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Critical success factors for a customer relationship management strategy ☆

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Abstract

Most organizations have perceived the *customer relationship management* (*CRM*) concept as a technological solution for problems in individual areas, accompanied by a great deal of uncoordinated initiatives. Nevertheless, CRM must be conceived as a strategy, due to its human, technological, and processes implications, at the time an organization decides to implement it. On this basis, the main goal stated in this research is to propose, justify, and validate a model based on *critical success factors* (*CSFs*) that will constitute a guide for companies in the implementation and diagnosis of a CRM strategy. The model is conformed by a set of 13 CSFs with their 55 corresponding metrics, which will serve as a guide for organizations wishing to apply this type of strategy. These factors cover the three key aspects of every CRM strategy (*human factor*, *processes*, and *technology*); giving a global focus and propitiating success in the implementation of a CRM strategy. These CSFs – and their metrics – were evaluated by a group of internationally experts allowing determining guidelines for a CRM implementation as well as the probable causes of the deficiencies in past projects.
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1. Introduction

Within the present business environment, characterized by an increasingly aggressive competence, the battle to win customers is stronger every day. Companies that enter to compete in a new market weaken the already existing and solid ones, due to the new ways of doing and conceiving businesses. One of the factors that have driven all these changes is the constant change and the evolution of technology. Because of this reality, the CRM concept has evolved in such a way that nowadays it must be viewed as a strategy to maintain a long-term relationship with the customers.

Further to the knowledge and implications that surround a CRM, one of the main problems is that no model exists to guide companies in the implementation of this type of strategy. Each company is different, has its own culture and business processes, etc. Consequently, it is important not to consider CRM as a magical solution that will solve all the company's problems. On the contrary, it must be studied to know its benefits and impacts for the organization. The implementation of this strategy requires hard work to be successful.

When managing the transition to a customer-centric organization, it is mandatory to develop the capabilities to acquire the necessary resources, knowledge, and tools to meet customer's requirements with the appropriate products and services. Unfortunately, many organizations, especially financial ones, have a product-oriented culture which could be inconsistent with the customer's expectations.

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These organizations tend to set the processes in terms of the product lines instead of the customer lines. Furthermore, these companies have a legacy of customers who often become unprofitable and they lack the ability to properly develop strategies to meet the services required by the entire customer base.

Our goal is *to propose a model based on CSFs for a CRM strategy, conformed by a set of 13 CSFs with their 55 corresponding metrics, which will serve as a guide for organizations wishing to apply this type of strategy*. These factors cover the three key aspects of every CRM strategy: *human factor*, *processes*, and *technology*; giving a global focus and propitiating success in the implementation of a CRM strategy. The proposal of these factors to guarantee a successful CRM implementation responds to the necessity of an integrated and balanced approach to technology, process, and people.

In addition, we evaluate the CSFs proposed and that evaluation shows that they can be upgraded, analyzed in depth, and adapted to the different markets where they are to be implemented. As a result of a *features analysis – survey*, we can conclude that the overall expert evaluation was positive and that the chosen CSFs are the starting point for the evaluation of a CRM strategy from a systematic standpoint.

The following sections will show the reality confronted by companies when undertaking CRM projects, and the aspects that a CRM strategy involves, with the purpose of providing support to formulate the aspects that address the success of its implementation. First, a brief description of the concepts related to CRM is provide; then, the research methodology is described, before the presentation of the proposal of the CSFs for a CRM strategy, as well as the planning and execution of its evaluation through the *features analysis – survey* method, which was selected by using the DESMET methodology. Lastly, a results analysis is described, as well as the conclusions reached in this research.

2. Customer relationship management (CRM)

In the late 1960s, Levitt suggested that the goal of businesses was to "create and maintain customers" [1]. After more than two generations, it can be appreciated how the CRM concept, and the need to maintain a long-term relationship with customers, is becoming an important issue. The main reason for this customer's importance return within the company is the change in the way of doing business nowadays [2]. In recent years, a study forecasts that for various reasons, and with more or less clarity regarding the subject, the companies have a new trend to implement CRM as a factor that will allow them to survive in these new market conditions, favoring the relationship with their customers [3].

Even though CRM systems are becoming a widely popular choice for implementation, success is becoming illusive. A survey of 202 CRM projects found that only 30.7% of the organizations recognized that they had achieved improvements in the way they sell to and serve customers [4]. Recently, a broader survey estimates that 70% of companies will fail eventually [5]. The Giga survey revealed that: (1) companies generally underestimate the complexity of CRM, (2) they lack clear business objectives, and (3) tend to invest inadequately in the provision of CRM software.

Considering this environment, and the evidence of the importance of having a close relationship with the customer for the companies' future, it is imperative that impacts be measured and everything related to CRM be handled with care. One of the problems that this term faces is to know its implications, as various trends exist within the market. One of the most popular trends is the software manufacturers' one, which identifies CRM as a series of information technology (IT) products oriented towards automating some business processes such as marketing, sales, or services [6]. According to [7] "to be successful, CRM projects need to be viewed as more than the implementation of IT." These solutions are valid as they allow obtaining some results regarding improvement in attention to the customer; nevertheless, CRM is a complex term that involves several aspects within the organization and it cannot be reduced to only one of these aspects. Systemic approaches to CRM help organizations coordinate and effectively maintain the growth of different customer contact points or communication channels. The systemic approach places CRM at the core of the organization, with customer-orientated business processes and the integration of CRM systems [8].

In this sense, only 3% of the companies are developing successful CRM projects; 17% are starting to see the projects from a holistic focus; 35% of the companies have started projects without any type of coordination; and 45% have not evaluated CRM [6]. Due to the complexity of starting a CRM strategy, encountered by several companies, some counseling companies and companies handling statistic data, have observed the mistakes incurred in the past. They recommend some practices and considerations to be taken into account [6–9].

In this research, some references are made to this point, to highlight and sustain the importance of each of the aspects related to a CRM strategy. For instance, the study performed by Forsyth took a sample of about 700 companies, with regards to the causes of failure to reach the CRM benefits [9]. The main causes of failure were:

- Organizational change (29%).
- Company policies/inertia (22%).
- Little understanding of CRM (20%).
- Poor CRM skills (6%).

This evidences the importance of defining CRM as a business strategy and, thus, as starting point for the organization's senior management. In addition, the relevance of taking into account the change in the environment of the manner of working of the people, and how to focus and

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relate within this new culture. As CRM is a relatively new concept, there are few experienced companies that allow adequate understanding and implementation [2]. Consequently, there is an imperative need to know more on the subject, evaluate experiences obtained by other companies, and to find the skills, both internal and external, to implement CRM [2].

On the other hand, Kirby expresses the following observations confirming the statements mentioned by Forsyth adding new elements [6]:

- The Directors' understanding that CRM is not only a strategy requiring changes in different company aspects, and its implementation is not instantaneous.
- Presuming that the customer is already well known, and not use the available resources to collect and input all information related to the customer.
- The belief that by purchasing a software package, a CRM is obtained, forgetting that there are important points, such as integration of present systems and the change of organizational culture.
- An inefficient communication between the departments involved in the processes.
- The lack of definition of metrics that allow understanding the evolution and benefits CRM is providing.

Payne assures that traditional marketing was focused in wining customers [10]; now, with the CRM focus, the purpose is both to win as to maintain the customers. The new CRM paradigm reflects a change in the traditional marketing, described as "customer management". According to [7], CRM evolved from business processes, such as relationship marketing, and the increased emphasis on improved customer retention through the effective management of customer relationships.

Relationship marketing emphasizes that customer retention affects the company's profitability because it is more efficient to maintain an existing customer relationship than create a new one [10,11]. Buttle is more concrete, stating that CRM has a marketing impact, but also in sales operations, customer service, human resources, research and development, finances and information technologies [12].

In some organizations, CRM is simply a technology solution that extends separate databases and sales force automation tools to link sales and marketing functions in order to improve targeting efforts. Other organizations consider CRM as a tool specifically designed for one-to-one [13] customer communications, a only responsibility of sales/service, call centers, or marketing departments. Attempting to connect the customer with the product can be achieved by automating a series of processes within the organization that allow the creation of that connection [2]. This focus is no more than a transformation of the product – based on marketing focus, towards a technology – based on customer focus [14].

Thus, it is apparent that the CRM concept has a technological component, but evidently affects and involves other aspects of the organization [15]. Although the technological component is present, it is important to understand that the organization must be viewed from a systemic perspective [16]. This confusion about the definition of CRM is also a likely contributor to the problems faced by organizations. They need to understand the theoretical and practical implications of the business perspective of CRM before initiating a CRM system project [7]. CRM systems must be considered as, potentially, a key component of the operation of a CRM strategy – not the only component. These issues contribute to a critical vehicle for understanding the resulting problems associated with CRM implementation and usage [7].

To achieve the CRM objective, there is a series of aspects involved [17,14]:

- The *Processes* through which the customer relates with the organization, according to Thompson, are: marketing, sales, and service [18]. In addition to these processes, and depending on the area of business, there are other processes which are directly affected and that must also be considered. The latter processes, however, are the most common and, generally, of broader scope.
- The *Human factor* (*people*) with a key role within the CRM strategy, both on behalf of employees within the organization (who must be immersed in a cultural change) as of the customers.
- The *Technology* is what facilitates implementing the CRM strategy; thus, it is necessary to know which of these technologies are and how they favor the CRM strategy.

The focus of this work is based on [5], which establishes that CRM is not merely technology applications for marketing, sales and service, but rather – when fully and successfully implemented – a cross-functional, customer-driven, technology-integrated business strategy that maximizes relationships and encompasses the entire organization [8,15,2].

A CRM business strategy includes marketing, operations, sales, customer service, human resources, R&D and finance, as well as information technology and the Internet to maximize the profitability of customer interactions [14]. *For customers, CRM offers customization, simplicity, and convenience for completing transactions, regardless of the channel used for interaction* [19].

The *processes*, *human factor*, and *technology* aspects for CRM are described in detail below.

2.1. Processes

CRM is a strategy within the organization that aims to satisfy and create a long-term relationship with the client. As such, one crucial factor of it is to analyze those processes which in any way involve interaction with the client. One must remember that depending on the type of business, the processes vary. Nevertheless according to [18] the

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main processes that involve client interaction are: *marketing*, *sales*, and *services*.

2.1.1. Marketing

Barnes proposes four "*new P's*" of marketing, namely: *product, processes, performance*, and *people* [20]. This new approach takes the characteristics of traditional marketing and upgrades them by focusing on the relationship with the client as one the crucial aspects [21]. Even though the marketing process is at its core, clearly oriented toward the needs of the client, the CRM strategy has influenced the way in which the process must incorporate the rest of the organization. According to Berkowitz, managing the relationship with the client, understanding the client's needs, knowing the client's buying habits, are all activities within the marketing process, but they must be understood as one more piece of the marketing machine and a source of information that must be shared with the whole organization [21]. This relationship becomes evident in the processes of marketing and sales, since the CRM strategy demands great coordination and flow of information.

2.1.2. Sales

In the sales process, the relationship between client and sales person becomes essential within the CRM framework. Sales people and clients interact face to face forming a long-term partnership. Even though managing the relationship with the client has always been a natural aspect of the sales process, the CRM strategy has an important impact on how this is done since it highlights aspects that were not given enough relevance in the past [22]. Sales follow-up and the gathering of key information which helps in the development of marketing plans are two important examples [22]. In this instance, CRM helps to conceptualize the mutually beneficial relationship that exists between those two processes. To overlook any of these aspects – that is to say, to disregard CRM and all of its implications – may very well be one of the main causes for failure and lack of results.

2.1.3. Services

Within the CRM strategy environment, the relationship with the client is the fundamental aspect. It follows then, that all issues related to services or customer services become critical. The service level offered by a company is defined by customers in terms of their particular experience regarding personal or telephone interaction with the company staff. In other words, the client cares a great deal about how he or she is treated, how fast problems are solved, etc. A study done at Harvard Business School shows that the overall quality of the service provided by a company is directly related to the client's satisfaction level with the services provided by the customer service staff. This confirms the importance of the personal relationship established between the client and the company, via the company's employees [20]. Another widely used term is "quality of service" which defines quality as the excellence level that the company has decided to achieve in order to satisfy its key client base. At the same time, it refers to the measure by which this measure of quality is achieved [23]. According to [24], those successful companies that can maintain high quality of service, have the ability integrate two key elements: a good service design and an effective execution of such design.

It is important to emphasize that these process (marketing, sales, and service) are not the only processes in which the client is involved; nevertheless, these processes are the most common, and happen more frequently in a CRM strategy, regardless of the economic sector in which the organization functions. Additionally, there are a series of processes which are specific to the type of industry. In the manufacturing industry, for example, the logistical processes of distribution are considered very important. Another example is the banking sector where all the processes which involve financial transactions are a priority.

It is clear, however, that the processes of marketing, sales, and services, have evolved with time, and have been adapted to the new demands of the market. Within the CRM strategy, the evolution of these processes is directed toward a common goal: to satisfy and create a long-term relationship with the client. To that end, these processes must be conceptually integrated and they must feed off on another in order to achieve the objectives set by CRM. It is important to note that according to [7] experience many organizations implement CRM systems in functional silos such as sales, marketing and call center. And his experience states that CRM evolved from business processes such as relationship marketing and the increased emphasis on improved customer retention through the effective management of customer relationships.

2.2. Human factor

The key factor in a CRM strategy is how the relationship with the client is handled. This approach relies on the fact that for this relationship to exist there must be at least two parties involved: a provider and a buyer. According to [25], most corporate strategies place more weight on internal processes, sacrificing – in most cases – all the aspects related to the client.

2.2.1. Aspects related to the client

In order to have a stable relationship with the client, the company must be aware of three key aspects. First, it must know how the client defines value. Then, it must provide satisfaction according to the needs and value standards of the client. Finally, it must work toward *retention and loyalty* from the customer.

- *Value.* According to [20] when any one thing, within a commercial relationship, generates value for a client, the client will be willing to buy it. A study by Zeithaml and Bitner quoted by [20], shows that clients identify value in different ways: (1) What the customer wants from a

product or service. (2) Low price. (3) Quality/price correlation. (4) What is the customer gives up in relation to what he or she gets.
- *Satisfaction.* One of the most popular formal definitions found in the literature, regarding satisfaction, is given by Oliver, quoted by [20]. He states that satisfaction is the response of fulfillment from the customer. It is a verdict of accomplishment of the expectations, motivated by an attribute of the product or the service, (or by the product or service as a whole) This in turn, provides the customer with a pleasure level. Satisfied customers are key when maintaining a long-term relationship, since their satisfaction will translate into retention and loyalty.
- *Retention and loyalty.* Loyalty in clients is one of the most sought after objectives on the market today. It is increasingly evident that the most profitable customers are those who have an enduring relationship with the company; customers who are loyal to one or several of the products or services that company provides. Loyalty involves more than simply retaining the client. It is connected to an evolution of the satisfaction of the client and the relationship between client and company over time. Loyalty can be defined as the personal identification felt by the client in regards to the performance of a product or service, and how this feeling drives the client's behavior [20]. Loyalty is closely related to performance: having the right product or service, at the right price and at the right time and place. It also involves a connection and successfully satisfying the client's needs.

Finally, in a CRM strategy, it is vital that all levels of the organization be aligned toward favoring the relationship with the client, taking into account all of the implications of this objective.

