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SEVEN STEPS TO THE VOICE OF THE CUSTOMER

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Abstract

This paper aims at presenting the preliminary results of an investigation whose objective is to propose resources for a better understanding of the initial stages of the new product development. Several authors refer to this phase as “Fuzzy Front End”, due to the difficulties involved in capturing and translating the customers’ needs and desires into a list of requirements. Additionally, many sources regard this stage as being very important, without making clear how to implement it.

In this way, several issues related to the new product development have been studied, such as: how the companies are performing the front end; how the business scope has been identified; how to define the customers and mechanisms for data collection; and which are the data interpretation methods.

The final result of the research is a structured method and related tools to identify and translate the customer demands into a list of requirements.

A case study with a household product has been used to illustrate the application of the proposed approach.

Keywords: Voice of the customer, customer demands, early phases of development, fuzzy front end, customer satisfaction

1 Introduction

The importance of product success is crucial to business survival, prosperity in the long and even in the short run, with a fierce competition, like the worldwide telecom business at the beginning of this decade. The 500 biggest companies in Brazil had a 5,8% increase in their revenues in 2001 in comparison with 2000. However, the profits have decreased from 8,4 billion dollars to 3,6 billion in the same period of time [1].

Gary Hamel [2] says the majority of the companies have already exhausted their possibilities of increasing profits by cost reduction, reengineering or performance improvement. In such environment of decreasing profitability, the development of successful products becomes an imperative, the cornerstone of wealthy business longevity.

To accomplish the task of developing a successful product, several design methodologies have been suggested [3], [4], [5], proposing thorough description of their phases and associated tools. However, these authors agree that the abstract and subjective nature of the early stages of the development turn them a difficult area to be dealt with. Some of them, have even proposed models for these stages [3], [4], which comprises idea generation, scoping and building business case [6], [3].

Despite the effort, this phase is still known as the “Fuzzy Front End” (FFE) [7] because typically involves ill-defined processes and ad hoc decisions. In this phase, the required

information has to be a reliable collection of needs and wishes of the customers, the output of one of the early steps of product development process. A complete, genuine and worthy set of information regarding a product is called the Voice of the Customer (VOC).

The understanding and fulfillment of customers' demands is one of the drivers for better business results [6]. High-quality marketing actions, which includes capturing the VOC, more than double the success rates and have 70% higher market shares than those projects with a poor approach [6].

Having a simple set of customers' demands defined by designers (usually, based on their experience) to be the foundation of product development, can be harmful, steer to a poor project, over-design, value mismatch, excess redesign cycles, amongst others [8].

It has been shown that the first few steps of product design are critical to deliver what customers need and want. However, these early stages are the least and poorly executed activities by most of companies during the product development process. Only 25% of the processes include a detailed market study. Even when the studies are performed, the quality of execution is extremely low [6].

The lack of a systematic approach for gathering and analyzing customers needs and wishes is due to the absence of customized tools or lack of knowledge for its usage [9]. Specially, there is an unconscious reluctance to embrace the appropriate tasks due to the existence of an under or not structured process within the organizations [8].

A key driver to business performance is a high-quality new product process [6]. As a low quality of the early phase of development is widespread, there is a mismatch between a key driver and the performance of the companies [6]. In order to fulfill this gap, a research has been conducted, envisaging defining a model for the VOC process that can produce a requirement list that represents the customers' needs and demands.

2 Research approach

Several researches and practices reported in the literature [6], [3], [4], [5], [8], [10], [11] have been consulted and established the foundation for understanding the lack of structured processes for obtaining the VOC. Following, it has been realized that a gap exists between the need for acquiring reliable information from customers and the lack of a structured process to obtain them. Therefore, a novel approach for the VOC process has been proposed.

Further, the model has been tested with a household product (low-tension energy termination). For that, a comparison between requirement lists (one produced without a structured approach and other, employing the proposed model) is presented. Following, the model has been evaluated with respect to: (1) the interrelationship of phases and tools in the model; (2) the amount of information generated by the model usage; and (3) the differences between structured and unstructured approaches.

3 Background theory

3.1 Product Development Process (PDP)

The lack of compliance to functional performance or market demands [6] is due, mostly, to poorly established or implemented development process. In order to comply with the demands and provide an acceptable return on investment over the development, process-based approaches have been established.

