The Strategic Role of Customer Requirements in Innovation

Many managers believe they do a good job capturing their customer's requirements. In reality, they do not – and their failure to do so is preventing them from managing innovation as a key business process.

by Anthony W. Ulwick

In a study of 270 business executives conducted by the Florida-based consultancy Strategyn, it was found that 72% of marketing and development managers were satisfied with their company's ability to capture customer requirements. Given this perception, it is difficult for many managers to accept that the root cause of many failed product and service initiatives squarely falls on their *inability* to capture the customer inputs that development and marketing need to successfully manage innovation. How is this possible? Granted, managers experience little difficulty in collecting information from customers, but the problems they face stem from the *types of information* they collect and subsequently use as inputs when devising and evaluating new product and service ideas, segmenting markets, generating IP, measuring customer satisfaction and executing other strategic development and marketing activities.

In our 12 years experience with organizations across many industries, we have found that when gathering customer inputs managers tend to capture four types of information: solutions; design specifications; customer needs and customer benefit statements. Technically, all these types of information are "customer requirements" – and some may be useful for certain business purposes, but none of them – *especially* customer needs and benefits – are the types of inputs that are needed to successfully create new products and services and to transform innovation into a systematic and manageable business process. In fact, using these types of information often *causes* the failures managers are fervently trying to avoid. To date, many managers have failed to distinguish one type of information from the other – even though each type of information is distinctly different and drives the innovation process in a different direction.

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The inability to capture suitable customer inputs stems from a void that has existed for years in new product and service development, as no clear definition has yet been established as to exactly what denotes a good customer requirement. Nor has it been established as to what inputs are needed by development and marketing to effectively create, position and sell breakthrough products and services. As it turns out, there are certain types of information, that when used effectively, are able to transform innovation into a manageable and predictable business process. As we shall demonstrate, these types of information serve as the measures of performance that are needed to apply six-sigma thinking to innovation.

In the years we have studied and evolved the innovation process, we have identified three distinct types of information that must be captured from customers to measure performance. They are the "*jobs*" customers are trying to get done when using a product or service; the "*outcomes*" they are trying to achieve when performing these jobs in a variety of circumstances and the "*constraints*" that stand in the way of them adopting or using a new product or service. Jobs, outcomes and constraints are critical inputs to the innovation process because they represent the three primary avenues in which managers are able to achieve growth: (1) by helping customers perform ancillary jobs or new jobs that could not be performed before, (2) by helping customers better perform a specific job, or (3) by helping customers overcome the roadblocks that stand in the way of them performing a specific job altogether. For example, a cell phone manufacturer can achieve growth by enabling users to perform ancillary jobs such as obtaining driving directions and playing games; by better satisfying outcomes such as minimizing the time it takes to power up the device or preventing the likelihood of errors while dialing and by overcoming constraints to use, such as the inability to use the cell phone in certain buildings and in moving vehicles without the fear of the call being dropped.

When managers understand the jobs and outcomes their customers are trying to achieve and the constraints they are trying to overcome, they dramatically improve their chances for growth, as they know exactly where to create value – leaving less to chance. Before we define each of these types of information in more detail and explain how they transform the way development and marketing managers perform many of their strategic activities, lets make clear the differences between the types of information typically captured – solutions, specifications, needs and benefits – and demonstrate how they can negatively impact development and marketing activities. It is important for managers to see exactly what information they are using and how it may be hindering their ability to create the next breakthrough solution.

Gathering Customer Requirements

In the mid-1980's managers began to recognize that being *technology-driven* – the practice of creating new technologies and then trying to find markets for them – was an inefficient approach to managing innovation and led to many failed efforts. As a result, momentum shifted to the *customer-driven* movement, which required managers to first understand what the customer wanted before investing in the creation of a new product or service. As part of this movement, managers sought needed inputs from customers – and these inputs became known as "customer requirements". As the process for getting these inputs evolved, it became popular – and is still today – to capture just what the customer says and to use that information as an input into the innovation process. This approach is often referred to as capturing the "voice-of-the-customer".

Logically, focusing on the "voice-of-the-customer" makes good sense, as it requires companies to listen closely to customers – but this practice has two major drawbacks: First, customers do not know what types of information are needed to create better products and services so they voice their requirements in a language that is convenient to them – e.g., solutions, specifications, needs and benefits – but not appropriate for the creation of breakthrough products and services. Second, because many managers apply the "voice-of-the-customer" so literally, they use the exact statements customers make as inputs into the innovation process – without recognizing the differences between the types of inputs they are likely obtaining. As a result, they often fail to consider how these different inputs may affect the way they identify opportunities, segment markets, generate and evaluate ideas, position products and services, measure customer satisfaction and perform other strategic development and marketing activities.

Let's take a look at the most common types of inputs managers are obtaining from customers today and understand the distinctions between each and the ramifications of using them as inputs to the innovation process. [For a summary of the differences, see the sidebar titled – "*Many Voices of the Customer*".]

Solution: Many customers offer their requirements in the form of a solution, which includes statements of ideas, new concepts or suggestions for product or service features. A solution is the physical or tangible deliverable that is included in the product or service. For example, a manufacturer of razors may hear from customers that they want "triple blades", "a rubberized handle" or a "lubrication strip". Each of these statements represents a possible product feature or solution. Accepting solutions as customer requirements is common, but the practice is riddled with drawbacks. Most customers are not technologists, engineers or scientists and do not know the best solutions – as a result, giving customers the solutions they request often

leads to customer disappointment. This is not to say that a good customer idea shouldn't be considered – it should. However, when capturing customer requirements, managers should be looking to capture the criteria customers use to measure the value of a solution – not ideas for the solution itself. For example, the razor manufacturer should realize that users are trying to "minimize the number of nicks when shaving" and that a lubrication strip is just one way in which this criterion could be satisfied. As we will later demonstrate, understanding these measures of value is the key to successful innovation.

