Using Improvement Gap Analysis for the management of trade-offs of operational strategies

Usando a Análise de Lacunas de Melhoria na gestão de trade-offs de estratégias operacionais

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Abstract: Objective: The objective of the present paper is to propose the use of the Improvement Gap Analysis (IGA) as a method for the management of commitments, or trade-offs, of operating strategies. **Design/methodology/approach:** A quantitative survey was carried out with 32 clients of a furniture manufacturer. The customers received and had the company's products properly installed in their homes between January and September 2012. It verifies the current performance and the level of expected satisfaction and dissatisfaction of customers due to changes in the performance of operating strategies. **Findings:** This study demonstrates that, by using Improvement Gap Analysis, it is possible to verify the impact of changes in the performance of operational strategies through customer satisfaction. **Limitations of the study:** A limitation to this research arises from the IGA methodology regarding the use of expected customer dissatisfaction as a measure of relevance of operational strategies. Another limitation is that this study only analyzes the change in the performance of operational strategies of quality, flexibility, speed, reliability and costs. However, the literature presents other possible operational strategies or competitive criteria, requiring future empirical research to investigate possible conflicts of management recommendations between the respective criteria. **Practical implications:** Managers should be aware of the focus of improvement in the performance of operational strategies and, in possible situations of conflicts inherent to the process of managing trade-offs in operations, which operational strategy could have its performance reduced. The priorities of recommended improvements by methods based on stated importance can be misleading, because the importance declared by clients may change as a function of performance. IGA can be a viable alternative. It is possible to define not only "what to improve", but also "how much to improve" in relation to the current performance of operational strategies. **Originality/value:** The performance of operational strategies has been managed from the perspective of stated importance, only defining "what to improve". However, the importance may change depending on performance, and it may be necessary to define "how much to improve". The present research confirms changes in the importance of operational strategy due to the change of its performance, and proposes the use of the IGA method not only to define the level of improvement, but also the change of configuration in operational strategies.

Keywords: Competitive strategy; Production strategy; Improved management; Operations management.

Resumo: Objetivo: *Este artigo propõe a utilização da Análise de Lacunas de Melhoria (Improvement Gap Analysis – IGA) como método para gestão de compromissos, ou trade-offs, de estratégias operacionais.* **Desenho/metodologia/abordagem:** *Uma pesquisa quantitativa foi aplicada a 32 clientes de um fabricante de móveis, que receberam seus produtos devidamente instalados em sua residência no período de janeiro a setembro de 2012, mensurando o desempenho atual e o nível de satisfação e insatisfação esperadas pelos clientes em função de alterações do desempenho de estratégias operacionais.* **Descobertas:** *Este estudo demonstra que através do uso da IGA – Improvement Gap Analysis é possível verificar o impacto da alteração de desempenho das estratégias operacionais por meio da satisfação dos clientes.*

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Limitações da pesquisa: *Uma limitação dessa pesquisa é proveniente da metodologia IGA – Improvement Gap Analysis quanto ao uso da insatisfação dos clientes como medida de relevância das estratégias operacionais. Outra limitação é que nesse estudo foi analisada a alteração do desempenho das estratégias operacionais denominadas qualidade, flexibilidade, velocidade, confiabilidade e custos. Porém são apresentadas na literatura outras possíveis estratégias operacionais ou critérios competitivos, sendo necessárias futuras pesquisas empíricas para verificar possíveis conflitos de recomendações gerenciais entre os respectivos critérios.* **Implicações práticas:** *Gerentes devem estar cientes de qual é o foco das melhorias em estratégias operacionais e, em possíveis situações de conflito inerentes ao processo de gestão dos trade-offs de operações, qual estratégia operacional pode ter seu desempenho reduzido, não gerando insatisfação significativa aos clientes. As prioridades de melhorias recomendadas por métodos fundamentados na importância declarada podem ser equivocadas, pois a importância declarada pelos clientes pode alterar-se em função do desempenho. A IGA pode ser uma alternativa viável, pois é possível definir não somente "o que melhorar", mas também "quanto melhorar" em relação ao desempenho das estratégias operacionais.* **Originalidade/valor:** *O desempenho das estratégias operacionais tem sido gerenciado sob a óptica da importância fixa e apenas definindo "o que melhorar". Entretanto, a importância pode se alterar em função do desempenho e pode ser necessário definir "o quanto melhorar". Esse artigo confirma a alteração da importância da estratégia operacional em função da alteração de seu desempenho, e propõe a utilização do método IGA com uma adequação importante, não definindo apenas a suficiência da melhoria, mas também a configuração de alteração nas estratégias operacionais.*

Palavras-chave: *Estratégia competitiva; Estratégia de produção; Gerenciamento da melhoria; Gestão de operações.*

1 Introduction

The organizational production function can be a restriction for survival of businesses, or a source of wealth able to provide financial viability; or justify the possible expansion of the business (Skinner, 1969). Meeting market demands has been an strategic issue because it denotes the medium and long term vision, due to the fact that the productive setting is not always flexible, given the complexity of the production system, investments, know-how, technical intellectual capacity and operational management.

Given the complexity of the production system configuration, for a company to be competitive the management must take care of the integration with other areas of the organization, to adapt to the environment in which the business is inserted and to the development of processes and resources of medium and long-term (Corrêa & Corrêa, 2010; Skinner, 1969).