Several sources, like Cooper, Clark & Wheelright, McGrath, Duncan, Valeriano, APQP divide PDP into phases. One of the phase models most cited in literature has been introduced by Cooper [6]. This representation contains six phases and can be seen in figure 1.

Also, several authors have established models for the design process, like Pahl & Beitz, Pugh, Ullman and Asimov [3], [4], [5]. Design is a sub process, of great importance, in the development process, which delivers a complete product specification. Like any other process, the quality of the output is closely related to the quality of its input, which in this case is a requirement list that describes which gap should the product fulfill.

A research has shown that the principal deficiencies in product development are not the technological oriented at all. The quality-of-execution of product design had the best score among all activities. By contrast, detailed market studies had the lowest score. The latest include user needs studies, building the voice of the customer and competitive analyses [6].

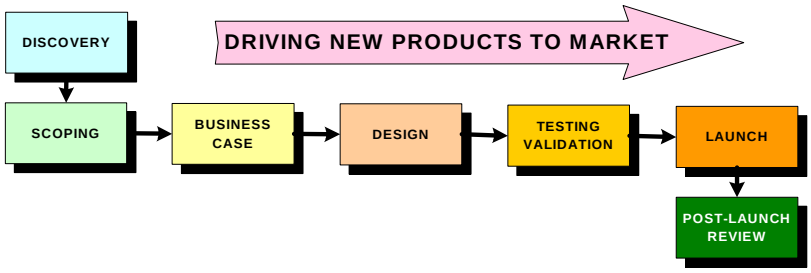

Figure 1. Product Development Process adapted from Cooper [6].

The first steps of the product development process are important and difficult to be implemented because it requires obtaining and expressing what the customer really wants and not what the team members think he or she expects [12]. Without well-defined method and tools, it is very difficult to obtain the required information.

3.2 Fuzzy Front End

These early stages of product development process, as seen in figure 2, have been called by some authors as Product Planning or Engineering Specification [3], [5].

They are often referred as the Fuzzy Front End (FFE) [7], due to the fact that they are usually unclear, confusing and lacking of details. The tasks are not clearly defined or applied, roles and responsibilities are not properly assigned and the flow of information between activities is not appropriate for the deployment of the customers' needs and desires throughout the life cycle of the product development.

Normally, these stages have poorly defined processes and a decision-making without planning [7]. An informal way of gathering and preparing this set of information is just to have a customer visit, from where a product specification is obtained. Being an unstructured process it is normal that the fundamental questions are not properly answered.

As FFE is seen as a burden to the business process, the companies usually adopt a fast track, applying few resources or even not performing it at all. As a consequence of a shallow approach, the results are inadequate to the business. The FFE embodies the task of having a clear understanding of what is relevant and could surprise the customers, and as a consequence of how companies deal with the FFE, they usually bypass it or take designers´ customers list of needs and demands for granted.

No matter the process that has generated the inputs for product design, the development will always continue. The poor quality-of-execution of the FFE and outputs does not halt the

project continuity, production or launching. However, the low quality and ill-defined information becomes the origin of delay and difficulties in the development process. Additionally, a weak FFE can lead to a premature death of products and difficulties to redesign those unsuccessful, considering the lack of a reliable knowledge base for the front end.

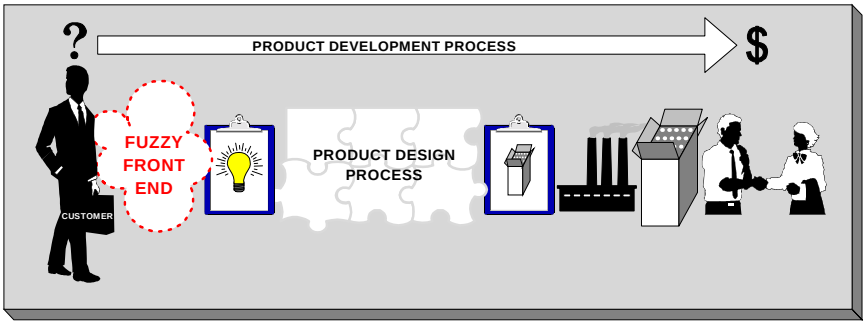

Figure 2. Development Process and the Fuzzy Front End.

