Managing Quality Perception Along the Customer Journey: A Behavioral Economics Approach

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Abstract. Human beings are not completely and always rational and are influenced by several cognitive biases and heuristics in how they evaluate and perceive the quality of a product or service offered to them; moreover, their expectations and perceptions of quality varies along customer journey and product lifecycle. Therefore, professionals dealing with product development, marketing and selling cannot deliver results if they do not understand these two perspectives and how to manage effectively customer perception of product quality. The usual perspective of quality management on quality perception on the one hand, and behavioral economics – which deals with how cognitive biases and heuristics affect economic decisions of people in real-life – on the other hand, have been both researched extensively. Yet there are just few research publications proposing a structured knowledge at the intersection of these two domains. This paper proposes a conceptual framework on how to use behavioral economics concepts and understanding in quality management, bringing together these two domains in a synthesized and exhaustive manner. The paper focuses on the influence of cognitive biases and heuristics on how quality of products or services is perceived, and how this influence occurs across customer journey, and consolidates other factors which may influence expected and perceived quality. It proposes a structured approach to manage those perceptions. It provides readers from the quality management and new product development research areas with an exhaustive list of the behavioral (cognitive) biases and heuristics that influence how people (customers) perceive the quality of products and services, and it provides readers from the behavioral economics research area a new, deeper, perspective on quality perception and its role in economic decision making. The paper does not propose itself at this stage to test and demonstrate the theoretical contributions it makes, but rather to make professionals from these domains aware of the possible implications – hypotheses remain to be tested in future research.

Keywords: Behavioral economics · Cognitive biases · Heuristics · Quality management · Quality perception · Perceived quality · New product development · Customer journey · Decision-making

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1 Introduction

For the last two decades or so, the world has been discussing about Industry 4.0, expected to bring unprecedented transformation in the production area. With these trends of automation, data exchange, Internet of Things or cognitive computing, and even more together with the concept of Globalization 4.0, production is prone to shift to faster-to-market, more international, more adapted products to a wider and wider group of customers. Yet this comes with an increasing challenge: how will customers perceive the quality of products in this context?

Quality perception appears on the table of many quality management, product development and marketing professionals, and has been researched well in the academic literature. More importantly, several researches have indicated the difference between what adequate and desired quality for customers are, and between the expected quality and the perceived quality of products or services.

Yet how we as human beings make economics decisions, and in this matter form ourselves a perception about the quality of a product or service, is not always completely rational, logic, coherent, and decisions are not always optimal as neoclassical economics would predict. Behavioral economics research has taught us there are various cognitive biases and heuristics, errors, that affect our decision-making. These are triggered by various other factors like context, emotions, social influences.

Consider the following example [1]: you go to a store wanting to buy a new TV. An enormous variety is in front of you, depicting the typical impressive image of a flower slowly blooming to reveal the ultra-high definition characteristics and quality of image. You must make a choice though, and you narrowed down your options to two products: a fairly good one for 400$, or a 500$ deluxe option with impressive and highly attractive characteristics yet above your budget. Despite how irresistible second one is, you decide to not go over your budget and choose the first one. On the moment, you feel you made a mediocre choice and have to settle in for a mediocre life – sigh. Yet once you reach home, you realize the TV looks very fine, in fact, it looks amazing – amazing display, color, sound, amazing quality! – you don't even figure out why you considered the second option in the first place. So why is this happening? It's because of a term in behavioral economics field called 'distinction bias', a tendency to look too much on small quantitative differences when comparing options, or in more exact words, a distinction between how you perceive a product when being in joint-evaluation mode (two or more options comparing that is) versus in single-evaluation mode [2]. In fact, research shows there is even a preference reversal between joint and separate evaluation of alternatives [3], not only a difference in perceived quality or performance.

After providing a brief background with examples of research in the areas of quality perception and behavioral economics concepts touching (directly or mostly indirectly) on the notion of quality perception, this paper brings for the first-time these two domains together in a systematic, synthesized manner, covering most important behavioral economics concepts grouped in six specific dimensions, and explains the potential influence on the perceived quality of product or service. As we see in the above example, the way we perceive quality of products varies at different moments in our customer journey. Therefore the paper explains why and how these implications

need to be considered at different moments in the customer journey, providing a comprehensive logical scheme of how to do it and factors to consider. The paper also proposes for this an approach consisting of 5 steps, named suggestively SENSE (Study the customer journey and decision-making process, Evaluate the role of quality in customer decision making process, Narrow down to desired/target quality role and objectives, Set relevant interventions to drive quality perception in the targeted direction, and Evaluate results and adapt continuously).