Based on the problem of meeting market demands, and productive configuration is not always flexible enough to be competitive, the organization should focus on operational strategies, such as: quality, flexibility, speed, reliability and costs (Corrêa & Corrêa, 2010; Skinner, 1969, 1974; Slack, 1993). Due to the existence of restrictions of the production process, Skinner (1974) illustrated the traditional view of trade-offs in operating strategies. Ferdows & Meyer (1990), however, showed the cumulative viewing capabilities, in which the increase in performance of an operating strategy can contribute to the performance of other strategies. Accordingly, Slack (1993) discloses an integrated view, between the traditional and cumulative vision capabilities, in

which the effects of trade-offs can be minimized if multiple strategies have their performance improved.

Acceptance of trade-offs and, therefore, the effort for improvement (Silveira & Slack, 2001), is a dynamic and continuous process of priorities, collaborating with an integrative vision (Slack, 1993). In this view of dynamic and continuous improvements, it is essential to use methods in line with the theory for defining priorities.

To check improvement priorities, one can examine the importance of competitive criteria under customers' point of view (Slack, 1994; Corrêa & Corrêa, 2010), noting for continuous improvement of operational strategies. However, there may be limitations on the process of assigning the importance given by customers (Fuchs & Weiermair, 2004; Matzler & Sauerwein, 2002).

Studies have identified priorities in the management of operational strategies of trade-offs, using the importance stated by customers for insight on what to improve (Corrêa & Corrêa, 2010; Slack, 1993, 1994). But there is evidence of low discriminatory power of stated importance, and that it changes depending on the attribute's performance (Fuchs & Weiermair, 2004; Matzler et al., 2004; Matzler & Sauerwein, 2002; Picolo, 2005).

A limitation of many studies is that they assume the relationship between attributes' importance and performance is linear. However, several studies demonstrate the existence of non-linearity between these factors (Anderson & Mittal, 2000; Kano et al., 1984; Picolo & Tontini, 2008; Tontini & Picolo, 2014), what may lead to erroneous decisions. Based on these problems, we define the following research question: *How the checking of the importance of operational*

strategies, as a function of performance changes, may assist in managing the trade-offs? This article uses Improvement Gap Analysis – IGA as a method for improvement management, or trade-offs, of operating strategies.

This proposal is justified because the integrative view of management of trade-offs is consistent with dynamic characteristics of operational strategies, and a continuous improvement process. The IGA seems to have aligned features, given its status of cumulative vision, presenting priorities for improvement based on the current diagnosis, confirming the dynamic relativity theory of the importance and raising the pivot Slack (1993).

In a process of continuous improvement, it is possible with the IGA defining settings subtle for performance improvement. Furthermore, it may happen that the effect of performance improvement is not linear. Thus, using methods that take in consideration the possibility of non-linearity is useful to avoid erroneous decisions. The IGA is based on the theory of the Kano model of customer satisfaction (Kano et al., 1984), providing non-linear conditions.

To demonstrate the use of IGA as a management method for trade-offs of operating strategies, this article is organized as follows: section 2 presents a brief literature review on the issue of management of trade-offs of operating strategies. Section 3 presents the methodology of the survey conducted with the proposed method. Section 4 deals with the application of IGA method and, finally, the final considerations, constraints and opportunities for future research.

2 Theoretical review

2.1 Management of Operational Strategies and Performance

Operations strategy settings show the need for consistency between operational actions, organization's strategy as a whole, and external environment. From this perspective, Johnson et al. (2007) define strategy as the direction and positioning of a long-term organization in order to achieve advantage in a changing environment through its configuration of resources, in order to meet the expectations of stakeholders.

In an understanding of Johnson et al. (2007), for Slack et al. (2009) operations strategy is related to the company inserted on global, social, economic and political context. The authors define these elements as the basis for defining the way in which the company must act. Slack et al. (2009) still have the need for awareness of the relationship between operations and other organizational systems. The authors present strategy in operations as its application in an operational sphere, generating support for organizational competitiveness. Thus, different operational strategies

are suitable for different competitive strategies (Ludwig & Pemberton, 2011; Sirmon et al., 2007).

Skinner (1969) introduced the term "production strategy". The development of this concept brought an expansion of its applicability, arising from manufacturing, solely, and then covering services and customer services, being today recognized as an operational strategy (Hamel, 2006; Maia et al., 2005). The initial proposal was the understanding of the inadequacy of production strategy for the strategy on a macro-organizational level and thus the existence of a lack of understanding of the manufacturing strategy. In a positivist character, it proposed the need for the existence of consistent production policies with the organizational strategies.

Hamel (2006) interprets Skinner (1969) as being the way the organization adopts the allocation of resources in a broad strategy proposal, so you can achieve the proposed objectives. It has a coherent approach to the allocation of resources between the market and the environment. As a result of this understanding, Hamel (2006) defines that management operations includes a methodology that involves processes, methods and improvements. And yet, with a complementary point of view, strategy understood as an action plan of how the organization allocates resources in production related to the application of tactics of macro strategy.

