Voice of the Customer (VoC): A Review of Techniques to Reveal and Prioritize Requirements for Quality

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Abstract

The quality of a product or service is judged with respect to a customer's wants, needs, and expectations of value. Understanding the multiple levels on which customer needs are expressed can help organizations produce, improve, and prioritize solutions that promote quality. "Voice of the Customer" (VoC) is the label that has been given to the process of identifying, articulating, and prioritizing these needs over the past three decades. Throughout this time, many qualitative and quantitative methods have emerged to help organizations gain insight into VoC. This article presents a comprehensive literature review of VoC approaches, techniques, and tools, and describes a conceptual framework for the various dimensions of VoC to help organizations better manage their VoC process. Both traditional methods and modern, intelligent methods for Quality 4.0 (based on machine learning) are covered.

Keywords: Quality attributes, Voice of the Customer (VoC), innovation, Quality 4.0

Introduction

Most organizations are better at speaking to their customers than listening to them. Organizations listen sporadically at best, and often only with a view to upselling additional products and services, placating customer anger, or gaining market intelligence. Many organizations dedicate the majority of communications resources to persuasive advertising and public relations, despite the evidence that poor listening practices contribute significantly to customer attrition and distrust in corporations. (Macnamara, 2018) Furthermore, paying attention to customer needs and requirements has an impact on quality costs: it is far more cost-effective to incorporate customer needs when new products are developed, thus reducing the likelihood of waste and rework later.

Organizations with mature processes in place for listening to their customers tend to spend less time analyzing, disseminating, and using the knowledge they gather from those listening activities. Most effort goes towards *being seen listening* rather than acting on the insights obtained, which can be a significant waste of resources and loss of opportunities that could have been identified from actionable customer information. (Chauhan & Sarabhai, 2018) As these authors have shown, overall *customer experience* is diminished by organizations that depend on simplistic feedback trackers to get customer feedback. While providing ample amounts of data, these approaches rarely uncover the customers' fundamental motivations and behaviors, the true Voice of the Customer (VoC).

Accurately assessing VoC is fundamental to quality management because the quality of a product or service depends on a customer's wants, needs, and expectations of value. Until ISO 9001:2008, quality was defined as "the totality of characteristics of an entity that bear upon its ability to satisfy stated and implied needs." In ISO 9001:2015, the definition evolved to become the "degree to which a set of inherent characteristics of an object fulfills requirements." While the concept of "stated and implied needs" is no longer called out explicitly in ISO 9001:2015, there is a tacit acknowledgment among quality professionals that both are critical for a complete articulation of quality attributes.

Understanding the multiple levels on which customer needs are expressed can help organizations produce or improve solutions that delight customers, better prioritize customer requirements, and discontinue products and services that no longer serve needs. Successfully capturing VoC requires multiple methods of organizational listening to design exceptional customer experiences. Many of these methods have been well described in research and case studies; in addition, newly developed methods are now emerging, intended to predict and anticipate future customer needs. To date, there have been no publications that provide an overview of the strategies, tools, and techniques available for gathering and using VoC data, including those under development.

To close this gap, this article reviews the VoC literature over the past three decades. We define the structure for an expanded and inclusive VoC toolkit that can provide insight into stakeholder needs and priorities, even when those stakeholders are not aware of what those needs and priorities are. Although VoC should be continually captured and used to improve the quality of products and services on an ongoing basis, the VoC process should also be a part of the new product development process to design quality into the offering.

The Voice of the Customer (VoC) Process

Listening to VoC is a *process*, not a project or a single event. We listen to the voices, but we must also organize, prioritize, analyze, and apply the information we get from those voices. VoC is therefore a journey with several independent (yet interconnected) tasks embedded within. In a seminal paper, Griffin and Hauser (1993) identified four stages on this VoC journey: 1) identifying customer needs; 2) organizing customer needs; 3) measuring or estimating the relative importance of the needs so that they can be prioritized, and; 4) applying the results with the goal of customer satisfaction.

Identifying and organizing customer needs must include the needs that are stated, as well as the needs left unstated. Stated needs are those that a customer is able to articulate. Tools for identifying them include focus groups, surveys, feedback forms, and interviews. Implied needs can be more challenging, both to identify and satisfy. These are the needs that the customer does not articulate directly but still very much wants or needs – for example, that a car needs to be able to drive, or that a washing machine must be capable of getting clothes clean. Implied needs are not articulated because the customer doesn't think it's necessary to state the "obvious" – alternatively, the customer may not know what their real needs are.

In the 25 years since Griffin and Hauser's paper was published, many organizations following the steps they outlined discovered a gap: customer needs cannot be satisfied piecemeal, rather, the holistic customer experience must be addressed. The term "customer experience" requires that the organization goes beyond simply accounting for the needs the customer articulates, and considers the customer's journey from introduction to the product or service, through his or her experience with it, and to the post-experience influence of customers on each other. (Chauhan & Sarabhai, 2018) A contemporary VoC program will incorporate experience design into the traditional steps in the VoC journey.

The main contribution of this paper is to review strategies, tools, and techniques for gathering VoC data and transforming it into actionable intelligence. It is organized into the following stages:

- **VoC Stage I: Identify customer needs**. This stage involves using traditional techniques from marketing and quality management to identify:
  - **IA**: **Stated Needs** that can be directly expressed by the customer
  - **IB: Implied Needs** that cannot be expressed, but can be determined by indirect means
  - **IC: Silent Needs** that cannot be expressed or determined indirectly, but can be identified by examining context, relationships, and needs expressed by social and societal trends
- **VoC Stage II: Understand and prioritize needs**. Some needs can be satisfied in many different ways. This stage involves applying methods such as Quality Function Deployment (QFD) and Kano's model to determine specific ways to address customer needs, and the order in which they should be satisfied.
- **VoC Stage III: Create meaningful customer experiences**. This stage involves using the insights derived from analyzing VoC to produce business value and exceptional customer experience.
- **VoC Stage IV: Anticipate future needs.** Identifying needs that do not currently exist is the basis for innovation. In this stage, advanced analytical methods (including applied machine learning) are used to predict future needs, possibly even before customers are aware that those needs exist. In this context, VoC can serve as a tool for innovation.

Combined with the democratization of consumer technology, the interplay between these levels of experience have led to considerable challenges for organizations that want to provide their customers with the best possible overall experience. For example, product features can easily be replicated, online review sites are remarkably influential, and additional purchasing options are available to most consumers online. This makes it easy to switch from one brand to another. An effective VoC program will cultivate loyalty, preventing a switch, and helping the organization adapt to its customers as their needs change and the market changes around them.