Specification: A specification is an input in which the customer states the desired size, weight, color, shape, look, feel or other product and service performance characteristics – in an attempt to shape the solution. For example, razor users may request that a razor have "a wider handle" or be "lighter in weight" or "have a sleek look". Each of these statements is an attempt to specify certain parameters of the design. The acceptance of specifications as inputs into the innovation process is common in many firms and especially common amongst government contractors, as the government often specifies just what solution they want delivered. Although this may be appropriate in certain situations, it again assumes the customer knows the best solution – which is oftentimes not the case. A wider handle, for example, may have been requested to prevent the razor from slipping out of the user's hand while shaving – and although a wider handle may be helpful, a superior solution may be a ribbed rubberized grip. In addition, customers rarely understand the ramifications of stating a specification. The razor user, for example, may be unaware that a wider handle will make it difficult to maneuver the razor in certain areas – negatively impacting other important outcomes. Accepting specifications as customer inputs inherently prevents engineers and designers from using their creative skills to devise superior solutions.

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Need: A need is a universal form of customer input and is typically stated as a high-level descriptor of quality. It is not uncommon for a customer to say that they want a product or service to be "reliable", "effective", "robust", "stable", "resilient", "consistent", "powerful", "resistant", "serviceable" or "dependable". Razor users, for example, may say they want a razor to be durable and strong. As defined here, needs are characteristically stated in the form of an adjective and inherently *do not* state a specific benefit to the customer. Although these simple statements provide some indication as to what customers are looking for, they are often vague in their meaning and ambiguous. While these statements may be useful for marketing

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communication and positioning purposes, they are near impossible to measure or control and as a result present designers, developers and engineers with the impossible task of trying to figure out just what customers mean by "efficient" or "reliable". If engineers faced the task of making a razor more "durable", for example, would they try to make the blade last longer, resist bending or withstand constant moisture? Would any of these actions satisfy the customer's true measure of "durable"?

In general, need statements leave too much to chance. This often leads to frustration and friction between marketing and development, as marketing believes they are providing developers with customer requirements and developers believe they are receiving useless information – which from their perspective, they are. Customers often state their requirements in this format as these statements generally sum up what they are looking for – but these need statements, in nearly all cases, are not precise enough to be useful inputs into the innovation process.

Benefit: A benefit is a statement – such as "easy-to-use", "faster", "better" or "cheaper" – that customers use to describe what value they would like a new feature or solution to deliver. A razor user, for example, may say they want a "better shave", "easy clean up", or "a faster shave". Like needs, these statements may be useful for marketing communication purposes, but here again, they present designers and engineers with information that is often ambiguous, un-measurable and in-actionable. In one study we conducted with Motorola cell phone users, for example, we found there were 21 different ways in which customers defined "easy-to-use". They included, for example, outcomes such as "minimizing the time it takes to look up a needed phone number", "minimizing the likelihood of calls being made by inadvertently hitting the key pad" and "minimizing the time it takes to dial a number without looking at the keypad." Without understanding exactly what is meant, and which measures of value are most important, managers run the risk of focusing on the wrong opportunities and making the wrong design trade-off decisions.

It is important for managers to know just what types of information they are obtaining when capturing the "voice-of-the-customer". Many firms knowingly or unknowingly capture a combination of all these types of information and attempt to use them all – adding to the confusion. What many managers fail to recognize, however, is that none of these types of information provide developers, engineers, marketers and others with the inputs they need to devise breakthrough solutions and transform the innovation process into a predictable discipline. As we shall demonstrate, being customer-driven is just not enough – managers must become *outcome-driven*.

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What Types of Customer Inputs Are Needed?

Innovation is the process of creating product and service solutions that deliver customers new and additional value. To master the innovation process, managers must be able to devise solutions that better satisfy the criteria customers use to measure value. The question is – what criteria do customers use to measure value? As it turns out, customers measure the value of a product or service based on (1) its ability to help them perform one or more jobs, (2) the degree to which their desired outcomes are satisfied when using the product to perform those jobs and (3) the degree to which their constraints are overcome so they are able to perform those jobs in all necessary circumstances. The thinking applied here is not foreign to most organizations.

To improve and streamline internal business processes, companies have over the years adopted six-sigma and other quality improvement programs, which require managers to define and measure performance along a key set of metrics. These metrics are often internally defined and become the focus of quantifiable process improvement and increased customer satisfaction. Such quality efforts have led to significant improvements in many key business areas. This six-sigma approach can be applied to the creation of valued products and services as well, but it must be recognized that it is different from typical applications along two important dimensions.

Rather than using *internally* defined metrics to address *business* processes, when it comes to innovation managers must apply *externally* defined metrics to the *job-related* processes customers are trying to execute when using a specific product or service. It is these fundamental differences that provide insight into the types of information that are needed to manage the innovation process. Let's explain.

In our study of new and existing markets we find that customers – people and companies – have "jobs" with functional dimensions to them that arise regularly and need to get done. When customers become aware of such a job, they look around for a product or service that they can purchase to get the job done. When shaving – or more specifically, executing the hair removal process, for example, a man may purchase a blade and shaving cream or an electric razor and after-shave lotion to get the job done. A woman may purchase a hair removal strip or a hair removal lotion. Similarly, a customer wanting to avoid financial loss may purchase an insurance policy or an options contract for protection. As a rule, customers purchase products and services to help them execute a job – whether it is hair removal or financial protection. It is these jobs around which performance metrics must be captured in order to create predictable improvement. Understanding the jobs customers are trying to perform – and the steps associated with executing those jobs – is the first customer input needed to create new growth through innovation. [For

more information on how our outcome-driven thinking is being applied to better manage innovation, see *The Innovators Solution* by Clayton Christensen, HBSP, Chapter 3.]

