

Product Strategic Development (PSD): preliminary overview

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Abstract: This paper presents the Product Strategic Development (PSD). This process focuses on the alignment between customers and company, or in a more detailed perspective, between customers' needs and company strategy as it includes the integration of all the information using the QFD Matrix "0". Developing the PSD process was initiated with a survey of best practices in the academic realm, specifically, the Balanced Scorecard (BSC) and Quality Function Deployment (QFD) methods. From this initial research, a comparative analysis of both methods was performed to broaden the understanding of their similarities, differences and information transference mechanism in each method. Once all this information was gathered, the QFD matrix "0" was structured for the specific particularities of the PSD process. The implementation of this process and its correct use ensures integration between customers' needs and senior managers' needs. Consequently, the likelihood of a company developing a product that fulfills most market requirements and company strategic objectives, at the same time, increases substantially. The use of this process might provide companies with a systematic way of incorporating their strategic objectives into new product development initiatives.

Keywords: strategic objectives, product development, QFD matrix 0

1. Introduction

The constant market evolution, the new technology development, the raise in the number of competitors, and the creation of new products and services in shorter times have forced organizations to follow up and revise their strategies more often.

The question is: how do companies deploy strategy formulations and revisions to their development teams? And how does it work throughout Product Development Process?

Until now, it's known that companies guarantee this deployment through early communication between senior managers and project managers or product development teams. Although, there is a lack of systematic methods that guarantee the effective incorporation of those strategies into product development initiatives and its project teams.

Strategy modifications impact directly in the portfolio management. The strategic objectives of the organizations must be aligned to new products development plans, that is, new products "road map".

How should companies then ensure that product development initiatives and business strategic plans or strategic objectives definition are in alignment?

It is essential that companies guarantee the link between the strategic objectives and the strategic plan of new products development. Companies need a method that

facilitates the definition, communication, and control of product and business strategy relationship.

2. Objectives

The contribution of this paper is to show companies a systematic way to have their strategic objectives considered throughout the product development process.

The final result is the elaboration of a method that integrates two largely used methods: the Balanced Scorecard (BSC) and the Quality Function Deployment (QFD). This method comprehends the elaboration of a matrix that relates both BSC strategic objectives and customer needs used for new products development. This matrix will be called herein as the QFD Matrix "0".

Its main benefit is to guarantee the correct association between strategy and product, that is, to guarantee that the products that will be developed are aligned to the strategic objectives defined by senior managers.

3. Theoretical background

3.1. Balanced Scorecard – BSC

According to KAPLAN & NORTON (1992), the BSC is a tool that translates the company vision and strategy through a consistent set of performance measures.

Its usage is justified for articulating the company strategy, communicating this strategy and supporting the alignment of individual and organizational initiatives, in order to achieve a common result.

Its main objective is to analyze all these objectives conjointly, in order to obtain a more balanced vision of the organization status. These objectives are grouped in “cause/effect” diagrams, which indicate the relationship among them.

According to KAPLAN & NORTON (1992), in a general way, the objectives and measures focus on the organizational performance under four perspectives: financial, customers, internal processes and learning.

Still according to the authors, the objectives and measures used by the BSC are not limited to financial and non-financial doubtful group of measures, since they are derived from a hierarchical process which top has the Business Unit mission and strategy.

Basically, the BSC provides answer to four questions:

1. Which objectives must be achieved to satisfy shareholders?;
2. Which values must be offered to customers to achieve the financial objectives defined previously?;
3. To conceive the values defined at the customer perspective, in which processes the organization must be excellent?; and
4. How the company must learn and innovate to achieve the targets?

The BSC must translate a Business Unit mission and strategy into tangible objectives and measures. The measures represent the balance among the external indicators, directed to shareholders and customers, and the internal indicators of critical business processes and learning and innovating.

The monitoring of the objectives achievement depends on the definition of performance indicators, targets, and action plans with respective responsible.

3.2. Quality Function Deployment – QFD

According to GUINTA & PRAIZLER (1993), Quality Function Deployment is a simple and logical method, which is implemented through a set of four matrices. The QFD matrices help to determine exactly what the customer wants, how the competitors meet the customer’s needs and where there are opportunities niches to be filled out. Moreover, the QFD technique is useful to check whether the company has the necessary resources to fulfil successfully the market niches with the correct quality levels.