2.2.2. Organizational aspects

There are several aspects related to the organizational behavior, as indicated following:

- The change in culture within the company staff. Switching from a product-oriented approach to a client-oriented approach requires a change in attitude within the organization [26]. A study by Purdue University, cited in [27], shows that highest levels of client desertion are related to problems with service. Among the reasons cited for the poor quality of service are: lack of access to the right personnel (41%) inattentive personnel (26%) rude employees (20%) and slow responses (13%) [27].
- The role played by the employee in successfully establishing a relationship with the customer, and in turn, generating customer loyalty, as well as profit. One of these studies, by Hesket from Harvard Business School, shows that the successful delivery of the services depends on the satisfaction level of the employees involved in the process [20]. Therefore, employee retention becomes just as important as client retention. The longer the employee feels motivated and satisfied, the higher the commitment level to the company.
- At the managerial level, there is one aspect of great importance: the degree of commitment and participation on the part of those in high management positions. It is the role of those in the top management positions to sell and to convince those under their supervision, of the benefits and results of the CRM strategy. As a consequence, effective leadership is important [28]. Those on top of the organization must become the main promoters of CRM, and must convey the motivation and commitment to all other levels of the company. Middle managers and supervisors also play an essential role, since their particular styles of management will directly influence how the rest of the employees relate to the customer. In this regard, Buttle points out that one of the latest tendencies is to implement "internal marketing", which promotes commitment to the company's mission and motivates employees to be marketing agents at any point of their interaction with the client [12].

In addition to the aspects already mentioned [29] points out other general aspects to consider regarding organization:

- *Managing change.* It is important to take into account that switching to a CRM client-focused strategy has a strong impact on employees, since it entails changing way in which they had done things to this point [26]. It may also involve using different tools from those to which they are accustomed.
- *Communication and follow-up.* When implementing any CRM project it is important to communicate the desired objectives, as well as to follow-up on those objectives.
- *Feedback.* Employees relate directly with customers on a daily basis. It is important, then, to provide them with feedback programs regarding the implementation of the CRM strategy. Opinions based on employee experiences constitute an important tool for gauging effectiveness.
- *Effective leadership.* According to [28], CRM normally involves process change and the introduction of new information technology (IT), consequently effective leadership is important. Also, the effective management of information has a crucial role to play in CRM [26].

It is evident that the human factor is crucial in a CRM strategy, both from an inward perspective (organization and employees) and from an outward perspective (customers) Even with the best definitions of processes and the most advance technology, the relation between people has determining effect in any business strategy. It is important, then, to get those people involved with the strategy and motivate them to reach the objectives. This way we can use the technology as a complementary tool to achieve the proposed goals.

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2.3. Technology

Within many commercial relationships – and especially within those involving buyers and clients – the technology has often been the origin of new paradigms and ways of doing business, which many companies have been forced to adopt. On the other hand, technology has also offered solutions to these very challenges. Peppard suggests that technological advantages in global networks, convergence and improved interactivity, are key to explaining the growth of e-business and CRM [26].

It is important to consider that in order to implement a CRM strategy within the context of systems, companies do not start off from zero. Generally the companies already have information about the client, but that information exists within isolated systems. One of the biggest challenges that companies face today, is understanding the need to integrate the applications in order to be able to compile all the available information related to the client.

2.3.1. Information systems (IS)

As we have already mentioned, one of the biggest problems and misunderstandings regarding CRM is that it is often viewed as just software and not as a strategy. In this regard, it is clear that the software part of the CRM is a component of the IS, especially in a strategy that uses these systems as support for the implementation process [30]. In this sense, the software aspect becomes important but not definitive. In order to offer a solution that allows managing the flow of information between the different types of systems, organizations have introduced *enterprise systems* [31]. In a client-relationship strategy the integrated systems constitute a key factor, because within them one can find information related to the client, which can be used by the marketing, sales and services departments [30]. The questions becomes, then, how to align those systems so as to respond to a strategy where the client is the core of the business. Similarly to enterprise systems, in recent years, there has been a surge of software packages that allow automating those processes directly related to clients (i.e. sales, marketing, and services) These software packages are very effective in making those processes more efficient. Nevertheless, many of these packages are conceived as software solutions and not as IS; they have neglected key elements like the processes and the people.

2.3.2. Software for CRM

The manufacturers of CRM software have developed multi-functional solutions, directed at consolidating the management of information and the automation of client-interaction processes – such as marketing, field sales, and call center sales and services [32]. Thanks to its modular design, most of this software offers a plan that allows the implementation of one or several of the functions. Lee showed that *CRM-developed software* is not meeting the basic needs of clients [32]. This is evident in the client satisfaction indexes (CSI) which normally fluctuate between 80 and 90 points for products and services of worldwide reputed software. In contrast, the CRM software is in the 60 points range. As a consequence,the implementation of a software of this kind implies a global vision of the company and of the relationship that the company wants to establish with the client. From this standpoint, the software is an essential help given the characteristics of the market. This underscores the importance of choosing the right software for a particular company. The ELMS case study [8] demonstrate that in reality CRM is a complex combination of business and technological factors, and thus strategies should be formulated accordingly. The conclusion that we reach from this data, though seemingly dramatic, reflects the reality of the market: *CRM software suppliers are not applying CRM with their own clients.*

2.3.3. Sales force automation (SFA)

One of the main problems of CRM-oriented software, especially regarding the area of sales, is that not all software takes into account that the company is not starting the process off from zero. This is to say that the companies have developed strengths over time. They have particular products and markets and have developed certain practices and cultures. When one considers implementing a SFA solution, one must be careful not to radically change the way in which people work; many things will be optimized, but in many cases, organizations attempt to adapt their work and processes to the capabilities and range of the software, which is not a healthy practice. The only way to implement a solution of this kind, and bring benefits to the company, is to correctly assess each element, and to look at the company form a holistic viewpoint within the CRM strategy, aligning people, processes and technology.

2.3.4. Data warehouse and data mining

In general terms, the objective of *data warehouse* is to establish a repository of the data generated by the systems of a company, making them accessible and easy to read to other people and systems [30]. When the data are transferred to data warehouse, they are integrated or converted into a consistent structure. Normally a system of storage is established using information summaries that facilitate the searching sorting processes [30,33]. Generally, the data warehouse has different databases as a source and offers one gateway of access to the final user. Once the data warehouse is established, or a *data mart* from the corporate data warehouse is used, the task becomes to make sense of the large amount of data obtained. At this point, the concept of *data mining* comes into place. As the information grows, data mining sorts and gives meaning to all information regarding the client, both chronological, and complex, allowing it to be shared with the concerned parties within the company [30,34].

Within a CRM strategy, for example, it is important to know who the most profitable clients are, and how to establish customer loyalty from them. By analyzing the data regarding their purchase history the company would be

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able to know who they are. Furthermore, it could predict potential clients, toward whom the company should direct their attention in order to make them more profitable and loyal. It could also anticipate desertion by analyzing past complaints and problems. Sandoe et al. argue that advances in database technologies such as data such as data warehousing and data mining, are crucial to the functionality and effectiveness of CRM systems [33]. While a comprehensive database of the clients is essential and necessary, it does not constitute the only factor that allows the company to build a long-term relationship with the customers. It is crucial to take an integral approach that places value on all the aspects of the relationship [30].

2.3.5. Help desk

Typically the implementation of a *help desk* is very complicated since even though it has clear benefits to the organization, it is not well understood by the high level management. It is essential to have support at an organizational level in order to generate a culture of internal service [35]. Within a CRM strategy, however, the help desk is a justified and well understood function which helps with the development of the strategy. If we analyze the help desk with an inward approach, it becomes an important tool for the employees, allowing them to use the right resources in order to achieve their job [35]. If take the help desk with an outward approach it takes on a equally important role since it facilitate the resolution of different types of problems that customer face [35].

2.3.6. Internet influence

From a CRM perspective, *Internet* is a means of interaction with the client which offers a number of advantages to the company [20]. It lowers costs, broadens market range and boosts the quality of service. It also increases the value of the relationship with the client on certain levels, such as access, convenience and low cost [20,30,31]. The problem arises when Internet is perceived by companies as a magical element that can solve all the problems of range and sales, instead of as a part of an integral strategy for relating to the customer. On the other hand one of the main problems companies have encountered when attempting to set their presence on Internet is that many of their processes are not yet automated, and in many cases, are not well defined [30]. This is why many experts note that more than being a channel for increasing sales, Internet demands an internal change. If we add the fact that the switch to e-commerce must be done within the frame of a strategy conceived to relate to the customer, then the need for a revision of the systems that support such strategy is evident [20].

2.3.7. Call centers

One of the elements which has evolved more dramatically, in terms of competition, since the early 1990s, is customer service. Many companies developed areas which specialize in responding to customer-related issues (such as complaints, inquiries, product warranty concerns etc.). According to [36], modern *call centers* are a mix of traditional technology (telephone platforms), and the new Internet developments. In other words they incorporate new interfaces and communication media to the relationship between clients and the companies. In fact, the Internet phenomenon has changed the traditional customer service designs, and many companies expect to establish it as an important medium of relating to customers. A recent study from the Forrester Research shows that 70% of polled companies believe that call center strategies are crucial and 26% of those companies are already implementing such strategies.

A critical aspect is that companies often loose sight of the objective of the *contact center*. They tend to forget an essential factor: the availability of customer information. If an operator establishes communication with a client, the former must have any and every useful information regarding the customer to help address the specific issue. If the issue has to do with a billing mistake, then the operator must have access to the billing system; if the issue pertains to a service or product then the operator must have access to the corresponding system. One of the main problems, which translates into inefficiency when addressing customer issues, is that the client's information is spread out in different systems within the organization which makes it difficult for the operator to access it in a timely and comprehensive fashion.

2.3.8. Coordinating the CRM implementation

One of the consequences of the confusion in regards to the CRM concept is the inefficiency when implementing it, which has led to difficulties and even failure within the organizations that have undertaken this approach. According to a number of studies by the Gartner Group, the majority of the organizations perceive the concept of CRM as a technological solution for problems in individual areas. Most organizations also believe that CRM functions within frame of uncoordinated initiatives [6].

After reviewing all these aspects, and facing this new business environment and the implications a CRM strategy would have, one of the main problems for the companies is that no model or method exists to guide them in implementing a solution. Each company is different, has its own culture, business processes, technologies used, etc. Now then, some questions arise: *How can a company locate the CRM concept within its organization*?; *How does each one of these aspects influence within the CRM strategy*?; *Which are the CSFs to be taken into account for a CRM strategy*?.

3. Research methodology

The research methodology followed to identify the CFS and their metrics is based on the *Systemic methodological framework for IS research* developed by the Information Systems Research Laboratory (Laboratorio de Investigación en Sistemas de Información – LISI – as named in Spanish) [37], which is inspired in the *action*

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research (*AR*) *method* [38] and integrates the *DESMET methodology* to choose an evaluation method [39]. A detailed explanation about each aspect that conform the research methodology can be see in the Appendix A. The instantiation of a methodological framework for this research can be seen in Fig. 1. The description of each activity is as follows:

(1) *Documentary and bibliographical research to make up the theoretical referential framework.* This activity corresponds to the literature review related to CSFs, CRM and prior research about CSFs formulation [40,41]. It is extracted from different available sources (electronic included) in order to build a conceptual base that would serve as a reference to support the CSFs formulation. The products obtained include: a set of social, technological and organizational aspects to be considered for identifying the CSFs and their metrics.

(2) *Analysis of the background.* Based on the experience of companies around the world on CRM implementation, interviews to consultants in IS and IT areas, and surveys and literature review made in the prior activity, we identified possible reasons for failure, best practices and, performance measures that may be useful in the research to be established.

(3) *Formulation of the objectives and scope of the research.* During this activity, the scope of the research was formulated. Its inputs are the results of the two previous activities. The main result of this activity was establishing the following objective: *to propose a set of CSFs which can be used to guide the organizations in the implantation of a CRM, according to three factors: people, processes, and technology.*

(4) *Design of the set of CSFs and metrics.* This was the first activity in the phase taking action; in which, based on the previous activities, 13 CSFs were proposed in a beta version, as well as the considerations of the context and cases in which they must be applied. To formulate the metrics of each CSFs, the researchers followed the Basili's *goal question metric* (*GQM*) *paradigm* [42] (a explanation about GQM paradigm can be see in the Appendix A). Finally, 55 metrics were defined. These metrics are inspired by an extensive literature review related to CSFs, CRM, referential documentation about CFS formulation [40,41], and technology management literature. The main results of this activity were presented in the Section 4 of this paper.

(5) *Analysis of the context.* This is the second activity of the taking action phase. The technical criteria proposed by DESMET were analyzed, in order to decide the evaluation method to be applied to the CFS produced in the previous activity.

(6) *Application of the DESMET methodology.* It is the last stage of the taking action phase. During this activity the DESMET evaluation more widely adapted to the CFS was selected. According to the model proposed in this work, the method most appropriated was the *features analysis – survey*.

(7) *Evaluation of the CSFs and metrics.* First activity of the evaluating phase. The CFS proposal was evaluated using the method selected according to DESMET in the previous activity. The main results of this activity are presented in the Section 5 of this work.

(8) *Analysis of the results.* This is the second activity in the evaluating phase, consisted of studying the results

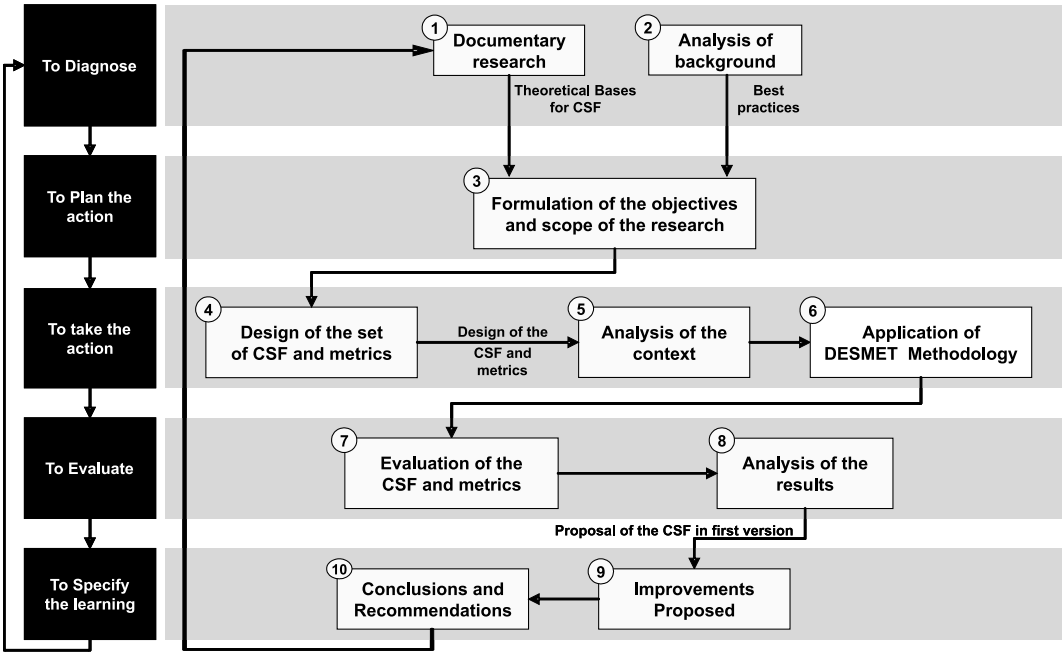

Fig. 1. Methodological framework used (Adapted from [37]).

based on the objective in the research, in terms of: the application of the evaluation method proposed by DESMET, the tangible products achieved and the changes in the environment. By incorporating the changes needed, a first formal version of the CSFs proposal was obtained for future iterations. The main results of this activity were presented in the Section 6 of this work.