We have also discovered that when customers hire a product to get a job done, they use a set of metrics – measures of value, if you will – that define what outcomes must be achieved in order for the job to be done perfectly. We call these metrics their *desired outcomes*. [*The concept of desired outcomes was first introduced in the January 2002 issue of HBR – Turn Customer Input Into Innovation*]. When executing the hair removal or shaving process, for example, customers may want to minimize preparation time, minimize the number of nicks, prevent skin irritation and minimize the number of passes that must be made to remove all hair. More outcomes are likely with highly functional products such as medical devices, phones and computers, than with less functional products such as soda or soap. Collectively, it is common for customers to state between 50 and 100 unique desired outcomes when describing how they measure the successful execution of a specific job. If a product were to satisfy all the outcomes completely, customers would be able to execute the job perfectly.

Not surprisingly, we have noted the some managers indeed capture desired outcomes from their customers, but they rarely capture more than a handful or distinguish outcomes from solutions, specifications, needs or benefits. In addition, they do not consistently capture outcome statements in the same format and they often do not understand the benefits of using outcomes as inputs into the innovation process. Recognizing that only desired outcomes need to be captured from customers – not needs, benefits, solutions or specifications – is the first step in overcoming the challenges posed by the use of traditional research methods.
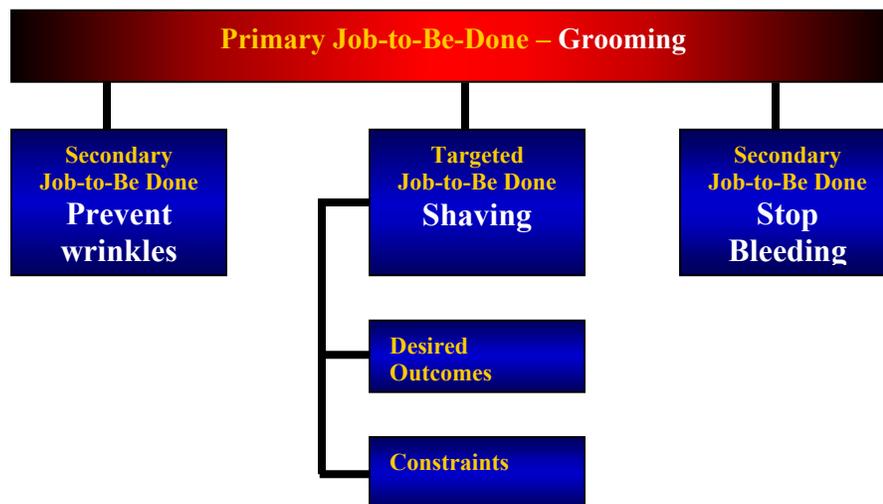
As stated by Microsoft research manager Jeff Baker, "at Microsoft we've been pursuing customer-centric, voice-of-the-customer market research for some time. While we did have some success with this in getting closer to our customers, over time product planners and developers would too often say, 'this information is not actionable' and 'I don't know what to do with this.' Similarly on the marketing side, we got to a point where customers were telling us 'your high level messages are correct, but where's the detail to back it up?' It wasn't until we started using a framework that categorized customer inputs into solutions, specifications, needs and benefits that we realized we were missing something at a deeper, more fundamental level – the customer's *desired outcomes*. We are now on the road to institutionalizing across the entire company desired outcomes as the essential form of customer input we collect in research, and we've already seen the powerful results it's had in our product development, marketing and sales groups."

In the development environment, desired outcomes *replace* the typical data inputs used by teams to devise new products and services. In the marketing communications and selling

environment they *complement* the use of needs and benefits, providing the detail that is needed to connect more solidly with customers.

As a third customer input, we have discovered that it is beneficial to understand the *constraints* that stand in the way of customers using a product or service to execute a job. These constraints often identify roadblocks to success. Users of hair removal products, for example, may not use a product that "causes pain" or "makes noise that awakens others when executing the hair removal process". These constraints may prevent users from executing the job altogether – inhibiting them from purchasing a product or service. Other constraints prevent the use of a product under certain circumstances. Finding new ways to overcome these two types of customer constraints often creates an excellent opportunity for growth, as we shall demonstrate later.

To understand the ramifications of being able to capture each of these types of information from customers let's examine them in turn and highlight the ways in which they transform many development and marketing activities, change organizational behavior and bring needed discipline to the innovation process.

<table>
<tr><td colspan="3">**Primary Job-to-Be-Done – Grooming**</td></tr>
<tr>
<td>**Secondary Job-to-Be Done**
Prevent wrinkles</td>
<td>**Targeted Job-to-Be Done**
Shaving</td>
<td>**Secondary Job-to-Be Done**
Stop Bleeding</td>
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<tr><td></td><td>**Desired Outcomes**</td><td></td></tr>
<tr><td></td><td>**Constraints**</td><td></td></tr>
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Jobs-to-be-Done – A Key Input For Growth

Understanding the jobs that customers are trying to get done when using a product or service is critical, as it dictates the area in which performance metrics – or desired outcomes – must be captured. Knowing what job a product or service is designed to perform is fundamental to success. What is less obvious, however, are the growth possibilities that may result from knowing what *other* supporting or related jobs customers may be interested in performing when

using a specific product or service. This information often holds the key to new growth opportunities. [*See graphic above*.]

As we mentioned earlier, people hire products and services to help them perform a job, but it is often the case that these jobs are not executed in series – as customers may be attempting to execute other jobs simultaneously or in conjunction with the primary job of interest. Discovering what other jobs customers are trying to perform – and determining which are poorly satisfied – opens the door to new opportunities for growth. It is often the case that 10 to 20 other jobs may be of interest. Users of a razor, for example, may not only want to remove hair – they may also want to "prevent skin dryness", "prevent wrinkles and the aging of skin" or to "stop bleeding when nicked", an activity that occurs outside the normal shaving process. The users of a Sony Walkman may not only want to listen to music – they may also want to learn the words to a song, learn more about the artist or learn when and where the artist will be playing in concert.