Stage I: Identify Customer Needs

Quality is all about meeting customers' needs. To ensure quality, these needs must first be recognized and (to some degree) understood, even if the customer is not conscious of them. This section describes how different kinds of customer needs can be captured: *stated* needs (which the customer can provide directly, usually when prompted), *implied* needs (which customers assume are known already), and *silent* needs (which are identified by the context, the environment, and the customer's beliefs and intentions). This section summarizes many of the methods that can be used to capture these three kinds of customer needs. An effective VoC program will leverage several methods in each category, and be monitored and continuously improved to ensure that the customers' most pressing needs are addressed at all times.

Stage IA: Identify Stated Needs

Many organizations have experience capturing stated needs, where customers state explicitly what their needs are, and how they would like products and services to meet those needs. The organization has flexibility in determining exactly how the needs should be satisfied, and sometimes, this involves further iteration with the cooperation of the customer.

Table 1 provides an overview of 22 methods that can be used to gather needs from customers, with references that describe those approaches in greater detail. Most VoC programs incorporate input from several of these methods to construct more detailed and nuanced pictures of customers' stated needs.

Technique	Description	References
Observations of Customers/"Lens Model"	Observing customers using a product or service can reveal needs that they may be able to express, but only when prompted by the experience. Talking out loud with a representative of the organization collecting the observational data is recommended.	Griffin & Hauser (1993)
Surveys & Direct Elicitation	Surveys use a series of defined questions (and sometimes, predefined answer choices) to provide easily quantifiable feedback to the organization. They can be conducted in person, over the phone, through a web form, or through videoconferencing. Surveys are useful for assessing and monitoring customer preferences and satisfaction, and to evaluate and assess the impact of changes to products or services.	Ding et al. (2011) Hayes (2008)
Benchmarking	Benchmarking helps organizations understand how other organizations and market leaders satisfy their customers' needs. Benchmarking allows organizations to study successes and best practices in other organizations, pinpointing places where they can make improvements in their own processes.	Brandt (2018) Cooper (1998)

Gemba Visits	By going directly to the workplace (*gemba*) information about what customers want and need can be directly obtained. Because many unsatisfied customers do not complain, direct observation can reveal the source of that dissatisfaction.	González Bosch & Tamayo Enríquez (2005) Cooper (1998)
Focus Groups/ Customer Interviews	Focus groups and customer advisory panels allow organizations to spend time with select groups of customers to solicit specific information or engage in brainstorming sessions, and can be conducted in-person or using collaborative technology.	Cooper & Dreher (2010) Hayes (2008) Griffin & Hauser (1993)
Brainstorming	Brainstorming, in which ideas and suggestions flow in a less structured way than they do in structured surveys and interviews, are effective tools in both internal and external contexts.	Cooper & Dreher (2010) Berry & Parasuraman (1997)
Social Media Analysis	Feedback on social media provides timely and unmediated customer insights that can be addressed, actioned, and, if necessary, remedied immediately.	Kohl et al. (2018) Jeong et al. (2017) Trainor et al. (2014)
Chat Transcripts	Transcripts of chats with service representatives on customer websites provide evidence of product deficiencies, customer difficulties, and how call centers solve (or don't solve) their problems.	Trainor et al. (2014)
Web Analytics	Web analytics specify the amount of traffic to specific parts of a website, which can provide significant insight into customer priorities and interests.	Croll & Power (2009)
Feedback Forms	Feedback forms are often provided immediately after customers have an interaction with the organization providing the product or service.	Brandt (2018) Cooper & Dreher (2010) Hayes (2008)
Emails	Emails from customers can be an excellent source of unstructured feedback from customers who have interacted with the organization.	Brandt (2018)
Research Results	Many organizations have market research departments that conduct both qualitative and quantitative research, the results of which they regularly share internally.	Gopalani & Shick (2011) Griffin & Hauser (1993)
Analyst Reports	Research firms, such as Gartner and Forrester, offer market and needs assessments for purchase.	Gopalani & Shick (2011) Griffin & Hauser (1993)
Call Center/Customer Service Notes	Customer service agents take notes or make recordings during customer interactions that can provide insights into customer dissatisfaction and product or service defects.	Shaw & Hamilton (2016) Goodman (2006)
Suggestion Box	The traditional suggestion box, in which customers or employees can place handwritten feedback into a sealed box, remains a valuable way of collecting spontaneous feedback.	Cooper & Dreher (2010)
Complaints	Analyzing customer complaints provides an opportunity for an organization to move beyond solving the immediate customer dissatisfaction and to diagnose process or product failures that are producing it.	Goodman (2006)
Product Cancellation Information	Many organizations provide feedback forms requesting details when customers cancel products or services.	Wu (2012) Goodman (2006)

Lost Deals	Sales teams frequently collect valuable insights from informal conversations with potential customers after failed bids or deals.	Snelgrove (2017)
Delphi Method	The Delphi Method presents multiple rounds of questionnaires to subject matter experts. Respondents deliberate on responses during each round until they reach a consensus.	Lee & Huang (2009)
Sales Meetings, Service Calls, Trade Show Interactions, Communities of Enthusiasts	Personal interactions with customers and potential customers can provide valuable anecdotal information that might not make it into a generic customer survey. The drawback is that most of these interactions are not effectively documented or analyzed, therefore limiting the potential impact of the information.	Cooper & Dreher (2010)
Willingness-to-pay (WTP)	The amount of money a customer is willing to pay for a product (WTP), and the minimum amount a person is willing to accept (WTA) to abandon a product or put up with negative features can provide valuable insight into the financial meaning they attach to needs.	Snelgrove (2017)
Warranty Data	Warranty data collected during the servicing of warranty claims are a valuable source of product failures and customer dissatisfaction; it suggests the thresholds at which customers believe that their products fail to live up to promises of performance.	Wu (2012)

Table 1. VoC Techniques for Assessing Stated Needs

Stage IB: Identify Implied Needs

Tools used to identify implied needs originate in the fields of psychology, philosophy, ethnography, and data science. This section provides a brief overview of tools for gathering the implied needs that influence product or service quality, but that are rarely called out by the methods in Table 1. A selection of the 11 techniques in Table 2 should be used in conjunction with a selection of the 22 techniques in Table 1 to ensure that both stated and implied needs are covered by VoC data collection.