(9) *Proposed improvements.* In this activity, into the specifying the learning phase, the improvements for the model were proposed.

(10) *Conclusions and recommendations.* In this activity into the specifying the learning phase, the conclusions on the CSFs proposal is presented in Section 7 of the article.

Well-known the methodology followed to perform this work, in the next section the main contribution of this article is presented: the formulation on the CSFs.

4. Proposal of critical success factors

Esteves and Pastor define a CSFs as the limited number of areas in which results, if satisfactory, will ensure a successful competitive behavior for the organizations [40]. In this context, it is considered that a factor is critical for a CRM strategy when its presence guarantees that the implementation of this strategy will be successful. In this sense CSFs were defined, which are intended to be taken into account by companies being in any of the following situations:

- No CRM strategy has been proposed as such, but efforts have been made in different areas to establish a good relationship with its customers. Thus, the evaluation of CSFs will allow valuing which aspects have been taken into account up to now, and which are worth strengthening.
- They are defining their CRM strategy, and the review of CSFs will allow reaching important considerations for their development.
- They are implementing a CRM project; thus, it is important to evaluate if all CSFs have been taken into account.
- They have implemented a CRM project and wished to evaluate or monitor the effects of the strategy.

CSFs related to the implementation of this type of project must consider all aspects that are involved. To this effect, the CSFs set is proposed taking into account:

- *Processes.* This aspect involves the main processes of relationship with the customer, such as marketing, sales, and service. Here, the importance of their definition, interrelationship, and documentation, will be taken into account.
- *Human factor.* For this aspect the CSFs having a human component and, thus, predominantly organizational, will be grouped.
- *Technology.* This aspect will include the CSFs depending directly of technological aspects, components, and tools, that must be present in every organization starting this type of strategy.

By nature, each of the CSFs has a direct or indirect influence on the three components involved in the CRM strategy (people, processes, and technology). CRM is a combination of people, processes and technology that seeks to understand a company's client base. Managing a successful CRM implementation requires an integrated and balanced approach to technology, process, and people. Nevertheless, one or two predominant factors exist that characterize the CSFs. Table 1 shows a list of the proposed CSFs to implement efficiently a CRM strategy, identifying for each one the aspects that characterize them most.

The proposal of each CSFs will be carried out using the same structure that allows a definition and characterization of each one of them. In Tables 2 and 3, each CSFs will present its conceptual definition and the metrics that allow evaluating each one.

Table 4 shows an example of definition of two metrics representing two different evaluation scales.

Table 1
CSFs classification according to human factor, processes and technology

ID	CSF	Human factor	Processes	Technology
1	Senior management commitment	X		
2	Creation of a multidisciplinary team	X	X	
3	Objectives definition	X		
4	Inter-departmental integration	X	X	
5	Communication of the CRM strategy to the staff	X	X	
6	Staff commitment	X		
7	Customer information management			X
8	Customer service		X	X
9	Sales automation		X	X
10	Marketing automation		X	X
11	Support for operational management	X	X	X
12	Customers contacts management	X		X
13	Information systems integration			X

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Table 2
List of proposed CSFs for CRM – part 1

ID	Conceptual definition	Metrics
1	Guaranteeing the commitment and participation of the organization's senior executives in the CRM project	1. Presence of the CRM project in the company's strategic plan
		2. Percentage of members of the board of directors that participate in the CRM project
		3. Percentage of the budget assigned to all the initiatives related to the CRM project
		4. Percentage of the objectives of the board members connected with fulfilment of the CRM project
2	Creating of a multidisciplinary team responsible for implementation of the CRM project	5. Areas of the company that belong to the team responsible for implementing the CRM project
		6. Frequency of CRM project implementation follow-up meetings
		7. Percentage of the members of the team responsible for implementing the CRM project who are leaders of their areas
3	Defining the objectives to be achieved with the implementation of the CRM project	8. Existence of public documents stating in writing the objectives sought by the CRM project
		9. Degree of knowledge of the potential benefits of the CRM project for the company
4	Integrating the different areas of the company so as to meet the general CRM objectives of the company and of each of the areas	6. Frequency of CRM project implementation follow-up meetings
		10. Existence of public documents where each area is aware of the objectives related to the CRM project of the rest of the areas of the company
		11. Percentage of participation by the different areas involved in the follow-up meetings of the CRM project
5	Publishing the objectives, benefits and implications of the project to all the company's staff	12. Percentage of staff that is aware of the objectives, benefits and implications of the CRM project
		13. Percentage of staff that has attended talks or seminars to learn the significance of CRM
		14. Use of electronic media to disseminate the objectives, benefits and implications of the CRM project
		15. Use of audiovisual media to publish the objectives, benefits and implications of the CRM project
		16. Use of internal bulletins and publications to disseminate the objectives, benefits and implications of the CRM project
6	Guaranteeing the staff's commitment to the CRM strategy	17. Percentage of objectives of the board members related to compliance with the compliance of the CRM project
		18. Staff turnover
		19. Annual rate of staff absenteeism
		20. Percentage of staff who fails to comply with company working hours
		21. Number of days lost each year by the company as a result of work stoppages caused by union claims
7	Handling key information on the company's customers	22. Segmentation of the company's customers
		23. Knowledge of the profitability of customers
		24. Knowledge of the customers' lifetime value
		25. Existence of a customer retention plan
		26. Percentage of annual desertion by customers
		27. Percentage of annual acquisition by customers
		28. Customer satisfaction ratio with the company
		29. Percentage of complaints related to the products or services sold

Each CSF could be implemented in different ways depending on the management level; meaning that top and middle managers must establish their scope of responsibility in its implementation. In addition, they should define an acceptance level for each CSF to ensure the successful implementation of the whole CRM strategy. In this sense, the CSFs constitute a guide to managers at different levels, however, they need to guarantee the balance between the three aspects above mentioned (human factor, processes, and technology) to assure their effectiveness.

Once these CSF were proposed, it was necessary to evaluate them by applying an adequate method according to the nature of this research.

5. Evaluation of the CSFs model for a CRM strategy through the "features analysis – survey" method

Once the CSFs were proposed, it became necessary to select the most adequate method for their evaluation; to this effect the DESMET methodology was used [39]. DES-

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Table 3
List of proposed CSFs for CRM – part 2

ID	Conceptual definition	Metrics
8	Providing a pre and post-sales customer service independent of the means the customer uses to communicate with the company	28. Customer satisfaction ratio with the company
		29. Percentage of complaints related to the products or services sold
		30. Percentage of the company budget earmarked for activities related to pre and post-sales services
		31. Frequency with which customer satisfaction is measured
		32. Average response time when dealing with requests from customers for information
		33. Average response time for dealing with customer complaints
9	Automating the company sales process	34. Integration of the sales system with the other systems of the company handling critical information such as production, marketing, and service
		35. Average time taken to update the sales forecast
		36. Average percentage of time spent by salespeople on administrative work
		37. Average time spent by salespersons in placing an order
		38. Average time spend by salespeople in obtaining information on all the offers made and on documentation sent to customers
		39. Average time spent by the sales manager in obtaining a unified view of the status of each of its customers
10	Automating the activities and handling of marketing information in the company	40. Average time taken to implement a new marketing campaign
		41. Average time taken to see the impact of a new campaign on sales
		42. Average time spent updating all the information related to sales
		43. Average time spent updating all the information related to customer service
		44. Average time taken to obtain an updated sales report by type of product, geographical zone, channels, etc
11	Implementing mechanisms to support operational management	45. Existence of a support unit for internal users
		46. Average frequency with which the equipment that supports the company's operation breaks down
		47. Percentage of the technology area's budget that is earmarked for supporting operational management
		48. Percentage of the value of operating equipment set aside for its spares inventory
		49. Average time taken to fix an operating problem or failure in the company
12	Developing adequate channels of communication with customers	50. Percentage of transactions carried out personally by customers at an office or branch of the company
		51. Percentage of transactions carried out by customers remotely, by phone or fax
		52. Percentage of transactions carried out by customers remotely, using electronic means such as websites or e-mail
13	Integrating Information Systems (IS) for consistency and availability of information related to customers in the company	53. Percentage of IS that have information on customers and are integrated
		54. Time taken to update information among different IS that share customer information
		55. Number of IS on average that have to consult someone in the company for customer queries or operations

Table 4
Example of a metric definition

Metric	Min	Max	Formulation
Presence of the project of CRM in the strategic plan of the company	0	1	1 = Its present 0 = Its not present
Percentage of the members of the board of directors that participate in the CRM project	1	5	5 = more of 75% 4 = between 50% and 75% 3 = between 25% and 50% 2 = less of 25% 1 = none

MET proposes a set of practical and technical criteria to select an evaluation method that allows to evaluate methods and/or tools in the Software Engineering field, and although the CSFs for a CRM strategy are not specifically found in this area, its use was considered in this research because the selection and evaluation criteria are perfectly

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applicable. In this sense, the CSFs constitute a "model" to be used by companies so as to obtain a diagnosis on the status of the implementation of a CRM strategy; thus, it can be said that they are a tool, although not a software one, with an implicit method for their implementation and use by the companies. Taking into account this premise, DESMET was applied, performing an analogy and adapting it to the CSFs own nature. According to the DESMET application, the method most appropriated to evaluate the CSFs was the *features analysis – survey*; which is reasonable, as the CSFs are defined by a set of features representing the main aspects considered in this research as people, processes and technology. This evaluation method resorts to a group of experts in the area under study, in this case CRM, to validate the suitability of the CSFs, their features, metrics and evaluation ranges.

5.1. Evaluation planning

Following is the explanation of the steps proposed for the *features analysis – survey* and how they were applied for the case of the CSFs.

(1) *Scope.* All CSFs for a CRM strategy were evaluated using the *features analysis – survey* method, with experienced professionals in CRM, that verified the suitability of the CSFs and the ranges of values suggested for the metrics.
(2) *Evaluation bases.* To efficiently evaluate the CSF and their metrics, two lists of feature's definition must be written, one for the evaluation of each CSFs (Table 5) and another one for evaluation of the CSFs metrics (Table 6).

Table 5
Features for the evaluation of each CSFs

Feature	Description	Evaluation scale
Pertinence	Refers to whether a CSF is or not adequate; that is, if it is actually a CSF for a CRM Strategy	1: means the CSF is pertinent 0: means the CSF is not pertinent
Completeness of factors involved	Refers to whether all aspects or characteristics of that CSF are actually being evaluated through the proposed metrics	1: means the CSF has enough aspects or characteristics involved 0: means the CSF does not have enough aspects or characteristics involved and, thus, its formulation is incomplete
Context independence	Refers to whether the characteristic being measured is contextualized in a specific type of company; for example, by size or very specific sector, or if, on the contrary, it does not depend on the context and applies to any type of company	1: means the CSF is context independent and not determined by the type or size of the company 0: means the CSF is not context independent and, thus, can only be applied to certain types of companies

Table 6
Features for the evaluation of each CSF's metrics

Feature	Description	Evaluation scale
Pertinence	Refers to whether a metric works to measure the existence or not of the CSF where it is found	1: means the metric is pertinent 0: means the metric is not pertinent
Range	Refers to whether the range proposed is adequate in its values, maximum and minimum, and the different scales proposed	1: means the range is adequate 0: means the range is not adequate
Feasibility	Refers to whether it is feasible to measure the characteristic proposed in the metric, within a company	1: means the metric is feasible 0: means the metric is not feasible
Context independence	Refers to whether the characteristic being measured is contextualized in a specific type of company; for example, by size or very specific sector, or if, on the contrary, it does not depend on the context and applies to any type of company	1: means the metric is context independent and not determined by the type or size of the company 0: means the metric is not context independent and, thus, can only be applied to certain types of companies
Depth level	Refers to whether the metric being verified has the adequate depth level for its result to be relevant, or if, on the contrary, more detail is needed for it to contribute value to the CSF	1: means the metric has an adequate depth level 0: means the metric requires more depth detail to actually be useful

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(3) *Roles and responsibilities.* Following is the definition of the roles and responsibilities applied in the evaluation:
   - *The promoter.* In this case, the "Laboratorio de Investigación de Sistemas de Información (LISI) de la Universidad Simón Bolívar" (Information Systems Research Laboratory of the Simón Bolívar University), the authors, and the "FONACIT" (National Fund for Science, Technology and Innovation) constitutes an environment of interest for the participation of the experts.
   - *Evaluators.* The authors of the present research.
   - *Users.* In the case of measurements, no interaction exists directly with the users of the CSFs. The experts who participated in this evaluation act as users because of their wide experience with CRM projects.
   - *Counselors.* In this case, the counselors are directly the experts that participate in the evaluation, and the LISI personnel (see above). Table 7 shows a summary from the eight experts that participated in the evaluation.

5.2. Evaluation procedure

To perform the evaluation, the following steps were followed:

(1) A questionnaire was sent to each one of the experts to evaluate the features, both for the CSFs as for their metrics. Each of the features of the CSFs or their metrics was answered according to the scales defined in Tables 5 and 6, respectively.
(2) The results from the experts were taken for each of the features, both of the CSFs as of the metrics, and the percentage of positive answers was calculated; that is, those that obtained a value of 1.
(3) For each feature, both of the CSFs as of the metrics, acceptable level was defined as when seventy five percent (75%) of the answers from the experts were positive (value 1). As there were eight (8) experts, this criterion guaranteed that a feature is acceptable when at least six (6) of them had evaluated it positively.
(4) Based on the previous criteria, the acceptance percentages were obtained for each one of the features defined, both for the CSFs as for each metric.
(5) A CSF is considered acceptable, according to the three defined features (pertinent; completeness of factors involved, and context independence), if the following conditions are fulfilled:
   - It must be pertinent to ensure that it is effectively a CSF.
   - The average of acceptance percentages of the three features must be higher than the defined acceptance level (75%).
(6) A metric is considered acceptable, according to the five defined features (pertinent; feasible, range, context independence, and depth level), if the following conditions are fulfilled:
   - It must be pertinent and feasible. Since they are metrics, the fact that their measurement is feasible must be a necessary condition.
   - The average of acceptance percentages of the five features must be higher than the defined acceptance level (75%).

6. Analysis and discussion of evaluation results

The overall average of all the CSFs, obtained a value of 83%, which is over the defined acceptance level in this research of 75%. As can be appreciated in Fig. 2, the general results of the defined CSFs were quite positive. Despite the fact of these successful results, two CSFs were found below the acceptance level (CSF #3 and #4), which means that the experts did not agree with their definition.

To identify the reasons for the non-acceptance of these CSFs and analyze the aspects to be improved of the accepted CSFs, it was necessary to analyze the results obtained in each one of the evaluated features. After the analysis of the results shown in Fig. 3, it can be appreciated that the second feature to evaluate, completeness of the factors, was the one that obtained the highest values below the acceptance level.

In fact, the values obtained in this feature were the main responsible for not accepting CSFs #3 and #4, as they obtained 13% and 25%, respectively. This causes that, although in the other two features they had good results; that is, being considered by the experts pertinent and context independent CSFs; their overall average was definitely not sufficient to reach the acceptance level. Because of the evaluation and comments from the experts, it was possible to analyze in depth the aspects to improve in the two CSFs mentioned before, and the necessary metrics were incorporated for the completeness of factors feature to reach acceptability levels.