PEIXOTO & CARPINETI (1999) pointed out that QFD should be used throughout the product development process and has the aim of assisting the design team to fit the real customers’ needs into products or services. Through the matrix set, the requirements posed by the customer are deployed and converted into technical specifications of the

product. The QFD matrices can be seen as a mean to support the teamwork as they allow for registering the discussions, evaluating and ranking the requirements. Finally, the matrices are a valuable source of information where the product development process can recur.

AKAO (1990) states that QFD is the conversion of the customer’s requirements into quality characteristics. This is done through a systematic deployment that starts of from requirements and ends up with product characteristics. The total quality of the product is, therefore, the outcome of this relation network.

The first QFD matrix, which is known as “The House of Quality”, is also the most important one, according to PEIXOTO & CARPINETI (1999). Within this matrix, the deployment of the customer’s requirements into product technical specifications takes place. The performance goals of the product, which are related to those characteristics, can also be recorded in this matrix.

3.3. Comparative analysis

A comparative analysis between the methods described previously was made based on the bibliographic research, considering the objectives, proceedings, and applications of each method. The comparison criteria defined for this analysis are: method objective, scope, method structure, involved team, performance, and results. A special attention was given to the analysis of the information transfer mechanism through both methods.

The results of the comparative analysis between the BSC and the QFD methods are presented in Table 1. The characteristics of each method are grouped considering its similarities and differences.

3.4. Information transference through both methods

3.4.1. Relationship among QFD matrices

The selection criteria of the information that runs through the QFD matrices is its relevance in the customer needs fulfillment, considering (1) technical difficulties to implement the product requirements, or the parts, or the manufacturing processes, depending on which matrix the information is; and (2) the target or the desired level defined by the company to the product requirements, or the parts, or the manufacturing processes, considering those whose values are far from the target. These values must be defined by actual needs identification, market trends and competitors analysis.

3.4.2. Relationship among the BSC perspectives

The objectives that belong to different perspectives are grouped in cause/effect diagrams, indicating the relationship among the objectives. Usually, the first perspective to be

Table 1. QFD and BSC comparative analysis.

Similarities between QFD and BSC		
Comparison criteria	BSC	QFD
Method structure	Involves the organization of the strategic objectives in 4 perspectives	Involves the organization of the project (product development) in 4 matrices
Involved team	Senior managers, business planners, company board	Multidisciplinary team, including engineering, marketing, manufacturing, quality representatives, among others
Performance	- Articulates the company strategy; - Communicates this strategy; and - Supports aligning individual and organizational initiatives, in order to achieve a common result	- Articulates clients needs; - Communicates these needs in a systematic way to project team; and - Supports guarantying the achievement of a product that fulfills customer needs (common result)
Differences between QFD and BSC		
Comparison criteria	BSC	QFD
Scope	Comprehends the entire company, deploying the strategic objectives to all processes and organizational areas	Limited to the Product Development Process (PDP). Used in the PDP to support the development team to incorporate at the project real customer needs
Objectives	Elaboration of the organization strategy related to the financial, customer, process and learning perspectives	Development strategy incorporating clients, product, manufacturing processes and operations aspects
Results	Organization strategic objectives relation tree and “cause/ effect” diagrams, which indicates the relationship among the objectives	Relationship among customer needs, product requirements, parts characteristics, fabrication processes and manufacturing operations

created is the financial, then the others are derived from the first one. It is essential to maintain the connection of every objective, so the achievement of common results is guaranteed.

3.5. Product development process

The strategic importance of the product development process for the companies’ competitiveness has been stressed by many authors and case studies. According to CLARK & FUJIMOTO (1991), the development of new product has become the focal point of the worldwide competitiveness. A number of evidences show that the effective development of new products has an outstanding impact onto costs, quality, customer’s satisfaction and companies’ competitive advantage.

The Product Development Process (PDP) can be defined (CLARK & FUJIMOTO, 1991) as a process by which an organization transforms market opportunities and technical possibilities data into information and resources necessary to the manufacturing of a commercial product. At the end, this process covers marketing, product engineering and manufacturing functions as well as almost the remaining areas of a company.

