of the analysis the group reached the conclusion that the priority for the company was to improve service level by a twofold action: lead time reduction and improvement of due date compliance. The scope of this purpose goes beyond the real possibilities of the current, time constrained change project. Therefore, the project was undertaken with a more limited scope: “To define a methodology to consistently align the management of the company; and implement the improved management of Design and Production stages”. To facilitate the implementation of the methodology in real world conditions, it would also be necessary to develop a tool to support the information generation, and update needs of the aligned management.

4.2 Detailed Diagnostic

Production

The analysis developed in the working sessions with the staff of the Production Department showed that all the regular capacity was used to perform only confirmed orders. Almost all the workload of this department came from wood staircase orders, and just a small amount of the capacity was used to manufacture metallic staircases. The manufacturing process was mainly composed of simple, sequential operations whose inherent uncertainty was low. There were significant differences in estimated workload required to produce the diverse products offered. Additionally, each single order required some customisation, making unfeasible strategies based on the use of half-elaborated and finished product inventory. The limitations related to human resources were the main source of uncertainty caused within the

department. The first fact was that as a consequence of the crisis, resources were tight with work. Employees are specialists with low polyvalence, giving rise to low flexibility, and there are difficulties in recruiting suitable resources due to the high specialisation required.

It was also corroborated that the Production Department was driven by the delivery program and strongly influenced by the outcomes of the Design Department. The inexistence of a tool to support manufacturing management was identified as a limitation to cope with the context. Due to this fact as well as to the precarious availability of historical information, experience was the only asset to manage production. Managers aim to orient resources towards on-time order delivery, but, lacking a production management method and supporting tools, working conditions were exacting.

Another point reported by participants was that these efforts were required both in high and low workload conditions, and due to causes external to the department. Unrealistic delivery plans were a direct consequence of the inability of the company to reliably manage orders and resources. The analysis of the evolution of delivery plans revealed that this procedure systematically led to on-time delivery failures. Occasionally the inputs to be provided by the Design Department were late or delivered incompletely. In addition, programmed delivery dates of launched orders were often changed. All these problems impacted on the program.

Other sources of uncertainty external to the company were also identified. Supply of materials and parts was usually under control, but occasional shortages or delays occurred and if so, delivery date slippages tended to follow. Certain designs also require outsourcing special jobs, complicating management and thereby leading to similar consequences.

Design

The analysis of Design phase was conducted similarly to the Production analysis. Importantly, two workflow breakage points were identified. All projects required BD, consisting of developing an outline to be approved by the customer, whereas DD was only needed for accepted orders, implying delivery of input for manufacturing. As explained in section 3, two stages compose this phase (i.e. BD and DD). They are separated by an intermediate customer acceptance point, and the Design process was finished when all the work was completed and delivered to the Production Department. Thus, the driver for Design management was visual estimation of the amount of work available in Production. Human resources related problems were the same as those reported in Production analysis. Likewise, there was not any management method or supporting tool available.

The main markets of the company are Spain and France. Sales force in the French market thoughtfully worked in customisation before the order was placed, whereas in the Spanish market customisation was considered to be a part of the order placing process. The direct consequence of these different approaches was that BD in the French market was very likely to be accepted “as it is”, in one day or less. The same endeavour frequently required days or even weeks in the Spanish market, turning the DD starting dates unpredictable.

