Outlining the voice of the customer

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best practice brief

- Capture and communicate the voice of the customer to everyone who participates in the new product development process.

PLM Software

Answers for industry.

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Outlining the voice of the customer

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An overview to voice of the customer requirements

Defining the voice of the customer. Outlining voice of the customer (VOC) requirements is a crucial phase in any product development initiative. AMR Research indicates that more than 50 percent of all product introductions fail because they do not meet customer requirements.

In addition, the Product Development and Management Association (PDMA) recently analyzed the variables that separate the "best" performing product development companies from the "rest" of their competitors and concluded that VOC activities are one of the strongest discriminators in determining marketplace success.

According to PDMA, *the voice of the customer is*[1]:

- Defined as a complete set of customer wants and needs
- Expressed in the customer's own language
- Organized to reflect how the customer thinks about, uses and interacts with a product or service
- Prioritized on the basis of what the customer considers to be important and how performance is viewed in the context of the customer's current level of satisfaction with existing alternatives

These requirements can be collected prior to the introduction of a completely new product or gathered as feedback to a generation of products. In either case, top-performing companies use these requirements as the basis for determining a product's ultimate success, as well as measuring its progress throughout the entire product development process.

While companies can define program requirements in development terms, they must make certain that customer needs and wants are captured and communicated in a systematic and repeatable manner. In other words, if the customer is not satisfied – and does not buy a product – development-related requirements, such as budget and time-to-market, effectively become moot.

Much has been written about the best practices for the *process* of collecting customer needs through focus groups, ethnography, surveys, customer visits and one-on-one interviews. However, the scope of this brief addresses how to ensure that those requirements are *captured and communicated* by marketing and market research teams throughout the rest of the project.

Leveraging the voice of the customer. VOC requirements typically occupy the top of a hierarchy comprised of more detailed requirements that define a project and measure its success. Given their importance, VOC requirements must be visible to everyone who participates in the product development process. Generally, market research teams will categorize and prioritize VOC requirements to best represent a project's customer needs, as well as map these needs down to functional requirements used by product development teams.

In brief:

The Product Development and Management Association (PDMA) recently concluded that VOC activities are one of the strongest discriminators in determining marketplace success.

Outlining voice of the customer (VOC) requirements is therefore a crucial phase in any new product development initiative.

Palm's first Palm Pilot provides a classic illustration of what happens when companies closely hold to requirements that have been explicitly defined by the customer. The Palm development team extensively interacted with potential customers who had a mix of computer and paper-based tools. Rather than automating either of these legacy tools, Palm created a new "system" that met two key requirements: the ability to work in remote mode and the ability to synchronize its operation with the customer's operational tools-of-choice[2].

The Palm Pilot, and its subsequent product innovations, continues to be successful because it satisfies the customer's needs period. It does not attempt to be all things to all people, but rather strives to be the best at those things that matter to the customer.

Target audiences for VOC initiatives. VOC initiatives directly apply to the business interests of multiple product lifecycle participants.

- *Executive management* uses VOC requirements as the framework for monitoring project success through high-level dashboards; VOC initiatives are especially adept at assisting executives in decision making where conflicts need to be escalated and resolved
- *Product management* is ultimately responsible for outlining a product's requirements and ensuring that the product successfully achieves the goals established by its requirements
- *Marketing* has to be confident that the entire development organization is working toward the ultimate goal of satisfying the needs of the prospective customer. Marketing uses VOC requirements as the framework for value messaging
- *R&D, design and engineering* require visibility to a comprehensive set of requirements that they can leverage to guide day-to-day decisions related to design and development. The VOC hierarchy provides these organizations with visibility into the project's requirement dependencies
- *Sales* leverages VOC requirements as part of the product's value proposition, which sales representatives present to prospective customers

In brief:

The Palm Pilot continues to be successful because it satisfies the customer's needs period. It does not attempt to be all things to all people, but rather strives to be the best at those things that matter to the customer.