Offering solutions that address these ancillary and related jobs often results in the creation of a breakthrough product or service – or combinations of both. Take Apple's IPod, for example, which is a portable MP3 player that not only lets users listen to music, but also enables them obtain new songs (legally) and organize and manage their song libraries as well. Helping users perform these related jobs by combining complementary products and services has enabled Apple to quickly gain dominance in the portable music player market with a product that is considerably more expensive than those produced by its rivals.

As another example, beverage producers are putting out products that not only satisfy a thirst, but also enable users to obtain the vitamins, nutrients and herbs that are needed to improve performance in a given situation. SoBe Beverages, Red Bull Energy Drink and Glaceau Vitamin Water all address the related functional jobs customers are trying to perform when quenching a thirst – and products such as these now account for a sizable percentage of beverage sales. In a related trend, we also see orange juice producers adding calcium to their products in an attempt to help users replace needed minerals.

It is often the case that users of a product or service are trying to perform more than one job at a time. Companies, however, tend to focus their product and service offerings on only one job because addressing the ancillary jobs often requires them to develop new or different competencies or to cross organizational boundaries. Developing these competencies may require new skills and investment, but addressing *all* the jobs customers are trying to get done under a given set of circumstances can pay great dividends.

Desired Outcomes – Metrics That Drive Innovation

For every business process there exists a set of metrics that can be used to measure its successful execution. With the right metrics in hand, managers are able to put the programs in place that will over time control process variability and ensure its perfect execution. In a similar fashion, for every job customers are trying to get done there exists a set of metrics that can be used to measure how well that job is executed. If a job is well executed across all the key dimensions of performance, than the job will – in the eyes of the customer – be executed perfectly.

The key here of course is to obtain the right metrics against which to measure performance and, not surprisingly, these metrics *must* come from the customer. It is this point that presents the rub, as customers do not naturally voice the metrics they use to judge value. So to capture these metrics, managers must not expect to capture the voice-of-the-customer, rather they must expect to engage customers in conversation that is designed to extract the information they need – the customer's desired outcomes. Although this represents a sharp departure from traditional requirements gathering practices, it does *not* present an impossible task. As it turns out, when probed, customers are very capable of stating the desired outcomes they are trying to achieve – providing more insight than well-tuned observational or anthropological techniques. In fact, in a typical one-hour interview it is not uncommon to capture between 20 and 30 desired outcome statements from a single customer. When asked for their measures of value while shaving, for example, customers may say they want to:

- Minimize the time it takes to prepare the skin for hair removal
- Minimize the frequency of nicks
- Minimize the number of passes that must be made to remove unwanted hair
- Minimize the frequency with which hair must be removed
- Increase the number of times the tools can be used before it becomes ineffective
- Minimize the likelihood of skin irritation
- Minimize the likelihood of in-grown hairs
- Minimize the number of hairs that cannot be reached
- Minimize the frequency with which hair removal is required

When all the outcomes are captured, they represent the measures of performance for each step of that job. What is important for managers to know, however, is the precise format in which outcomes must be captured so they can be used effectively by development and marketing throughout all subsequent stages of the innovation process. To that end, managers should be aware that desired outcomes are unique in that they state a direction of improvement (minimize or increase), contain a unit of measure (number, time, frequency, etc.) and state what outcome is

desired. More importantly, it should be noted that desired outcomes, when captured correctly, are stable over time, since they represent measures of performance that are inherent to the execution of a specific job. Consequently, they are applicable as long as customers are trying to get that job done, providing the firm with long-term as well as short-term direction. Desired outcomes are analogous to the metrics that are used internally by managers to measure the effective execution of a key business process and are essential to applying six-sigma thinking to the process of innovation.

As we shall demonstrate later, these metric-orientated statements can be used throughout the innovation process to help development and marketing managers overcome numerous historical roadblocks to success. For example, they are useful in uncovering areas of opportunity, segmenting markets, conducting competitive analysis, brainstorming ideas for growth, evaluating ideas, generating intellectual property, communicating value to customers, selling products and services and measuring customer satisfaction. They are also useful in changing organizational behavior, as they provide employees with a basis for agreement and a shared direction.

Constraints – Roadblocks to Success

Managers are often curious why some customers adopt the use of a product while others do not. They may also wonder if customers are getting the full value out of their products or services. Constraints that prevent customers from (1) gaining a product's full utility or (2) prevent them from using a product altogether represent significant opportunities for growth.

As an example of lost utility, let's look at J&J's LifeScan division and its competitor, Roche – both manufacturers of blood glucose monitoring devices. These test kits are used by diabetic patients to obtain blood glucose readings, enabling them to better manage their diabetic condition. LifeScan, who led this market in 1999, saw that market leadership position change hands in 2001, after Roche discovered a constraint that hindered product use.

As it turns out, when diabetics are suffering from a severe diabetic condition, they often experience shaky hands and blurred vision, making it impossible for them precisely place a blood sample on the small test strip and place the strip in the device to obtain a reading. As a result, when they needed the device the most, ironically it could not be used. This situation represented a constraint to use – and an opportunity to Roche who in 1998 introduced the Accu-Chek® Comfort Curve®, a product that eliminated the need for accurate blood placement on a strip – making it possible for diabetic patients to take readings when suffering from a diabetic episode.

Helping diabetics overcome this constraint to use in an important circumstance enabled Roche to increase their market share from approximately 28 percent to 45 percent in two years

and to take over the leadership position. J&J acquired another company, Inverness Medical Technology in 2001, to help fill the gap and many LifeScan employees lost their jobs. Much of this could have been avoided if they had identified this constraint first – and taken the action to address it.

In this market we also find that there are constraints to use, as many diabetic patients refuse to use a device that requires them to prick their finger to obtain a blood sample. As a result, we see companies developing products that do not require patients to provide blood samples. Done correctly, this will likely be the next generation of successful a blood glucose monitoring systems.