Technique	Description	References
Observation	Observing a customer as he or she uses a product or service can reveal information about needs that he or she may not be able to articulate directly.	Zultner (1993) Karat et al. (2003)
Lead User Process	A specific customer or group of customers is selected to actively and iteratively participate in a new product development or continuous improvement process. Originally developed at 3M.	von Hippel (1986) von Hippel (1999)
Typology of Customer Value	Based on the idea that perception of value depends on the interaction between a customer and a product or service, this technique helps an organization identify feelings and beliefs that may be associated with definitions of quality.	Holbrook (1996)
Prosumerism and Customization	When customers participate (partially or fully) in the creation or improvement of a product or service, or in generating supporting artifacts (e.g. videos, blog posts) for a product, those contributions can yield a valuable source of intelligence about implied needs.	Hartmann (2016)

Experience Sampling	Prompting a customer on an occasional basis to provide brief information and insights about a product or service (usually using an electronic tool, such as a smartphone) as they are using it can provide surprising insights because the customer has little time to think about their answers.	Larson & Czikszentmihalyi (1983)
Repertory Grid	A comprehensive method that requires users to identify quality attributes, rate them (one or more times) on a 5 or 7-point scale, and categorize them to find signals for what contributes to perception of value in a complex customer experience.	Tan & Hunter (2002) Lemke et al. (2011) Pike (2003)
Ergonomic Studies	Implicit in a statement of needs is the customer's desire to remain safe, comfortable, and free from bodily harm and injury. Ergonomic studies provide information about how products and services can be designed for safety and comfort, providing information about requirements that a customer may not be able to verbalize.	Nath (2017)
A/B Testing	Customers are presented with Option A and Option B, and then decide which one they like better. This does not require the customer to explain why a particular option is more desirable. Results are analyzed statistically to determine which option is more effective and desirable.	Kohavi & Thomke (2017)
Semantic Differential Technique	This method asks customers to evaluate the degree to which a product, service, or concept aligns with one or more pairs of descriptive words (e.g. wet-dry, brave-cowardly, confusing-clear). It became one of the cornerstones of kansei engineering decades later.	Snider & Osgood (1969)
Kansei Engineering	This family of methods seeks to incorporate emotional needs and responses into product design. Semantic differential technique is one method used in kansei engineering.	Huang et al. (2012) Schutte (2014)
Zaltman Metaphor Elicitation Technique (ZMET)	This approach asks customers to choose images that reflect their feelings and needs regarding products, services, and concepts, or alternatively, asks them to tell stories about images that reveal unconscious issues. Zaltman's 2003 book was written to help companies apply the ZMET method.	Zaltman & Coulter (1995) Zaltman (2003)

Table 2. **VoC Techniques for Assessing Implied Needs**

Lead User Process

Originally piloted by the 3M company in the 1980's to catalyze innovation, the lead user process engages early adopters of a product or process, referred to as "lead users," whose needs can be expected to anticipate those of the larger market. Lead users are often highly attuned to their wants and needs, even if they cannot express them directly as stated needs. They provide a very different source of information for new product development and continuous improvement, since other users may not have the frame of reference or deep experience to contextualize their needs when providing marketing feedback. (von Hippel, 1986) They can anticipate the needs of regular users by months or even years, and they stand to benefit the most when the product and services they help develop or improve are implemented.

According to von Hippel, engaging lead users involves the following steps:

- **Identify an important market trend**. This is a research activity that requires trend analysis and considerable market knowledge.
- **Identify lead users.** These can users can often be identified from existing customers or known best-in-class practitioners.
- **Analyze lead user data**. Multiple methods to gather stated and implied needs are used, and the information is examined collectively to design the new products, services, or features.
- **Project lead user data onto the general market of interest**. The knowledge gathered from lead users can be used to design product attributes, create communications and messaging plans for delivering the solution to the larger market at a future date, and shaping the market to anticipate that need.

To take advantage of the lead user process, follow the four steps above.

Typology of Customer Value

Customers have a deep and contextualized relationship with the influences that impact their perception of value, so it is not surprising that sometimes these complex ideas are difficult to express. Using Holbrook's (1986) Typology of Customer Value, an organization can begin examining these subtle concepts. Holbrook explained that customers will make judgements about the products and services as they engage with them, and determination of value reflects that entire experience. He identified three components of customer value:

- **Extrinsic vs. Intrinsic**: Extrinsic value sees the customer experience as a means to an end. Intrinsic means the experience is valued as an end unto itself: it's the experience, not what the experience can produce, that is valued.
- **Self vs Other:** Self-oriented consumption is done for my benefit and the effect it will have on me as an individual. Other-oriented consumption looks to see the effect of the experience on others (or society) and the product or service is valued for how others react to it.
- **Active vs Reactive:** This dimension examines the influence of the customer on the product or service (active), or the influence of the product or service on the customer (reactive). Both aspects of the relationship are important to examine.

To apply Holbrook's method, an organization should examine each combination of these concepts, shown in Table 3. For example, to articulate the self-oriented, active, extrinsic form of value, the organization can ask "How can I make this product or service more convenient for my customers?" To explore the other-oriented, reactive, extrinsic form of value, ask "How can I enhance my customer's reputation if he or she owns this product or uses this service?" Stepping through each of the eight combinations can unveil new insight into the customer's implied needs.

		Extrinsic	Intrinsic
Self-Oriented	Active	Efficiency (Convenience)	Play (Fun)
	Reactive	Excellence (Quality)	Aesthetics (Beauty)
Other-Oriented	Active	Status (Success, Impression, Management)	Ethics (Justice, Virtue, Morality)
	Reactive	Esteem (Reputation, Possessions)	Spirituality (Faith, Ecstasy, Sacredness)

Table 3. Holbrook's Typology of Customer Value.

Prosumerism and Customization

In the 1980s, "prosumerism" described consumers performing tasks that were traditionally the responsibility of commercial producers, such as growing their own food. More recently, however, it is seen as a blurring of the boundaries between production and consumption. (Hartmann, 2016) As customers participate in the production process, organizations can learn more about their wants and needs.

Another manifestation of prosumerism is customization. For example, someone purchases a car and then customizes it with more spectacular wheels, a better stereo, and various accoutrements to enhance its performance and aesthetic appeal. Yet another example of prosumerism is the creation of videos, recipes, blogs, "fan fiction," conventions, and communities of practices around a product or service, allowing more people to participate in prosumer production and customization. The end result is a collection of artifacts that demonstrate the VoC. People who consume raw materials to make their own goods or customize existing products are demonstrating exactly what their wants and needs are, and that those needs are not currently being met by existing products.

To make use of these concepts, organizations should look for ways to engage customers in product development and improvement, and gather data on the customizations that they request as well as the artifacts that the prosumer community generates. These artifacts can provide an enormous amount of information for an organization seeking insight into VoC.

Experience Sampling

Another way to find out what customers think or feel about a product or service is to interrupt their experience to ask them – thus capturing their impressions in the moment. Experience sampling occurs when a customer is prompted, usually by an electronic interface, to answer one or two questions about whatever they are experiencing at the time. (Larson & Csikszentmihalyi, 1983) The questions could ask for details about what the subject is doing, how they were feeling, who they were with, or any other questions that would provide the researchers with insight into how subjects spend their time and navigate their environment. The information collected through experience sampling can help organizations more intimately understand their market segments, leading to a deeper understanding of the ways in which customers might articulate or demonstrate their wants and needs.