2 Background

Some of the most notable work on how quality is perceived by consumers is unarguably the work of Parasuraman, Berry and Zeithaml on the difference between expected and perceived quality [4], and the important separation they make later on between adequate and desired quality: adequate quality is the minimum level of quality that customer finds acceptable, while the desired quality is the level the customer hopes to receive (from either a new product, or service, or from customer service activities) [5]. Perceived quality thus can be different than the objective, expected value of the product or service, and needs to be understood relative to the concepts of adequate and desired levels of quality. An even more interesting separation was made by the same famous authors between quality of products and services: in case of products or goods, the consumer has many tangibles cues to evaluate quality, like technical characteristics, performance, materials, color, etc. In case of services, the tangible evidence is more limited, and consumers must depend on other 'soft' cues, and as such they defined a series of ten determinants of service quality later on grouped into five dimensions: reliability, tangibles, assurance, empathy, responsiveness – the famous SERVQUAL model [6]. Though it addressed the notion of perceived quality, quality management literature overall has not been concerned with what psychological, cognitive, behavioral factors influence that perception of quality.

Behavioral economics literature on the other hand deals a lot with cognitive biases and heuristics and how these influence our decision making in real life contexts. While one could argue that people would tend to maximize the economic expected utility (or quality being offered) from an economic transaction, product or service, according to Herbert Simon, people tend to make decisions by "satisficing", a combination of satisfying and sufficient, rather than optimizing or maximizing utility [7]. As such, people usually choose options or decide based on the basic criteria that is met, not based on analyzing and maximizing utility or finding the optimal option weighing all criteria and information. Several concepts from behavioral economics touch upon the idea of how quality is perceived by consumers and people, yet not always directly, and not systematically.

One of the most famous behavioral economists and recent winner of the Nobel prize for his contributions to the field, Richard Thaler, argued that people think of value in relative rather than absolute terms. He introduced the term "mental accounting" [8], showing people treat money differently depending on money origin or intended use. He also showed how people derive pleasure not only from the product quality or value itself, but also from the quality of the process or deal of getting that product – term

called "transaction utility". According to his research, people derive or feel/perceive a loss if they give up to something for which they already incurred a cost, failing to consider the opportunity costs, term called "sunk-cost fallacy" [9], that also influences in turn the quality or value of the good. Similarly, once owning a product or service, the value assigned to it increases versus when it is now owned, regardless of the real market value, term called "endowment effect" [10]. This is observed even more for goods that are considered symbolic of experiential. The experience itself is an important factor. Hedonic adaptation occurs when you get used to changes in life experience, returning to a relatively stable base of happiness. According to research by Mochon, Norton and Ariely [11], repetition of smaller positive hedonic boosts, or positive experiences, has a more lasting effect on our wellbeing than major life events. Another interesting paper by Huang et al. [12], proposed 3 hypotheses, rooted on this exact idea, that incremental improvements in a product or customer service will make the customers perceive quality as desired, even if it is not the case in reality. They base their hypotheses on other behavioral economics principles, on Kahneman's two cognitive systems theory [13], loss aversion and reference dependence [14], and also on attribute substitution effect [15]. Similar theory has been developed by the authors of this paper relating quality perception to the frequency of product innovation and improvement, arguing that customer churn/deflection can increase, and perceived quality can be unfavourable relative to competition, even if still better objectively, if frequency of product innovation is not sustained due to an innate bias of people to try what is new – try-new bias [16].

Research exists also on how quality and perceived quality fit together with other factors of choice of customers, such as price or brand. For example, a direct positive relationship has been shown between the brand name and the perceived quality of consumer products from that brand by Rao and Monroe [17]. According to Maheswaran, Mackie and Chaiken, even using brand names alone as salient cues can trigger evaluations about the product quality [18]. Reliance on such cues is known as salience and it refers to information that stands out, seems relevant or new, and is more likely to affect our thinking, evaluation and actions about a product [19]. On price, research exists on how for example price is correlated with quality, as there is a tendency to think that higher price typically means higher quality. And in fact, research showed there is somehow a correlation explaining this direction – see Rao and Monrore [17], citing Tellis and Wernerfelt [20].