To understand customer constraints, we often ask users of a product to explain under what circumstances they are unable to use a product and obtain the desired results. We also often ask non-users to tell us what constraints are preventing them from adopting or using the product or service. It should be noted that not all constraints can be overcome, but knowing they exist provides managers with the information they need to potentially generate new growth.

Applying Outcome-Driven Thinking to Innovation

Let's take a look at how this outcome-driven approach to innovation moves away from using the sub-standard inputs that have for years plagued the customer-driven movement and enables companies to strategically reinvent themselves.

Uncovering Areas of Opportunity: Historically, when managers talk about uncovering areas of opportunity, they are often referring to identifying new ideas and solutions from customers and others. These solutions, it is believed, represent opportunities for growth – and if the right ideas are pursued and delivered, the opportunity is recognized. This thinking is backwards, as solutions are the means by which opportunities are addressed – they are not opportunities in-and-of themselves. To find growth opportunities, managers must be able to determine how to create more value for customers. This is only possible if they are actually able to determine how customers measure value and identify which dimensions of value represent the greatest opportunity for improvement.

In an outcome-driven environment, areas of opportunity are defined as under-served desired outcomes – that is the desired outcomes that customers want to achieve, but are unable to do so satisfactorily when performing a specific job with the tools currently available to them. These under-served outcomes identify which measures of performance customers want to see improved – and where they would recognize the delivery of additional value. If razor users felt that "minimizing the number of nicks" was an important and unsatisfied outcome, then they

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would value a product that helps them better satisfy that outcome. Conversely, the outcomes that are unimportant and/or already satisfied represent little opportunity for improvement and as consequently should not receive any resource allocation.

It is also possible to discover opportunities for growth by determining what ancillary or related jobs are underserved by the current product or service. If it turns out that "preventing skin dryness" is an important and unsatisfied job, then customers would value a product that would help them perform that job more effectively. This opportunity area often goes unexplored and yet offers tremendous growth potential.

Using outcome and job statements, rather than solutions or other types of data to define where opportunities lie provides managers with quantifiable, tangible measures along which to innovate products and services. These measures represent solid opportunities for improvement and growth. As stated by Andrew Reed, the VP of Bosch Tools and Services for Robert Bosch Tool Corporation, "focusing on customer outcomes enabled us to uncover a dozen opportunities for improvement in a very mature circular saw market, many of which were previously unknown to our development team. As a result, we departed from many of our traditional design characteristics. For example, we devised a clever mechanism that prevents users from cutting the cord and catching the plug on the material when making a long cut. This was accomplished without inhibiting their ability to use the cord to lower the tool from a ladder to the ground. In addition, we devised a way in which the user could continue to see if the cut is on track when approaching the end of the cut. Currently the saw itself covers the material, blocking the users vision. We also devised new ideas to prevent tool theft and address the other opportunities for improvement. The products that resulted from this insight have generated more interest than any other circular saw product we have created to date. We also used this information to convince retailers such as Home Depot and Lowes to carry the product. Showing them something they did not know dramatically simplified the often difficult task of securing the distribution channel."

Segmenting Markets: It is rare even today that a company employs a segmentation scheme that satisfies the basic tenets of solid segmentation theory; i.e., segments that are homogenous in membership, predictable in behavior, different from one another and reachable through marketing and sales efforts. The reason for this non-compliance, in our view, is two-fold. First, many managers find it more convenient to group customers into attribute-based categories such as product type, price point, age, business size and other demographic or psychographic classifications, because it makes it easy for them to identify, collect, track and analyze customer data. Second, companies have yet to discover an effective method to identify truly homogenous groups of customers, offering them few alternatives. Those managers who

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have experimented with "needs-based" segmentation, for example, often complain of segments that are heterogeneous in membership, difficult to target and fail to offer a predictable model of customer behavior. This is not surprising, given the inherent vagueness of most stated needs.

Elevating marketing theory from the use of convenient demographic or psychographic classifications or traditional "needs-based" segments to one that is based upon what customers want to achieve when using a product or service is a critical prerequisite for helping firms to break free of the apparent randomness of successful new product introductions. According to Harvard Business School Professor Clayton Christensen in his book, *The Innovator's Solution*, "It is only if managers define market segments that correspond to the circumstances in which customers find themselves when making purchasing decisions, that they can accurately theorize which products will connect with their customers. When managers segment markets in ways that are misaligned with those circumstances, market segmentation can actually cause them to fail – essentially because it causes managers to aim their new products at phantom targets."

What makes outcome-based segmentation particularly intriguing is that it enables managers to identify and size markets that have yet to emerge. Let's explain. Managers often rely on financial data to determine the size of a market in terms of the revenue it has generated in the past. Using this measure, markets for which products have yet to be developed cannot be measured, as they have yet to generate revenue. Outcome-based segmentation, on the other hand, makes it possible to identify and size a market from a non-financial perspective.

Take the "day-trader" segment in the securities market, for example – which was created and led by E-Trade. From a traditional market measurement and segmentation perspective, the "day-trader" market showed little revenue potential or growth in the early 1990's. At the time, traders who wanted to make many transactions within short periods of time could only do so by holding a seat on the Board of Exchange. With a limited number of seats – and a seat price that exceeded the annual incomes of most people – it is not surprising this market was relatively small from a revenue-producing perspective. As a result, companies were discouraged from making investments in this market.

However, if companies such as Merrill Lynch studied the market using an outcome-driven lens, they would have seen a very different picture. Throughout the 1990's, when hiring products to make trades, many people wanted to "increase the number of trades that could be made per day", "minimize the time it takes to complete a trade" and "minimize the cost of making a trade." Using outcome-based segmentation – managers would have found precisely how many traders found these outcomes to be both important and unsatisfied. The percentage of people in this segment – and the size of the market – would have been defined. The reality is, the market already

existed, but potential traders were waiting for a viable solution to arrive before making a move. When it did, they were quick to act, generating revenues for companies such as E-Trade and thus establishing the day-trader market from a traditional, financial perspective.