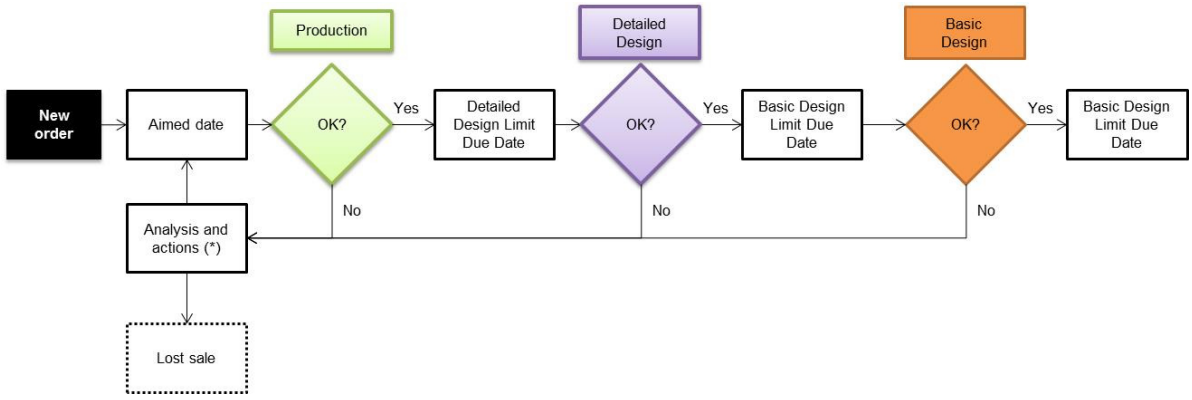
On the other hand, uncertainty was higher than in the Production Department. In this context, uncertainty and workload are dependent on the nature of each specific job according to the following factors: staircase model; level of customisation; and characteristics of the edifice, as the product must fit its specific features. Apart from that, new product designs were developed by the Design Department implying high workload and, usually, also high uncertainty. Finally, several problems reported by the Production Department were reported to cause similar results also here: human resources limitations, changes of delivery dates and unavailability of a management methodology.

General

The first issue found in the detailed diagnostic was unexpected. The meeting based framework described in the preliminary diagnostic seemed to be very well founded, thus enabling aligned management. Nevertheless, a deeper analysis showed that the background of this approach lacked capability for day-to-day management. The root problem was inconsistency in mixing order lead times, committed work and resource efficiency. Actually, the 5 week delivery period was offered regardless of the product or committed workload, thereby becoming unrealistic. For instance, estimated workload for standard products ranged between 3 and 15 hours for design jobs; similarly, manufacturing tasks varied between 29 and 72 hours. These differences, as well as intermediate breakage points and departmental workload fluctuations made the initial approach incapable of managing orders properly. Consequences caused downstream in the Design and Production Departments, such as inconsistencies during execution, were motivated by the inexistence of a method to perform aligned, and to the inability to properly gather, process and update information.

It was also observed that depending on the very nature of orders, there were very different situations contributing to interrupting workflow between the Design and Production Departments. One extreme situation occurred when several projects required exactly the same design, for example for blocks of flats or identical chalets. In these situations design workload was very low compared to Production workload. The circumstances defining the opposite extreme were related to the factors involving high uncertainty levels in design, as mentioned above.

Figure 2: summary of the planning process for a new order



Importantly, the overall process to be followed by an order once it is defined is delimited by two workflow-breakage points, and by a deadline. Thereby it is divided into 3 steps: BD, DD and Production. As explained above, these phases had different natures, used specific resources and involve changing, disproportionate workloads. Therefore, orders follow a discontinuous workflow, requiring decoupling the 3 phases to facilitate an overall, aligned management.

Order delivery dates must be assigned considering the overall workload of the system and priorities. This implies that internal delivery dates for new orders must take into account global priorities and committed orders. It also requires checking on-time delivery feasibility stage by stage, from the end to the beginning of the process, thus identifying the required due dates for sales force and acceptance of the customer. The rationale for this process is summarized in figure 2.

As foreseen in the Preliminary Diagnostic, the need for computerized support to enable the use of this theoretical approach in real world conditions was confirmed. This tool would allow updating estimates with specific detailed data from individual customised orders, as well as generating updated information to enable aligned management. In addition, given the professional background of those people in charge of the management, this tool would have to be user friendly. Finally, the new approach also requires modifying the meeting based framework. Instead of supposing a 5 week delivery time for any order, workload analysis and delivery dates have to be obtained from the software tool. It must also be assumed that the later the change was asked for (i.e. more downstream in the process) the less feasible is a change of delivery dates.