Next to affect and availability, representativeness heuristic is one of the most important heuristics researched in behavioral economics. Its influence on perceived quality has been shown for example in the rating of the quality of a local product from a generic store being higher it its packaging was designed to resemble a national brand [21].

Another major part of behavioral economics field has been focused on choice making. Choices are often made relative to the available options of the offer, and not in absolute terms. Distinction bias described in the introduction giving the TV example is one. Yet there are several other biases or heuristics that may influence perceived quality. Asymmetrically dominated choice effect for instance occurs when people's preferences for one option change when introducing a third option, similar to one of the previous two, but less attractive. As an example, people are likelier to choose a high-quality pen instead of cash if there is a third option in the form of a low-quality pen

[22]. As such, we see that choices can be presented in different ways, highlighting either positive or negative aspects, as in the riskiness behind (risky choice framing), or the attributes – attribute framing. On the latter, Levin, Schneider and Gaeth provide an example of beef meat described as 95% lean versus being described 5% fat, which rationally represents the same thing, yet influence how customers perceive it [23]. Other known concept researched in relation to choices and decision-making is "extremeness aversion" – that is the influence of extreme options making the middle one to seem satisfactory or desirable; people tend to avoid choosing the extremes. Here both background context, defined by prior existing options, and the local context, defined by the choice set, are important considerations [24].

Also, presence of choices triggers often a certain decision tree for customers. Elimination-by-aspects introduced by Tversky ever since 1972 refers to a heuristic where people gradually reduce the number of options they consider from a choice set starting with the aspects they see most significant, evaluating one cue at a time until fewer options remain [25]. Not only that such a funnel in decision-making can exist, but sequential decision-making is shown to facilitate certain comparisons at the different stages of the choice process [26] and breaking down the decision process in more stages can sometimes yield superior decision making [27]. We observe as such again the importance of perceived quality not only at the moment of purchase, but along the entire customer journey, from consideration to researching, comparing, and only after the final decision-making.

The more "fast and frugal" view of behavioral economics lead by Gigerenzer sees choice making rather as ecologically rational, versus irrational, based on heuristics such as "take the first" or "take the best" (as the names suggest, making decisions of choice based on the alternative or factor that comes first to mind in the former, and based on the one attribute that is deemed most important – discriminant factor – in the latter) [28].

Behavioral economics research concentrated also on the social influence. Social proof bias, or herd behavior for example, has been show several times to influence economic decision-making of people, and in fact has been discussed in psychology, behavioral finance (ex. collective irrationality of investors), politics, science and other fields – it is sometimes referred to as, or put in relation with, "information cascades" [29].

In all these cases, be those choice making related or social influence, we observe overall that perceived quality can be influenced by several cognitive biases and heuristics, yet this influence has not been researched sufficiently, with only a handful of examples existing – on the one hand, quality management or product development professionals or researchers did not focus too much on the impact of behavioral economics, on the other hand behavioral economists did not focus that much on how quality is perceived, rather on how the actual decision is made or what that is.

Lastly, despite not being classified as behavioral economics, it is worth mentioning Kano's model that separates between three types of needs or expectations of customers in terms of quality: must's, those attributes or properties of product that satisfy the basic needs or expectations; want's, those that customers are able to still specify loudly from their mind, and provide a higher level of satisfaction and differentiation of product from

competition; and wow's, those that excite and delight customers beyond expectation, that are unexpected in fact [30]. Authors see this as yet another layer of complexity in how customers perceive the quality of the product, given the difference between known or stated characteristics that make up the perception, and surprising factors which cannot be stated upfront and form/influence the perception only ex-post – again, the importance of customer journey.

3 Proposed Conceptual Framework to Use Behavioral Economics in Influencing Perceived Quality of Product or Service

As we have seen in the previous pages, several notes on the influence of some behavioral economics concepts over the quality perception have been drawn in the research literature, where notable research was identified. Some research exists therefore on these implications, however not extensively and holistically, and gaps to our understanding of what drives perception of quality from a cognitive and behavioral point of view exist.