Repertory Grid

The repertory grid is a "surfacing" technique built on the idea that individuals make sense of their environments using cognitive maps derived from their own experiences. (Tan & Hunter, 2002) The interviews that generate the grid will uncover those hidden maps, revealing both conscious and unconscious factors that influence how the value of a product or service is perceived. Results can also be used to understand larger organizational dynamics and relationships between individuals within an organization. The main value of this method is that it can be used to identify unique and uncommon quality attributes. (Pike, 2003)

A repertory grid has three components. **Elements** represent the product or service to be discussed. **Constructs** represent how the subject views the elements, and contain a positive or desired attribute ("product provides high customization") and a contrast ("product provides no customization"). **Links** rate each construct along a scale, e.g. 1 for the positive element and 5 for the contrast, with the numbers in between representing an assessment somewhere between the two ends. A comprehensive example of applying a repertory grid to the quality of customer experience can be found in Lemke et al. (2011).

Ergonomic Studies

Ergonomic studies can yield valuable information on the physical impacts of products and services on customers, needs which are likely to be left unstated. As one example, the Prevention through Design (PtD) initiative by the National Institute for Occupational Health and Safety (NIOSH) is a research program that explores the risks of poor ergonomic design and workplace safety. (Nath, 2017) PtD uses three forms of data collection that cover both stated and implied needs:

- **Self-assessment**, in which participants respond to questions on workplace risks using questionnaires and interviews. This is considered the least effective method, since responses can be imprecise and unreliable, and respondents may be unaware of the stresses that impact them.
- **Observational ethnography**, in which analysts directly evaluate workers on the job site. Despite its strong data collection approach, this method is often impractical and expensive.
- **Direct measurement** using sensors attached directly to customers' bodies is the most accurate and effective method of data collection, because it provides a constant and unmediated flow of data to track movements and physical parameters in every moment. Unfortunately, not all factors should be measured directly; direct measurement of spinal forces (for example) can be very insightful, but it is medically impractical to insert sensors into a customer's spinal column to get information about a product's impact on the body.

Data collected through ergonomic studies, particularly unmediated data, can provide valuable insights into customer's needs for safety, comfort, and harm reduction. Ergonomics is also used to reduce workplace injuries and musculoskeletal disorders.

A/B Testing

A/B testing is frequently used for user experience design on websites. In a typical example, the website provides two options to the website visitor: A is the current version of the website messaging; and B is a modified version of the current version that tries something new. Customer are assigned randomly to one of the two versions and asked which of the two he or she prefers. (Kohavi & Thomke, 2017) The results are examined using statistical hypothesis tests to determine whether there is a difference in preference between A and B. Even when customers might not be able to articulate their preferences on a survey, or choose between options effectively, an A/B test can serve as a powerful indicator of overall priorities.

Semantic Differential Technique

With this technique, users record their reaction to an object or concept using a scale that moves between two opposing terms, such as cold → hot, bright → dark, and so on – similar to the repertory grid approach. The semantic differential technique builds on the philosophical and linguistic distinctions between objects and representations. Semantic Differential Analysis can illuminate connections that customers themselves are unaware of, such as the emotional responses a particular color of car can invoke, reflecting anger or hostility.

Kansei Engineering

This collection of methods is used to assess emotional responses to specific products or environments. The Japanese word "kansei" is similar to "affect" in English, representing the feelings aroused by direct sensory perceptions or by imagining a product or service. (Schutte, 2014) Kansei engineering attempts the difficult task of measuring human emotional responses by creating a controlled "VoCabulary" of terms that subjects can use to express their needs and feelings. By working in the realm of emotional response, and not simply asking customers to provide lists of product features they would like, abstract ideals are translated into tangible features that will provide the emotional response the customer seeks.

Kansei Engineering uses four approaches to capturing and classifying VoC: (Huang et al., 2012)

- **Physiological monitoring** allows researchers to monitor emotions based on physical responses such as pulse rate, as well as electrical brain activity by means of an electroencephalogram (EEG).
- **Interviews** in which researchers can ask subjects questions like "How would you describe this product?" with the kansei words providing the constraint in their responses.
- **Inductive card sort** in which participants are given a series of concepts or objects and asked to sort them according to the natural categories that seem to present themselves.
- **Semantic differential technique**, described above.

Kansei engineering is typically applied in new product development, although it has the potential to be applied for continuous improvement or innovation.

Zaltman Metaphor Elicitation Technique (ZMET)

The Zaltman Metaphor Elicitation Technique (ZMET) uses visual images to inspire subjects to associate words or feelings with concepts or objects. The premise of ZMET is that human cognition is structured around visual images, and that visual metaphors are key to accessing the structure of that cognition. This technique is often used in counseling situations where trauma prevents an individual from describing feelings directly. In these cases, insights into feelings and fears can emerge when the subject chooses pictures to reflect the emotional state, or tells stories about what he or she sees in the pictures. Similarly, Zaltman & Coulter (1995) explain that when groups of customers associate, organize, and describe a series of images they associate with a product, the underlying emotional and cognitive factors that influence perception of value can be uncovered.

Stage IC: Identify Silent Needs

Some customer needs cannot easily be expressed directly by the customer, or implied by the customer (and thus identifiable using other methods). These additional needs still must be articulated, and can mean the difference between success and failure over the full lifecycle of the product or service. The purpose of this section is to outline 8 approaches that can be used to articulate these silent requirements, summarized in Table 4. This is not a comprehensive list, but rather a representative list of the ways silent needs can be unveiled.

Technique	Description	References
Voice of the Customer Table (VoCT)	Examines vague or nebulous customer needs to extract true, actionable needs.	Tague (2005)
Topic Modeling	This method takes any collection of unstructured text (e.g. online reviews, social media posts, customer comments) and identifies themes or priorities in them.	Radziwill (2018) Ko et al. (2018)
Sentiment Analysis	This method takes any collection of unstructured text (e.g. online reviews, social media posts, customer comments) and compares them to established lexicons that contain word characteristics to determine whether overall sentiment is positive or negative, and/or whether certain emotions are more represented than others over time.	Radziwill (2018) Jeong et al. (2017)
Corporate Ethnography	Involves observing or shadowing customers to inductively build concept maps that explain needs, motivations, and preferences. Requires highly trained researchers to gather and interpret data.	Anderson (2018) Ladner (2014)
ISO 26000 Guidance on Corporate Social Responsibility	Provides best practices for "how to ensure social equity, healthy ecosystems and good organizational governance, with the ultimate objective of contributing to sustainable development." (Frost, 2011)	Hahn (2012)
ISO 9241 Ergonomics of Human System Interaction	Provides guidance on meeting customers' usability needs for hardware and software displays, Interactive Voice Response (IVR) systems, visual presentation of information, forms, tactile and haptic response, and so on.	Bevan (2009) Bevan et al. (2015)
Sensor Surveillance (e.g. IoT)	Sensors embedded into products or the customer's environment (e.g. via the Internet of Things, or IoT) can provide information about how, when, and why they use products and services.	Radziwill & Benton (2017)
Sousveillance	This technique involves customers actively counter-surveilling organizations that monitor their needs, desires, and behaviors.	Mann et al. (2002) Levy & Barocas (2018)

Table 4. VoC Techniques for Determining Additional Needs

Voice of the Customer Table (VoCT)

The premise of the Voice of the Customer Table (VoCT) is that while customers can articulate what they want, those wants don't always represent what they actually need. For example, if the customer says "the brakes on this car are terrible," this could be restated as "I need to reduce the vehicle's momentum easily at any time." An example using this scenario is presented in Table 4. Using VoCT, organizations can discover and respond to the customer's tacit needs, even if the customer isn't aware of it. VoCT analysis will sometimes uncover that the customer's articulated wants are actually a synthesis of several unstated needs. These findings represent the "unknown knowns" – what the customer doesn't know they know.