The inherent characteristics of outcome-driven segmentation provide managers with a proactive means by which to search for new growth opportunities. [For more information on outcome-driven segmentation, see the working paper by Anthony W. Ulwick titled, Outcome-Based Segmentation.]

Conducting Competitive Analysis: Managers typically conduct competitive analysis by comparing product specifications. In many high-tech industries this is referred to as comparing speeds and feeds. Computer products, for example, are often evaluated by looking at hard disk capacity, amount of memory, DVD drive speed, screen size and processor speed. Although these product specs may offer some insight into a product's strengths and weaknesses, they assume that customers measure value along these same dimensions – which they do not. Instead, customers measure value based on a product's ability to help them execute a job and achieve important outcomes. It is this faulty logic that undermines many competitive analysis activities.

In contrast, by using the 50 to 100 desired outcomes and job and constraint statements as metrics against which to compare the performance of competitive products, managers are able to gain unique insight into how well products perform against the customer's measures of value. Rather than comparing speeds and feeds, PC manufacturers, for example, are able to compare which computers are best at helping customers "minimize the time it takes to load all needed programs at start up", "minimize the time it takes to switch from a dial-up to a LAN connection to retrieve e-mail" or "minimize the frequency with which data is lost". Knowing which product best satisfies these and the dozens of other customer desired outcomes provides developers and marketers with detailed insight into each manufacturer's competitive strengths and weaknesses – and precise measurements against which to take action if needed. In a typical outcome-driven scenario, managers not only know how well each competitor performs along each dimension of value, but they also know which outcomes are most important – so resources can be quickly allocated to overcome the weaknesses that are most debilitating.

What is more interesting, however, is that with this information in hand, managers are often better off *ignoring* their competition and focusing specifically on their customers' measures of value. United Technologies Pratt & Whitney Aircraft division, for example, found that by measuring their performance against the customer's prioritized outcomes – instead of comparing specifications with competitive products – they were able to spend much less time second guessing their actions and felt much less compelled to blindly copy the actions of their

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competitors. With a focus on what their customers wanted – rather than on what their competitors were doing – this division managed to increase customer satisfaction by 35% over a 2-year period and they accomplished this without being distracted by the often-misguided actions of their competitors.

Brainstorming Ideas for Growth: The biggest drawback to most brainstorming and idea generation efforts is management's inability to inform employees where their creativity should be focused. Because managers do not have the information they need to help focus employee creativity, employees spend much of their time and effort thinking about ideas that deliver little customer value. If a razor manufacturer does not know that "minimizing skin irritation" and "reducing the number of nicks" are important and unsatisfied outcomes, then how can employees focus their creative energy in a way that will ensure value creation? It is this lack of insight that slows the idea generation process, as managers often apply a shotgun approach to brainstorming and ideation activities. Employees think about product, distribution, pricing, service and advertising issues and generate hundreds of ideas across all disciplines, bogging down and already complex process to the point where inaction is commonplace.

This issue is overcome when managers and employees alike know what jobs customers are trying to get done and what outcomes they are trying to achieve – and know in advance which of these jobs and outcomes represent opportunities for improvement. With this knowledge, employees are able to focus their creativity, with precision, on the under-served jobs and outcomes. If managers knew that "stopping bleeding when nicked" and "minimizing skin irritation" were underserved jobs and outcomes respectively, then they would be able to focus company creativity and resources on creating new value along those dimensions. The chance of employees coming up with a valuable idea is far greater if they know just where to focus their attention – certainly more so than when using the typical shotgun approach. Paul Zarookian, Executive Vice President of AIG's insurance premium finance division, whose team focused on desired outcomes when improving AIG Credit's relationship with its agents and brokers says, "Knowing where to focus our creativity made all the difference in the world. The process provided a clear prioritized list of customer generated opportunities. This resulted in new ideas for operational process changes and web-based services. As important, the information prevented us from expending resources on service functions our agents would deem of little value. We are confident that we have devised a breakthrough solution, providing us a competitive advantage."

As the A.I. Imperial team worked their way through the idea generation sessions, they made several worthwhile observations. First, they recognized that many of the ideas they generated did not require new technology or invention; rather, they were clever applications of

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existing technology, focused on satisfying specific customer outcomes. This helped to dispel the myth that innovation is dependent on the creation of new technology.

Second, they observed that their breakthrough solution was not the result of any one big idea or feature. Rather it was the result of many ideas or features brought together to collectively add significant value to the overall offering – without inadvertently diluting value along other important dimensions.

Evaluating Ideas: With hundreds of ideas to consider, managers must be able to determine which ideas to pursue and which to forego. Unfortunately, the concept evaluation techniques used in the customer-driven environment rarely produce accurate or optimal results – and once again the cause can be tied to *not* having the right type of information.

Several approaches are common. For example, some managers simply choose to select ideas that have intuitive appeal, are easy to implement or can be more easily justified from a financial perspective. Other managers may put ideas through a willowing process that filters out those ideas that do not fit the current business model or meet other stringent metrics that are internally defined. More disciplined managers may use customer focus groups – where customers offer their opinions as to which ideas they like best. In less disciplined environments, politics and personal goals may be a driving force and an idea may be chosen not on its merits, but because it is backed by a powerful executive, an aggressive engineer or a convincing marketer who hopes to see his product go to market.

The underlying problem with each of these methods is that they do not incorporate the customers' measures of value into the evaluation process and they fail to consider just how much customer value the ideas will likely deliver. In the outcome-driven environment, ideas are evaluated for their ability to satisfy the outcomes that customers are trying to achieve when performing a job. Thinking of the 50 to 100 desired outcomes as metrics in a "Customer Scorecard", managers (using an internal team – not customers) are able to measure the degree to which each idea satisfies the set of outcomes. A solution that satisfies all the outcomes completely – and gets the job done perfectly – delivers 100 percent of all the value that is desired. Using this method, the amount of value delivered by all proposed ideas is quantified along this scale, enabling managers to determine just how much more value one idea is likely to deliver over another – and more importantly, how much more value each idea is likely to deliver over current offerings and competitive solutions as well. The strengths and weaknesses of each solution can also be identified and the failures can be avoided.