On the other hand, the CSFs that had obtained the best acceptance levels by the experts (90%) should be highlighted as follows:

- Senior management commitment (92%)
- Management of customer information (92%)
- Market automation (96%)
- Commit to operations management (92%)

These factors achieved an excellent acceptance level; nevertheless, both for these as for the rest of the CSFs, a detailed analysis of each one was necessary, interpreting the results obtained in each one of the metrics. Thus, afterwards the results for each CSFs and their associated metrics were analyzed.

Following, is shown the analysis of the 13 CSFs, which gather varied results regarding their acceptance. To can read each figure, you must take in account:

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Table 7
Experts description by the participating in the evaluation

General description	Experiences	Country
E1 Present CRM Manager in the CANTV Corporation. CRM counseling experience in ANDERSEN. Participation in implementing highly complex projects in different industries	CRM Project Management for the Petroleum Industry, Services and Telecommunications Companies. Process Reengineering. Change Management Project Management in the IT area. IT Outsourcing. Help Desk Management. Software Development and Implementation Management	Several Latin-American countries
E2 Large experience in counseling and implementing projects of strategic characteristics in several types of companies, Venezuelan and foreign, especially in the finance area	CRM counseling, managerial induction and project implementation; images digitalization and overall automation of critical processes. LINK Consultores S.L. Madrid, Spain. Counseling and induction for Senior Management Strategic Planning and Customer Attention in several Latin-American countries. 2SP Consulting Team. Caracas, Venezuela. Project leader in services improvement and organizational changes (simulation, technology, structure, digitalization, and warehouse-data), service quality indicators, services functions restructuring, job descriptions for the Office Web. Banco Mercantil Vice-President, Caracas, Venezuela. Marketing Professor, during 10 years, at the "Universidad Central de Venezuela" (1988–1998)	Venezuela and Spain
E3 Teaching experience and as counselor for projects of strategic character and CRM in several types of companies, Venezuelan and foreign, especially in the Telecommunications area. MBA in the International Management European University, Madrid - Spain; Specialization in Business Management in the "Universidad Simón Bolívar", Caracas, Venezuela	Relational Marketing and CRM Professor in Company Management Specialization, "Universidad Simón Bolívar", Caracas, Venezuela. Project strategic definition in the CRM and EAI areas for Latin-American companies, in the Telecommunications, Petroleum and Services sectors. Planning Director, ACM Group, Miami, Florida. Planning and optimizing Movilnet's cellular web, Caracas, Venezuela	Several Latin-American countries
E4 Senior Counselor at international level for board of directors and managing teams. Director and Partner of 2SP Consulting Team, since 1990. Bachelor in Business Economy Sciences, Nuremberg University, Germany	Workshops and seminars conductor in all Latin America, on Human Resources and Business Strategies, with emphasis in orienting towards the internal and external customer CRM. Coaching, business strategies, motivation, and creativity. Counseling in Organizational Development and Human Resources Management. Professor a the Balearic Islands University, Spain, since 1997. Guest Professor at the ESADE, Barcelona, Spain, 2000	Several Latin-American countries and Europe
E5 CRM Business Developer for SAP Italy. Experience in implementing CRM projects in Italy. MBA, Luigi Bocconi University, Milan, Italy. Bachelor in Economics, Naples University, Naples, Italy	CRM market analysis, planning and support to launch CRM solutions. Cooperation with Peppers and Rogers in the study of the benefits of CRM projects. Counseling at strategic level for IT processes. MC at multiple CRM events, CRM essay writer in the main IT magazines in Italy	Italy
E6 Account Manager in SAP Italy. Experience in the implementation of high complexity projects in the ERP, CRM areas; counseling in IT projects in Italy. PhD in IT Sciences, "Universitá degli Studi", Milan, Italy	IT Project Management. Implementation of ERP and CRM systems. Process counseling. Lecturer at several IT congresses in Italy	Italy
E7 Experience as project counselor in the areas of Call Center, Help Desk, Sales Force Automation, and CRM in general; especially in the software and system integration areas, for over 10 years in all Latin-America. B.S. in Electrical Engineering and B.S. in Computer Engineering, Kansas University, USA	Main counselor/Project manager in implementing help desk, call center and CRM software such as: SupportMagic, HEAT, ONYX and Vantive (PeopleSoft) at: Movilnet - Venezuela, TV Azteca - México, AFP - Argentina, British Petroleum - Colombia, Bancredito - Dominican Republic, Banco Popular - Dominican Republic, Tandem - Peru. Active member of the Help Desk Institute Active member of the Channel Partner Advisory Council (CPAC) of FrontRange Solutions. Conferences on the impact of the Help Desk in the organizations, in: Argentina, Chile, USA, Colombia, Peru, Mexico and Venezuela. Conferences on CRM "A Strategy, not Technology", in: Ecuador, Mexico, Panama, Puerto Rico, Costa Rica and Brazil	Several Latin-American countries
E8 Experience in Call Center project definition, from the telephone and systems point of view. Altitude (Easy Phone) Representative in Venezuela. Digitel TIM Purchase Manager in the IT and Telecommunications area	Contact Centers and integration with CRM systems. Text messaging and multimedia, Mobile Entertainment. Telecommunications solutions for vertical markets. Voice, video and data convergence solutions	Venezuela and Central America

- All values in the right side are expressed in percentage (%).
- Legend of the acronyms: (M)etric number, (P)ertinent, (R)ange, (F)easible, (C)ontext (I)ndependence = CI, (D)epth (L)evel = DL, and (A)verage.

6.1. Senior management commitment (CSF #1)

As can be appreciated in Fig. 4 (left side), this factor obtained results over the acceptance level in the three

evaluated features. This indicates that the majority of the experts considered this a fundamental factor within a CRM strategy, as it is pertinent, the factors defined for its evaluation are sufficient, and it is independent from the type of company and the sector where it is located. It can be noticed that 100% of the experts agreed on its pertinence and the context independence; nevertheless, although an acceptance level of 75% was achieved, a small group of experts considered necessary to complement some of the factors included in its definition.

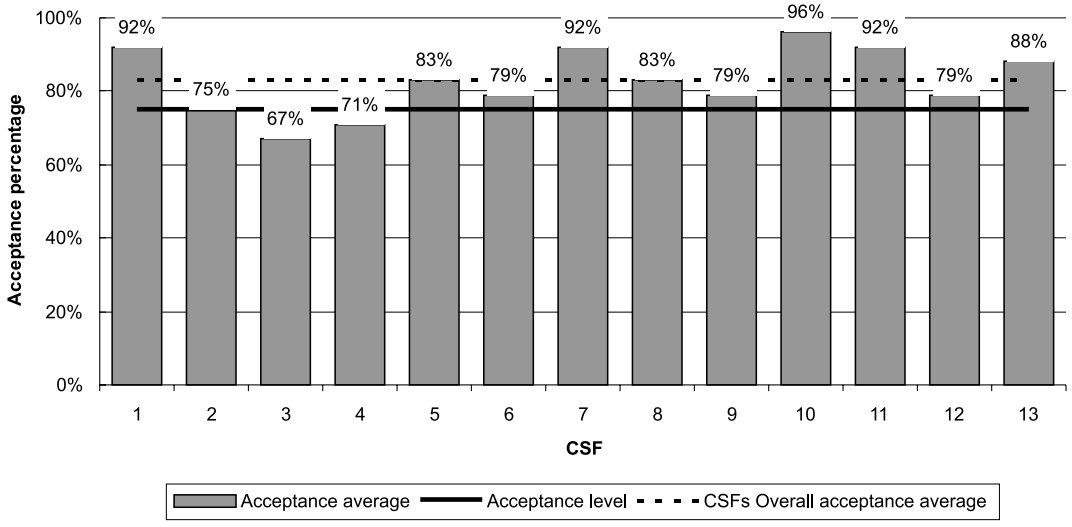


Fig. 2. Results obtained for all CSFs.

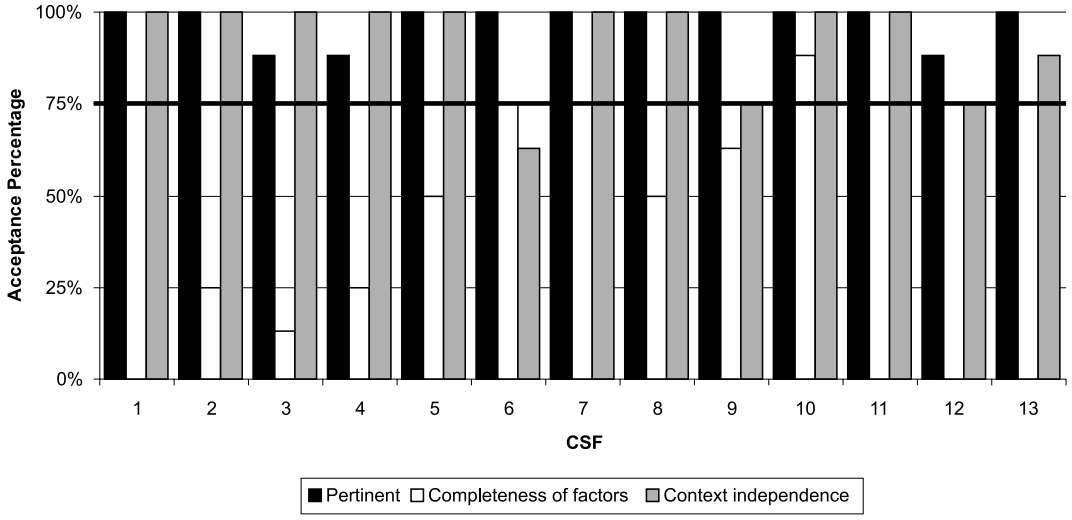


Fig. 3. Evaluation results of the characteristics present in the CSFs.

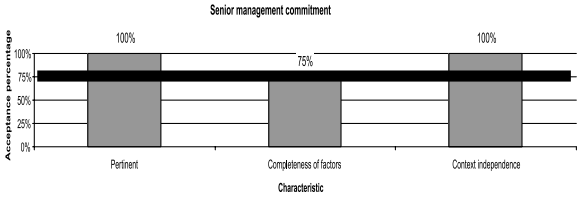
CSF results	Metrics results						
	M	P	R	F	CI	DL	A
	1	100	100	100	100	100	100
	2	100	75	88	100	63	85
	3	100	88	75	100	63	85
	4	100	88	88	100	75	90

Fig. 4. Evaluation results of the characteristics and metrics of the CSF #1.

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Notwithstanding this last element, the average of acceptance percentages of the features was of 92%, which represent an optimum value.

As can be appreciated in Fig. 4 (right side), all the metrics associated to this CSF were accepted, according to the evaluation criteria. That is, each one of them is pertinent, feasible, and the average of acceptance percentages is over 75%. Nevertheless, observing the detail in Fig. 4 (right side), it can be appreciated that for metrics #2 and #3 it was necessary to deepen their definition, as per the experts' judgment they have a non-acceptable depth level, that is, they are too generic. On the other hand, metric #1 (presence of CRM in the company's strategic project) was the only one that obtained unanimous acceptance among all the experts. The rest of the metrics had lower levels regarding range and feasibility, although always over the acceptance level. The experts' observations on these metrics were mainly focused towards the importance of specifying in more detail the budgetary aspect, as it being a project that involves the whole company. It is necessary to determine in more detail the budgets for each initiative, so as not to mix initiatives or improvements that, even if they would favor the CRM project, had already been considered, for example, technological improvements, personnel induction courses, etc.

6.1.1. Proposed improvements for CSF #1

The results obtained for this CSF were successful; nevertheless, the metrics that could be improved are #2 and #3 in their depth level, for which the changes shown in Table B.1 of Appendix B are suggested.

6.2. Creation of a multidisciplinary team (CSF #2)

This CSF was evaluated positively, in the sense that it was considered pertinent and independent of the type of company and the sector where it is located. Nevertheless, as can be appreciated in Fig. 5 (left side), the experts considered insufficient the aspects involved in its definition, in fact, it is well under the defined acceptance level of 75%. In overall terms, the expert's opinion agrees in the importance of a team constitution, as well as a need to define the macro objectives pursued in the project. On the other hand, observations were made on the importance of the participation of the entire company in the project to avoid certain areas prevailing over others, such as marketing or technology, which are the ones that traditionally have been more involved in CRM projects to date. This is reflected in the average of acceptance percentages of the features, which was of 75%, placing it in the limit of the acceptance level.

Regarding the completeness of factors feature, one of the major contributions from the experts made to this CSF that was not originally considered is the importance of including the role of the CRM project manager within the company, being independent from all areas. Preferably, this role reports to the board of directors and with coordination and follow-up responsibilities of the Multidisciplinary Team to be conformed.

In the context of the metrics associated to this CSF, it can be appreciated in Fig. 5 (right side) that two of three of them resulted acceptable according to the evaluation criteria. Nevertheless, metric #7 is well below the acceptance level. Going into more detail, it can be appreciated in Fig. 5 (right side) that metric #5, although having a good acceptance level, obtained a very low level in the depth feature. In this sense, it should be noted that for the definition of metric #5 – see Fig. 5 (right side), there were proposed as fundamental areas, those of: human resources, technology, sales, marketing, and customer service. Observations made by the experts are oriented towards extending the participation of all areas within the company, including the aforementioned key areas, but without leaving aside other existing areas according to the type of company. With regards to metric #6, it had an acceptance level slightly over the minimum acceptable; mainly due to the fact that experts considered that the range feature is not acceptable (less than 75%).

Concerning the leaders of each area participating or not (metric #7), the same was not accepted as valid. The original idea, at the time of defining this metric, was to guarantee that the representation of each area in the multidisciplinary team was actually representative and with weight in the organization. Nevertheless, for the experts; although a high-level follow-up is important to give the project the necessary priority; the importance of the participation of the different management levels was commented, to avoid rivalries or protagonist attempts from different areas.

6.2.1. Proposed improvements for CSF #2

The results obtained for this CSF are intermediate, as one of the features of the CSF was not accepted and like-

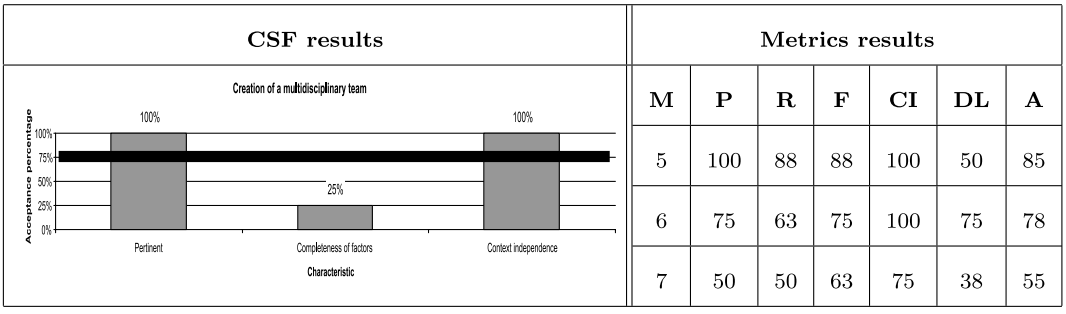


Fig. 5. Evaluation results of the characteristics and metrics of the CSF #2.

wise one of its metrics, for which Table B.2 of Appendix B presents the proposals to improve its definition.