The Product Development Process of the case study company is known as the *Innovation Pipeline*, or the *Innovation Funnel*. The pipeline process, its phases and a short description of each phase is presented in Figure 1.

4. The product strategic development process

The Product Strategic Development (PSD) process, at the beginning of the Product Development Process, comprehends the elaboration of a matrix that relates the BSC strategic objectives and the customer needs used for new products development. This matrix will be called the QFD Matrix “0”, since it precedes the elaboration of the first QFD matrix, *Product Planning*, also known as the *House of Quality*. The creation of this matrix must occur throughout the first phase of the Pipeline Innovation – *Pre Briefing*. Naturally, the PSD process goes far beyond the Matrix “0”, however to describe the subsequent steps is out of scope of this paper.

To create the Matrix “0”, the company board, senior managers and business planners must structure its BSC financial and customer perspectives, defining the strategic objectives, indicators and measures. Essential to the success of this method is to determine the strategic objectives and measures of a specific Business Unit (BU), so the customer needs identified are all related to the same product portfolio. For each measure, the involved team must define both actual and target values. Figure 2 presents this first activity.

These measures will fulfill the Matrix “0” lines. Each measure must have its *importance level* (IMP) specified and its *improvement rate* (IR) calculated. The former indicates, qualitatively, how important a specific measure to

PRE BRIEFING	BRIEFING	VIABILITY		EXECUTIVE PLAN	LAUNCH	
Ideas formalization	Concept development and product proposition	Technical Design development and/or fragranty and/or experimental formulas	Financial Consolidate prototype into product	Project implementation	Launch availability Pilot batch production	1° to 6° month assessment Project evaluation
Present ideas and opportunities usage and new technologies to new products	Deploy idea into concept and demonstrate opportunity diagnosis	Deploy concepts into propotypes	Indicate costs and investments based on preliminary sales estimation	Conclude lauch strategy	Purchase material, produce pilot batch and release to production	Product performance assessment Product performance at the Market Perform corrections

Figure 1. Innovation pipeline.

Perspectives	Indicators	Measures
Financial	Indicator 1	Measure 1.1 with actual and target values
		Measure 1.2 with actual and target values
	Indicator 2	Measure 2.1 with actual and target values
		Measure 2.2 with actual and target values
Customer	Indicator 1	Measure 1.1 with actual and target values
		Measure 1.2 with actual and target values
	Indicator 2	Measure 2.1 with actual and target values
		Measure 2.2 with actual and target values

Figure 2. BSC financial and customer perspectives.

the companies' strategy is. The importance level is defined using a 1-3-5 scale, where 1 means not so important, 3 means important, and 5 means essential. The latter is the relation between the desired value and the actual value of a specific measure.

The second activity of the proposed process is to survey and gather the needs of the prospect customers. It is essential that these needs are aligned with the Business Unit (BU) capabilities and know-how, so they can be related later on to the products and technologies the BU can conceive. The information collected should be stored in a systematic way, without any interpretation. Key to the success of this activity is to write exactly what the customer has said, word-by-word. None of the information should be directly

related to a specific product. The more generic the customer needs are stated, the better will be the Matrix "0" usage and results. Once all customer needs are gathered, they must be prioritized by the customers, considering a 1-3-9 scale, where 1 means not so important, 3 means important, and 9 means essential. This prioritization will be called herein *preliminary customer needs importance level* (PCN), and are presented at Figure 3. Customer needs and its respective importance level will be placed at the columns of the Matrix "0".

The next step is the fulfillment of the correlation matrix according to the relation between the customers needs weights or prioritization and the strategic objectives or measures of each product.

After all necessary information has been defined, the next step is the calculation of the *final customer need importance level* (FCN) of each customer need considering its importance for each BSC measure. The formula to obtain the FCN is described bellow:

$$FCN_j = \sum \prod (IMP_i * IR_i * PCN_j) \quad (1)$$

Where:

j indicates the column related to a customer need, and i indicates the BSC measures placed at the lines. Figure 4 presents the QFD Matrix "0".

Figure 5 represents the necessary steps to elaborate Matrix "0", described herein.