Situation	VoC	Tacit Customer Need
Safely bringing a car to a stop.	"The brakes on this car are terrible."	The brakes don't stop the car quickly enough.
		The brakes take too long to engage.
		The brakes are noisy.
		The brakes need to be replaced too often.
		The brakes are too "sticky."
		The brake pedal is not easy to reach.

Table 5. **Example of a VoC Table (VoCT)**

Topic Modeling

The technique of topic modeling operates on collections of documents, where "document" can be defined in many different ways (e.g. a memo, a whitepaper, a social media post, a Tweet, a product review, a customer complaint). Mathematical relationships characterizing the presence or absence or words or phrases, their proximity to one another, and the relationships between those values between collections of documents are used to determine the themes and structures of different documents.

Sentiment Analysis

This method examines unstructured text data and compares it to lexicons of words and their emotional characteristics to determine the tone, sentiment, and change in tone and sentiment over time. As in topic modeling, the documents that are analyzed by sentiment can be books, papers, or short items like social media posts and Tweets.

Corporate Ethnography: Identifying the Unknown Unknowns

Fields of study like behavioral economics and cognitive psychology have shown that people frequently make poor and irrational decisions, and in addition, are often not even aware of their own motivations. Traditional methods of listening to the VoC could, as a result, give companies partial or even *misleading* information about what their customers want and need, while true motivations remain hidden both to the customer and the organization trying to meet his or her needs. Corporate ethnography studies customers within their own social context. This helps the organization better understand "unarticulated preferences" – how the customer interacts with and ascribes meaning to his or her environment. To generate the best data, a skilled ethnographer should manage this process.

Unlike traditional marketing approaches that use deductive methods like surveys and focus groups, this approach is more inductive and seeks to adopt the subject's perspective. (Ladner, 2014) Ethnographers observe and shadow their subjects to determine whether behaviors confirm or contradict stated preferences. Ethnographers therefore inductively build their knowledge of the way the customer behaves and interacts with the environment instead of imposing preconceived notions onto the situation. Several technology companies, most notably Intel, have used corporate ethnography with great success and have a roster of corporate ethnographers on staff to engage in these unique and insightful VoC initiatives. (Anderson, 2009) Armed with knowledge of the forces that underpin the desires that customers express, organizations can better meet customer needs to increase customer satisfaction.

ISO 26000: Guidance on Corporate Social Responsibility (CSR)

Published standards and guidance can also illuminate customer needs, especially when the needs are known at a high level but not a detailed level. For example, ISO 26000:2010 was introduced to standardize terminology and expectations for pursuing corporate social responsibility (CSR). CSR encompasses topics from ethics to philanthropy to environmental awareness, and is a complex practice that seeks to help organizations become better global citizens. (Hahn, 2012) ISO 26000:2010 provides a framework for organizations to incorporate "the voice of society" into their approach, ensuring that customers' desires to protect human rights and the environment are properly addressed, even when those needs are not stated directly.

CSR is an issue of considerable urgency given the relationship between social responsibility and competitive advantage in many contemporary markets. ISO 26000 introduces seven key principles of social responsibility, and suggests corresponding subjects that should be addressed in business processes and quality management (Table 6). Unlike ISO 9001, organizations cannot become ISO 26000 certified; the best practices are provided only as guidance to help develop sound CSR practices.

Seven Key Principles	Seven Core Subjects
Accountability	Organizational Governance
Transparency	Human Rights
Ethical Behavior	Labor Practices
Respect for Stakeholder Interests	The Environment
Respect for the Rule of Law	Fair Operating Practices
Respect for International Norms of Behavior	Consumer Issues
Respect for Human Rights	Community Involvement and Development

Table 6. ISO 26000 Principles and Subjects

ISO 9241: Ergonomics of Human System Interaction

Another ISO family of standards that can reveal customer needs is ISO 9241, which broadly covers best practices for usability. (Bevan et al., 2015) The contemporary view of usability is that it is not just a characteristic of a product or an interface, but the degree to which a customer is able to use it to satisfy needs. Consequently, usability considers effectiveness (the ability to achieve goals while reducing risk of negative outcomes), efficiency (the use of resources in achieving effectiveness), and satisfaction ("freedom from discomfort, and positive attitudes towards the use of the product"). Learnability, memorability, accessibility, maintainability, and ability to gracefully recover from errors and issues are also emphasized.

Sensor Surveillance via Internet of Things (IoT)

The vast network of sensors that are now part of many devices, from vehicles to virtual assistants to home appliances, can support machine-to-machine communication as well as the collection of vast amounts of data based on user behavior. This data does not rely on the customer's ability to understand and articulate their own behavior. Instead, sensor data can provide an unfiltered view of user behavior and interaction without the need to filter it through an incomplete understanding of their own motivations and actions. For example, fitness wearables (such as Fitbit) can provide evidence of a customer's level of physical activity – a more accurate assessment than if they were asked about activity levels on a survey or during a focus group.

Similarly, many of us have experienced a virtual assistant (such as Siri or Cortana) observing our statements, and then anticipating our needs (for example, by prepopulating search terms). IoT thus holds the potential to move from simply listening to the VoC to inferring the silent VoC. We can use the lessons learned to engage in closer and more personal conversations with the customer. As we help them learn more about their own preferences and behavior, our relationships with our customers can be based more on dialogue and shared learning opportunities.

Sousveillance

"Watching the watchers" (or *sousveillance*) has emerged as a counterpoint to the broad surveillance that is routinely employed to gather customer information. First discussed by Mann et al. (2002), the core concept is that some needs will never be made visible by surveillance. For example, consider the different narratives that might be revealed by police dashboard cameras versus cell phone videos from multiple observers of a crime or brutality situation. Levy & Barocas (2018) extended this concept to *refractive surveillance* – surveilling one group can reveal information that can be used to influence or control another group. These authors provide the example of the *Amazon Go* store, where smartphone apps can identify and track the movements of customers, resulting in the "purest expression of a future of retail in which sensors in the built environment and the sense-making of machine learning render customer interactions with staff completely unnecessary."

The implication for VoC data collection is this: *everyone and everything* will be collecting data, all the time. Organizations that can access and combine data from as many sources as possible will be able to assess and respond to customer needs most completely.