When J.R. Simplot used an outcome-driven approach to improve their French fry product offering, they were able to eliminate several ideas from consideration and devise others of

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significant value. Business Development manager Kim Westover says, "The ability to quantify our ideas against the customer's measures of value really changed our plans – in fact it completely reordered our development priorities. Using this approach we were able to generate and validate exciting ideas that we never would have uncovered using traditional methods. Several ideas showed dramatic improvement over currently marketed products. One idea, which we had previously ignored, turned into a star project, after we saw how it addressed many key opportunities for improvement across a large percentage of the market. This information collected as part of this effort clarified and substantiated precisely what actions our designers needed to take to create exciting products. As an important side benefit, time and energy formerly spent on lobbying was eliminated as project selection was based on the use of outcome-based tools rather than on the salesmanship of a champion." We often find that this basis for agreement enables managers to maintain their conviction in the face of opposition, as they are able to quantitatively defend their positions.

Taking the guesswork, emotion and variability out of the evaluation process brings discipline and predictability to the innovation process. As a result, managers are able to predict, in advance, which ideas are worth pursuing and which are not. They are also able to identify those situations in which a new idea may add value along certain dimensions but perform poorly along a set of outcomes that have a greater customer importance. Failing to make the right design trade-off decisions and delivering solutions that miss the mark are common causes of product failure that are avoided in the outcome-driven environment.

Generating Intellectual Property: Companies invest millions of dollars in intellectual property (IP), but ironically over 95 percent of all issued patents fail to result in a successful product or service, as no method exists – in the customer-driven environment – to determine which ideas are likely to be valued by customers. In the outcome-driven environment, however, companies are able to measure – in advance of development – the amount of value generated by a new idea and as a result can spend less time pursuing and protecting IP of little value and invest only in IP that addresses important and unsatisfied outcomes. More importantly, they can be proactive in generating IP that creates and sustains a valued competitive position.

Motorola's Radio Technology Group, for example, used this approach to advance their position in fuel cell technology, as they were able to determine that customers not only wanted fuel cells to provide power, but also wanted them to allow uses to quickly determine how much fuel remained; minimize down time while recharging; minimize performance degradation as fuel was depleted; prevent damage from overcharging; and minimize fuel depletion while the device

was not in use. When examining existing patents, they found that their competitors had ignored the creation of IP relating to many of these aspects of fuel cell technology commercialization.

With the intention of creating a broad patent fence – and knowing just where to focus their knowledge – Motorola convened a team of physicists, engineers and technologists and systematically formulated patentable ideas that addressed the most important and least satisfied desired outcomes.

They found this approach changed the way they thought about innovation. Rather than trying to find markets for new technologies, they were devising new technologies for the express purpose of driving value in a specific market. They knew if they could come up with an idea that addressed the measure of value then that idea would be worthy of protection. They also found that applying discipline to the creative process did not hinder creativity – rather it channeled it in the right direction so the desired result, e.g., a valuable and patentable idea, could more likely be achieved.

With many of these patents now issued, Motorola has systematically created a valuable patent fence – making it difficult for others to address the opportunities that will lead to the successful commercialization of the next fuel cell technology. Interestingly, they accomplished this feat without making large investments in high-risk technology development. As stated by Motorola technology manager Dr. Bob Pennisi, "this proactive, outcome-driven approach radically changed the way in which we approached the job of generating IP. Instead of wasting time and resources generating and protecting ideas of little value, we knew exactly where to generate IP that would bring value to customers while creating a valuable asset for Motorola."

Communicating Value to Customers: As part of the marketing effort, managers must find the best way to position their products and services in order to sell the most units possible. In the customer-driven environment, this often results in companies making claims about their products and services that are not well supported. For example, positioning a product around a set of need statements such as "reliable", "consistent" and "robust" or a set of benefit statements such as "faster", "better" and "cheaper" is ineffective because these types of statements are ambiguous and subject to many interpretations. As a result, making the claim that a razor is "easy-to-maneuver" because it has a rubberized handle, for example, may arouse suspicion from customers who measure "easy-to-maneuver" in terms of the razor's ability to "minimize the frequency of nicks when shaving across the jaw line" – an outcome that the rubberized handle and other product features may not satisfy at all. When this level of precision is missing, it eventually leads to a decline in customer loyalty, as customers perceive the broader claims to be

misleading. This may explain why consumers find Ford's claim that "Quality is Job One" and Aetna's claim of "Turning Promise Into Action", are difficult to believe.

In the outcome-driven environment, managers are able to position a product, service or company with precision – making it possible to connect more solidly with customers. Using outcomes as the key input, managers know all the measures of value that must be satisfied by a product or service before a broad claim can be made without the fear of eroding customer loyalty. If a razor manufacturer, for example, knew all the outcomes associated with razor safety, they would be able to design product features to address each of the dozen or so outcomes before making the claim that their product was the "safest" razor available today. If their product addressed one or more outcomes – but not all – the product could be positioned along those dimensions with more precision.

Selling Products and Services: Many sales strategies specifically direct the sales person to uncover the customer's needs and benefits and work to find a solution that satisfies those needs. Because the sales person is initially obtaining ambiguous information – e.g., statements such as easy-to-use, reliable, efficient and safe – they end up missing the target when presenting their case for their products and services.

In the outcome-driven environment, the sales force is educated – in advance – on the jobs the customer is trying to get done, the specific desired outcomes they are trying to achieve, the outcome-based segments that exist and the key constraints to purchase. Armed with this information, the sales organization is in a much better position to speak to the customer in a language they understand and to find for them the right product or service. In addition, they are less likely to push an unwanted feature or to talk about benefits that are not of interest. Knowing just what customers are trying to achieve makes the sales process more precise and focused.