The authors leverage previous work performed on the influence of behavioral economics concepts over new product development [16], where more than 60, most important, behavioral economics were brought together, analyzed, and allocated for the first time to a conceptual framework of how to utilize them in different phases of the new product development process, structured in five main dimensions: utility and value perception, uncertainty and risk, probabilities and weights, temporal, social, and choice. That allocation has been done systematically and it is based on reviewing behavioral economics literature extensively – some of the most important papers are mentioned in the previous background section, while some other important ones addressing some of these concepts are considered [31–37, 39]. Further references and details on each concept can be found in the behavioral economics literature as each concept mentioned below is a consecrated term.

This time, authors leverage this clusterization and provide a new conceptual framework on how to consider these dimensions and their concepts in quality management, i.e. how these cognitive biases and heuristics may influence the perception of the quality of a (new) product or service. This analysis contains already a drill-down of only those behavioral economics concepts considered relevant for the understanding of quality perception – a short list that is. For more behavioral and cognitive concepts within each dimension see [16].

Table 1 below provides a synthesis of this new conceptual framework proposed, by selecting those appropriate and relevant behavioral economic concepts within each dimension and commenting on what is the potential influence on quality perception.

Table 1. Conceptual framework: potential influence of behavioral economics on perception of quality of products or services

Dimension	Behavioral and cognitive aspects	Potential influence/hypothesis
Utility and value perception in decision making	Experienced utility Procedural utility Transaction utility	The perceived quality may be influenced by these types of utility consumers derive, despite other core standard attributes that make up the quality of a product or service (like functional of technical specs)
	Remembered utility	Potential influence of past utility evaluations on present utility evaluation. See also influence of peak-end rule below
	Endowment effect	The perceived quality depending on whether the product is owned or not, and even if tested or not (utilized for a short period of time)
	Try-new bias	Potential impact on how quality is perceived simply because a product/service is new or has a new functionality/feature, regardless of its objective value-add *(To be seen in relation to loss aversion and reference dependence also)*
	Satisficing	Potential influence on overall quality perception. Expected to show that same level of perceived quality can be achieved through less actual quality, due to focus only on some factors through which consumers assess the product quality as sufficient and satisfactory *(To be seen also in relation to other concepts of decision making in dealing with choices, for ex. take the best/first heuristic, evaluation by aspects, etc.)*
	Anchoring Affect heuristic	Anchor information or salient features that trigger feelings, especially in presence of asymmetric or incomplete information, may trigger System 1 evaluations that may not be followed by more rational System 2 ones
	Scarcity	Potential influence on quality depending on the scarcity of the product or service
	Sunk-cost fallacy	Potential influence depending on how much money has been invested or paid for the product/service and depending on distance toward achieving the goal/job to be done through that product or service
	Hedonic adaptation	Frequency of occurrence of the benefit of the product/service may influence how quality is perceived, ex. more frequent experience of small benefits may lead to overall higher perceived quality, vs. rare experience of high benefits
	Pain-of-paying [38]	The different pain of paying between spendthrifts and tightwads may influence also a difference in quality perceived between the two groups
Decision making under uncertainty and risk	Loss aversion Reference point/dependence Prospect theory	Potential influence depending on reference point consumers use to compare with. In addition, the perceived 'loss' they could have in switching to a new product, and/or in comparison to the new benefits, may influence perceived quality standalone and in comparison, with competition
	Availability heuristic	Standing out information, cues, etc. may influence the way quality is perceived, most of the times rather unconsciously

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Table 1. (*continued*)