Customer needs with higher final customer need importance level represent the most important customer needs identified, considering customer prioritization,

strategic objectives (measures) importance to the company and its desired improvement rate, due to companies strategy. These customer needs will be then used in the first QFD matrix: product planning.

Customer needs prioritization per Business Unit (BU)											
Company	BU Products	Preliminary customer needs importance level									
	Product A	3	9	9	9	9	3	9	9	1	1
	Product B	9	9	9	9	9	3	9	3	9	9
	Product C	1	9	3	1	1	3	3	1	1	1

Figure 3. Customer needs prioritization per Business Unit.

QFD Matrix "0"											
QFD	Customer needs	Measure importance level (IMP)	Measure improvement rate (IR)	Customer need 1	Customer need 2	Customer need 3	Customer need 4	Customer need 5	Customer need 6	Customer need 7	Customer need N
		BSC									
Measures			Customer needs								
Financial perspective	Measure 1.1	3	1.00	●	●	●	○	●	○	○	▽
	Measure 1.2	5	1.20	▽	●	○	●	▽	●	○	○
	Measure 2.1	1	0.67	○	○	○	●	●	●	●	▽
	Measure 2.2	3	1.17	○	●	▽	▽	●	▽	○	○
Customer perspective	Measure 1.1	5	1.50	●	▽	●	●	●	○	●	●
	Measure 1.2	5	1.33	●	○	●	●	▽	○	●	○
	Measure 2.1	1	0.80	●	●	○	▽	○	●	●	▽
	Measure 2.2	3	1.07	○	●	●	●	▽	▽	▽	▽
Final customer need importance level (FCN)				298	449	413	402	402	150	413	264

Figure 4. QFD Matrix "0".

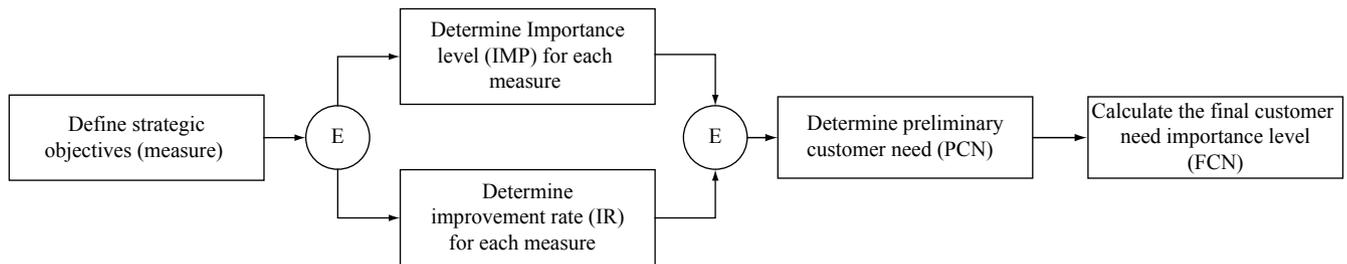


Figure 5. QFD Matrix "0" elaboration flow.

5. Case study

A case study has been made up to exemplify the Product Strategic Development (PSD) model proposed herein. The objective is to simulate the integration between the strategic objectives and a new product development initiative inside a world-class product development company.

The Case Study company, one of the largest Brazilian cosmetic, fragrances and toiletries (CF&T) manufacturers, has a portfolio of approximately 600 products. CF&T products are characterized by a complex chemical system, which should be stable, pleasant, deliver a certain amount of cosmetic benefits and, at the same time, be completely devoid of adverse reactions and preserved from microbiological deterioration.

CF&T products are composed, mainly, of (1) a package, that may be composed of a bottle, a cap, a valve, a label and a box and (2) a formulation, which is the content inside the package. The raw material of a formulation is known as ingredient, and each formulation must be related to a formula or recipe. The process of mixing the ingredients, its concentration and the speed of the mixture are some of the critical aspects of a formulation that are essential to the attendance of marketing claims.

The Business Unit used as an example for this case study will be the Perfumery Unit. This segment comprehends, mainly, three major product categories: perfumes, deodorant colognes and body oils.