In a coherent perspective with Skinner (1969), Ludwig & Pemberton (2011) emphasize the importance of organizations operating in a dynamic environment, stating that companies must hold attention in its operations in order to achieve strategic objectives. They underscore the importance of dynamics and the importance of building capacity in accordance with the strategy, creating consistency in the organization's tactics.

Operations management strategies from the perspective of Johnson et al. (2007) mainly inhabit organizational resources. However, they influence the way operations and its resources are managed, and thus having impact on the way that the organization achieves its objectives, its external environment, and its ability to meet the needs of stakeholders.

While there is no single way to understand "strategy" and "operations strategy", one can accept that these perspectives are complementary. On this basis, for operating strategies can be inferred that flexibility is a strategic element, and between the organization adaptation possibilities is the possibility of changing the allocation of resources used in operations (Berry et al., 1995). Welcoming this perception, Ketokivi & Schroeder (2004) and Berry et al. (1995) propose that one can understand that resource optimization is possible, provided the organization uses the interface with customers to have reflections on operations.

2.2 The process of formulating operational strategies in production

Skinner's (1969) approach on strategy in operations occurred initially through an extremely critical operational vision and reactive to market conditions. The author observed the opportunity to make fundamental changes in operations management. To seek answers to the question "how to compete," he recommended to focus on the interaction of manageable aspects: products, technology and markets. In this interaction, it highlights the importance of focusing on operations, based on the concept that simplicity, repetition, experience and homogeneity of the tasks brings improvement to competencies; and that the various areas of the organization must have the same goal, because you can not be good for all purposes.

The initial objective of the industry is to reduce costs, but there were other ways to compete, besides the cost, despite the relevance of this competitive advantage. Other goals may be delivery short-cycle, product quality and higher reliability, reliable delivery, the ability to produce new products quickly, flexibility in adapting to volume changes, low investment, and as a consequence, higher return on investment and low costs (Skinner, 1969, 1974).

Another model presented in the literature is called phase model (Table 1), obtained according to a research of changes over time as a competitive advantage (Bolwijn & Kumpe, 1990; Moura & Botter, 2011). In the 1960s, the markets are characterized by the pursuit of quantitative growth, where the price was the most important criteria for market success. In the 1970s, customers began to pay more attention to product quality, which has become an important success factor as price. In the 1980s, in which capacity exceeded demand, companies began to offer shorter delivery times and a range of customized products; Speed and flexibility were key success factors, as well as quality and price. And in the 1990s it started a process of product innovation, in which market success depended on the ability to renew with speed and offer unique products (Bolwijn & Kumpe, 1990; Moura & Botter, 2011).

Other competitiveness strategies emerged in the literature, such as new products and customer service. Hill & Westbrook (1997) presents: cost,

Table 1. Phases model.

Period	Competitive factor
Decade for 1960	Price / cost
Decade for 1970	Quality
Decade for 1980	Speed / flexibility
Decade for 1990	Innovation

Source: Adapted from Bolwijn & Kumpe (1990).

product quality, fast and reliable delivery. While Paiva et al. (2004) understand that the criteria are: cost, quality, delivery performance, flexibility and innovativeness. For Maia et al. (2005) innovation can be considered a facilitator of other operational strategies. But the most cited operational strategies are: speed, quality, reliability, flexibility and cost (Martín-Peña & Díaz-Garrido, 2009).

It can be noticed the existence of a common core among these criteria that may be interrelated. But there is the understanding that meet all the criteria simultaneously can be a risky option. As a result of this understanding, companies should opt for trade-offs of these criteria, in which they can decide the good performance of an operational strategy over another (Corrêa & Corrêa, 2010; Hill & Westbrook, 1997; Moori et al., 2009; Paiva et al., 2004; Slack, 1993; Slack et al., 2009; Skinner, 1974).

2.3 Visions regarding trade-offs of operating strategies

There are three views in relation to trade-offs in the literature (Boyer & Lewis, 2002): traditional (Skinner, 1969, 1974), cumulative (Bolwijn & Kumpe, 1990; Collins et al., 1998; Ferdows & Meyer, 1990), and integrative (Maia et al., 2005; Slack, 1993).

The traditional view of trade-off assumes that various operating strategies can not be equally well performed, because of the inevitable limitations of equipment and process technologies. It involves implicit choices, according to organizational policies, implying that elevating performance of a competitive criteria automatically lowers the performance in another (Godinho & Fernandes, 2005; Moori et al., 2009; Skinner, 1969, 1974; Teixeira & Paiva, 2008). The cumulative vision criticizes the traditional view, exposing that the benefit of a strategy helps to improve other operational strategy; as well as capacities could be accumulated and built upon others (Collins et al., 1998; Silveira & Fogliatto, 2002; Ferdows & Meyer, 1990; Moura & Botter, 2011). Ferdows & Meyer (1990), presenting the cumulative vision model, recognize that the theory of trade-offs does not apply to all cases, presenting an ideal to be sought, which is a cumulative vision of capabilities. You can seek an improvement of operational strategies in order to improve the organization as a whole.