Voice of the customer initiatives apply to all the major groups involved in bringing a product successfully to market – people who directly or indirectly influence the customer experience.

- Executive management
- Product management
- Marketing
- R&D, design and engineering
- Manufacturing
- Production
- Sales
- Support

Challenges to outlining the voice of the customer

Functional requirements vs. needs. While VOC requirements should be part of most discussions during the initial product planning and ideation phase of product development, sometimes customers do not participate or are overlooked. In certain cases, product development teams dive right into the process of capturing functional requirements by assuming they already know what the customer requires.

This approach can lead to illusionary results. Customers and prospective customers are the best source for articulating their own *needs*. It is the responsibility of the product development organization to design and develop solutions to satisfy these needs. On the other hand, customers rarely understand all of the possible *solutions* that can be provided to satisfy their needs – and are therefore the wrong source for suggesting detailed innovation.

Techniques for capturing input. Gathering and consolidating VOC input often is achieved through *field observation* (observing prospective customers in everyday activities that involve the use of a category of products). Another common input gathering technique is to use *focus groups*, where individuals – who represent a class of user – are observed and recorded while they participate in a series of prepared experiences or interviews. In other instances, companies simply question prospective users by using email or web-based surveys.

Regardless of what method of input gathering is employed, this information needs to be captured, categorized, prioritized and distilled into finite requirements against which the product development organization can execute. This is not always an easy step since VOC requirements are generally stated in "fuzzy" terms that customers sometime employ, such as "easy to use." Trying to use finite engineering terms to describe a requirement often loses something in translation.

Since product development teams may prioritize requirements on the basis of organizational interests or pet projects – rather than reflecting customer priorities – the process for prioritizing VOC requirements should be conducted in conjunction with actual customers and prospects. Prioritization can be accomplished by conducting simple surveys that ask customers to rank specific requirements. Subsequently, surveys can be force-ranked by the development team on the basis of their consolidated results.

Establishing functional requirements. After being prioritized, VOC requirements need to be quickly translated into specific functional requirements that can be used to guide individual development teams. For example, a requirement such as *form factor* could become the reference point for *overall dimensions, packaging dimensions and shipping weight.*

In turn, *overall dimensions* could then be broken into envelope targets for each of several different functional requirements, such as *enclosure dimensions* and *circuit board dimensions*. In this particular example, each development team would work to requirements that are directly related to one another even though they might not always be sensitive to the original VOC requirement.

In many instances, requirements will conflict with one another, leading to the need for tradeoff decisions. For example, a VOC requirement called *storage location = shirt pocket* might determine the engineering effort required to fit necessary electronics into a relatively small package and thereby drive a project's choice of electronic technologies. This may require more expensive, compact electronic components that conflict with budget requirements.

In brief:

Customers and prospective customers are the best source for articulating their own needs. It is the responsibility of the product development organization to design and develop solutions to satisfy these needs.

On the other hand, customers rarely understand all of the possible solutions that can be provided to satisfy their needs – and are therefore the wrong source for suggesting detailed innovation.

Close collaboration between the company and its customers through activities such as field observation and focus groups, is therefore critical.

In the case of the Palm Pilot, the specifics for this requirement were derived from smallest shirt pocket sold on the market, which came on a Brooks Brothers' shirt[3].

Leveraging the requirements' prioritization levels along with the project's VOC requirements also should play a role in resolving these kinds of conflicts. For example, while it might be easy enough to grow the size of the package to meet the project's material budgets, this type of decision will endanger a critical customer "want" if prioritization is not factored into the development decision. It is not uncommon for the development team to "want it all" but in the end, tradeoffs need to be made. These decisions must always take the ultimate VOC requirements into account.

Conflicts and other influences often result in changes that ultimately affect the entire requirements hierarchy. Changes that are not effectively disseminated cause errors that result in re-engineering and manufacturing rework, or even misunderstood capabilities that threaten the product's marketplace success.