4.3 Implementation

The methodology was implemented progressively, following the flow of the planning logic. Production planning methodology was introduced first. Then, DD planning methodology was brought into effect. On the other hand, the tool was also gradually developed, in parallel with the implementation needs of both stages. Furthermore, the development of the tool, including tests and adjustments, set the pace of the implementation at every stage. It consisted of a customised spreadsheet designed to manage the system consistently as a whole with the methodology described above; the existing meeting based dynamic; and the professional background of staff.

Production

A first version of the spreadsheet was created aiming to provide reliable production delivery dates, starting from set due dates and product features. Firstly a product database was developed, containing data related to the basic product models as well as the standard customisation options available according to the catalogue offer. Then, the concepts underlying the DBR approach were put into practice. As a result, production managers were capable of creating the production program for the bottleneck resource, also obtaining delivery dates for orders and limit due dates for the previous process (i.e. DD).

The methodology and the spreadsheet were tested in real conditions over a 4 month period, confirming clearly confirming improvement. Based on the new methodology almost all committed orders were completed within the regular working period, dramatically reducing delays due to manufacturing causes and only requiring some overtime. The main problem sources were three: delays in DD task completion, supply problems and unexpected delivery date changes prompted by the sales force. In addition, a specific training process was developed for production managers, who thereby totally owned the management of the spreadsheet by the end of the interval.

Design

Based on the experience with the improvement in production management, a very similar process was conducted with the Design Department, starting from DD and then addressing BD management. In this case the objective was to create a reliable DD program. Thus, two results were aimed at: DD due dates, consistent with limit starting dates required by the Production Department; and limit due dates for BD approval. An improved version of the spreadsheet was initially developed, introducing additional functionalities for DD management, aligned with the needs of the Production Department. That way, Design managers were capable of creating the DD program by combining different workload sources and priorities, aligned with Production needs and consistent with the current Design workload status.

In the two-month observation period that followed the implementation, the tool worked correctly, providing the expected information and thereby facilitating priority management. It gave visibility to the Design Department, displaying the current situation of each order. That way, the Design staff was capable of self-organising themselves. Working on the correct priority, in line with the overall goals and priorities, turned easy.

As both, the Design and Production departments were dependent on the same information which was linked by the tool, a spontaneous collaboration took place. The backwards calculations immediately provided by the spreadsheet allowed them to analyse the impact of potential decisions together, as well as to agree on the best solution for each situation from an overall perspective.

Nevertheless, some problems such as delays in obtaining BD acceptance of the customer, and changes of priorities caused by sales force, remained unsolved. These impacted on DD performance and consequently on production management as well, challenging order due date performance. The solution for these two issues was addressed, but only partially implemented due to time limitations. The third version of the spreadsheet provided the means to manage the entire system aligned and according to the principles defined in the detailed diagnostic as summarised in figure 2.

In brief, the change project which was conducted in the company led to better responses in Production and DD stages. As explained above, the observation periods in both stages showed that management was improved, leading to higher deadline compliance rates. Therefore, order on-time compliance rates were also improved, as production delivery dates were fixed in accordance with order due dates. Another relevant outcome of the change project was the acquired ability to analyse, arrange and manage the work at each stage/department systematically.

5. Discussion

The aim stated for the change project in the Preliminary Diagnostic was to “define a methodology to consistently align the management of the company; and implement the improved management of the Design and Production stages”, including a tool as enabler of the aligned management. This objective was later detailed in the Detailed Diagnostic. The response to the underlying problem (i.e. consistently adapting and combining order lead times, workload and resource efficiency) was given through a methodology that combines overall alignment and uncoupled functioning of the workflow of the departments.