Stage II: Understand and Prioritize Needs

Collecting VoC data is only the beginning. The next step is to translate *what* is needed into *how* those needs will be satisfied – and decide which are most important.

Stated, implied, and additional customer needs must be critically examined to understand how requirements should be used to make design choices. In some cases, an organization will know the needs of customers and how they should best be satisfied, but be constrained by feasible or available options for satisfying those needs.

For example, when a patient with a medical condition wants to be healed, there are usually multiple ways to meet this need, but the availability of medical procedures and technology and the feasibility of performing those procedures on the patient need to be evaluated. This section outlines some qualitative and quantitative techniques used to extract meaning from VoC data and prioritize outcomes:

Technique	Description	References
Kano's Model	A classification technique to help prioritize features of products and services	Kano et al. (1984)
Quality Function Deployment (QFD)	A qualitative tool for examining trade-offs to decide how customer needs should best be met	Chan & Mazur (2018)
Analytic Hierarchy Process (AHP)	A quantitative tool to make complex decisions based on multiple attributes by simplifying the problem into many smaller pairwise comparisons	Saaty (1999)
Conjoint Analysis (CA)	A quantitative tool to identify the best combination of features based on which ones contribute the most to overall perception of value	Green & Srinivasan (1990)
Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS)	A quantitative tool that compares a set of alternatives based on weights assigned to components of those alternatives	Yoon (1987) Hwang, Lai, & Liu (1993)

Table 7. Examples of Methods for Analyzing and Prioritizing VoC Data

Kano's Model

Not all features are created equal, and most organizations will not have the resources to implement all desired features. It is important to be able to distinguish between features that will satisfy customers, features that will cause dissatisfaction, and features that will delight and impress them. Clearly, an organization wants to maximize satisfaction, minimize dissatisfaction, and select high-impact delighters. Kano et al. (1984) developed methods to do this. He identified four categories of product and service characteristics that can provide insight into how requirements should be prioritized with respect to one another:

- **Must-be requirements**: Features that customers expect will be a part of a product or service. The customer may or may not explicitly state that these features should exist, but they must be present; without these features, the customer will be dissatisfied. For example, cars must be able to provide transportation, and phones must be able to make calls.
- **Indifferent requirements**: This category includes features that will not differentiate our offerings in the minds of our customers. Organizations should avoid expending effort on these features, because they will not have an impact.
- **Performance requirements**: The value of these features increases or decreases depending upon how well the feature is implemented. For example, faster internet speeds will probably be associated with greater customer satisfaction.
- **Attractive requirements**: These features delight customers and distinguish one organization's products or services from the others. The attractive requirements create competitive advantage.
- **Undesirables**: These are features that should not be included in the final offering. For example, when designing internet service in a hotel, it would not be desirable to offer ethernet-based connections when so many laptops do not even have ethernet ports.

For each feature that is being considered, classify it into one of the five categories. If it is indifferent or undesirable, then the development plan should not include that feature. If it is a must-be, performance requirement, or attractive requirement, poll some customers to find out which ones are the most significant. There are two questions to ask:

1. If the feature is present, how does it make you feel?
2. If the feature is *not* present, how does it make you feel?

There are five possible answers: *I like it, I expect it, I'm neutral to it, I can tolerate it,* and *I dislike it.* In addition, ask the customers about the priority of each feature on a 5- or 7-point scale to be able to effectively detect differences. By examining the priority information in the context of how your customers will feel if the features are present or absent, a clear picture of the highest priority features to differentiate your product or service will emerge.

This example only, however, provides the most basic way to apply Kano's model. Mikulić & Prebežac (2011) go into much greater detail, covering methods like penalty-reward contrast analysis (PRCA), the importance grid (IG), and the critical incident technique. All of these variations on a theme share the same goal: to prioritize product and service features so that the organization's resources can be focused on delivering the ones with highest impact.

Quality Function Deployment (QFD)

Quality Function Deployment (QFD) was developed in the 1960s to integrate customer, market, and business analysis with product and process design. (Chan & Mazur, 2018) Introduced into the United States in the early 1980s, "classic" QFD involves four steps:

- **Phase I – Product Definition:** Phase I involves collecting requirements from the customer and using them to select and prioritize product specifications that will meet those needs. The primary tool used at this stage is the House of Quality (shown in Figure 1), a qualitative grid that facilitates discussions about the relationships between requirements, specifications, and trade-offs.
- **Phase II – Product Development:** The organization analyzes customer needs and cascades them down through the various levels of product design to determine how the product should be designed to meet each one.
- **Phase III – Process Development:** In Phase III, the organization defines the processes and workflow for creating the product and product components that will meet the customers' stated and implied needs.
- **Phase IV – Process Quality Control:** Phase IV involves identifying all the critical characteristics of the product and the components and determining their Quality objectives. This is the final stage before the full implementation of the production workflow.

QFD was further expanded by the introduction of ISO 16355:2015 – *Application of statistical and related methods to new technology and product development process.* ISO 16355:2015 moves beyond the origins of QFD in the automotive industry with the intention to bring QFD methods to a wider group of organizations. This group of standards is not prescriptive, but complements standards that address management systems, especially ISO 9001:2015. ISO 16355:2015 expands the four phases of "classic" QFD to eight, shown in Table 7.

Section	Description
Part I: General principles and perspectives of QFD method	Provides the framework and tools.
Part II: Acquisition of Non-Quantitative VoC	Discusses methods for collecting VoC for stated and implied needs.
Part III: Acquisition of Quantitative VoC	Discusses methods for collecting VoC using surveys and statistical tools.
Part IV: Analysis of Non-Quantitative & Quantitative VoC	Provides the tools for organizing and prioritizing customer needs.
Part V: Solution Strategy	Discusses translating customer needs into engineering requirements.
Part VI: Optimization – Robust Parameter Design	Addresses the design phase and nominal value parameters.
Part VII: Optimization – Tolerance Design and Output to Manufacturing	Addresses ways of improving overall product quality and performance.
Part VIII: Guidelines for Commercialization and Life Cycle	Addresses testing, building, and commercializing of the product or service.

Table 7. Sections of ISO 16355.

Analytic Hierarchy Process (AHP) and Conjoint Analysis (CA)

Organizations need to prioritize customer needs as well as the methods of achieving them. Analytic Hierarchy Process (AHP) and Conjoint Analysis (CA) are analytical techniques that provide distinct and complementary ways to prioritize customer needs. AHP (Saaty, 1990) breaks a decision-making problem into a hierarchy of smaller, inter-related problems that can be analyzed independently. Each attribute is weighted to reveal how customers make decisions.