Dimension	Behavioral and cognitive aspects	Potential influence/hypothesis
	Representativeness heuristics Recognition heuristic	Unlike above anchoring and affect heuristic effects, it is argued that these perceptions of quality could actually hold longer in time, meaning they will not necessarily trigger a System 2 rational evaluation after some period of time (when factors and context or available information do not change)
	Confirmation bias	By tapping on to what consumers need/prefer (even what they say they need/prefer) through communication of benefits, they may have a confirmation bias that could be reflected in their quality perception
	Control premium	By offering more 'control' over how consumers interact, use, even construct the final product/service, perceived quality may increase (control premium)
	Risk as feelings	Emotions and feelings at the moment of decision making are treated in this model as an anticipatory factor. By understanding consumers' biases (or prediction power on the other hand) in how they will feel about the product/service in the future, quality perception could be influenced through smarter targeting or communication
	Information avoidance	Perceived quality may be influence in both directions. On one hand, too much information may influence consumers to avoid taking it into account, remain prey to other biases (ex. take the first, take the best heuristics, evaluation by aspects, etc.) and look only at certain benefits or factors in evaluating quality. On the other hand, offering insufficient information may produce in fact the same effect, also due to a 'satisficing' behavior, or could actually not be sufficient to move them from the 'status-quo'. In both cases, perceived quality may be below actual quality, and below adequate quality level in some cases
Decision making under uncertainty and risk – Probabilities and weights dimensions	Certainty and possibility effects Naïve allocation/1-N heuristic Category size bias	The way consumers think of probabilities either at extremes (going from a chance of 0 to some, or going from a 99% to 100% chance), how they think of probabilities between a wider set of choices (also triggered by other aspects of satisficing behavior), or how they evaluate chance (or direct quality of a product) based on the size of category where it comes from, all could lead to biased perceived quality
	Ratio bias	The right way (or wrong way) of communicating benefits for example, either in percentages or absolute numbers could influence positively (or negatively respectively) the quality perception
	Optimism bias Hindsight bias	Perceived quality may be influence, similarly as with confirmation bias, by tapping on some salient features/information/aspects of the product/service that occupy a major portion of consumers' attention or thoughts, leading to biased impressions about quality
	Ellsberg paradox (ambiguity aversion)	Failing to articulate clearly the benefits for example (or offering too much information – see above information avoidance) may trigger an ambiguity aversion of consumers and consequently biased perception of quality

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Table 1. (*continued*)

Dimension	Behavioral and cognitive aspects	Potential influence/hypothesis
Decision making when dealing with time aspects	Time discounting Hyperbolic discounting Present bias Planning fallacy Dual-self model (and Myopic loss aversion)	Understanding these biases of consumers of placing more importance on immediate gains, myopic planning and sight, and so on, could be leveraged both ways: avoid negative evaluation of quality (by focusing for example in communication only on the long term benefits), or avoiding overestimated perceived quality at the beginning without a real background – companies may be 'biased' in trying this, yet a backfire effect could exist if after a time, consumers realize actual quality is below their initial evaluation
	Diversification bias	The bias of preferring to keep options open for the future, have more features available, etc. may negatively influence perceived quality in cases too much focus is placed on simplicity for example. A balance of 'easy to use, easy to understand' with 'more features, options in case you will need them' should be found. On the other hand, offering too many 'diverse' alternatives or options may again trigger a negative evaluation of quality (connected also with choice overload and information overload potentially)
	Peak-end rule (evaluation by moments)	Direct influence expected over how consumers perceive the quality, by looking/remembering mostly the peak-end moments from interacting with the product (either before or after acquisition), as opposed to taking a rational evaluation approach and judge quality through the sum of all interactions. See also potential influence of remembered utility above
Decision making under social influence	Social norms Social proof Herd behavior	Leveraging social proof, norms or trying to influence decision making through herd behavior may influence quality perception. In most cases, it is expected to influence it positively, yet caution should exist as backfire effect may exist (if initial expectations or perceptions are not confirmed practically). In some cases a social proof through the wrong segments, with which consumers do not identify with, or that are subject to controversial aspects in society in that moment, could have a negative effect over perceived quality
	Cognitive dissonance	It is expected that any cognitive dissonance that is triggered in consumers mind (through communication or consumer behavior that occurs) can either have positive or negative influence over quality perception, depending on whether consumers are able eliminate that dissonance (in which case, a sentiment of frustration and desire of avoidance can appear). It would be recommended to avoid leveraging such cognitive dissonance, unless it is easy for consumers to eliminate it through product/service interaction (acquisition or usage)
	Commitment	By leveraging this and making consumers 'commit' to a certain behavior, along the progress or after the progress is achieved the perceived quality may deviate from the more rational evaluation

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Table 1. (*continued*)

