

STRATEGY – DESIGN ALIGNMENT : INFORMATION AND KNOWLEDGE MANAGEMENT

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Keywords: strategy, design management, integration, alignment

1. Introduction

The intention of this paper is to understand how, in an industrial company, strategic objectives interact with the operational objectives of design. The question is: how to guide design in order to make its process, as well as its results, coherent with the strategy of the firm and eventually increase the firm's global performance.

This complex question will be tackled with the particular point of view of management sciences. We aimed at participating in the crossdisciplinary research on design which will undoubtedly increase design performances.

The research community, as well as industrial managers and CEOs, largely agree on the necessity to elaborate robust alignment of strategic thinking and operational management. The point is not new: as early as 1974, Skinner [SKIN, 74] had implicitly conceptualized the need for strategic coherence and consensus in the whole organisation and for alignment of competitive priorities and design objectives. More recently, Boyer and Mc Dermott define strategic consensus as *“the level of agreement within an organisation regarding the relative importance of cost, quality, delivery and flexibility to the organisation's operational goals”* [BOY, 1999, p. 290].

Thus theoretically, the alignment of strategy and design is obvious. Yet practically the question remains still open and the link between strategic objectives and design objectives is mostly still missing: how can managers build a bridge between strategy and design?

By presenting 10 studied cases of French industrial companies we will try to give robust guidelines to ensure coherence between strategic thinking and design process. We'll show in which organisational, cultural and managerial characteristics it can be developed.

2. Strategic-design alignment: related works

This section will present a rapid state of the art concerning strategy-design alignment. The first part will state meanings and implications of strategic alignment for industrial firms. The second part will detail the way this alignment could be built.

2.1 What does strategic alignment mean?

Organizational coordination between a firm's strategy and its activities is essential to its global competitiveness and continual improvement

In management science, the concept of alignment, also stated as coherency and consensus, is a central theme of research for company's performance. One of the precursors in strategic management, Ansoff [ANS, 1965] emphasized the importance of aligning the firm's strategy with an internal appraisal of the firm's capacities and an external assessment of its environment.

This analysis was conducted using the well known SWOT approach (Strengths, Weaknesses, Opportunities, Threats) developed in the 1960's by the Harvard Business School. This approach has introduced the necessity to align the management of internal resources of the firm in order to reinforce its strategic fit with an evolving environment.

In the 1980's, Porter conceptualized the company as an "*added value chain*" relating strategic performance of the firm with the strategy-operations alignment rather than with local performance of each operation [POR, 1982, 1985].

Smith and Reece found that the fit between business strategy and operational decisions, such as logistics, workforce issues and organization, leads to improved business performance [SMI, 1999].

Although a study of Joshi, Kathuria and Porth based on the analysis of 98 manufacturing plants, revealed no direct relationship between alignment of strategic and manufacturing priorities and the performance of the unit [JOS, 2003].

Design process is not apart in the alignment theory. For the 14th International Conference on Engineering design (Stockholm 2003) the majority of researchers introduced their issue by placing the design process in an organizational context that implied alignment of strategic priorities and design objectives. Most researchers claim that the design process is guided by strategic vision and objectives and participates to the firm's objectives fulfillment.

The concept of alignment may combine intellectual and social dimensions. The intellectual dimension means that strategic and design plans should be internally consistent (i.e. the design mission, objectives and plans are dependant of business mission and objectives). The social dimension emphasises that both business and design managers should understand each other's objectives and plans.

2.1 The construction of strategy-design alignment

Process management is needed to maintain the strategic alignment between core business processes and strategic thinking. Process management changes the firm's orientation from functional performance to process performance based on cross functional performance criteria related to strategic objectives.

With this point of view, strategic management and design are interconnected. Strategic management states a vision of the future for the firm and determines its long term performance criteria. Design should contribute to this performance.

Strategic management consists of three steps: formulation, implementation and control.

- The formulation step enlightens the vision of the future, the firm's position in its competitive environment and the expected performance. This step guides the design processes by determining quality and innovation targets and by selecting design projects that will contribute to strategic performance.
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- Implementation concerns planning, resources management, eventually change management. This step establishes resources allocations for design processes, concerning material as well as immaterial resources. This determines budget and delay for design projects.
- Control phase evaluates if the company is moving well to the targeted strategic position. This control step needs a reporting system that allows the general manager to monitor internal evolution. This is built on a unique reporting system at operational level giving, at a glance, a view on the contribution of each process on the global movement of the company.