6.3. Objectives definition (CSF #3)

This was one of the two factors that were not accepted by the experts, as it obtained an average of acceptance percentages of the features of 67%, which is below the defined acceptance level (75%). Based on these results, a detailed analysis was carried out of the same to also propose the needed improvements to be able to consider it a CSF or, if necessary, consider its deletion.

In first place, as can be appreciated in Fig. 6, the main reason this CSF was not accepted because the experts considered that the factors involved in its definition were not sufficient. The value obtained in this feature (13%), strongly contrasts with the other two features, which obtained results largely over the acceptance level, inclusive one of them with a 100% acceptance. In the opinion of the experts, it is necessary to define in more detail the general and specific objectives of the project, as well as those of the short, medium and long-term. In this sense, the metrics defined in this CSF are insufficient. To verify this observation, following is a more detailed analysis of the results obtained in the evaluation of the metrics. As can be appreciated in Fig. 6, the two metrics have resulted acceptable according to the evaluation criteria previously defined. Nevertheless, both achieved levels very close to the acceptance level, which indicates that they have several aspects that need to be improved.

Observing the details the right side of Fig. 6, it is important to note that for both metrics the absent feature was the same: lack of depth. In this sense, the experts proposed that a metric should exist regarding existence or not of objectives, as the public documents or the knowledge level of the benefits are consequences of this. Additionally, they indicated the need to define the general and specific objectives, and also which would be the short, medium, and long-term objectives. Likewise, they indicated that it should be possible to measure, in a more quantitative manner, the benefits that the CRM strategy will bring to the company.

6.3.1. Proposed improvements for CSF #3

The results obtained for this CSF and its metrics have in common the Lack of depth in their definition. Thus, the proposed improvements are oriented towards including new metrics that will allow completing the absent factors indicated by the experts. These are shown in Table B.3 of Appendix B. All the improvements mentioned above take into consideration the observations made by the experts, and by including them in the definition of this CSF surely the acceptance of this factor could be achieved.

6.4. Inter-departmental integration (CSF #4)

In the same manner as the previous CSF, this factor was not accepted by the experts, as it obtained an average of acceptance percentages of the features of 71%, which even if it is not a deficient average, likewise it is below the defined acceptance level (75%). Based on these results, a detailed analysis was carried out to propose the required improvements and therefore to be able to consider it as CSFs. As can be appreciated in Fig. 7 (left side), as in CSF #3, the main reason for which this CSF was not accepted was the insufficiency of factors contemplated in its definition. The value obtained in this feature (25%), strongly contrasts with the

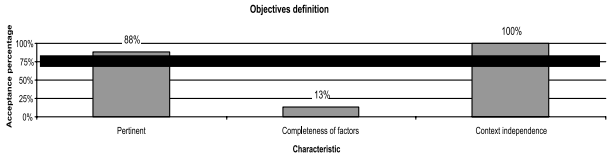
CSF results	Metrics results						
	M	P	R	F	CI	DL	A
	8	88	88	88	88	25	75
	9	88	88	75	88	63	80

Fig. 6. Evaluation results of the characteristics and metrics of the CSF #3.

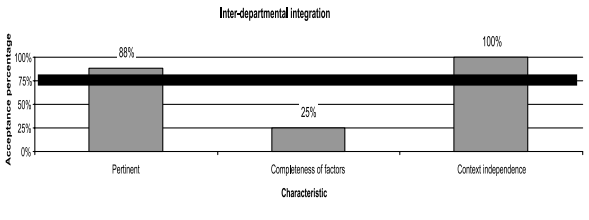
CSF results	Metrics results						
	M	P	R	F	CI	DL	A
	6	75	63	75	100	75	78
	10	75	100	88	100	63	85
	11	100	100	100	100	75	95

Fig. 7. Evaluation results of the characteristics and metrics of the CSF #4.

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other two features, which obtained results largely over the acceptance level, including one of them with a 100% level.

According to the experts, it is fundamental that levels of integration exist between the departments; otherwise it would be very difficult to achieve the proposed objectives in the CRM strategy. Nevertheless, it was considered that no sufficient elements exist within this CSF for its definition to be effective, so it is necessary to analyze the results obtained at the its metrics level.

As can be appreciated in Fig. 7 (right side), the three metrics resulted acceptable according to the evaluation criteria. It is important to mention that metric #6 had already been evaluated in CSF #2; nevertheless, it is also present in the definition of this CSF. The fact that this CSF was not accepted is interesting, especially taking into account that the two metrics introduced for the first time in this case (metrics #10 and #11) have quite good acceptance levels. Thus, this confirms the need to include new metrics to complete the factors that are missing.

Thus, at the detail level of each one of the evaluated features that can be appreciated in Fig. 7 (right side), it can be observed that the three metrics were accepted; nevertheless, only one (metric #11) obtained results over the acceptance level in all its features and in four of them obtained a 100% acceptance.

Regarding the public documents that reflect the objectives of each area (metric #10), the experts' evaluation notes a lack of depth in this aspect. In this sense, the observations were on the need that they must be unique documents where the objectives of all the areas are shown, as this can create unnecessary divisions in the project implementation.

Finally, although CSF #4 was one of the unaccepted CSFs, the metrics defined for this CSF were well accepted by the experts. Nevertheless, it is necessary to carry out some proposals regarding additional metrics that allow improving the completeness of factors feature level, at the CSFs overall level.

6.4.1. Proposed improvements for CSF #4

According to the results obtained and the suggestions from the experts, it can be concluded that this is a necessary CSF. Nevertheless, it is adequate to extend the metrics to differentiate this factor from CSF #2 (creation of a multidisciplinary team), as it constitutes a previous and necessary element for the second one to exist, and basically depends on the support and participation level defined by senior management. In turn, the inter-departmental integration must be maintained and deepened through time, as it will largely depend on how teamwork is performed and the coordination steps of the CRM project manager (suggested as additional metric in CSF #2).

Regarding metric #10, it should be noted that this subject is already stated in metric #8 to express the objectives of the CRM strategy in its entirety, taking into account the experts' observations concerning the existence of unique documents that state the overall objectives and those of each area, for the knowledge of the entire company. Thus, it will not run the risk stated by the experts. Table B.4 of Appendix B proposes new metrics with their respective ranges.

6.5. Communicating the CRM strategy to the staff (CSF #5)

This aspect was evaluated as positive since it was considered pertinent and it characteristics were viewed as important by all experts. The characteristics obtained an average of 83% in regards to acceptance. However, as shown in Fig. 8 (left side), the experts considered that there are not enough factors involved in the definition.

We will see in Fig. 8 (right side) that all the characteristics obtained a acceptability level higher than 90%, with the exception of metric #14 (83%). This metric obtained results below the acceptability level regarding the characteristic related to independence of context. This is due, as pointed out by the experts, to the fact that the means to be utilized when communicating the CRM will largely depend on the type of company and on the type of activities performed by the employees. For instance, since not every person in a determined type of company will have access to a computer or a intranet, it is suggested that the method of evaluating this metric be verified taking into account the largest number of means available to the company. Another comment from the experts made by

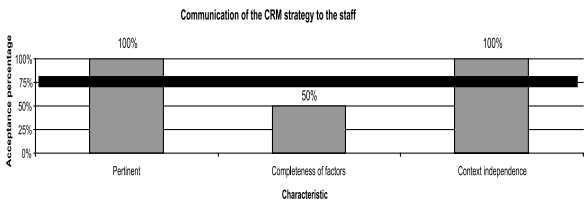
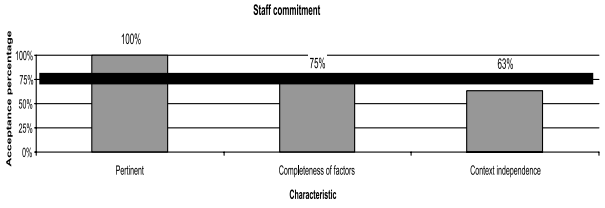
CSF results	Metrics results						
	M	P	R	F	CI	DL	A
	12	100	100	88	100	100	98
	13	100	75	100	100	88	93
	14	88	88	88	63	88	83
	15	100	100	100	88	100	98
	16	100	100	100	75	100	95

Fig. 8. Evaluation results of the characteristics and metrics of the CSF #5.



CSF results	Metrics results						
	M	P	R	F	CI	DL	A
	17	100	63	88	88	75	83
	18	88	63	88	63	88	78
	19	88	63	75	38	75	68
	20	88	63	75	38	63	65
	21	75	63	63	38	63	60

Fig. 9. Evaluation results of the characteristics and metrics of the CSF #6.

the experts pointed out that this CSF depends on the clarity with which the objectives of the CRM strategy are defined (CSF #3), since without such clarity, confusion may arise and provoking an opposite effect to that expected.

6.5.1. Proposed improvements for CSF #5

No aspects to improve were detected on this CSF, but it is important to take into account that metric #14 would apply to those companies which because of their type do not have internal electronic media for relating information.

6.6. Staff commitment (CFS #6)

As shown in Fig. 9 (left side) this CSF had a positive evaluation on the part of the experts regarding its pertinence and thoroughness when considering the factors necessary for its definition and metric. Even though the percentage of the characteristics is of 79%, this was the only one of the CSF's to obtain a negative result regarding independence of context. This information is relevant because the definition of this CSF depends largely on the size and type of company. To better understand this aspect, it is important to analyze the metrics involved.

As shown in Fig. 9 (right side), 5 metrics were not accepted by the experts. This constitutes the most critical situation in the CSF. We can note that all the metrics were considered pertinent. However, there is one metric that was considered not plausible. In regards to range, all the metrics scored below the acceptability level. On the other hand, only metric #17 was considered acceptable in terms of independence of context. The rest of the metrics were not accepted. In regards to metric #19, the characteristics not accepted were those of range and independence of context, which are closely related. The main observation of the experts in this sense is was the need to adapt the range to correspond with the type of company.

This case is not very different from other metrics that were deemed not acceptable (metric #20). Even though the metric was evaluated as pertinent and plausible, the rest of the characteristics were not accepted, which ultimately means the metric must be revised. The observations of the experts pointed out variations, depending on the type of company, and also deemed the metric as lacking in depth. This last observation was due to the fact that the work designs in many companies have varied, and in many cases companies are more inclined to evaluate employees solely in terms of results and not in terms of commitment or fulfillment of regulations.

Another interesting element evident in the results is the characteristics of the range and independence of context. In the case of range, all the metrics were not accepted; in the case of the independence of context only one metric showed that characteristic over the acceptability level.

This indicates that, according to the experts the defined evaluation ranges are not satisfactory because they depend heavily on the size and type of company. Elements like rotation, schedule observance, and attendance, tend to vary significantly. It was suggested that those elements be more specified or that the levels of evaluation be different depending on a size and type of company.

6.6.1. Proposed improvements for CFS #6

Generally speaking, there is agreement in that this CSF is pertinent. Nevertheless, due to its dependency on the context and, by extension on the range, it becomes necessary to adjust the metrics, or to include other metrics to help gauge the incentive and the commitment level of the staff in a project such as the CRM. The changes suggested are shown in Table B.5 of Appendix B.

6.7. Customer information management (CFS #7)

This factor obtained results above the acceptability level in the three characteristics that were evaluated – see Fig. 10 (left side). It was one the most accepted factors (it drew no observations on the part of the experts), and obtained an average of 92% on the evaluation of its characteristics. All the experts agree that it is highly important to know the client, and that the metrics included in this CSF are the most adequate.

It is interesting to note that 100% of the experts agreed in regards to the relevance and independence of context. How-

ever, even though the acceptability level was achieved at 75%, a small group of experts considered that it necessary to complement some of the factors included in the definition.

As shown in Fig. 10 (right side), regarding the metrics, it can be pointed out that all obtained fairly high levels of acceptability; it fact the metric with the lowest percentage of acceptability was metric 29 which scored 83%.

Looking at Fig. 10 (right side) more in detail one can note that all the metrics obtained values above the acceptability level in all the characteristics. Metric #29 (Percentage of complaints related to products or services) was the metric with the lowest acceptability level (83%) due to the fact that two of its characteristics obtained the lowest acceptability level (75%). This characteristics were the range and the independence of context. Regarding range, the comments from the experts tend to point out the need for more demanding values that provide the metric with more relevance. In regards to the independence of context, the experts point out that, for a specific type of company, the ranges could vary depending on the characteristics of the market and the outside competition.

6.7.1. Proposed improvements for CSF #7

In general, the results of this CSF are good. No significant improvements were considered. However, in regards to the observations made by the experts, the changes made are shown in Table B.6 of Appendix B.

6.8. Customer service (CSF #8)

This factor was positively evaluated in the sense that it was considered pertinent and independent from the type of sector in which the company falls. These characteristics obtained the consensus of all experts. In fact, this CSF obtained an average percentage of 83%. However, as shown in Fig. 11 (left side), the experts considered that the factors introduced in its definition are not enough.

Regards to the metrics, we can see in Fig. 11 (right side) that all of them are situated above the acceptability level. It is important to point out that metrics #28 and #29 are already included in CSF #7, and have been already analyzed.

6.8.1. Proposed improvements for CFS #8

While all the metrics were considered pertinent and plausible – as shown in Fig. 11 (right side) – it is interesting that the characteristic with the lowest acceptance level was the one of range. This indicates the need to revise the values defined in the metrics of this CSF. The critics pointed out the need for more strict response timeframes within the defined ranges. One of the two metrics with the lowest acceptability level is metric #33, which regards to the response timeframes for customer complaints. In regards to this metric, it is necessary to look in depth at its definition and also to revise the range of defined values. One common factor in all the evaluated metrics in this CSF (metrics #30 through #33) is that they received the same observation from the expert regarding range. It is necessary to define more demanding levels in order to guarantee better quality customer service. The improvements are shown in Table B.7 of Appendix B.

6.9. Sales automation (CSF #9)

The pertinence and independence of context of this CSF were acceptable. In fact, the average percentages were of 79% which locates it above the acceptability level – see Fig. 12 (left side).

In regards to these metrics, one can observe in Fig. 12 (right side) that even though the metrics did not obtained

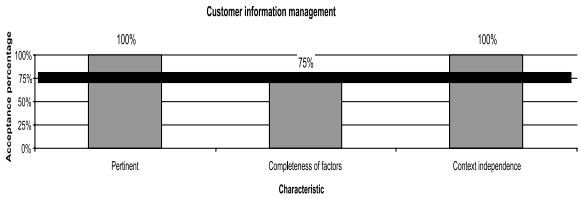
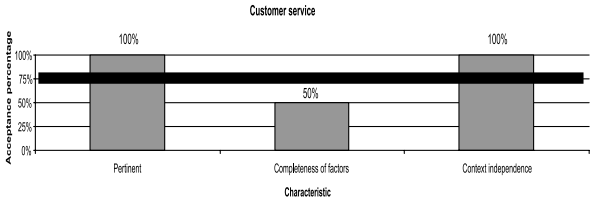
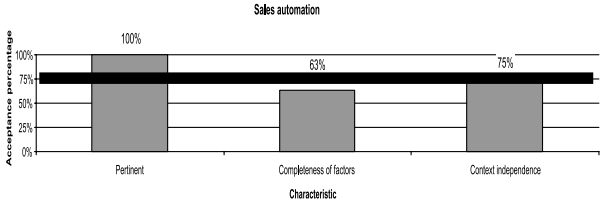
CSF results	Metrics results						
	M	P	R	F	CI	DL	A
	22	100	88	100	100	88	95
	23	100	100	100	100	100	100
	24	100	100	100	100	100	100
	25	100	100	100	100	100	100
	26	100	88	100	88	88	93
	27	100	88	100	88	75	90
	28	100	75	100	100	88	93
	29	88	75	88	75	88	83

Fig. 10. Evaluation results of the characteristics and metrics of the CSF #7.