The strategic objectives of the financial and customer perspectives related to the Perfumery Business Unit, shown in Tables 2 and 3, respectively, are presented herein:

- **Financial strategic objective:** to guarantee the portfolio competitiveness throughout the innovating capacity maintenance, revenues income and profitability; and
- **Customer strategic objective:** to be a reference as a concept and product innovating company, guaranteeing the best value proposition for the products development.

oped (quality and price) in order to fulfill customer needs and creating new habits or attitudes.

Once customer needs related to the perfumery segment are gathered and prioritized by the customers considering the 1-3-9 scale, the columns of QFD matrix “0” can be structure. This initial information, called *preliminary customer needs importance level (PCN)*, is presented in Figure 6.

The *preliminary customer needs importance level* presented in Figure 6 will be then transposed to the

correlation matrix of the QFD matrix “0”, according to the relation between the customers needs weights or prioritization and the strategic objectives or measures of each product. The complete QFD matrix “0” is presented in Figure 7, where “●” represents, qualitatively, the customer need weight equal to 9, “o” represents weight 3, and “∇” the weight 1.

Customer needs with higher final customer need importance level are detached in Figure 7 with a gray

Table 2. Financial perspective indicators and measures.

Indicators	Measures
Innovation rate	% of new perfumes sales/total sales in perfumery. (Actual) 10% (Target) 15%
	% of new cologne sales/total sales in perfumery. (A) 50% (T) 45%
	% of new perfumed oil sales/total sales in perfumery. (A) 40% (T) 40%
Revenue increase due to new products launch	% of revenue from launching new perfumes/total revenue in perfumery. (A) 30% (T) 40%
	% of revenue from launching new colognes/total revenue in perfumery. (A) 30% (T) 35%
	% of revenue from launching new perfumed oils/total revenue in perfumery. (A) 40% (T) 25%

Table 3. Customer perspective indicators and measures.

Indicators	Measures
Share increase due to new products launch	% of new perfumes share / total share in perfumery. (A) 20% (T) 30%
	% of new colognes share / total share in perfumery. (A) 25% (T) 30%
	% of new perfumed oils share / total share in perfumery. (A) 10% (T) 15%
Share maintenance due to existing products	% of existing perfumes share / total share in perfumery. (A) 15% (T) 18%
	% of existing colognes share / total share in perfumery. (A) 12% (T) 14%
	% of existing perfumed oils share / total share in perfumery. (A) 8% (T) 11%

		Customer needs prioritization per Business Unit (BU) products																
Perfumery	BU Products	Preliminary customer needs importance level																
			Customer needs															
		Ideal for using at any time of day or night	Fresh fragrance, ideal for summer time	Pleasant fragrance, although with strong presence	Refreshing fragrance	Pleases men (boyfriends, brothers, friends)	Perfect for fashioned and stylish women	Can be used by students, gym practitioners and clubbers	Biodegradable package	Sustainable package (refill)	Energizing feeling at the skin	Refreshing feeling at the skin	Relaxing feeling at the skin	Moisturized and oiled skin feeling	Application easiness	Easy to carry (taking on trips, gyms)	Smooths the skin	Provide confort before, during and after sports activities
	Perfume	9	9	9	9	9	9	9	3	3	1	3	1	1	3	3	1	1
	Deodorant cologne	9	3	3	3	9	9	9	3	3	1	3	1	1	3	3	1	1
	Body oil	9	1	9	1	1	3	3	3	9	9	9	3	9	9	9	9	3

Figure 6. Customer needs prioritization vs. Business Unit products.