Finally, the integrative view, that is the combination of the traditional view and of the cumulative view (Boyer & Lewis, 2002; Corrêa & Corrêa, 2010; Silveira & Slack, 2001; Maia et al., 2005). The conflict between operational strategies is symbolized by a seesaw motion (Figure 1a), in which a goal of increasing an efficiency reduces the efficiency of other (Figure 1b). However, this conflict can be minimized in the paradigm of "Rise pivot" (Figure 1c), improving performance
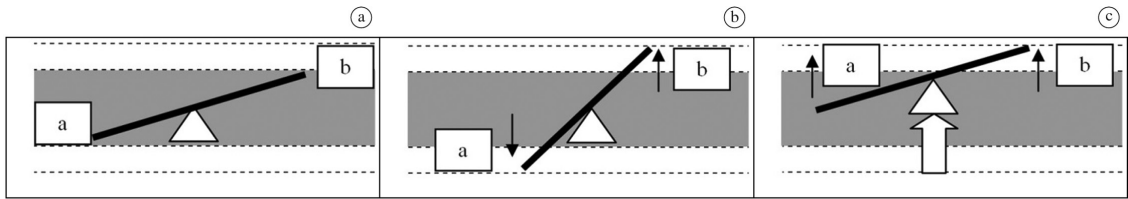
Figure 1. Integrative view of the movement of the seesaw with pivot high. Source: Adapted from Slack (1993).

of multiple operating strategies in the medium term, although there are differences in performance between strategies. According to Slack (1993, p. 22),

> [...] the pivot is the structure, the limitations, assumptions and culture of the manufacturing system itself. It involves questioning long-held ideas, about what truly is attainable, expand the limitations of technology, manpower and systems.

In the integrative view is the implicit innovation of operational strategies, making it inherent in the process of managing trade-offs, because when raising the pivot of operating strategies, it provokes the increase of the performances of the various strategies.

2.4 Priorities improvements in operational strategies

Boyer & Lewis (2002) found in their studies that organizations consider all vital operational strategies for staying competitive, though the distinctions between these strategies mean that managers still perceive the need for trade-offs. Acceptance of the trade-off doesn't mean they are immutable, and its recognition is seen as something to be focused to target improvement efforts. Some trade-offs are more easily managed than others. Still, trade-offs can be overcome, but not eliminated, by changing the resources in a manner that operations may improve the performance of relevant strategies (Silveira & Slack, 2001; Moori et al., 2009).

Customer priorities should guide the process of defining operational strategies. The success of this stage in the formulation of the strategy is determined by the establishment of customer needs and of what is required of the operation to satisfy these needs (Slack, 1993). Yet little attention has been given to the participation of clients in reference to competitive dilemmas (Teixeira & Paiva, 2008). Customers' expectations and needs can be considered as important external factors for the existence of trade-off within the area of operations (Silveira & Slack, 2001).

Production function has the occupation of generating competitive advantage from operating strategies implementation and the developing of competitive criteria (Davis et al., 2001). Paiva et al. (2004) conceptualize competitive criteria as a conscious set

of priorities that the "company" adopts to compete in the market. The criteria that would be able to generate competitive advantage for the organization should emerge from the needs and desires of the consumer (Slack et al., 2009; Hayes et al., 2008).

To check the relevance of customer's needs we can examine the importance of the competitive criteria (Slack, 1993, 1994; Corrêa & Corrêa, 2010). However, there may be implications using importance stated by customers. According to Fuchs & Weiermair (2004) and Matzler & Sauerwein (2002), usually customers have low discriminatory power in assessing the importance and value, stating that almost all the attributes are important. There are also evidence that there is change of the stated importance, depending on the performance (Matzler et al., 2004). As shown by Picolo (2005), "stated importance" is positively correlated with the performance of the attributes.

Thus, there are doubts about the validity of the "stated value", since it is unclear how consumers actually interpret and evaluate importance. Because of this limitation, it is proposed that the relevance of competitive strategies can be evaluated based on the impact of their performance on the results. According to Kaynak (2003), improvements in operational performance provide increase on sales and market share, thus providing a competitive advantage for companies. Anderson & Mittal (2000) show that improving the performance of critical success factors influence satisfaction and therefore customer repurchase intention, increasing operating profit organization.

Another implication is on the dynamically changing performance, represented by the "see-saw movement" (Figure 1) of the criteria "a" and "b". Before the Organization to decide which competitive criterion improve, based on organizational diagnosis (Figure 1a), the respective criteria can be found with possible differences in performance and their conflicts inherent in the operational process. Then, the Organization may decide improve the performance of the competitive criterion "b" and may be inevitable the occurrence of conflict with criterion "a" (Figure 1b). Or you may decide to lift both criteria, represented by the rise of the pivot (Figure 1c). The implication resides in the problem of determining the importance of operational strategy, because the "see-saw movement"

can be subtle and the client can give no importance to this movement, but can give great importance to an aggressive move. The steps of "possible seesaw movements" and its effect on customer satisfaction are represented in the Figure 2 model.

Thus, +D1 +D2 +D3 scale (x-axis) represents the performance variations of operational strategies and their impact on customer satisfaction (+S1 +S2 +S3). And –D1, –D2, –D3 scale (x-axis) shows the reduced performance of the operational strategy and its reduction in customer satisfaction (–S1, –S2, –S3). With the realization of the existence of scale variations, it becomes relevant to the customer stating the importance or function of the variation in the performance of the operational step strategies, or competitive criteria.