Measuring Customer Satisfaction: When measuring customer satisfaction, many managers ask customers to tell them how well a product, service or company performed along a number of different dimensions. These measures are usually stated in the form of needs or benefits. For example, many hotels ask customers to rate satisfaction based on attributes such as "friendliness of staff", "cleanliness of rooms" and "quality of food". Although these statements provide some insight into a potential strength or weakness, they are not predictive of future success nor do they offer insight into where action should be taken in the event of a low satisfaction rating – making them in-actionable. For example, if high ratings are received over a 3-month period, this does not ensure that high ratings will be received over the next 3-month period, as the metrics that are driving those high scores are unknown, not measured and as a result unmanaged. In addition, if a hotel manager finds they are doing poorly on "friendliness of

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staff", they do not know precisely what action to take. Should they train the check-in group, the bellboys, the room service staff or the hotel operator? Since the measure of customer value is unknown, so is the needed course of action.

When using desired outcomes as measures for customer satisfaction, these issues are resolved, as managers are able to understand not only what to measure and control in the delivery of the service in order to predict future success, but they are also able to determine what to do when deficiencies are uncovered – such as "increase the number of returning guests that are greeted as such when checking in" or "minimize the time it takes to remove room service carts from the room." Using the typical 50 to 100 metrics as data points, managers are able to gain the precise inputs they need to better manage and control the delivery of a service or the performance of a product. By comparing satisfaction along these dimensions, an accurate gauge of customer satisfaction can be obtained – bringing accountability into the customer satisfaction model.

In each of the development and marketing disciplines we have discussed above – from identifying opportunities to measuring customer satisfaction – an outcome-driven focus transforms the way in which performance is measured and success is achieved.

Closing

As in most disciplines, managers need a common language around which to discuss issues and build a shared understanding. The innovation process is no different. Knowing that jobs, outcomes and constraints are desired inputs and that solutions, specifications, needs and benefit statements hinder the successful execution of the innovation process gives managers a new language to consider when talking with customers and employees. Using this common language – and using desired outcomes as the metrics for six-sigma thinking in innovation – managers are better positioned to transform innovation into a manageable business process.

Today, very few employees in any firm know *all* the jobs that customers are trying to get done, *all* the outcomes they are trying to achieve and *all* the constraints that are standing in the way of product use. Improvement is inevitable when *all* employees across a firm have access to this valuable information and are empowered and motivated to use it to create customer value.

Adopting an outcome-driven philosophy is indeed the first step in applying six-sigma thinking to innovation. Without the proper inputs, the innovation process will remain an art. However, those managers who know what types of information to look for – and what types to ignore – will be on the forefront of transforming innovation into a manageable business process.

Many Voices of the Customer

By Anthony W. Ulwick

Development and marketing managers are responsible for identifying opportunities for growth, segmenting markets, conducting competitive analysis, generating and evaluating ideas, generating IP, communicating value to customers and measuring customer satisfaction. Interestingly, they are dependent on obtaining information from customers in order to successfully perform these activities, making the "customer requirements" gathering process one of the most critical business processes.

What is surprising then is the lack of precision that exists in capturing needed customer inputs. Listening to the "voice-of-the-customer" has been the marketing mantra for the past decade, and although great strides have been made as a result of the customer-driven movement, the 'voice' that managers are listening to needs to be refined in order for marketing and development to be more successful. It is no longer sufficient for mangers to simply gather customer requirements. Rather they must know precisely what types of information are needed and what types of information they are collecting in order to create a more accountable model of innovation.

The table below summarizes the types of information that are typically collected when talking with customers and contrasts those with the types of inputs that are needed to better manage their development and marketing activities.

The Customer-Driven Environment – "Voice of the Customer"			
Solution	**Specification**	**Need**	**Benefit**
A solution is the means by which a need or outcome is satisfied. A solution is often stated as an idea, a concept or a product or service feature.	A specification is a design parameter for a product or service. Size, weight, color, shape, look and feel may be specified by a customer.	A need is a high level descriptor of quality and is often summarized in a statement such as robust, reliable, effective, fresh, consistent and resilient.	A benefit is a statement such as easy-to-use that customers use to describe what value they would like a new feature or solution to deliver.
Razor solutions, for example, may include:	Razor specifications, for example, may include:	Razor needs, for example, may include:	Razor benefits, for example, may include:
• Triple blades • A rubberized handle • A lubrication strip • A more powerful motor	• A wider handle • Lighter in weight • A sleek look • Titanium blades	• Durable • Dependable • Sturdy • Strong	• Long lasting • Faster shave • No slip grip • Lower cost
Giving customers the solutions they request often results in the creation of "me-too" products and services. Customers are rarely qualified to suggest a breakthrough solution.	Designing products and services to meet a customer specification is dangerous as customers fail to consider all the design trade-off decisions that must be made.	Need statements are often vague and ambiguous, making it difficult for engineers and developers to determine precisely what to do to create customer value.	Benefit statements are often stated at a high level and do not provide the precision needed to determine just how to improve product or service performance.

The Outcome-Driven Environment – Customer Desired Outcomes	
A desired outcome defines what customers are trying to achieve and how they measure value when hiring a product to get a job done. Desired outcomes are unique in that they state a direction of improvement (minimize or increase), contain a unit of measure (number, time, frequency) and state what outcome customers are trying to achieve. Desired outcomes, when captured correctly, are also stable over time, as they represent measures of performance that are inherent to the execution of a specific job – and these metrics remain measures of value for as long as customers are trying to get that job done. They can be used over and over – for years – to better execute many development and marketing activities.	As an example of desired outcomes, a razor user, for example, may want to: • Minimize the time it takes to prepare the skin for hair removal • Minimize the frequency of nicks • Minimize the number of passes that must be made to remove unwanted hair • Minimize the frequency with which hair must be removed • Minimize the likelihood of skin irritation • Minimize the likelihood of in-grown hairs