On the other hand design also influences strategic management: by activating resources and competences to create new products, design is evolving in a forthcoming reality, opening the way for new strategic developments.

As illustrated in fig. 1, the strategic use of information technology is fundamental to the successful deployment of strategic objectives towards design process. Information technology must therefore be deployed in conjunction with the processes rather than using the conventional functional organization.

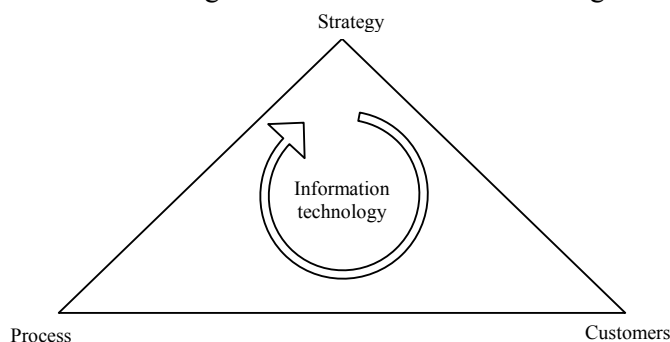


Figure 1. Strategic alignment triangle [Lockamy & Smith, 1997]

The use of information technology (IT) by a firm supports its strategic vision and direction. Without the use of IT, managers may find it difficult, if not possible to maintain strategic alignment with design and operations management. Not only does IT permit communication on strategic decisions and plans but also, and this is fundamental, makes top management understand the design process. Last but not least, it also allows reactivity by the monitoring of organisational systems.

Customers are the third part of the strategic triangle because customer satisfaction constitutes the driving force for companies. The strategy-design alignment process will enhance a company's competitiveness only through customer satisfaction i.e. the customer's perception of the value the company is creating for him.

Another view of alignment is given by Bergeron (2004) underlining the link between strategic alignment and performance (fig 2).

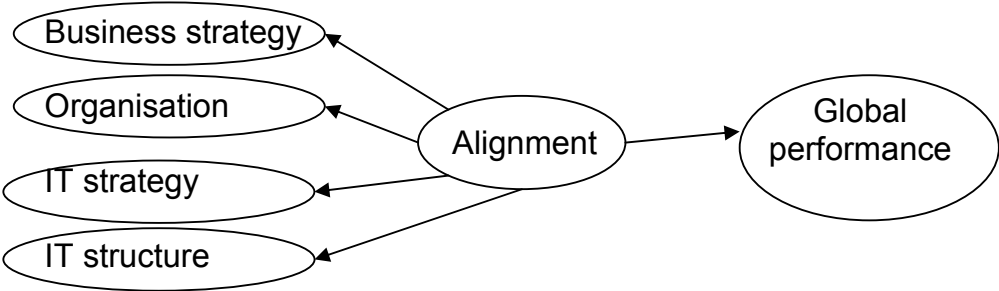


Fig 2: Correlation model for strategic alignment (Bergeron, 2004)

If many researches emphasise the need for the strategy-design alignment, none presents the requirements and the way to reach it. In the following section we will present our observations in ten different French companies which realised this alignment.

3. Case study

3.1 Presentation of the empirical field

3.1.1 Methodology

We built our empirical analysis with two different approaches: an extensive approach based on interviews and a clinical approach based on a specific case study.

In nine French SME's we interviewed CEO's, operations and design managers. These interviews lasted approximately two hours (on average), were very open on

different strategic and operational aspects of design management and enabled us to collect a wide amount of information. We completed oral investigations with documents (external documents and internal reports).

In one company we implemented a methodological reflection on a diversification strategy. This intervention lasted two days during which we worked with the chairman, the general manager, the production manager and the design manager.

3.1.2 Field of analysis

The 10 observed companies are all independent SME's. They work on different industrial fields, with different organizations.

However, they share three important characteristics, which allowed us to include them in our sample. These characteristics are as follows:

1. they design complex technological products facing rapid technological evolution,
2. they've proved a high capacity for innovation on new technologies,
3. they are not designing technological products but technological systems which they produce in small quantities even sometime a single unit.

3.2 The strategy-design alignment : communication and knowledge management

3.2.1 The Product Master Plan

All the interviewed managers think their strategy on a middle term horizon (three years) with a rethinking every year. The strategic team includes CEOs: general manager, finance manager, design manager, production manager, information system manager, marketing manager, human resource manager, sales manager.