Studies about improving the performance has gradual influence on customer satisfaction are presented by Cheung & Lee (2005), Picolo (2005), Picolo & Tontini (2008) and Ting & Chen (2002). For Rungtusanatham et al. (1998), continuous improvement in organizations has a significant effect on customer satisfaction. According to Das et al. (2000), quality practices are positively correlated with customer satisfaction, and in turn, with the company's performance.

Another implication is the non-linearity between performance and satisfaction. There is the possibility of linearity, in which the competitive criterion is categorized as one-dimensional (Figure 3). Improved performance increases customer satisfaction and reduced performance, the resulting dissatisfaction accordingly. But there may be competitive criteria in which the relationship between performance and the satisfaction is not linear. Possibly there are obligatory competitive criteria, attractive and neutral (Anderson & Mittal, 2000; Brandt, 1987; Cheung & Lee, 2005; Kano et al., 1984; Matzler et al., 2004; Picolo, 2005; Picolo & Tontini, 2008; Tontini & Picolo, 2010, 2014; Ting & Chen, 2002).

For obligatory criteria it is not recommended reduce performance, because it generates significant dissatisfaction. However, their improvement does not generate customer satisfaction, meaning they may be maintained its current performance. But the criterion classified as attractive, an increase on the performance generates customer satisfaction, but if reduced performance it does not generate dissatisfaction to customers. Neutral competitive criterion requires no improvement and may have reduced performance because it does not influence customer satisfaction (Anderson & Mittal, 2000; Kano et al., 1984; Matzler et al., 2004).

3 Research methodology

The present study design is characterized as descriptive field research with quantitative method (Vergara, 2010). The field survey was carried out
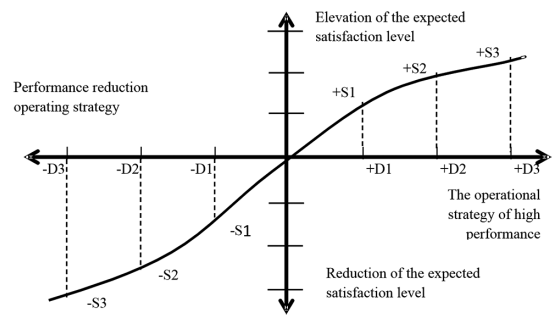

Figura 2. Possible impact on customer satisfaction due to the change of the performance of operational strategy. Source: Authors.
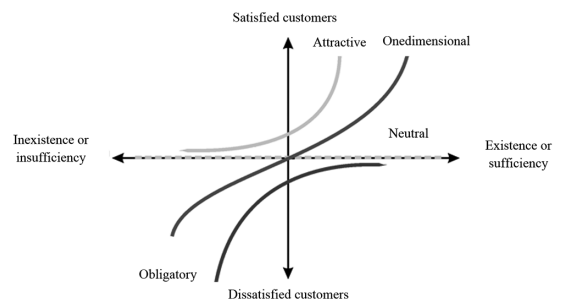

Figure 3. Customer satisfaction model Kano. Source: Adaptado de Tontini & Picolo (2014).

through the census of customers in a furniture factory. The factory is a micro-enterprise, located in the city of New Venice, SC, founded in mid-1990 and has four employees.

The choice of this company to study is mainly due to its feature of business, operating throughout the care cycle, from project design to the installation of products directly to the end customer. Thus, a single group of clients has the perception of the performance of all operating strategies. This condition does not occur, for example, in factories that are intermediate in its supply chain, in which the perception of performance of operational strategies of the plant is distributed between the end customer and the retailer intermediary. Thus, the quality of research increases, because the respondent who is the end user of the furniture factory, can relativize with greater commitment to performance and the importance of operational strategies, confirming the use of the Improvement Gap Analysis – IGA as a method for management appointments, or trade-offs, of operating strategies.

The interviews took place from October to November 2012, totaling 32 customers that volunteered answering the survey, having the product properly installed in their residence in the period from January to September 2012. Customers were interviewed after

the installation of the furniture, having experience throughout the company's service cycle.

Data collection took place through personal interview using a structured questionnaire. In the first part of the questionnaire, questions were collected related to costumer profile. The profile of the respondents is described in Table 2, and the classification of customers is predominantly: physical person (71.88%), females (62.50%), distributed age group, with prevalence among 40-49 years (34.38%). And the dominant social class is C (43.75%), measured according to the criterion of the IBGE (Brazilian Institute of Geography and Statistics).

Then the level of satisfaction with the current performance of the five operational strategies was measured: adequate price to product type, speed expressed by the delivery of promised time, reliability of delivery on the promised date, the product quality and flexibility due to the variety of products offered. The level of satisfaction with the current performance was measured using a Likert scale, ranging from 1, "dissatisfied" to 5 "very satisfied."

And lastly, sufficiency and insufficient issues of operating strategies, using IGA method – Improvement Gap Analysis (Tontini & Picolo, 2010). The expected satisfaction levels were obtained with the same Likert scale used in the previous stage, because of standardization of scale.