3.3 Available Methods and Tools

Akao [13] says that the development of more attractive product requires a linkage between the deployment mechanisms (e.g. QFD) and the marketing needs. Therefore, new methods and tools have to be devised, allowing VOC to match company-wide activities to customer focus.

The VOC is a process embodied inside the FFE. The goal of the VOC process is to identify the real needs, collecting a complete and accurate set of customer requirements (declared and unspoken) and representing them in a structured way [8], [9], [14]. Therefore, the outputs of the VOC process have to be deployed into the product and the commercialization activities. The two most widely used deployment mechanisms are Quality Function Deployment (QFD) [8], [9], [12], [14], [13] and Customer Oriented Product Concepting (COPC) [8].

The gap highlighted by Akao, reflects that only few formal resources have been used to gather information from customers, which have usually been deployed straightforward.

Two relevant initiatives have been developed to fulfill this void as follows:

1. The Center for Quality of Management (CQM) has provided a methodology called FOCUS Process, consisting of 20 steps, divided into five phases: Frame the Project, Organize Resources, Collect Data, Understand the Voices and Select Action [11].
2. A structured process for capturing of the VOC has been proposed by Shillito [8]. The basic steps of the process are: focusing, collection, interpretation, structure, quantification, verification, deployment and monitoring.

A thorough, but not exhaustive literature review, reveals that several tools exist for most steps of the VOC process, as seen in figure 3. These tools can be applied in a wide range of activities that vary from the new product development to quality and marketing tasks. So, it can be realized that availability of tools is not the constraint for practicing gathering and analysis of customers' needs and demands.

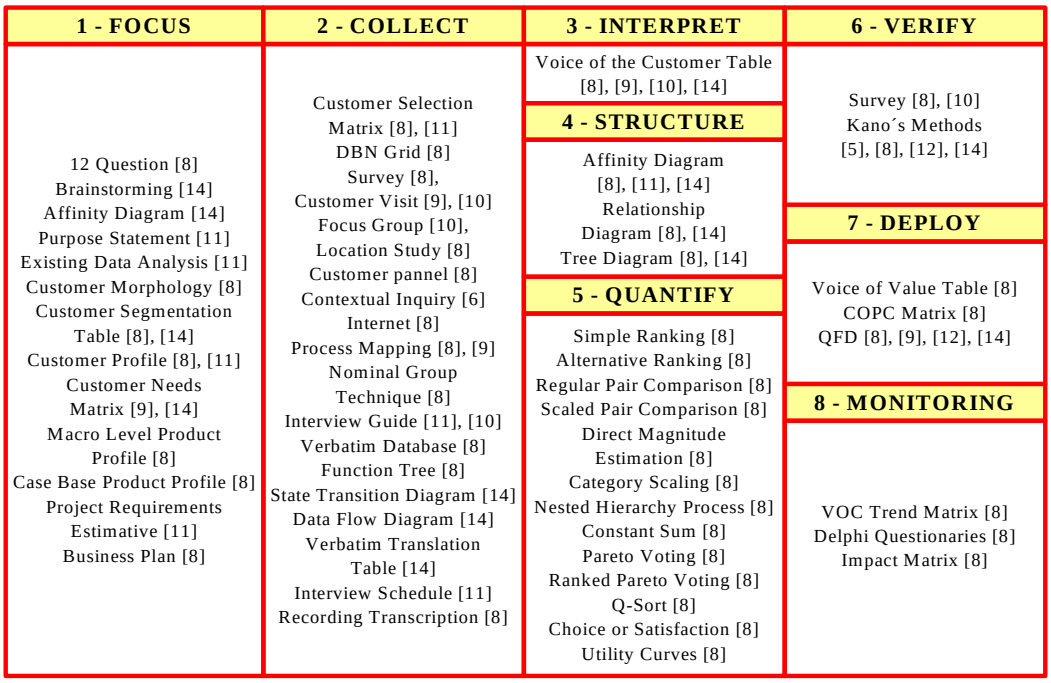

Figure 3. Available tools allocated by phases, according to Shillito´s VOC Process.

4 Proposed model

4.1 Framework

The work developed by Shillito [8] has been used as the foundation for the research and the proposed model. It is a structured approach, which divides the VOC process into discrete and recognizable phases. The author refers to each phase as a function of the VOC pathway and assigns activities for each of the functions.

4.2 A novel model for the VOC Process

The proposed model for VOC Process comprehends seven steps, each of them with declared aims, as pictured in figure 4.