Disseminating requirements. Teams that evaluate and eventually define VOC requirements often do not share the same IT systems as teams that define and execute the functional requirements. This disparity can result in a communications breakdown.

Product marketing and product management teams often conceptualize and brainstorm using desktop tools such as Microsoft Office, Excel and PowerPoint and shuttle files back and forth using email. They might not even manage the resulting files in any of their company's data silos – relying instead on product management to communicate VOC requirements downstream.

In essence, these requirements are "thrown over the wall" to design, where engineers translate these wants into features and then throw those features over to the manufacturing organization, which continues the over-the-wall approach downstream.

This process results in VOC requirements that are frequently "forgotten" before actual development begins. The end result is a situation where development teams only rely on functional requirements without understanding the initial, and most important, source of the requirement – the very customer needs the product is supposed to satisfy.

Potential pitfalls. A recent AMR Report ranked needs assessment as a highly important phase in the new product development process even though close to 40 percent of the report's respondents indicated that currently available technology tools were unable to support this factor. It is safe to say that product development software must take top-level requirements into account.

In addition, teams often translate VOC requirements into functional requirements without understanding the overall relationship back to the original VOC requirement. The VOC usually is expressed in a language that is difficult to measure on a quantitative basis – thereby increasing the likelihood that pragmatic groups (like engineering) will ignore the VOC and rely instead on the more tangible set of functional requirements.

A third pitfall occurs when companies lack a requirements management system and fail to communicate changes in a timely or effective manner.

In these instances, companies are not in a position to maintain the relationships that exist between various requirements – with an end result that changes are not rippled throughout the requirements list. This causes team members to continue designing to the original set of requirements without knowing that requirements have changed and need to be reflected in the product design.

In brief:

There are always numerous ideas. In addition, different ideas often conflict. The process for prioritizing VOC requirements should be conducted in conjunction with actual customers and prospects.

A recent AMR report ranked needs assessment as a highly important phase in the new product development process. It is safe to say that product development software must take top-level requirements into account.

In the case of the Palm Pilot, the specifics for this requirement were derived from smallest shirt pocket sold on the market, which came on a Brooks Brothers' shirt.

Once outlined, formalized and agreed upon, it is critical for all the major groups that can influence the customer experience to be aware of the customer requirements. They'll then be in a position to maximize their efforts.

- Executive management
- Product management
- Marketing
- R&D, design and engineering
- Manufacturing
- Production
- Sales
- Support