4 Proposal for analysis of a change the performance of operational strategies with the IGA (Improvement Gap Analysis)

The IGA (Improvement Gap Analysis) is a quadrants analysis. It compares the expected dissatisfaction if the performance is low versus the satisfaction of a customer if a factor have their performance improved. Basically, for each factor analyzed the client responds on his satisfaction or dissatisfaction expected with two hypothetical questions. The functional question (FQ), in which the factor would have high performance, and the dysfunctional question (DQ), in which the factor would have low performance. The third question is about the satisfaction with the current performance of the factor under study (CS) (Tontini & Picolo, 2010, 2014).

To define the operational strategies, the manager can simulate the impact on consumer perception of a possible trade-off, with a functional issue (FQ) and a dysfunctional (DQ), however with an additional definition. The issues of sufficiency and insufficiency, as well as specify "what better or worse," may, where be possible or necessary, parameterize "how much improved" or "how much worse", representing the "see-saw movement" of operating strategies.

In this article, the operating strategies "price," "speed" and "reliability" were specified in possible explicit declaration of performance (Table 3) according to the specification of "how much better" with the objective, to check the impact of the increase and reduction of performance, representing the "see-saw movement" of each operational strategy

The parameterization of "how much better" or "much worse" in the functional (FQ) and dysfunctional (DQ) questions, respectively, were taken as the definition of manager of mobile business under study. The operational strategy "price" was parameterized to "–10%" and "+10%" compared to the practiced by the market. If the questions were not parameterized, the questions would be, for example, for this purpose simply "FQ - if the price is below the market rate" and "DQ - if it is above the market rate." The possible trend would be that consumers give more importance to the objective than if it was parameterized, as in this case, with 10%. It could still be stipulated other values to verify the performance of the sensibility by reason of price and observe the non-linearity between the expected satisfaction and performance.

The operational strategy "speed" was parameterized in days of delivery and "reliability" in days past due, to assess the client's tolerance for "FQ - 5 days delivery before the promised date" and "DQ - 10 days after date promised. The parameterization of "quality" and "flexibility" were not set to verify the importance of the attribute with the sufficiency and

Table 2. Profile of respondents.

Customer classification	%		Gender	%
Physical person	71.88		Masculine	37.50
Juridical person	28.12		Feminine	62.50
Age group	**%**	**Social class**	**Monthly family income**	**%**
De 20 to 29 years	25.00	E	Up to R$ 1,244.00	0.00
De 30 to 39 years	21.88	D	R$ 1,244.01 to R$ 2,488.00	21.88
De 40 to 49 years	34.38	C	R$ 2,488.01 to R$ 6,220.00	43.75
De 50 to 59 years	12.50	B	R$ 6,220.01 to R$ 12,440.00	18.75
60 years or older	6.25	A	Above R$ 12,440.00	15.63

Source: Research data.

Table 3. Used questions according to Kano model.

Operational strategy	Cod. Factor	Description
Price	FQ	Price 10% below the Market rate
	DQ	Price 10% higher than the Market rate
Speed	FQ	If the deadline is in 15 days
	DQ	If the deadline is in 45 days
Reliability	FQ	If installed up to 5 days before the promised date
	DQ	If installed within 10 days after the promised date
Quality	FQ	If the furniture having durability and resistance
	DQ	If the furniture don`t offer durability and strength
Flexibility	FQ	If you have diversity of products and materials choice
	DQ	If you don`t have diversity of products and materials to choose

Source: Authors.

insufficiency because the manager found difficult in identifying "how much" could improve.

The survey results in relation to the expected satisfaction levels with the functional questions (FQ) and dysfunctional issues (DQ) are represented graphically in Figure 4.

The operational strategy with the highest expected level of satisfaction is "quality" (4.66) followed by "flexibility" (4.53) "reliability" (4.44), "price" (4.28) and "speed" (4.22). If the company under investigation had no restrictions in its operating systems, it could "increase performance" in all strategies, supporting a cumulative view of performance (Collins et al., 1998; Silveira & Fogliatto, 2002; Ferdows & Meyer, 1990).

However, if having limitations in operating systems, generating conflicts between different operating strategies, it could reduce performance primarily on strategies that do not impact significantly on dissatisfaction to the customer, and thus can be managed more easily the trade-offs strategies (Silveira & Slack, 2001; Moori et al., 2009; Slack, 1993).

Thus, the operational strategies that have less impact on the expected satisfaction are the strategies "speed" (2.81) and "reliability" (2.25). Strategies with the greatest impact on the expected dissatisfaction were "quality" (1.03), followed by "flexibility" (1.34) and the "price" (1.53).

Based on the survey results, it turns out the non-linearity between performance and customer satisfaction, observing that the strategies "speed" and "reliability" have lower levels of dissatisfaction with operational performance degradation, than others strategies, confirming the non-linearity and the change in importance due to the change of performances (Kano et al., 1984; Tontini & Picolo, 2010, 2014).