For example, a classic AHP example problem seeks to choose a new leader for an organization. There are three candidates (A, B, and C) and four decision criteria (education, experience, charisma, and age) that must be considered. The evaluators are responsible for generating *pairwise comparisons* – for example, when comparing candidates A and B to one another in terms of education, who is better (and by how much)? When comparing candidates B and C to one another in terms of charisma, who is better (and by how much)? These assessments are combined into a global evaluation which suggests the most appropriate candidate. CA, in contrast, combines multiple attributes of a product or service into groups, presenting "batched choices" to the subject. One example of a CA choice task for the configuration of a new software product is presented in Table 8.

Software Option A	**Software Option B**
• Easy to use • Minimal configurability • Low cost • 2 years to obsolescence	• Easy to use • Maximum configurability • High cost • 1 year to obsolescence
Software Option C	**Software Option D**
• Difficult to use • Maximum configurability • High cost • 5 years to obsolescence	• Difficult to use • Minimal configurability • Low cost • 10 years to obsolescence

Table 8. Examples of Choices in a Conjoint Analysis (CA) Survey

Key

Symbol	Meaning	Value
⊙	Strong Relationship	9
O	Moderate Relationship	3
▲	Weak Relationship	1
++	Strong Positive Correlation	
+	Positive Correlation	
−	Negative Correlation	
▼	Strong Negative Correlation	
▼	Objective Is To Minimize	
▲	Objective Is To Maximize	
x	Objective Is To Hit Target	

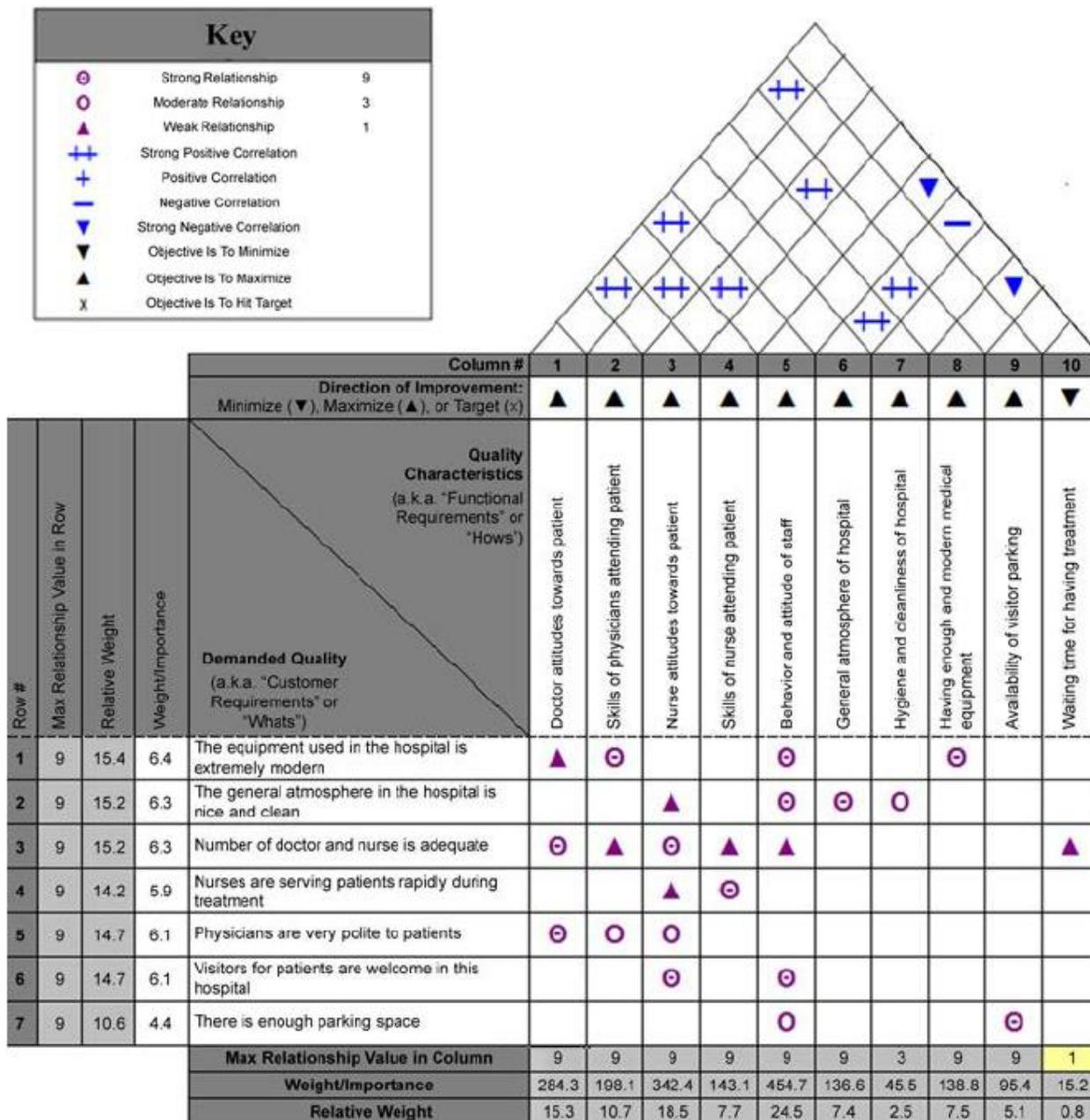| Column #				1	2	3	4	5	6	7	8	9	10
Direction of Improvement: Minimize (▼), Maximize (▲), or Target (x)				▲	▲	▲	▲	▲	▲	▲	▲	▲	▼
Row #	Max Relationship Value in Row	Relative Weight	Weight/Importance	**Quality Characteristics** (a.k.a. "Functional Requirements" or "Hows") / **Demanded Quality** (a.k.a. "Customer Requirements" or "Whats")	Doctor attitudes towards patient	Skills of physicians attending patient	Nurse attitudes towards patient	Skills of nurse attending patient	Behavior and attitude of staff	General atmosphere of hospital	Hygiene and cleanliness of hospital	Having enough and modern medical equipment	Availability of visitor parking	Waiting time for having treatment
1	9	15.4	6.4	The equipment used in the hospital is extremely modern	▲	⊙			⊙			⊙		
2	9	15.2	6.3	The general atmosphere in the hospital is nice and clean			▲		⊙	⊙	O			
3	9	15.2	6.3	Number of doctor and nurse is adequate	⊙	▲	⊙	▲	▲					▲
4	9	14.2	5.9	Nurses are serving patients rapidly during treatment			▲	⊙						
5	9	14.7	6.1	Physicians are very polite to patients	⊙	O	O							
6	9	14.7	6.1	Visitors for patients are welcome in this hospital			⊙		⊙					
7	9	10.6	4.4	There is enough parking space					O				⊙	
				Max Relationship Value in Column	9	9	9	9	9	9	3	9	9	1
				Weight/Importance	284.3	198.1	342.4	143.1	454.7	136.6	45.5	138.8	95.4	15.2
				Relative Weight	15.3	10.7	18.5	7.7	24.5	7.4	2.5	7.5	5.1	0.8

Figure 1. Example of the House of Quality used in QFD, from Camgöz-Akdağ et al. (2013).