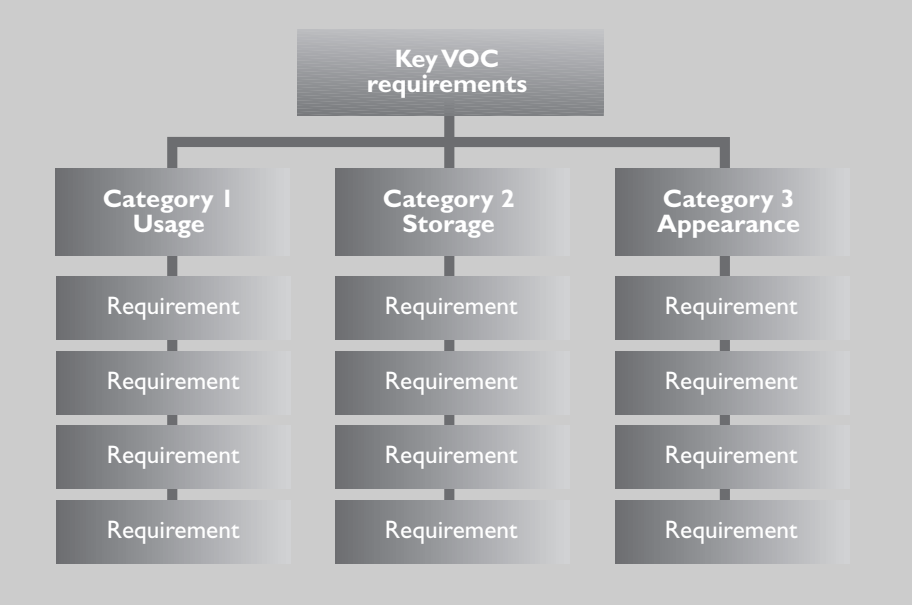
Best practice solutions

The most successful new products match a set of fully understood customer problems with a cost competitive solution to those problems. According to a recent Aberdeen Group Study, 72 percent of top-performing product development organizations rank *increasing the fit of products to customer and market needs* as being the most important factor in increasing product revenue.[4]

These requirements need to be collected in a free-form ad hoc environment that allows easy access by people outside of the development organization (such as marketing and market research teams).

One best practice is to categorize these requirements into logical groupings and document the results in an *affinity diagram* (illustrated below). An affinity diagram defines a hierarchy of requirements with the title of each category representing a higher order requirement that is detailed by the requirements beneath it.

Sample affinity diagram



Another common best practice is to develop and maintain a complete hierarchy of requirements, including the VOC requirements and the relationships to their functional counterparts. The quality function deployment (QFD) approach developed by the Japanese in the 1970s popularized the practice of tracking this set of requirements throughout the development process.

In brief:

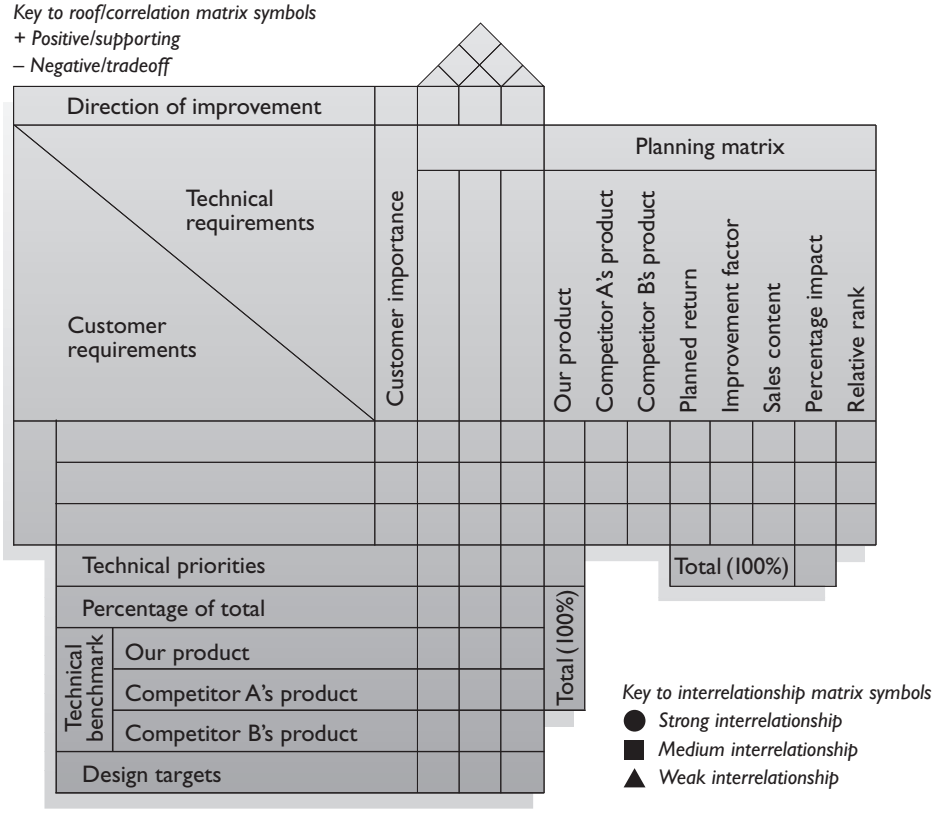
"The most successful new products match a set of fully understood customer problems with a cost competitive solution to those problems." [5]

One best practice is to categorize customer requirements into logical groupings and document the results in an affinity diagram.