It is understood that this behavior is the customer's perception of the possible "see-saw movements" (Slack, 1993) performance change with the parameters, used in the questionnaire of sufficient and insufficient questions. If strategies have other parameter "as
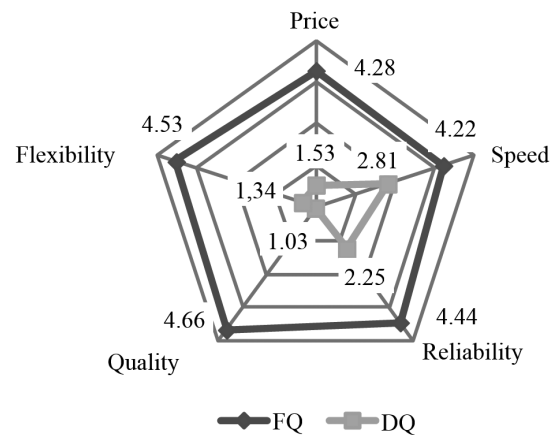

Figure 4. Expected levels of satisfaction and dissatisfaction. Source: Research data.

increase or decrease" performance, another could be the dynamic.

It is observed also that the operating strategies "quality" and "flexibility" were not configured due to the difficulty in the parameterization by the manager, showing higher values of FQ and DQ, respectively. It demonstrates the importance of, whenever possible, to parameterize the performance of the operational strategy, and thus representing the "subtle see-saw movements' performance.

Assuming that the expectations and needs of customers can be important, external factor guiding the prioritization of improvements and recognizing the trade-off are something to be focused to target improvement efforts (Silveira & Slack, 2001; Moori et al, 2009; Slack, 1993).

To find the performance impact it is necessary information regarding the improvement gap. The improvement gap (GAP) can be obtained by calculating the proposed method IGA (Tontini & Picolo, 2010), using Equation 1.

$$Gap_n = FQ_n - CS_n \qquad (1)$$

The value of the gap is standardized in accordance with the Equation 2, and the results being plotted on the x axis of the two-dimensional array (Figure 5).

$$Gap_n = \frac{Gap_n - \overline{Gap}}{ó} \qquad (2)$$

The value of the expected level of dissatisfaction with the dysfunctional performance (DQ) is standardized (Equation 3) on the y axis of the two-dimensional array (Figure 5).

$$DQ_n = \frac{\overline{DQ} - DQ_n}{\sigma} \qquad (3)$$

The survey data are shown in Table 4, with them the level of expected satisfaction with the increase of operational strategy performance (FQ), the level of expected dissatisfaction by reducing the performance of the operational strategy (DQ), the level of satisfaction with the current performance of operational strategies (CS), and the improvement gap of operational strategies (Gap).

Standardized values are analyzed in two-dimensional matrix (Figure 5), where the dividing line is at zero. On the x axis, positive operating strategies are the priorities for improvement, being on the right of the dividing line. In the y-axis, the most critical operating strategies, with a supposed reduction of performance, are above the dividing line.

The operational strategies of the furniture manufacturer in study located in quadrant I, "quality", "flexibility" and "price," are considered critical for improvement because they present significant potential for improvement and if having a reduced performance generate high dissatisfaction to customers. These factors shall receive immediate attention.

There were no operational strategies located in quadrant II. Factors located in this quadrant should maintain good performance, not in need to be improved, but if the organization reduce its performance it would get penalty with unhappy customers.

Operational strategies located in quadrant III, "speed" and "reliability" can be reduced in performance if necessary, if they have other conflicting goal. These factors present low improvement gap in customer satisfaction and low dissatisfaction if the performance is reduced.

And, finally, there were no strategies in quadrant IV. Factors located in this quadrant are considered attractive, because they generate no dissatisfaction if missing but can improve customer satisfaction have improved their performance (Tontini & Picolo, 2010).

With the management recommendations derived from the IGA analysis matrix, it was possible to identify improvement priorities, identifying the operational strategies with the greatest potential to increase the level of performance in an integrative view (Slack, 1993), combining the traditional view of trade -offs (Skinner, 1969, 1974) with the cumulative viewing (Ferdows & Meyer, 1990) operating strategies.

The IGA recognizes the priorities according to the traditional view, because it identifies operational strategies that are priorities, located to the right of the dividing line on the x axis at the expense of strategies located on the left, where necessary decision making on the basis of the production process. Furthermore
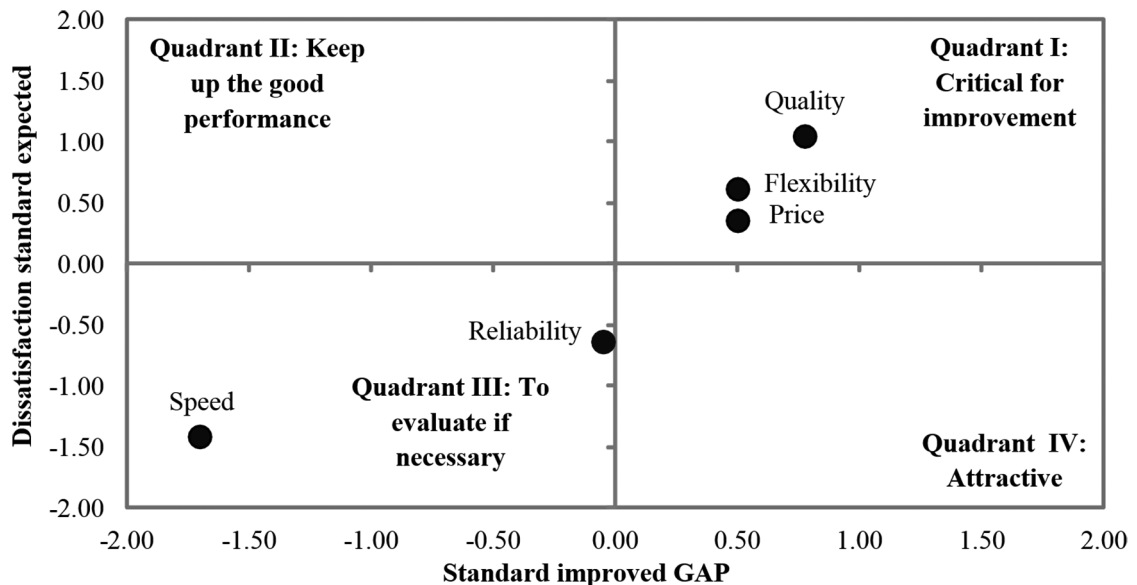