BSC		QFD		QFD Matrix "0"																
				Customer needs																
Measures		Measure importance level (IMP)	Measure improvement rate (IR)	Ideal for using at any time of day or night	Fresh fragrance, ideal for summer time	Pleasant fragrance, although with strong presence	Refreshing fragrance	Pleasant men (boyfriends, brothers, friends)	Perfect for fashioned and stylish women	Can be used by students, gym practitioners, and clubbers	Biodegradable package	Sustainable package (refill)	Energizing feeling at the skin	Refreshing feeling at the skin	Relaxing feeling at the skin	Moisturized and oiled skin feeling	Application easiness	Easy to carry (taking on trips, gyms)	Smooths the skin	Provide confort before, during and after sports activities
Financial perspective	% of new perfumes sales/total sales in perfumery. (Actual) 10% (Target) 15%	5	1.50	●	●	●	●	●	●	●	○	○	▽	○	▽	▽	○	○	▽	▽
	% of new deodorant cologne sales/total sales in perfumery. (A) 50% (T) 45%	3	0.90	●	○	○	○	●	●	●	○	○	▽	○	▽	▽	○	○	▽	▽
	% of new body oil sales/total sales in perfumery. (A)40% (T) 40%	1	1.00	●	▽	●	▽	▽	○	○	○	●	●	●	○	●	●	●	●	○
	% of revenue from launching new perfumes/total revenue in perfumery. (A) 30% (T) 40%	5	1.33	●	●	●	●	●	●	●	○	○	▽	○	▽	▽	○	○	▽	▽
	% of revenue from launching new deodorant colognes/total revenue in perfumery. (A) 30% (T) 35%	3	1.17	●	○	○	○	●	●	●	○	○	▽	○	▽	▽	○	○	▽	▽
	% of revenue from launching new body oils/total revenue in perfumery. (A) 40% (T) 25%	1	0.63	●	▽	●	▽	▽	○	○	○	●	●	●	○	●	●	●	●	○
Customer perspective	% of new perfumes share/total share in perfumery. (A) 20% (T) 30%	5	1.50	●	●	●	●	●	●	●	○	○	▽	○	▽	▽	○	○	▽	▽
	% of new deodorant colognes share/total share in perfumery. (A) 25% (T) 30%	3	1.20	●	○	○	○	●	●	●	○	○	▽	○	▽	▽	○	○	▽	▽
	% of new body oils share/total share in perfumery. (A) 10% (T) 15%	3	1.50	●	▽	●	▽	▽	○	○	○	●	●	●	○	●	●	●	●	○
	% of existing perfumes share/total share in perfumery. (A) 15% (T) 18%	3	1.20	●	●	●	●	●	●	●	○	○	▽	○	▽	▽	○	○	▽	▽
	% of existing deodorant colognes share/total share in perfumery. (A) 12% (T) 14%	1	1.17	●	○	○	○	●	●	●	○	○	▽	○	▽	▽	○	○	▽	▽
	% of existing body oils share/total share in perfumery. (A) 8% (T) 11%	1	1.38	●	▽	●	▽	▽	○	○	○	●	●	●	○	●	●	●	●	○
Final customer need importance level (FCN)				394	268	328	268	334	349	349	131	176	104	176	59	104	176	176	104	59

Figure 7. QFD Matrix "0".

cell. They represent the more appropriate customer needs to be used throughout the development of a new product, considering customer prioritization, strategic objectives (measures) importance to the company and its desired improvement rate, due to companies strategy. These customer needs will be used in the first QFD matrix: product planning.

6. Conclusion

A Product Strategic Development (PSD) process has been preliminarily presented. This process is extremely

focused on the alignment between customers and company, or in a more detailed perspective, between customers' needs and company strategy, since it comprehends the alignment of both information through the usage of the Matrix "0".

The PSD process claims to (1) structure the integration, communication and alignment between company's strategy and the product development process; and (2) make decisions traceable and less subjective.

Customer needs with higher final customer needs importance level (FCN) represent the most important customer needs identified, considering customer prioritization,

strategic objectives importance to the company and its desired improvement rate, due to companies' strategy.

The FCN value indicates a prioritization among customer needs. The user can:

1. Transfer all customer needs to the next QFD matrix; or
2. Build a Pareto diagram to determine a threshold level.

The PSD process minimizes subjectivity, avoiding people's interpretation, regarding issues like (1) weighting customer needs; (2) prioritizing them against company's strategy; and (3) the selection of customer needs that will be used at each new product development initiative.

The implementation of this process and its correct utilization can allow the integration between customers' needs and senior managers' necessities. Consequently, the likelihood of a company to develop a product that fulfills most of market requirements and company strategic objectives at the same time increases substantially.

Further activities of this work include continuing the definition of PSD throughout the entire Innovation Funnel.

The strategic objectives modification impact analysis is also an important issue to be pursued.

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