This approach relies on the House of Quality (shown in the illustration below) as a means of linking VOC requirements to their related functional product requirements. Numerous books and internet references discuss the QFD House of Quality; details will not be covered in this brief.

In general, a development team goes through a process of filling in the "house," which catalogues a complete set of customer needs (VOC). In turn, the customer needs become the names of the rows, and system design metrics, which become the names of the columns. These design metrics become the design specifications for the new product or service. When completed, the matrix calculations are used to reorder and prioritize these design specifications, directing the development team to concentrate their efforts on specifications that matter most in satisfying customer needs. It is also a best practice to conduct multiple houses.[6]

Blank QFD House of Quality matrix[7]



Another important best practice revolves around a company's ability to effectively manage and disseminate requirements-related information throughout its organization. It also is crucial to effectively manage the complex interrelationships that exist between the product's requirements, including the many functional relationships that tie the solution to a higher level VOC requirement. Given the "networked" nature of the relationships between these requirements, development teams need to reconcile and communicate their changes in a timely manner.

In brief:

Another best practice to capture and prioritize requirements is to apply the quality function deployment (QFD) approach developed by the Japanese in the 1970s. The QFD House of Quality matrix helps focus development teams on key requirements by simply linking VOC requirements to their functional components.

It is crucial to effectively manage the complex interrelationships that exist between a product's requirements, including the many functional relationships that tie the solution to a higher level VOC requirement. A company's ability to effectively manage and disseminate requirements-related information throughout its organization is a definite key to success.

Development teams also need to continuously design to the requirements expressed by their functional groups. When conflicts occur, teams must be able to follow the chain up to the original VOC requirement that spawned the functional requirements.

To make this work, systems must be in place to enable all teams to access the requirements list throughout the entire project. This best practice allows multiple teams to resolve requirement conflicts by guiding the decision-making process toward the overriding goal of satisfying the customer.

Keys to success. The following imperatives are crucial to enabling VOC success.

- Ensure that development teams rigorously input VOC requirements as completely as possible by expressing and prioritizing these requirements in customer terms (instead of merely relying on the development team's perspectives)
- Prioritize requirements by enlisting customer participation whenever possible; this objective often can be accomplished by forced ranking survey results or a more formal QFD approach
- Categorize requirements into logical groupings by using methods, such as affinity diagrams, to fully represent the requirements' interrelationships
- Disseminate an entire hierarchy of requirements (covering both VOC and functional requirements) to the entire development organization throughout the product lifecycle; changes should be communicated in a timely manner to ensure that changed requirements are disseminated to all participating teams via the organization's systems-of-choice

Important tool characteristics. To meet these key objectives, development teams need the tools that provide the following functionality.

- Collaborative, top-down planning (partitioning) structures that can be shared between program management, work breakdown, design integration and requirements definition, to make sure that requirements can be understood and tracked consistently across these disciplines
- Easy-to-use requirements capturing tool that enables the organization to collect and manage the customers' *intangible* wants and needs. This should include the ability to document and/or model objectives, needs, problems (as potential failure modes), and especially use cases
- Tools should be capable of managing the complex interrelationships between requirements and support change management workflows of the requirements. Requirements should be traceable back to the key design parameters that address the needs, wants and use cases they were designed to address
- Flexible access capabilities that allow all participating teams to work with the captured requirements throughout the product lifecycle. Potential design concepts should be communicated back to customers for validation. Customer validation is best served by statistically analyzing web-based survey results

In brief:

To enable VOC success, software tools much provide the following functionality:

- Collaborative, top-down planning (partitioning) structures
- Easy-to-use requirements capturing tool
- Manage the complex interrelationships between requirements and support change management
- Flexible web access capabilities

Key Siemens solution capabilities

Siemens Teamcenter® software powers innovation and productivity by connecting people and process with knowledge. Teamcenter's comprehensive portfolio of proven digital lifecycle management solutions is built on an open product lifecycle management (PLM) foundation.