The Product Master Plan (PMP) is aimed at managing the whole pool of resources that make up the firm in order to strengthen its competitiveness. This competitiveness is largely rooted in the product range which induces the firms' position on the markets vis-a-vis the company's customers. The strategic objective of the companies is clear : to be considered as the best supplier by every market.

The PMP is monitored through information systems with well defined reporting systems that are analysing four global and local performances :

- Financial performance
- Market performance
- Process management indicators
- Growth and innovation potential

The strategy-design alignment is based on two major factors: information systems and management systems. Strategic management is elaborated both top-down and bottom-up to ensure communication and understanding of strategic objectives. These returns are essential for strategic coherence. On the one hand, they guide the deployment of strategic thinking to the design teams. On the other hand they inform the direction board of new opportunities that are being discovered in design process. Because strategy is also based on entrepreneurial spirit, the bottom-up link is very important to ensure innovation in design and new product development.

Human relationships are very important for strategic-design alignment. The human factor very often influences design alignment. Namely management decision making, status and culture of managers and careers influence the design alignment. Business competence of design managers appears to be fundamental for design alignment. Business competence may be more important than technical competence in facilitating design alignment with strategy.

The CEOs we interviewed defined four main reasons explaining why design alignment may be difficult :

- unclear or unstable business mission, objectives and priorities,
- failure in the communication process, namely a unique top-down process,
- unrealistic expectations from chairman towards design due to low understanding of design process,
- lack of sophistication of the reporting system.

But also complexity and volatility of markets influence the degree of alignment with strategic plans.

Information technology is becoming an important factor of alignment, it supports the monitoring systems allowing a very sophisticated transfer of information from the strategic team to the design teams.

From our observations we can enlighten 12 conditions essential to the alignment between strategy and design:

1. top management has confidence in the design teams;
2. design teams agree with the strategic vision of top management;
3. there is real and frequent communication between top management and design management;
4. business goal and objectives are made known to design managers;
5. the corporate business plan is made available to design teams;
6. there is a set of organizational goals for design department;
7. the design management participates actively in business planning;
8. top management actively participates in design planning;
9. business and design management work together in partnership in prioritizing product development;

10. the design department is responsive to customer needs;
11. the design staff is able to maintain a technological advance for the company's products on the markets;
12. design teams actively participate in reporting elaboration.

These items have been implemented in all the companies acting for strategy-design alignment.

3.2.2 Knowledge Management the link between design and strategy

Among the ten observed companies, seven implemented more or less formalized knowledge management systems(KM). KM is considered as the best system to maintain the strategic-design alignment by integrating design opportunities in strategic planning.

For the company we clinically studied, deployment strategy has definitively been anchored in global knowledge engineering. The principal activity of this SME is the design and production of light vehicles for the French army. The company has been facing continuous decline of the armament budgets and has been forced to enter civil markets. We worked on a diversification strategy with CEOs, production and design managers, with whom we spent several days analysing the knowledge available in the company.

We distinguished strategic knowledge from operational knowledge and tried to enlighten knowledge forces and knowledge weaknesses in order to determine where the firm had to reinforce its knowledge to tackle civil markets.

This dynamic analysis of design knowledge and capabilities evaluation linked with a strategic vision helped the CEO's to define the way for a strategic diversification : using their expertise in the welding of armour plating to offer effective solutions in the naval and railway markets, providing stabilizers for ships or bogie trucks for the railway.

With this knowledge analysis the company avoided the pitfall of launching products on the market of the armoured vehicles for the transportaton of valuables. The company has surely the necessary technical competence but does not have sufficient organisational and industrial competences to be competitive in this sector.

In that case the analysis was conducted from design to strategy and knowledge was the core links for alignment.

3. Conclusion

This study emerges from industrial practices. It enlightens the way a company can align strategic planning with design plans. We explored the cases of SME's which

implemented a sophisticated information and monitoring system in order to make this alignment a reality. Our point of view comes essentially from management sciences. This work stands on the thinking that the design community could benefit from viewpoints coming from management sciences. In fact, optimization of design process makes sense only if it enhances a company's performance. This performance increase will be maximized if all internal process are consistent with strategic objectives. This research gives some essential conditions for strategic-design alignment.

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