On one hand, overall management of such a system requires a global perspective to set and maintain priorities. On the other hand, approval of BD introduces an interruption in the workflow, out ruling order continuous flow from beginning to end. Additionally, the lack of workload balance between departments causes activity peaks and troughs, leading to discontinuous order flow due to resource contention. Moreover, the features of each department make a different management approach necessary. The very nature of each department asks for a distinction between suitable approaches. The Design Department can simultaneously work on different orders, and its context is close to project management. In contrast, single flow characterises manufacturing operations performed by the Production Department, and are best addressed by production management approaches.

The project closure meeting confirmed that the results were satisfying for the company from different perspectives. The manager of the company agreed that the change clearly improved the performance of the company, encouraging the staff to continue working in that direction. Design and Production staffs also were pleased with the change, particularly with the information provided by the tool. Interestingly, the first month after the implementation in the Production Department fell into a period historically characterised by higher workload

levels. Based on the new methodology, all orders were completed within the regular working period, not requiring additional working days, and only some minimum overtime.

Moreover, the roots of almost all the problems reported in the four-month observation period after the implementation were external to the Production Department. This fact demonstrated that an inherently simple context may become difficult to manage due to the uncertainty generated by external sources.

A similar result was found in the Design Department: the erratic behaviour of BD approval dates and the inexistence of clear information about the needs and priorities of the Production Department were turning management difficult and very time-consuming. Lacking information and means to properly manage the department, the Design Department had to work reactively, basing their decisions on the visual estimation on the amount of work available in the Production Department. The methodology provided clear information and support for the management. The direct result was improved management and on-time delivery of work to the Production Department. Thereby the focus was moved from avoiding still stands to timely provision of work.

The combination of methodology and tool resulted in a fast transference of all functions and responsibilities to the management staff, making them self-sufficient. Furthermore, the tool enabled the spontaneous collaboration of the Design and Production managers in coordinating order execution. This objective information-based procedure substituted the visual estimation previously used by the Design Department. Thus, the alignment of either department was increased, enhancing flexibility of both, the departments and the entire process, in turn improving global performance. A user-friendly solution is key. It not only involves the conceptual resolution of the problem, but it also works in the particular context of the company. Interestingly, it takes into account the managerial limitations of the staff and the need for effective task management.

On the other hand, it is still early to determine the overall result of the change, as the effective integration of the sales force has not yet been completed. Furthermore, due to the ETO nature of the product and the lack of historical information it is difficult to calculate the exact extent of the improvement. This also makes it difficult to apply these findings to other contexts. Apart from these results, it is also worth discussing some other findings from the study.

Due to the lack of management skills and to the limited resources of the company external support was required. Both the design of the solution and its progressive implementation were led by the researchers, which coordinated actions and facilitated the participation of the staff. The results in this experience would probably not have been reached without external support, a fact that can be applied to many other small companies. Some other results and behaviours confirm this lack of comprehension within the management. For instance, the meeting based structure was logically designed to handle the key factors needed to enable aligned management from a general perspective. That way, aspects like the launch of new orders, control of orders in execution, or resource load vs. capacity analysis among others, were apparently suitably addressed. However, this approach proved to be insufficient to manage the system as a whole. It lacked a holistic basis, frequently leading managers to set objectives based on unreal targets rather than proper analysis. The inevitable results were unrealistic programs, and exacting working conditions. What is worse, nobody was aware of the underlying problem: the lack of consistency between the parts composing the entire system.

Additionally, the main problems reported by the Design and Production departments were external to them, originated in preceding phases, as explained in section 4.2. The holistic perspective acted as an eye-opener, showing that these causes were often avoidable. The lack of understanding of the dependence between individual factors was preventing the

company managers from approaching the problem as a whole. Causes generating delays in the beginning of the process were considered to be minor problems which would easily be resolved at some later stage. Nevertheless, these problems tended to be amplified throughout the process, eventually resulting in on-date delivery noncompliance.