CSF results	Metrics results						
	M	P	R	F	CI	DL	A
	28	100	75	100	100	88	93
	29	88	75	88	75	88	83
	30	100	50	100	75	75	80
	31	100	50	100	88	88	85
	32	100	63	100	75	75	83
	33	100	63	100	75	63	80

Fig. 11. Evaluation results of the characteristics and metrics of the CSF #8.



CSF results	Metrics results						
	M	P	R	F	CI	DL	A
	34	100	88	75	88	75	85
	35	63	63	63	63	38	58
	36	88	88	88	75	63	80
	37	88	88	88	63	88	83
	38	88	50	88	88	75	78
	39	88	38	88	88	88	78

Fig. 12. Evaluation results of the characteristics and metrics of the CSF #9.

outstanding values, all of them are above the acceptability level, with the exception of metric #35 (Average time of update of the sales forecast). As shown in Fig. 12 (right side), it is interested to point out that the most rejected characteristics were range and independence of context. Regarding metric #35 (Update of sales forecast), the results show that none of the characteristics were accepted and that experts indicate that the metric is not considered pertinent, due to low incidence of this concept in many types of companies and to the dynamic nature the updating of the information required in the sales process.

The observation was made that it is necessary to include a metric that helps in evaluating if the company configures its sales plans in an effective manner. This would serve as a clear indicator to help in gauging the automation of the sales process within the company. Other noteworthy results, are those regarding the values obtained by metrics #38 (Average time of retrieval of special promotions information and other documentation sent to a customer), and #39 (Average time it takes a manager to obtain a comprehensive overview of the customer's information). Experts pointed out that if the integration of systems and automation of sales are actualized, then the ranges proposed must more strict.

6.9.1. Proposed improvements for CSF #9

This CSF obtained positive feedback. However, in regards to the metrics, it is necessary to make some improvements as shown in Table B.8 of Appendix B. After such improvements, the overall evaluation of this CSF must be positive and reach the acceptance level of metric #35.

6.10. Marketing automation (CSF #10)

This factor ranked above the acceptability level for the three characteristics that were evaluated – see Fig. 13 (left side). Additionally, this CSF obtained the highest acceptability level and yielded no observations by evaluators, scoring an average of 96%. Experts agreed that the automation of the marketing processes is crucial when making fast and timely decisions.

As shown in Fig. 13 (right side), the degree of acceptability of the metrics was fairly high. The metric with the lowest

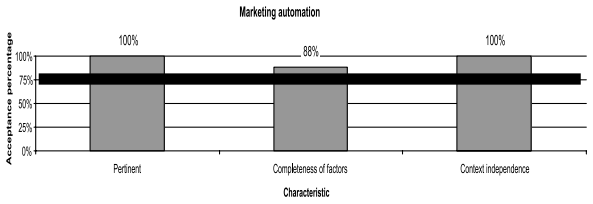
CSF results	Metrics results						
	M	P	R	F	CI	DL	A
	40	100	50	100	63	100	83
	41	100	38	100	63	88	78
	42	100	88	100	88	100	95
	43	100	100	100	88	88	95
	44	100	88	100	88	88	93

Fig. 13. Evaluation results of the characteristics and metrics of the CSF #10.

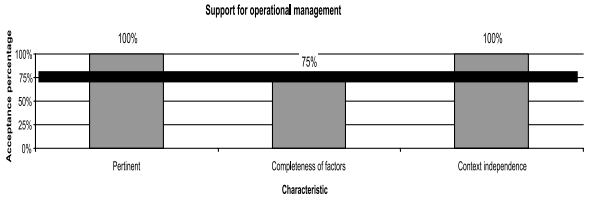
CSF results	Metrics results						
	M	P	R	F	CI	DL	A
	45	100	100	100	100	88	98
	46	88	50	88	88	88	80
	47	75	63	75	88	75	75
	48	88	75	75	88	63	78
	49	88	63	100	75	75	80

Fig. 14. Evaluation results of the characteristics and metrics of the CSF #11.

percentage was #41 with 78%. As shown in Fig. 13 (right side), all the metrics were accepted and most of them scored a 100% acceptance level. Noteworthy, however, are #41 and #40, whose range and independence of context were unacceptable. In regards to the above mentioned metrics, experts agree that the timeframe to implement or measure the effects of a campaign depends largely on the product or service, and on the distribution chain and volume of sales.

6.10.1. Proposed improvements for CSF #10

Based on the observations made by experts, this CSF's suggested improvements pertain to metrics #40 and #41. These achieved values above the levels of acceptability, but two of their characteristics (range and independence of context), were not accepted. Both metrics pertain to the implementation of marketing campaigns. Metric #40 refers to the average time for implementing a new marketing campaign. Metric #41 refers to the average time to appreciate the impact of the campaign in the sales indexes. It is important to note that the two characteristics are closely related, since the defined options for range will depend on the type of company, which is to say that that range will depend on the context. The improvements shown on Table B.9 of Appendix B would solve these two aspects.

6.11. Support for operational management (CSF #11)

This factor achieved values over the acceptability level in all three evaluated characteristics – see Fig. 14 (left side). It was widely accepted and yielded no observations by experts. It scored an average of 92%. Experts agreed that it is important for internal clients to have the support in order to do their job and eventually produce benefits of the customers It is worth noting that 100% of experts agreed that the factor was pertinent and independent of context. Overall the factor was accepted by 75% and a small number of the experts recommended complementing the definition.

As shown in Fig. 14 (right side), all proposed metrics were accepted. In fact, the one with the lowest percentage score a 75% (metric #47) which is the lowest acceptability level. In Fig. 14 (right side) we can see that, with the exception of metric #45 (which scored a 98% acceptance level), it is necessary to analyze the metrics in detail. Metrics #46, #47, and #49 show rejected range. Experts point out that the range parameters must be stricter in order to guarantee better internal support. In the metric #48, the characteristic that was not accepted was depth. In regards to this experts point out that many companies today are implanting third-party outsourcing designs, to manage certain aspects of their businesses especially in the areas of IT and communi-

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Metrics results						
M	P	R	F	CI	DL	A
50	100	75	100	75	88	88
51	100	75	100	75	88	88
52	100	75	100	75	88	88

Fig. 15. Evaluation results of the characteristics and metrics of the CSF #12.

cations. The majority of the contracts include parts supply and equipment updates. The metric then should not be measured.

6.11.1. Proposed improvements for CSF #11

Considering the obtained results, the validity of metric #48 will depend on whether or not the figure of outsourcing is in place within the specific company. Improvements proposed for the other metrics are shown in Table B.10 of Appendix B.

6.12. Customer contacts management (CSF #12)

This CSF achieved levels of acceptability in all its characteristics, scoring 79%, However, as shown in Fig. 15 (left side), two of the characteristics (Complexity factors and Independence from context) obtained minimal values (75%). The experts showed agreement about how this factor was defined in regards to the importance of handling customer contact properly. It is necessary, however, to look at the metrics in order to verify the characteristics of complexity of factors and independence from context.

In regards to the metrics, these obtained an altogether 83% acceptance level, which places them above the of acceptability level – see Fig. 15 (right side). The results of the characteristics shown in Fig. 15 (right side), show that none of the characteristic was ranked below the acceptability level. This means that along with CSF #7 there are then, two set of factors which show such results. It is interesting that all the characteristics within this factor obtain the same results within the evaluation. This CSF was defined with the purpose of verifying if the companies were right means to communicate with the customers; in this regard, three of the metrics are defined to encompass the main means of communication: face to face, telephone and electronic communication. A new metric be developed whenever video becomes more popular.

Even though all the characteristics rank above the acceptability level, some of the experts made observations regarding range and independence of context. These characteristics obtained the lowest acceptability level (75%). The observations pertained to the fact that certain media (and therefore also their range), are not applicable in some companies. This is an important point since these percentages might vary depending on the media used by the companies. This in turn, will depend on the types of clients the company targets.

6.12.1. Proposed improvements for CSF #12

In light that of the only important observation made by the experts, one can conclude that the three metrics defined in this CSF are complementary. A company may choose to consider one of this metrics separately or all of them simultaneously. This is reason for, the experts' observation regarding range. One cannot evaluate all three metrics at the same time, using the same percentages. Consequently, in the definition of the metric and its application, the analysis must take into account that the positive final result is obtained by adding three different results. Evidently, this cannot exceed 100%. This way we can measure the company's use of the media, regarding of which ones they are. In that sense, no improvement would be made for these metrics.

6.13. Information systems integration (CSF #13)

This CSF achieved acceptance in all its characteristics, scoring and average percent of 88%, which places it above the acceptability level. However, as shown in Fig. 16 (left side), the characteristic of Complexity of Factors obtained the minimum acceptance value (75%). These results suggest that the experts agree on the importance of the integration of information systems, in order to offer consistent and efficient management of the client's information, regardless of the type and size of the company.

We can see in Fig. 16 (right side) that all the metrics score well above the acceptability level, with the exception of metric #53 which scores 80%. In Fig. 16 (right side) we see that the majority of the characteristics were accepted with satisfactory values, including many with 100%. Regarding metric #53, experts agreed that it is necessary to be more specific regarding the areas and systems in which client data are involved.

6.13.1. Proposed improvement for CSF #13

The results of this CSF at the metrical level and in general, were very positive. The only observation pertained to metric #53 which explores the percentage of integrated information systems which handle client information. In order to improve this metric, it is necessary to look further

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in depth at which are the systems involved in the integration, a factor that will depend on the company itself. Undoubtedly, and depending on the size and type of company, there may be different systems of information for different purposes. There may also be a number of common systems which also handle client information.

Regarding metric #53, experts agreed that it is necessary to be more specific regarding the areas and systems in which client data are involved. To accommodate to this situation we propose a slight change in the language of the metric so that it can be applied to companies of any size and kind. The new definition of metric #53 would be as follows: "percentage of integration between all information systems that handle client data or information." The range would remain the same as in the original definition.

6.14. Final comment

When analyzing all the results, it is important to point out that just as any other tool, CSF's must always be updated, revised and adapted to the environment were they are to be applied. As we have illustrated, the evaluation of the experts was very positive and it is evident that the defined CSF's constitute a starting point when evaluating a CRM strategy.

In this sense, the CSFs constitute a "model" to be used by companies so as to obtain a diagnosis on the status of the implementation of a CRM strategy. Thus, it can be said that they are a tool, although not a software one, with an implicit method for its implementation and use by the companies. To the stakeholders, the formulation and evaluation of the CSFs proposed, allows determining which factors, (responding to an integrated view of the process) have a low acceptance value or still fail to meet the acceptability levels and are likely to affect the achievement of a successful CRM strategy implementation. Finally, by applying the CSF metrics throughout the CRM project execution, the companies can determine their current CRM implementation projects status at any time. Since the proposed CSF metrics are objective and repeatable, they can also be used by future researchers to estimate a company's compliance level for each factor in a given CRM project.

Additionally, we observed that the proposed improvements are the results of the important contribution and feedback derived from the experts, as they applied the method of evaluation indicated by DESMET. With these improvements we achieve a refinement level regarding the definition of CSF's that ratifies their quality turning them into a more effective tool for the evaluation of CRM strategies. All the improvements, especially the inclusion of new metrics, have a direct impact on the observations made by the experts, especially regarding the low completeness of factors feature level, and constitute a new iteration of the AR cycle, on which the research methodology used is inspired.

7. Conclusions

As a confirmation of our premise, it was found that CSFs must consider three components: human factor, processes, and technology which constitutes a systemic, integrated and balanced approach.

Further to the initial definition of the CSFs and each one of its metrics, it is important to note the improvements that were carried out in the process of analysis of results obtained in the evaluation by the experts. They emphasized some relevant aspects:

- *Structure.* The importance of a board of directors and the CRM project manager to achieve a whole commitment. Including, the participation of the different management levels, to avoid rivalries or protagonist attempts from different areas. In general, the participation of the entire company in the project to avoid certain areas prevailing over others, such as marketing or technology. Especial considerations must be taken in those cases where the company uses outsourcing for some processes
- *Objectives.* The need to define the general and specific objectives, which would be the short, medium, and long-term objectives. They must be unique documents where the objectives of all the areas are shown, as this can create unnecessary divisions in the project implementation. Also, it is essential to evaluate whether effectively structures their sales planning. We must define more demanding standards so that we can guarantee better customer service quality.
- *Nature of the organization and product.* The means used to communicate the CRM strategy, as well as the commitment form the staff, will depend on the type of activities done by the employees. The nature of the product

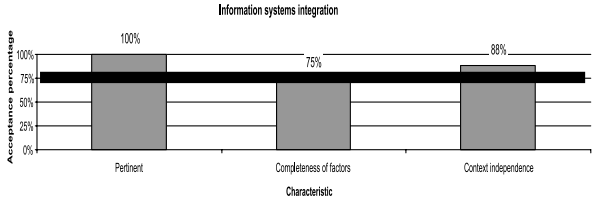
CSF results	Metrics results						
	M	P	R	F	CI	DL	A
	53	75	75	100	100	50	80
	54	100	88	100	100	100	98
	55	100	88	100	100	88	95

Fig. 16. Evaluation results of the characteristics and metrics of the CSF #13.

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will also determine the effectiveness of such activities as the marketing campaign.
- *Automation.* Internal clients must count with the best support possible in order for their job to translate into benefits for the clients. For this to occur, it is necessary that the systems of information be integrated, so that the user utilize all the information regarding customers in a consistent and efficient manner. It is essential to become familiar with those systems and areas of the company that entail client data. Depending on the type and size of the company there may be different systems for different purposes, or there may exist several common systems involved with client information.

On the other hand, it is necessary to highlight the fact that CSFs are tools that allow to evaluate the presence or not of factors that guarantee the success of a CRM strategy. Thus, it remains for future research, applying these CSFs to companies and analyzing the results obtained. Finally, it is important to note the contribution of this research as starting point and opening for future researches on the subject. In a marketing and enterprise environment of constant chances, in all senses, these CSFs constitute a basis and starting point; nevertheless, the complexity of the subject and the different aspects that are involved must be taken into account. It is very probable that in some cases it will be necessary to adapt certain ranges and metrics to the specific features of the companies to be evaluated, due to certain specific aspects inherent to the type of market where they operated and the size of said companies.

Appendix A. Additional details about the research methodology

Next are described the most important elements that conform the research methodology followed in this work: *action research method*, *DESMET methodology*, and *GQM paragigm*.

A.1. Action research method

Classic research methods such as field studies and, more specifically, exploratory studies, are not easily adaptable for use with the type of research undertaken by LISI. It is thus necessary to use other research methods that enable *soft* problems to be studied. Checkland defines a *"soft"* problem as: "a problem related to the manifestations of the real world of human activity systems, characterized by a sense of maladjustment, that eludes the precise definition between what is perceived as reality and what is perceived as what reality could be" [43]. Clearly, research in the field of IS is "soft." According to [38], "the AR domain is clearer when human organizations interact with IS and when they are more oriented towards the understanding of a complex human process than towards prescribing a universal social law." On the other hand, the basis for AR is that the process of *human activity systems* can be studied better if changes are introduced in these processes and the effects produced by these changes are observed. This is because human organizations, in a context where they interact with IT, can only be understood as a total entity [38].