Teamcenter is ideal for facilitating collaborative interaction among product teams during the initial collection, categorization and prioritization phases of requirements definition.

The marketing and market research teams that normally perform these tasks do not typically interact with engineering data management systems – nor do they want to overly constrain their ad hoc working style. Teamcenter provides a flexible environment for meeting these objectives while delivering key capabilities that include, but are not limited to:

- *Customizable lists* for organizing input captured during the VOC data gathering process
- *Idea capture* tools for collecting and recording ideas in an ad hoc manner
- *Discussion boards* for capturing threaded discussions that can be leveraged as paper trails for later review
- *Web-based* survey tools to rank and prioritize requirements
- *Routing* capabilities to distribute content in an organized manner
- *Lightweight web access* for enabling all development teams to easily interact with each other as well as with prospective customers

Teamcenter integrates requirements management capabilities into a data management environment so that engineers and decision makers can understand the relationships between product requirements and the lifecycle decisions that need to be made.

Teamcenter excels at managing complex product configurations and extends this strength by managing an intricate web of functional requirements and their interdependencies. This functionality is crucial for determining how interface dimensions relate to supplier subsystems (for example, how *14 point font* relates to *easy-to-use*).

The result provides the entire organization with a consistent view to customer needs, thereby improving everyone's chance to deliver what the customer will buy. The Teamcenter portfolio allows all of a product's stakeholders to see how customer requirements relate to every phase in the development process.

Teamcenter's capabilities provide the following advantages to help companies deliver products that meet or exceed customer expectations.

- *Complete requirements traceability* to their original sources (which contrasts with traditional disconnected solutions that produce isolated requirements documents)
- *Easy user access* via a web browser
- *Connected requirements* linked to specific lifecycle processes
- Automatic generation of *requirements documents*

Teamcenter keeps everyone who participates in the product lifecycle – from the customer to manufacturing – in sync with the latest requirements. By making changed requirements dynamically visible to the entire organization, Teamcenter eliminates errors while making certain that right product capabilities are developed and aligned with VOC requirements throughout every step in the development process.

In brief:

Siemens software solutions offer the following capabilities for requirements *capture:*

- Idea capture
- Idea data organization and management
- Discussion boards
- Web-based surveys
- Routing
- Distributed and secure access for all participants
- Connection to the rest of the product lifecycle

In brief:

Siemens software solutions offer the following capabilities for requirements *management:*

- Complete requirements traceability
- Easy user access via the web
- Connected requirements
- Requirements documentation

Additional information

The *Teamcenter customer needs management* white paper provides a more detailed description of managing voice of the customer requirements. It is available at:

http://www.plm.automation.siemens.com/en_us/Images/tc%20customer%20needs%20mgmt%20wp%20W%207_tcm53-4882.pdf

Footnotes

[1] *PDMA Handbook of New Product Development; Kenneth B. Kahn, George Castellion, Abbie Griffin, 2005*

[2] *Ibid*

[3] *Ibid*

[4] *New Product Development: Profiling from Innovation; Jim Brown, The Aberdeen Group, 2005*

[5] *Ibid*

[6] *"After QFD: Now What?" Gerald M. Katz, Visions Magazine, www.pdma.org/visions*

[7] *Dr. A. J. Lowe, 2000, http://www.ent.ohiou.edu/~cparks/708/HOQ%20Matrix.pdf*

About Siemens PLM Software

Siemens PLM Software, a business unit of the Siemens Industry Automation Division, is a leading global provider of product lifecycle management (PLM) software and services with nearly six million licensed seats and 56,000 customers worldwide. Headquartered in Plano, Texas, Siemens PLM Software works collaboratively with companies to deliver open solutions that help them turn more ideas into successful products. For more information on Siemens PLM Software products and services, visit *www.siemens.com/plm*.

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8/09