The stages in the proposed model are similar to the phases in the reference framework. The difference is that the monitoring phase has been removed, to be applied in another point of the life cycle of the product.

Additionally, the model represents other distinctive features, such as:

1. The model does not define activities for each stage. Instead, it states the main objective of the phases, allowing the user of the model to choose which activities are most suitable and purposeful for the development environment.
2. There is a strong link between each consecutive phase, thus the former shall provide relevant input for latter, adding knowledge to the process through each step.

The process has been established into a macro level perspective oriented by objectives that can encompass any kind of project. The core of the model is the adherence to the objectives, allowing choosing an appropriate path to the VOC, considering the given resources and constraints.

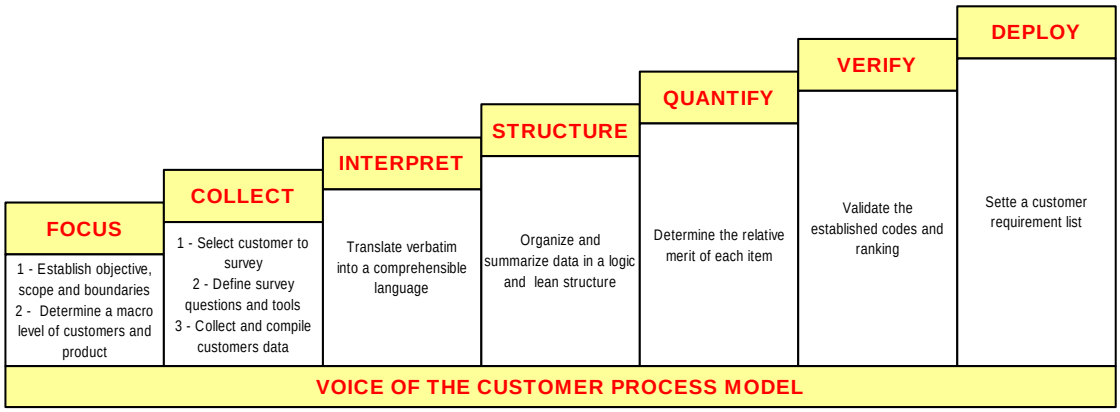

Figure 4. Proposed model for VOC Process.

The model suggests that seven stages should be used to gather information and reduce uncertainties. Each stage is described in more details next.

Focusing deals with organizational, political, behavioral and strategic issues, in order to diminish tensions and problems during resource allocation.

Collection methods have to be selected according to time and resource constraints. At this point, interview guides, log files and all recording resources have to be arranged. Training of interviewers and executing the collection with the interviewees are carried out. Immediately after the collection, information should be processed.

Interpretation is performed with the data compiled directly from the customers and can be used as a database for the understanding of the available statements. Customers usually declare things they have experienced in vague and chaotic terms. Furthermore, they tend to propose solutions to their problems, instead of exposing their needs and wishes. A rewording usually is necessary.

Structure has to be applied reducing the amount of information to a manageable set of data. The information provided by a single customer usually is quite expressive regarding the amount of topics covered, but the analysis of a group of customer shows patterns that can be assembled together.

Quantification must be conducted to allow the design team to understand which verbatim are more important in a series, to give them the appropriate allocation of resources and time.

Verification is performed with the customers to confirm the coded verbatim for their wants and needs and their assigned priority. Therefore, flaws can be detected regarding the expressed information or some unforeseen gap.

Finally, Deployment is implemented via a list of customers' requirements to the design team.

4.3 Tools selection

To achieve the proposed objectives for each step of the VOC Process, appropriate tools should be available. To decide which tools can be applied in each phase of the model, those mentioned in the reviewed literature (figure 3) have been carefully analyzed regarding four criteria: knowledge, personnel, resources and information, as seen in table 1. An evaluation considering the matching between availability and demand has been performed for each tool. For instance, comparing Simple Ranking with the Nested Hierarchy Process [8], used for the same purpose, there has been a mismatch with knowledge (tool not know by the user) and time (not enough time to learn and use it). So the option is the Simple Ranking.

Table 1. Criteria for the tools selection.