Figure 5. Analysis of Gap for improving operational strategies. Source: Research data.

Table 4. Results of the data collected.

Operational strategies	FQ	DQ	CS	GAP	GAP Standardized	DQ Standardized
Price	4.28	1.53	4.00	0.28	0.50	0.36
Speed	4.22	2.81	4.19	0.03	−1.71	−1.41
Reliability	4.44	2.25	4.22	0.22	−0.06	−0.63
Quality	4.66	1.03	4.34	0.31	0.77	1.05
Flexibility	4.53	1.34	4.25	0.28	0.50	0.62
Average	**4.43**	**1.79**	**4.20**	**0.23**	**0.00**	**0.00**
Standard deviation	**0.18**	**0.72**	**0.13**	**0.11**	**1.00**	**1.00**

Source: Research data.

it is possible to estimate the level of dissatisfaction generated with the possible performance degradation..

Still, this method identifies priorities according to the cumulative view, because the improvement priority is set from the current diagnostic of performance, since the improvement gap is calculated as the difference between the level of expected satisfaction and the current level of satisfaction .

You can also configure and simulate possible performance settings for decision making, when specified in the functional and dysfunctional issues, according to the Kano model (Table 3), which allows you to check the feasibility of possibilities in changing the performance in the production process.

5 Final considerations

In the perspective of operations strategy, presented by Sirmon et al. (2007) and Ludwig & Pemberton (2011), the findings of this research come to meet this understanding; in which it is able to generate and support the competitive strategies of the organization as a whole, such that you realize that different operational strategies are suitable for different competitive strategies.

Within an integrative point of view of operational strategies, that combine the traditional view of trade-off cumulative (Boyer & Lewis, 2002; Corrêa & Corrêa, 2010; Silveira & Slack, 2001; Slack, 1993; Maia et al., 2005), there is a possible subtle movement and performance trade-off represented by the see-saw movement and the trend of "high pivot" from the current performance to a new improvement scenario.

In this view, the article proposes the use of Improvement Gap Analysis – IGA as a method for appointments to management, or trade-offs, regarding operating strategies. Thus, with the IGA method - Improvement Gap Analysis, it was possible to simulate the performance variations of operational strategies in an integrative vision. IGA matrix obtained information to the trade-off management of the operational strategies of the company, setting priorities for strategies classified as "critical for improvement: "quality", "flexibility" and "price",

because they present significant improvement gap if they have increased their performance, and high fee with dissatisfied customers to the furniture manufacturer if having low performance.

On the other hand, the strategies "reliability" and "speed" were attributes that may have reduced their performances, if necessary, in function of a possible restriction of the process or characteristic of trade-off operations. This fact was possible not only because the IGA presupposes the possible non-linearity, as Kano et al. (1984), but also because this method is characterized by the relativity of the improvement gap, and the expected dissatisfaction with a possible reduction of performance, positioning attributes in quadrants "Keep up the good performance", "evaluate if necessary", "critical for improvement" and "attractive".

Furthermore, the IGA identify improvement priorities, indicating a new performance scenario, from current expectations, consistent with the "rise pivot," because the improvement gap is defined from the diagnosis of current performance, with a view to the expected satisfaction if the operational strategy has performance improved, identifying "critical for improvement" and "attractive" factors.

Furthermore, the IGA identified subtle variations in performance, expressed in operational strategies "Price," "Speed" and "Reliability", the parameter "how much improved" and "how much worse" (Table 3), surpassing methods definition of the declared amount with a fixed amount of criteria that specifies only "what to improve" when only highlight the attribute to define the importance..

A limitation of this research comes from the IGA methodology - Improvement Gap Analysis, on the use of customer dissatisfaction as a measure of relevance of operational strategies (Tontini & Picolo, 2010). Another limitation is about the determination and setting of operational strategies to search. As for the performance setting change in "how much better", translated for the customer, it becomes critical to identify the level of satisfaction and dissatisfaction expected by customers.

It is worth emphasizing that the present work shows the applicability of the IGA, and the results can not be generalized because they show just for the company studied. So it is recommended to be held studies in other organizations for further analysis. It is recommended research on other operating strategies, presented in the literature (Maia et al., 2005; Martín-Peña & Díaz-Garrido, 2009), and also other longitudinal studies, after performance improvements, in order to understand in depth the integrative vision of Slack (1993), in function of to the dynamic and continuous process improvement that the IGA provides.

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