Another relevant issue from this perspective is the changes of delivery dates for orders, neglecting the feasibility and impact of such decisions. Certainly, the stage of the process in which the change is to be introduced determines its feasibility as well as the impact on the system. Thus, the real chance of successfully anticipating the deadline of an order is greater by far when it is still in the Design phase than once it is being manufactured. The reason for this is that regardless of whether the change is a lead or lag, amendments to the original plan require additional efforts to accelerate specific orders, in turn causing unexpected changes for other orders. Clearly this kind of decision must be founded on an overall analysis of the consequences.

Likewise, it was confirmed that the application of different procedures in the beginning of the change process leads to very different final results, due to their amplification downstream. In contrast with the French market, the management of order definition and BD approval in the Spanish market had a severe impact downstream. It caused imbalances in resource workload and instability of the delivery program, greatly complicating overall management. Two conclusions emerge: first, the reasons for not applying a known better approach are the organisational implications or complications this might involve. Second, factors such as organizational nature or entrepreneurial culture may limit or even block the proper performance of a conceptually valid methodology.

5.1 Unanswered questions and suggested future work

Even though the scope of the project has been accomplished, the implementation remains unfinished. Issues such as deadline changes or standardisation of order definition and BD approval processes among others remain unsolved. Thus, the next step should be the integration of the Sales force into the change process. It is expected that this way, a better global result will be achieved, also completing organizational alignment. This would also provide a complete picture of the impact of the approach regarding management of orders, departments and the entire company.

During the four-month period observation in the Production department an unusual situation was reported: almost all the orders composing the workload of one week involved metal staircases. The described methodology and tool turned out to be not useful in these conditions, as they were designed for wooden staircases. In this case, as this was a one-off situation, it was possible to deal with it by using analogous estimation with the same tool. If the demand for metal staircases grew, an upgrade of the methodology and the tool would be required.

The time limitations of the project made the creation of a spreadsheet necessary, rather than acquisition of existing software. This resulted in limitations for data storing, retrieving and analysing, i.e. essential functions for improvement. Consequently, once the methodology is implemented, substituting the spreadsheet with a more powerful tool, and integrating the ERP, would be beneficial for the company. For instance, when negotiating an offer, knowledge of the specific features of the product regarding Design and Production processes, as well as the current status of workload, would be helpful. The new methodology would allow the development of more realistic programs. Additionally, under certain conditions such as lower workload or less complex products, shorter delivery times could be offered reliably.

As explained above, another factor significantly hampering the company is human resources management. Significant problems arise when additional capacity is required, as an

immediate response is needed. Two alternatives are worth to be explored for this purpose: first, ability to quickly increase capacity would be very helpful to deal with unexpected situations. Secondly, widening the scope of knowledge and know-how of staff would offer extra flexibility, also alleviating capacity problems.

5.2 Limitations of the study

The general approach of this experience may be useful for other contexts where process interruptions and/or variable workload proportions between two or more departments occur. However, the specific solution adopted for managing each sub context (e.g. Production and Design departments) should not be directly taken. As in this case study, each methodology must be carefully identified, implemented and tested according to the particular features of each individual context, as they will vary from one case to another.

6. Conclusion

Even when the aim and the objectives of a company are clear and agreed upon, there is a gap between expectations and actual performance. Dealing simultaneously with new customer requests, orders in process, and resource efficiency involves consistent integration of different approaches in a sole methodology. The features of the organization as well as the very nature of activities determine the critical conditions to design an effective management approach for each context. Lack of understanding of the underlying problem and inability to construct and implement a suitable solution are the main reasons for failure. On the other hand, the results indicate that the effort to overcome these obstacles was worthwhile. Organizational alignment not only provides the means for consistent integration of tasks and capabilities towards general objectives. It also makes for an outstanding overall performance which is not achievable by simply gathering the individual parts that constitute a company.

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