Criteria	Description	Evaluation Example
Knowledge	Know how to make use of the tool	Knowledge to use Simple Ranking is inside the competence of the user
Personnel	Team to execute the task	Personnel available to use Simple Ranking have been considered enough to the demanded
Resources	Money, time, equipment, facilities	Resources to be applied in Simple Ranking have been fully available
Information	Level of details and accuracy of data	Information provided by the Simple Ranking has been equally demanded to the task of ranking demands

5 Case study

5.1 Product

The proposed model has been applied to an existing product in order to evaluate the differences between the structured and unstructured approaches.

A low-tension electrical termination (LTET), seen in figure 5, has been used, due to the fact it is a well-known product, easy to manipulate and is it takes part of a future work validation.

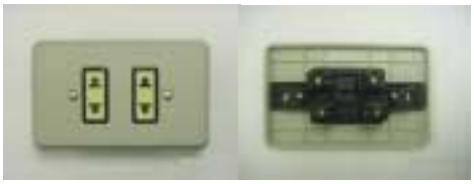

Figure 5. Low-tension electrical termination case.

5.2 Application

Using the approach established in Section 4.3 and considering the available tools described in figure 3, for studying the LTET case the tools presented in figure 6 have been selected.

The first task has been to ask an experienced design engineer to prepare a list of requirements for the product development based on his knowledge and experience.

Next, the model has been fully applied to generate a set of customer's requirements for the LTET case, as described in the following paragraphs.

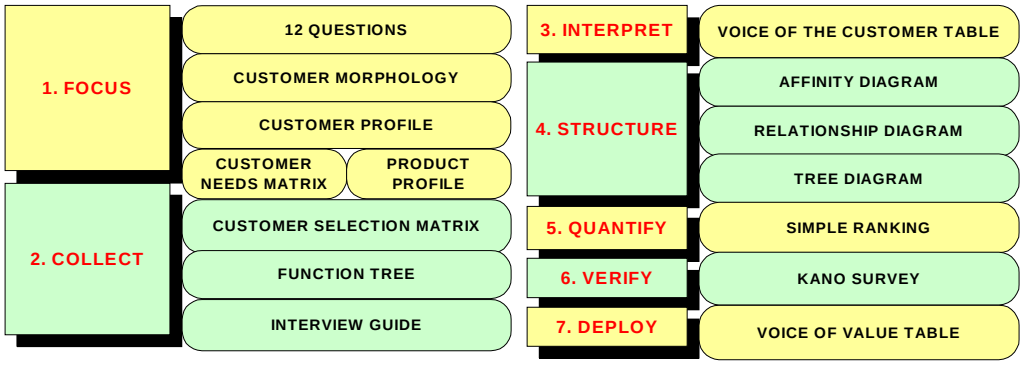

Figure 6. Selected tools for the case study.

The ***Focus*** phase has began with the application of the 12 Questions, defining the purpose and scope. The answers have provided guidance to construct the customer morphology, allowing the identification of several types of customers of the product (e.g. homes, Small and Medium Enterprises, civil engineers) and the establishment of the target market.

The Morphology has lead to the identification of customer profile, which has offered the generic characteristics that should be allocated in the product. That information has then been directed to the Customer Needs Matrix to seek the match of the general need to specific function of customers (e.g. adults, children).

In addition, the Customer Profile has provided useful insights about the product. Using the Product Profile it has been possible to depict a gap between the current product with the competing one, regarding those defined generic characteristics.

The two objectives for the ***Focus*** phase have been reached, leading to the ***Collection*** phase, which has given the foundation to identify the customer to survey through Customer Selection Matrix. The product Function Tree has supplied guidance to construct an Interview Guide.

Interviews have been conducted based on the defined guidelines and information has been collected by notes during the contact with the customers. Having accomplished the objectives of the phase, ***Interpretation*** has been performed through the Voice of the Customer Table. At the ***Structure*** phase, Affinity, Relationship and Tree Diagrams have been organised and summarised the data.

For the LTET case the Simple Ranking approach has been applied to generate the list of requirements at the ***Quantify*** phase. At the ***Verify*** phase a survey based on Kano´s method has been performed with certain customers to identify fundamental flaws related to the ranking and coding of the requirements. The ***Deploy*** phase has been executed with the Voice of Value Table. Each phase and an excerpt of some tools used can be seen at figure 7.