The ideal domain of the AR method, then, is characterized by a social configuration where [38]:

- The researcher is actively involved, with benefits expected for both researcher and organization. in our case, one of the researchers works as sales agent of a CRM product.
- The knowledge obtained can be applied immediately, not separately from the observer but as an active participant hoping to use any new knowledge based on a clear and explicit conceptual framework. One of the advantages of our investigation is that the results can be immediately fed back into the organization where the study is conducted.
- Research is a process (generally cyclical) that links theory to practice [44].

The most frequent description of AR was proposed by [45], where the cyclical process is detailed in five phases (see Fig. A.1):

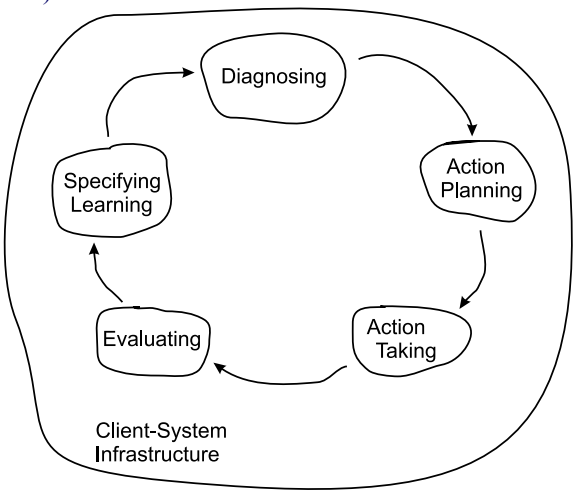

Fig. A.1. The AR cycle [44].

- *Diagnosing.* Identifying the primary problems i.e. the underlying reasons for which the organization wants to change.
- *Action planning.* Stipulating the organizational action through which the principal problems should be eliminated or improved.
- *Taking action.* Implementing the action planned. The participants and researchers cooperate in active intervention in the client's organization, channelling certain changes.
- *Evaluating.* The researcher and the participants evaluate the results in order to determine whether the theoretical effects of the action were accomplished and if these effects solved the problems.

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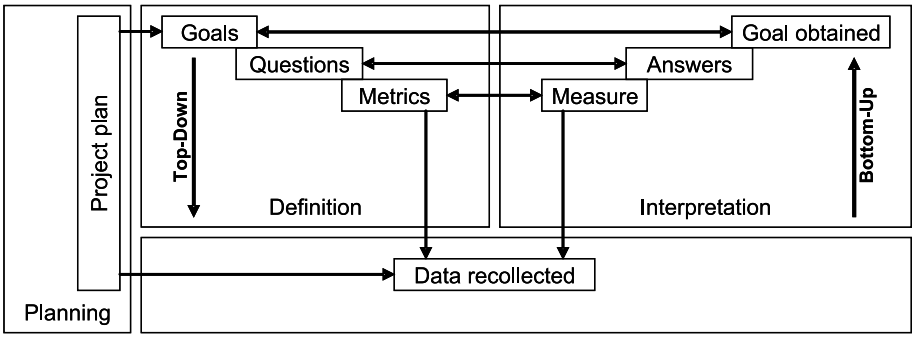

Fig. A.2. GQM paradigm phases [42].

- *Specifying was learned.* the researchers must specify the knowledge acquired based on the results of the evaluation.

Thus, AR supports a qualitative research process that inspires soft systems methodologies to enable us to make judgments about the results of research from different points of view or angles [46]. Natural science methods are very difficult to apply to human affairs. Since the field of information provision belongs to the domain of human affairs, AR is a relevant way of investigating it and the issues surrounding it. [47]. Therefore, AR will be the reference for the framework proposed. This is where the AR application materializes as a coherent framework that gives it consistency.

A.2. DESMET methodology

The objective of an evaluation methodology is to reduce the risk of selecting an invalid or incorrect evaluation method [48]. In the methodological framework, the DESMET methodology will be useful in the evaluation phase of the AR method. DESMET methodology arises from the necessity of the software engineers to count on a method to evaluate methods and tools used in this area [49]. The authors try to give support to academic investigators who develop or investigate a new method.

With the exception of formal experiments, DESMET evaluations are context-dependent, which means that we do not expect a specific method/tool to be the best in all circumstances. This derives from, its systemic character. DESMET constitutes an important methodology since it can be used by academic institutions interested in experimental software engineering [49].

DESMET identifies nine (9) different evaluation methods [49]:

- *Quantitative experiments.* An investigation of the quantitative impact of methods/tools organized as a formal experiment.
- *Quantitative case studies.* An investigation of the quantitative impact of methods/tools organized as a case study.
- *Quantitative surveys.* An investigation of the quantitative impact of methods/tools organized as a survey.
- *Features analysis – screening mode.* A features-based evaluation done by a single individual who not only determines the feature to be assessed and their rating scale but also does the assessment.
- *Features analysis – experiment.* A features-based evaluation done by a group of potential users who are expected to try out the methods/tools on typical tasks before making their evaluations.
- *Features analysis – case study.* A features-based evaluation performed by someone who has used the method/tool on a real project.
- *Features analysis – survey.* A features-based evaluation done by people who have experience of using the method/tool, or have studied the method/tool.
- *Qualitative effects analysis.* A subjective assessment of the quantitative effect of methods and tools, based on expert opinion.
- *Benchmarking.* A process of running a number of standard tests using alternative tools/methods (usually tools) and assessing the relative performance of the tools against those tests.

DESMET suggests a set of technical criteria that affect the selection of the evaluation method. These are: the evaluation context, nature of the impact, nature of the object evaluated, the impact's reach, the maturity of the item, the time spent on learning and the maturity of the evaluating organization. It also suggests three restrictions that can influence the final selection of the evaluation method, such are [48]: the time required for different evaluation options, the trust that the user has in the results of an evaluation and the cost of an evaluation. All these criteria stress systemic characteristic of DESMET. In other words, it supports the choice of evaluation method, not only by considering the internal aspects of the object evaluated, but its contextual aspects, focusing even more on the relations between the researchers and the object investigated.

A.3. Goal question metric (GQM) paradigm

The GQM paradigm (see Fig. A.2) allowed formulating the CSFs, its metrics following a top-down refinement of CFS into questions, and then in metrics; and a bottom-up

analysis and interpretation of the data that will be obtained when applying them [42].

Thanks to this, it was understood how the data obtained after the measurements would be analyzed. We are now able to understand the presentation formats for this data, and the description of how to compare the measured data with the defined hypotheses when organizing the CSFs for CRM. All this was considered as a basic guide to support the CRM project manager with the "feedback" obtained from the measurement. The results of this activity was presented in Section 4 of this work.

Appendix B. Proposed improvements to CSFs

In this appendix, all proposed improvements to each of the 13 CSFs are compiled in the Tables B.1–B.10.

Table B.1
Improvements proposed for CSF #1 "Senior management commitment"

Improvement	Implementation
Metric #2 (*Percentage of board of director members participating in the CRM project*)	
Have a larger depth level. To this effect, specify who the key members of the board of directors are in decision making and who know the company's operation better. In some companies the board of directors makes the strategic decisions, but then the implementation of the projects passes to a more operative level	To this effect a change is proposed in describing the metric, to read as follows: Percentage of board of directors members (including general directors and senior managers that handle the company's operation) involved in the CRM project
Metric #3 (*Percentage of the budget assigned to all the initiatives related to the CRM project*)	
Have a larger depth level. It is necessary to specify the budget distribution in the different areas and activities involved in the project	To achieve this, including additional metrics is proposed, which cover, at a macro level, the three main aspects of this investigation (people, processes, and technology): Percentage of the budget in the technology and communications area, assigned to system integration, acquisition or optimization of CRM software that includes the marketing, sales, internal and external customer service areas, and investment in call center and Internet access platforms. The range would be as follows: 5 = more than 20%, 4 = between 10% y 20%, 3 = between 5% y 10%, 2 = less than 5%, 1 = no budget Percentage of the budget in the human resources area, to design an internal plan for consciousness, information, and management of the change, regarding the CRM project's benefits. The range would be as follows: 5 = more than 20%, 4 = between 10% y 20%, 3 = between 5% y 10%, 2 = less than 5%, 1 = no budget Hiring external counselors or creating an internal area, to elaborate or optimize the critical processes related with the customer. The range would be as follows: 1 = YES, 0 = NO

Table B.2
Improvements proposed for CSF #2 "Creation of a multidisciplinary team"

Improvement	Implementation
At CSF level	
To achieve a larger completeness of factors involved	The creation of two additional metrics is proposed, related to incorporating the figure of the CRM project manager. The metrics would be the following: *Existence of a CRM project manager.* The range would be the following: 1 = YES, 0 = NO *To whom this Project Manger reports.* The range would be the following: 1 = Board of directors, 0 = A director or manager of a specific area
Metric #5 (*Areas of the company that belong to the team responsible for implementing the CRM project*)	
To improve the depth of the company's areas that are part of the team responsible for implementing the CRM project	Other than the defined areas (human resources, technology; marketing, sales, and customer service) adding other areas is also proposed, such as: finances and planning. It is important to note that on being more specific in this definition, generality would be lost since, for example, other areas could be included, such as: logistics, production, engineering, etc., but which would largely depend on the type of company. Thus, improving this aspect and clarifying the criterion is recommended, so that, according to the company's characteristics, the areas are specified at the time of using these CSFs
Metric #6 (*Frequency of CRM project implementation follow-up meetings*)	
Allow the range to be accepted, based on the suggestions by the experts, as this characteristic was rejected	The frequency of meetings is proposed as optimum. Presently the range defined is the following:

(*continued on next page*)

Table B.2 (*continued*)

Improvement	Implementation
	5 = every 2 weeks, 4 = once a month, 3 = every 2 months, 2 = every 3 months, 1 = no team exists And as improvement, the following is proposed: 5 = every week, 4 = every 2 weeks, 3 = once a month, 2 = every 2 months, 1 = no team exists
Metric #7 (*Percentage of the members of the team responsible for implementing the CRM project who are leaders of their areas*)	
This metric was not accepted by the experts, and only one of its characteristics (context independence) was barely approved	Taking into account these opinions and also incorporating the role of the project manager; which guarantees leadership and independence of each of the areas, it is considered adequate to delete this metric

Table B.3
Improvements proposed for CSF #3 "Definition of objectives"

Improvement	Implementation
New metric: Existence of defined objectives	
To increase the depth level	This metric allows determining in an explicit manner if a defined objective actually exists within the CRM strategy. The range would be the following: 1 = YES, 0 = NO
New metric: Existence of general objectives	
Verify if these objectives are defined at an adequate detail level	The following range is proposed: 1 = YES, 0 = NO
New metric: Existence of specific objectives	
Verify if these objectives are defined at an adequate detail level	The following range is proposed: 1 = YES, 0 = NO
New metric: Existence of short-term objectives	
Verify if these objectives are defined on the short-term	The following range is proposed: 1 = YES, 0 = NO
New metric: Existence of medium-term objectives	
Verify if these objectives are defined on the medium-term	The following range is proposed: 1 = YES, 0 = NO
New metric: Existence of long-term objectives	
Verify if these objectives are defined on the long-term	The following range is proposed: 1 = YES, 0 = NO
Metric #8 (*Existence of public documents stating in writing the objectives sought by the CRM project*)	
With the inclusion of the six prior metrics, metric #8 would no longer be required, as actually it is a consequence of the definition of objectives; thus, communication of the same is more related to CSF #5 (Communication of the CRM strategy to staff)	Consequently, it is considered adequate to delete this metric

Table B.4
Improvements proposed for CSF #4 "Inter-departmental integration"

Improvement	Implementation
New metric: Existence of shared objectives among several units	
The presence of these objectives would denote the existence of the view and guidelines by the company's senior management to work in a multifunctional and cooperative manner between the areas	The range would be the following: 1 = YES, 0 = NO
New metric: Percentage of previous projects that have required multidisciplinary work within the company and that have been successful	
This achieves an indicator of how successful projects have been in the past, having the same requirement of integration level of several departments	The range would be the following: 5 = over 90%, 4 = between 75% and 90%, 3 = between 50% and 75%, 2 = less than 50%, 1 = no projects of this type have been carried out
New metric: Existence of a systemic view of the company by its personnel	
In this sense, the system view helps to understand the different relationships and roles existing between the departments and the people Also, to understand the importance of dependencies among areas and achievement of common objectives	The range would be the following:

(*continued on next page*)

Table B.4 (*continued*)

Improvement	Implementation
	1 = YES, 0 = NO
New metric: Personnel's capability to work in multifunctional teams	
This is a basic requirement to achieve integration of areas for team work	The range would be the following: 5 = Very good, 4 = Good, 3 = Regular, 2 = Bad, 1 = Absent
New metric: Personnel's disposition to share information	
At present, information is one of the most important values the company has, and with regards to the CRM subject, customer information management is critical	The range would be the following: 5 = Very good, 4 = Good, 3 = Regular, 2 = Bad, 1 = Absent

Table B.5
Improvements proposed for CSF #6 "Staff commitment"

Improvement	Implementation
At CSF level	
To improve the measurement of the incentive and degree of commitment of the staff in a CRM project	To incorporate in this CSF the metrics #13 (Percentage of staff who has participated in presentations of seminars regarding the purpose of CRM) and #9 (Degree of knowledge of the benefits of CRM for the company). This is indicative of the interest level of the staff in regards to the CRM project. We also propose two additional metrics
New metric: Staff motivation level towards the CRM project	
This allows to assess the disposition to get involved with the project. Should the staff lack motivation, then their commitment will not be optimal	The range would be the following: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = null
New metric: Staff knowledge about the influence of its work in the client satisfaction	
This allows to assess whether or not the staff is aware of their role and the importance of their interaction with the client (both direct and indirect)	The range would be the following: 5 = very high, 4 = high, 3 = medium, 2 = low, 1 = null
Metric #19 (*Annual rate of staff absenteeism*) and *Metric #20* (*Percentage of staff who fails to comply with company working hours*)	
To reduce both the percentage of absenteeism and the percentage of staff members who fails to comply with company working hours	The defined ranges are based on market standards. It is the responsibility of the company to adapt this levels to the specific characteristics, environment and background. The ranges will not be changed but note should be made as to the need for adaptation
New metric: Staff percentage who does not obtain the results according to the raised work objectives	
To emphasize the need for actual results on the part of the employees, and not only compliance to the working hours	The range would be the following: 5 = less than 1%, 4 = between 1% and 3%, 3 = between 3% and 6%, 2 = between 6% and 10%, 1 = more than 10%
Metric #21 (*Number of days lost each year by the company as a result of work stoppages caused by union claims*)	
With the inclusion of the prior metrics, the metric #21 would no longer be required, since the proposal for reparations on the part of a union is related to personnel motivation, which is contemplated within the metric	Consequently, this metric will be deleted

Table B.6
Improvements proposed for CSF #7 "Customer information management"