When customer preferences are examined all together, values called "part-worth utilities" are determined mathematically. These can be examined for each factor to determine the optimal combination of characteristics for a final product. For example, using CA you may be able to determine that an item of clothing should be cotton (rather than linen or polyester), should have two layers of thickness (instead of one), and should be $19 (rather than $25 or $15). By presenting the attributes as combinations, researchers can measure both the stated and implicit value subjects place on each possible value for each factor.

Another frequently employed multi-criteria decision-making method, similar to AHP and CA, is TOPSIS, which aids in the prioritization task when multiple objectives must be satisfied. The problems are structured similarly to AHP problems, but a "positive ideal" solution and "negative ideal" solution are first constructed. The mathematical distance between those two solutions is determined, and each alternative is compared to that result. The final output is the "relative closeness" of each possible alternative to the best solution, which can be ranked to determine a final prioritization of features. Like AHP and CA, this method requires the use of statistical software or custom programming.

Stage III: Create Meaningful Customer Experiences

While VoC can be useful for uncovering customer preferences regarding pricing or product features, the goal of a truly insightful VoC process is to discover what constitutes a meaningful customer experience. Customer experience is built on the premise that while customers are often rational decision makers, they are also emotional and value experiences that are pleasurable, beneficial, and educational. Furthermore, they value experiences that allow them to co-create those values through their interaction with brands and companies. (Hwang and Seo, 2016)

Total Customer Experience (TCE) describes the end-to-end process that encompasses the social, physical, and emotional realities of the customer as they from the initial stages of awareness to the post-transactional "nurture" stage. (Hwang and Seo, 2016) With the democratization of technology contributing to a levelling of innovation in conjunction with increased customer expectations, customer experience has the potential to be a powerful differentiator and competitive edge for today's organizations. (Alcántara et al., 2014) The practice of Customer Experience Management (CEM) complements Customer Relationship Management (CRM) by negotiating the gap between customer expectations and customer experience and working to enhance customer loyalty. (Hwang and Seo, 2016).

Despite this, a universal definition of customer experience remains elusive. While some approaches consider customer experience to divide into positive and negative, other more holistic approaches see it as including values such as pleasure, learning, nostalgia, and fantasy along a continuum that matches the highs and lows of everyday life. (Hwang and Seo, 2016). A meaningful experience does not need to be something overwhelming or sublime, but something that reflects that values of the person having the experience in different stages of their existence. These experiences could also move beyond the mundane and become experiences that have a lasting impact on the well-being of the environment and the basic needs of cultures around the world. (Jensen, 2014) Experience is therefore more than simply solving the problem the customer has at hand: it becomes *something that explores the possibility of living and creating a good and meaningful life*. (Jensen, 2014)

VoC is the fundamental exercise that exposes the customer values that can help organizations create those meaningful experiences. Customers adopt products for instrumental usage when those products interact with and are seamlessly interwoven with the complex and profound systems that make up the customers' lives. VoC is therefore a critical input to the design process.

One of the most valuable ways to which VoC can be used is through the application of storytelling. Storytelling is how people and organizations create common cultures by sharing their knowledge and values to create emotional connections. (Beckman and Berry, 2009) Designers can incorporate storytelling into their process by using the VoC toolbox to learn how the customer views the narrative of their lives, the performative actions that

might confirm or contradict their interpretation of their experiences, and the workarounds that they could consciously or unconsciously incorporate into their lives as they negotiate the complex systems of their experiences on a daily basis. The stories the customer tells, whether overtly or tacitly through their behavior, become the inputs designers use to inspire new and innovative solutions that complement and delight customers. (Beckman and Berry, 2009) Designers learn from those stories (and become characters within them) as they find ways to inspire customers to adopt products that blend seamlessly and profoundly with the customer experience. These stories can also become structural narratives that inspire other customers and create new communities and cultural values.

Stage IV: Anticipate Future Needs

Capturing customer needs and desires is important, but being able to identify the needs that they will have in the *future* is the basis for innovation. Anticipating future needs is an active subject in marketing and quality management research. This section introduces several techniques that have been used to forecast or infer future needs. Because many of these methods are exploratory and not yet validated, this section only introduces a small sample of the kinds of approaches that may be used routinely in the future.

For example, Gotzamani et al. (2018) used multivariate Markov Chain models to capture the dynamic nature of VoC, and how it changes over time and in different contexts. They developed an adaptation of Quality Function Deployment (QFD), a qualitative tool to help organizations evaluate trade-offs and select product specifications that will meet customers' needs. Stansfield & Azmat (2017) have started exploring "artificial intelligence infused ISO 16355" to make QFD more responsive to the new data available from the Internet of Things (IoT) and sensor networks. Trainor et al. (2014) studied "social customer relationship management (CRM)" to see if customers' needs can be predicted or anticipated by the decisions their friends and social contacts are making.

Horizon scanning, the "systematic search for incipient trends, opportunities and constraints that might affect the probability of achieving management goals and objectives" (Sutherland
et al., 2011) has also emerged as a paradigm for capturing high level trends in VoC. Some software packages are now available to manage the collection, organization, and analysis of horizon scanning data that can contribute to understanding VoC. Ernstsen et al. (2018) recommend a 3-step horizon scanning process, specifically aimed to anticipate disruptive forces that should transform customer needs and requirements. The steps are: 1) Defining, 2) Identifying, and 3) Synthesizing. Most significantly, they recommend examining the following resources to anticipate future customer needs:

- Technology reports (e.g. by analysts including Gartner, IDC, Forrester, McKinsey)
- Industry-specific reports (from World Economic Forum, McKinsey)
- Conferences and seminars
- Technology conferences
- Foresight reports (by public authorities, governments, US agencies, European Union)

Ernstsen et al. (2018) also recommended that techniques like topic modeling and sentiment analysis should be applied to the horizon scanning resources to uncover future needs. The most critical requirement, however, is to embed horizon scanning into product design and development processes to adapt to newly emerging needs as soon as they can be detected.

Summary

Understanding customer needs and desires is important because it helps organizations develop high-quality products and services now – and helps drive innovation to meet customer needs in the future. In this article, we provided a four-stage process to help organizations in their VoC journey: identify customer needs, understand and prioritize needs, create meaningful customer experiences, and anticipate future needs.

Additionally, this article provided an overview of 22 techniques for extracting customers' stated needs, 11 methods for identifying implied needs, and 8 approaches for examining silent needs. Although the emphasis was on identifying VoC for new product development, the same techniques can be applied to the development of new services or continuous improvement of any offering. A robust, comprehensive VoC program will incorporate multiple methods from each of the three needs categories, and use techniques like storytelling to create and deliver meaningful customer experiences. Brandt (2018) provides detailed guidance about how to design systematic, repeatable processes to support a VoC program.

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