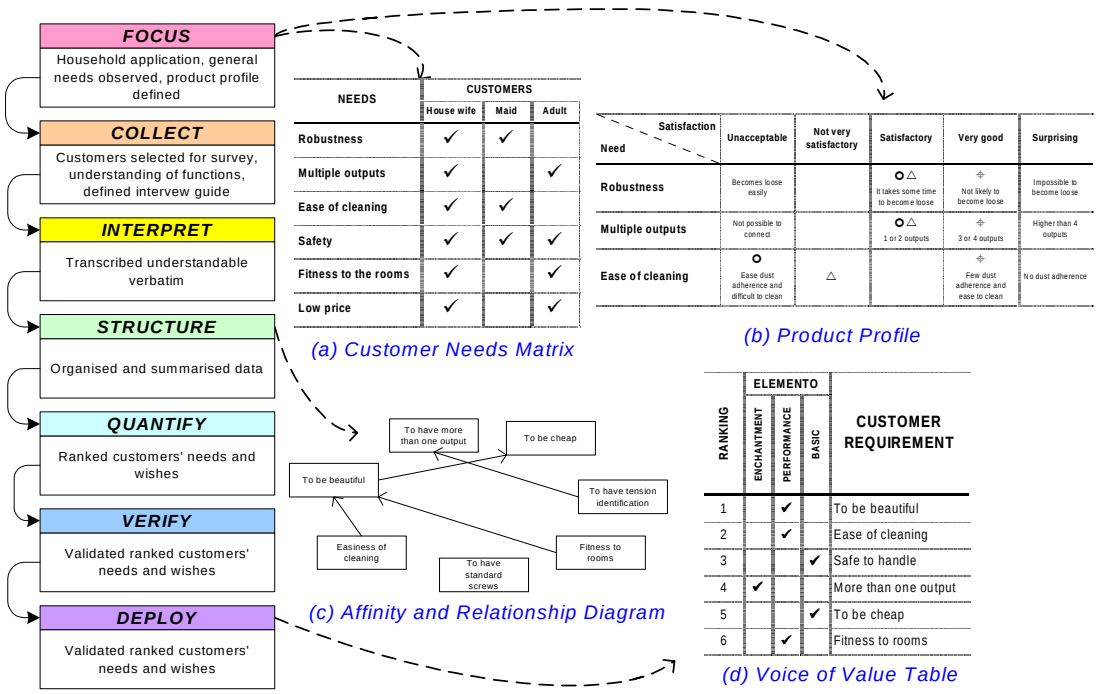

Figure 7. Applied model and extracted results from specific tools employ in a case study.

The lists of requirements obtained from the designer engineers and proposed model have been compared. Considering the amount of time needed to produce the list, the unstructured approach has been obtained faster than the one from the structured. However, the VOC model has revealed more relevant information. Furthermore, the model has covered product functions not mentioned by the engineer, which has been demonstrated to be of fundamental importance to the customers (e.g. multiple energy outputs).

A major observation has been the occurrence of customers' requirements not addressed by the design team, as seen in figure 8. There, some rows representing the customers' needs and wishes are not connected to the unstructured approach list of requirements. Additionally, some requirements established by the design engineer have not been among customers' demands, indicating that some issues could have been developed into the product and the customer would not have recognized them as a value.

Unstructured Method / VOC Process Model	Change shape	Reduce size	Fixation System	Safety plug connection	Reduce thickness
Increase beauty	✔	✔			
Multiple outputs					
Ease of cleaning					
Voltage identification					
Low price		✔			✔
Allow earthing					
Children protection				✔	

Figure 8. Extract from the lists requirements comparison.

The application of the model and tools has been performed without difficulty. The final results have been accomplished, when attaining to the phase objectives and understanding that the output of a tool would be the input of the next one.

6 Conclusions

The fierce competition in the industrial businesses has obliged companies to a better addressing of customers and their demands.

A thorough literature review has revealed that the early stages of product development have been still considered as a Fuzzy Front End. Additionally, it has been perceived that the amount of tools available for accomplishing the tasks of the FFE is satisfactory. However, the means for applying them is not clear.

A novel approach, presented by the VOC model, has been proposed, to deal with the major issues, which exist in gathering and processing information from customers.

The results from a case study have revealed that the list of requirements produced by the use of the model is more comprehensive. This has shown that the VOC model has potential to better clarify, define and structure the Front End.

An industrial application of the VOC model is currently being conducted and the results will be published in future papers.

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