Improvement	Implementation
Metric #29 (*Percentage of complaints related to the products or services sold*)	
To make more strictly the range of complaints related to the products or services sold	As it is stands, definition is fairly strict regarding the maximum level (less that 1% in complaints). Nevertheless, for companies involved in mass markets (such as manufacturing companies or telecommunication companies) which generate millions of calls and/or transactions, the volume of complaints could be significant. Consequently the percentage could reach high numbers. Here we can also appreciate that there is a coincidence with the characteristic of independence of context. In this case a stricter range will be defined for those companies which handle a large volume of products or services (such as telecommunication companies and financial companies). As a result we would have two ranges: the original range for companies of low to medium volume, and different range (shown next) for high-volume companies: The original range defined is the following: 5 = less than 1%, 4 = between 1% and 5%, 3 = between 5% and 10%, 2 = more than 10%, 1 = it is not measured And for high-volume companies, the following is proposed: 5 = less than 0.5%, 4 = between 0.5% and 1%, 3 = between 1% and 5%, 2 = more than 5%, 1 = it is not measured

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Table B.7
Improvements proposed for CSF #8 "Customer service"

Improvement	Implementation
Metric #30 (*Percentage of the company budget earmarked for activities related to pre and post-sales services*)	
To define more strictly the range of the percentage the company budget earmarked for activities related to pre and post-sales services	Currently the range defined is the following: 5 = more than 10%, 4 = between 5% and 10%, 3 = between 1% and 5%, 2 = less than 1%, 1 = no assigned budget And as improvement, the following is proposed: 5 = more than 15%, 4 = between 10% and 15%, 3 = between 5% and 10%, 2 = less than 5%, 1 = no assigned budget
Metric #31 (*Frequency with which customer satisfaction is measured*)	
To define more strictly the levels of the range of the frequency with which customer satisfaction is measured	Currently the range defined is the following: 5 = in each interaction, 4 = whenever it makes a purchase, 3 = once a month, 2 = every 2 months, 1 = it is not measured The maximum values cannot be optimized because they are defined in the lowest frequency between company and client. Nonetheless, we can optimize the intermediate values. As improvement, we propose the following: 5 = in each interaction, 4 = whenever it makes a purchase, 3 = every 2 weeks, 2 = once a month, 1 = it is not measured
Metric #32 (*Average response time when dealing with requests from customers for information*)	
To define more strictly the levels of the range of the average response time when dealing with requests from customers for information	Currently the range defined is the following: 5 = 24 h, 4 = 36 h, 3 = 72 h, 2 = more than a week, 1 = it is not known It is evident that the values need improvement since many companies strive to respond to the information in real time, because it is key that the company have up to date information. We proposed the following improvement: 5 = real time, 4 = 1 h, 3 = 8 h, 2 = more than 24 h, 1 = it is not known
Metric #33 (*Average response time for dealing with customer complaints*)	
To define more strictly the levels of the range of the average response time for dealing with customer complaints	Currently the range defined is the following: 5 = 12 h, 4 = 24 h, 3 = 36 h, 2 = more than 72 h, 1 = it is not known This metric is more crucial than metric #32 since it refers to problems of errors that provoke a customer complaint. We propose the following improvement: 5 = real time, 4 = 30 min, 3 = 1 h, 2 = more than 2 h, 1 = it is not known

Table B.8
Improvements proposed for CSF #9 "Sales automation"

Improvement	Implementation
Metric #35 (*Average time taken to update the sales forecast*)	
To improve the metric writing	The new writing would be: *Existence of a company sales planning.* The new range would be the following: 1 = YES, 0 = NO
Metric #38 (*Average percentage of time spent by salespeople on administrative work*)	
To define more strictly levels of the range of average percentage of time spent by salespeople on administrative work	Currently the range defined is the following: 5 = less than 1 min, 4 = between 1 and 5 min, 3 = between 5 and 15 min, 2 = more than 15 min, 1 = it is not known As improvement, the following is proposed: 5 = real time, 4 = less than 1 min, 3 = between 1 and 15 min, 2 = more than 15 min, 1 = it is not known
Metric #39 (*Average time spent by the sales manager in obtaining a unified view of the status of each of its customers*)	
To define more strictly levels of the range of the average time spent by the sales manager in obtaining a unified view of the status of each of its customers	Currently the range defined is the following:

(*continued on next page*)

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Table B.8 (*continued*)

Improvement	Implementation
	5 = 24 h, 4 = 36 h, 3 = 72 h, 2 = more than a week, 1 = it is not known It is evident that we must improve these values since many companies respond to the information in real time, since it is key to have the most up to date information. We propose the following improvements: 5 = real time, 4 = 1 h, 3 = 8 h, 2 = more than 24 h, 1 = it is not known

Table B.9
Improvements proposed for CSF #10 "Marketing Automation"

Improvement	Implementation
Metric #40 (*Average time taken to implement a new marketing campaign*)	
To improve the definition of the range of average time taken to implement a new marketing campaign	Currently the range defined is the following: 5 = less than 5 days, 4 = between 5 and 10 days, 3 = between 10 and 20 days, 2 = between 20 and 30 days, 1 = more than 30 days In order to define a marketing campaign it is necessary to understand the different activities it involves. Nevertheless, one the initial factors in accelerating this process is the automation level with which the information is handled. This is closely related to CSF #13 since it is the effects of the levels of automation what CSF #13 is attempting to measure. There are also other activities such as defining the advertising. Implementing these activities normally takes time, because, in most cases, it depends on third parties hired by the company. Based on this, the metric must be adapted to the standards of each type of industry (this would fall beyond the scope of our research since it would be done at the time of implementation of the CSF within a specific company)
Metric #41 (*Average time taken to see the impact of a new campaign on sales*)	
To improve the definition of the range of average time taken to see the impact of a new campaign on sales	Currently the range defined is the following: 5 = less than 5 days, 4 = between 5 and 10 days, 3 = between 10 and 20 days, 2 = between 20 and 30 days, 1 = more than 30 days In this case there is dependence of context, but in less degree than in the previous case. The main factor when observing the impact on sales, is the company's capability to acquire sales information as fast as possible. This is where CSF #9 becomes important. Taking into account the experts' opinions we consider necessary to have stricter levels of evaluation that guarantee the flow of information along the chain of distribution. We propose the following improvements: 5 = less than 2 days, 4 = between 2 and 5 days, 3 = between 5 and 15 days, 2 = between 15 and 30 days, 1 = more than 30 days

Table B.10
Improvements proposed for CSF #11 "Support for operational management"

Improvement	Implementation
Metric #46 (*Average frequency with which the equipment that supports the company's operation breaks down*)	
To improve the range definition of the average frequency with which the equipment that supports the company's operation breaks down	Currently the range defined is the following: 5 = less than 1 time by month, 4 = between 1 and 5 times by month, 3 = between 5 and 10 times by month, 2 = more than 10 times by month, 1 = it is not known The proposal for a new range that guarantees less flaws in the equipments in order to provide a better service level, would look as follows: 5 = less than 1 time every 45 days, 4 = less than 1 time by month, 3 = between 1 and 5 times by month, 2 = more than 5 times by month, 1 = it is not known
Metric #47 (*Percentage of the technology area's budget that is earmarked for supporting operational management*)	
To improve the range definition of the Percentage of the technology area's budget that is earmarked for supporting operational management	Currently the range defined is the following: 5 = more than 15%, 4 = between 10% and 15%, 3 = between 5% and 10%, 2 = less than 5%, 1 = no assigned budget This range is already fairly strict. We would only change the highest option (5) in order to guarantee a stronger effort on the part of the companies. We would also broadens the lowest option (4). We propose the following improvement:

(*continued on next page*)

Table B.10 (*continued*)

Improvement	Implementation
	5 = more than 20%, 4 = between 10% and 20%, 3 = between 5% and 10%, 2 = less than 5%, 1 = no assigned budget
Metric #49 (*Average time taken to fix an operating problem or failure in the company*)	
To improve the range definition of the Average time taken to fix an operating problem or failure in the company	Currently the range defined is the following:
	5 = less than 30 min, 4 = between 30 min and 1 h, 3 = between 1 and 5 h, 2 = more than 5 h, 1 = it is not possible to be determined We propose the following improvement: 5 = less than 1 h, 4 = between 1 and 2 h, 3 = between 2 and 8 h, 2 = more than 8 h, 1 = it is not possible to be determined

References

[1] T. Fox, S. Stead, CRM: delivering the benefits. Tech. Rep., 2000.
[2] B. Goldenberg, What is CRM? What is an e-customer? Why you need them now, in: Proc. DCI Customer Relationship Management Conference, Shared Insights, Boston, USA, June 2000, pp. 27–29.
[3] R. Versleijen-Pradham, European CRM Services Forecast and Analysis, 2000–2006, Tech. Report IDC PR01H, 2000. Available from: <http://www.idc.com>.
[4] J. Dickie, Why CRM projects fail, Tech. Rep., 2000. Available from: <http://www.firstwave.net>.
[5] Giga Information Group, Inc., Seven out of ten CRM projects fail, Computing 16(2001) 27.
[6] J. Kirby, CRM program management: the art of change, in: Presentations of the Conference on Making the Vision a Reality, Gartner Group, Paris, France, 2001.
[7] B. Light, A review of the issues associated with customer relationship management systems, in: Proc. Ninth European Conference on Information Systems - ECIS 2001, Association for Information Systems, Bled, Slovenia, 2001, pp. 1232–1241.
[8] C. Bull, Strategic issues in customet relationship management (crm) implementation, Business Process Management Journal 9 (5) (2003) 592–602.
[9] R. Forsyth, Six major impediments to change and how to overcome them in CRM in 2001, Tech. Rep., 2001. Available from: <http://www.crmguru.com>.
[10] A. Payne, M. Christopher, M. Clark, H. Peck, Relationship Marketing for Competitive Advantage, second ed., Butterworth Heinemann, Oxford, UK, 1999.
[11] F. Reichheld, The Loyalty Effect, Harvard Business School Press, Boston, USA, 1996.
[12] F. Buttle, The S.C.O.P.E. of CRM, Tech. Rep., 2000.
[13] D. Peppers, M. Rogers, The One to One Manager: Real-World Lessons in Customer Relationship Management, Doubleday, New York, USA, 1999.
[14] I. Chen, K. Popovich, Understanding customer relationship management (CRM). People, process, and technology, Business Process Management Journal 9 (5) (2003) 672–688.
[15] C. Ciborra, A. Failla, Infrastructure as Process: The Case of CRM in IBM, Oxford University Press, 2000.
[16] H. Rudolph, CRM Myths, Tech. Rep., 1999.
[17] ACM Group, CRM Workshop 2001, Tech. Rep., 2001. Available from: <http://www.acmgrp.com>.
[18] B. Thompson, What is CRM?, Tech. Rep., 2000. Available from: <http://www.crmguru.com>.
[19] R. Gulati, J. Garino, Get the right mix of bricks & clicks, Harvard Business Review 78 (3) (2000) 107–114.
[20] J. Barnes, Secrets of Customer Relationship Management, McGraw-Hill, New York, USA, 2001.
[21] E. Berkowitz, R. Kerin, S. Hartley, W. Rudelius, Marketing, fifth ed., McGraw-Hill, New York, USA, 1997.
[22] W. Stanton, R. Buskirk, R. Spiro, Management of a Sales Force, ninth ed., Mcgraw Hill/Irwin Series in Marketing, New York, USA, 1995.
[23] J. Horovitz, Service Strategy: Management Moves For Customer Results, second ed., Financial Times/Prentice Hall, New York, USA, 2004.
[24] R. Ramaswamy, Design and Management of Service Processes: Keeping Customers for Life, Prentice Hall/Engineering Process Improvement Series, New York, USA, 1996.
[25] E. Thompson, CRM program management: making the vision a reality, in: Presentations of the Conference on Making the Vision a Reality, Gartner Group, Paris, France, February 2001.
[26] J. Peppard, CRM in financial services, European Management Journal 18 (3) (2000) 312–327.
[27] R. Feinberg, M. Trotter, J. Anton, At any time – from anywhere – in any form, Tech. Rep., 2000. Available from: <http://www.crmproject.com>.
[28] J. Galbreath, T. Rogers, Customer relationship leadership, TQM Magazine 11 (3) (1999) 161–171.
[29] W. Brendler, The Human Dimension of CRM: The Key to Success or Failure, Tech. Rep., 2000. Available from: <http://www.crmguru.com>.
[30] E. Turban, J. Aronson, T.-P. Liang, R. Sharda, Decision Support and Business Intelligence Systems, eighth ed., Prentice Hall, New York, USA, 2006.
[31] E. Turban, Introduction to Information Technology, third ed., John Wiley & Sons Inc., New York, USA, 2004.
[32] D. Lee, D. Mangen, B. Thompson, Multi-function CRM Software: How Good is It? Tech. Rep., 2001. Available from: <http://www.crmguru.com/crmstudy>.
[33] K. Sandoe, G. Corbitt, R. Boykin, Enterprise Integration, John Wiley & Sons, Ltd., New York, USA, 2001.
[34] I. Witten, E. Frank, Data Mining: Practical Machine Learning Tools and Techniques, second ed., Morgan Kaufman Publisher, San Francisco, USA, 2005.
[35] I. Martínez, Help Desk – Una función productiva, Minuteman Press, 1997.
[36] B. Wallace, G. Hulme, The Modern Call Center, Tech. Rep., 2001. Available from: <http://www.informationweek.com>.
[37] M. Pérez, A. Grimán, L. Mendoza, T. Rojas, Systemic methodological framework for IS research, in: Proc. Tenth Americas Conference on Information Systems - AMCIS 2004, Association for Information Systems, New York, USA, 2001, pp. 1119–1125.
[38] R. Baskerville, Investigating information systems with action research, Communications of the Association for Information Systems 2 (19) (1999) 1–32.
[39] B. Kitchenham, S. Linkman, D. Law, DESMET: A method for evaluating software engineering methods and tools, SIGSOFT Notes 21 (1) (1996) 11–14.
[40] J. Esteves, J. Pastor, Analysis of critical success factors relevance along SAP implementation phases, in: Proc. Seventh Americas Conference on Information Systems – AMCIS 2001, Association for Information Systems, Boston, USA, 2001, pp. 1119–1125.

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[41] J. Rockart, Chief executives define their own data needs, Harvard Business Review 25 (2) (1979) 81–93.
[42] V. Basili, G. Caldiera, H. Rombach, Goal Question Metric Paradigm, second ed., Wiley Interscience, 2001, pp. 528–532.
[43] P. Checkland, Systems Thinking, Systems Practice: Includes a 30-Year Retrospective, John Wiley & Sons, Ltd., London, UK, 1999.
[44] R. Baskerville, A. Wood-Harper, A critical perspective on action research as a method for information systems research, Journal of Information Technology 11 (3) (1996) 235–246.
[45] G. Susman, R. Evered, An assessment of the scientific merit of action research, Administrative Science Quarterly 23 (4) (1978) 582–603.
[46] A. Abu-Samaha, Soft Evaluation: A Systemic Approach for Postimplementation Review, IDEA Group Publishing, 2003, pp. 136–157.
[47] P. Checkland, S. Holwell, Information, Systems and Information Systems – Making Sense of the Field, John Wiley & Sons, Ltd., London, UK, 1997.
[48] B. Kitchenham, Evaluating software engineering methods and tools, part 2: selecting an appropriate evaluation method – technical criteria, ACM SIGSOFT – Software Engineering Notes 21 (2) (1996) 11–15.
[49] B. Kitchenham, Evaluating software engineering methods and tools, part 1: the evaluation context and evaluation methods, ACM SIGSOFT – Software Engineering Notes 21 (1) (1996) 11–14.

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