Dimension	Behavioral and cognitive aspects	Potential influence/hypothesis
Decision making when dealing with choices	Salience	Information that stands out, seems relevant or new, emphasizing either positive or negative information and so on, is expected to have major influence over perceived quality
	Status-quo bias	The status-quo bias in consumers may negatively influence the perceived quality or produce underestimations, even though actual quality is at a certain level, simply because people will have a tendency to not make the acquisition or use the product/service. In addition, it can influence also the perception of reference point – see reference dependence and loss aversion above
	Choice architecture Default options Framing effect Extremeness aversion Asymmetrical dominated choice	The way product/service choices are shown/exist, the frame (positive or negative for ex.), the existence of extreme choices, asymmetrical choices – all factors are expected to influence the perceived quality of a product or service
	Choice overload	Choice overload is expected to influence the perceived quality of the choices at hand. In addition, even after the decision to select an alternative has been made, choice overload is expected to continue to influence the perceived quality of the final selected option. This effect could be in both ways, both positive and negative, and factors influencing the direction should be studied, and it is expected to come also through other cognitive and behavioral biases
	Less is better effect Distinction bias Evaluability hypothesis Elimination by aspects Take the best heuristic Take the first heuristic Decision staging/choice bracketing	The way consumers evaluate choices and their attributes, features, and so on, is expected to influence perceived quality. Again, this can happen in both directions, positive or negative influence over perception. Decision staging/choice bracketing is expected to influence the quality perception not only at the moment of after the decision is made, but also during the process of deciding. The perceived quality during the decision-making process, and the perceived quality at the moment or after the moment of deciding, are expected to be different – factors influencing this difference and direction of difference (which is lower/higher) should be studied

Authors suggest that even more, the treatment of customers and potential customers given the suggested ideas in Table 1 should not be done only homogeneously, and in fact there likely exist segments of customers that display different behavioral or cognitive typologies – research in the segmentation of customers depending on their behavioral or cognitive typology, i.e. cognitive biases or heuristics, is rather at the beginning, a virgin field.

As one of the questions readers of these paper may have is "How or when should I use this conceptual framework?", the paper proposes the following steps in understanding and influencing the quality perception of customers when developing new products or services or when marketing and selling them, presented in Table 2 below, and named suggestively the **SENSE approach**.

Table 2. Proposed approach: steps in managing properly how your customers will perceive the quality of your (new) product or service and improving sales and customer satisfaction

Step	Step description	Actions to take	Recommended methods
S	Study customer journey and understand the decision-making process	Map customer journey in following recommended steps: awareness, research, compare, test, decide-buy, fulfillment, usage, re-engagement, disposal. (Please note that this is a suggested departure point; actual steps of customer journey may vary) Understand main actions used by customers in each step and on which channels (ex. physical location/shop, online, mobile, social media, etc.) Understand and map the customers' decision-making process at each step of the journey (ex. how do they compare, how do they narrow down list of choices and decide, based on which factors) Identify and analyze on the decision-making process how customers: • define quality (ex. design, functionality, features, technical specifications, materials, finishing, look and feel, etc.) • perceive quality of product/service • how they evaluate quality, when and in what order they consider the factors that define 'quality' in their view • what other factors become important in their quality perception (context, biases, heuristics) – utilize Table 1 in this paper. *Note: how quality is defined needs to be done from the customer perspective, accounting both for 'hard' elements as well as for 'soft' elements like design, look and feel, which may matter as much or even more to customers* When/where relevant, perform customer segmentation to differentiate: • customer journey by different relevant segments • customer decision making process (ex. behavioral biases and heuristics) by different relevant segment ***Note: utilize for this step the logical scheme in*** Fig. 1 ***provided further after this table***	Quantitative research (survey) – in particular more important if required to perform customer segmentation Qualitative research: customer interviews (if relevant, also focus groups) Ethnographic observations (ex. observing real customers in real life context)

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Table 2. (*continued*)

Step	Step description	Actions to take	Recommended methods
E	Evaluate current quality role in customer decision making	Based on previous step, identify main factors of choice within relevant target segments. Recommended and most important (at minimum) to use are: • quality • price • promotion • brand (and marketing communication) • variety (of product offer, or within one product, of functionalities or features) • availability (of stock) *For all above factors, it is important to identify the exact sub-factors which are important and their influence, for ex. a simple message in communication that taps on social norm bias like "95% of people recognized this product as very good" or a simple "Most sold" tag may influence perceived quality beyond standard brand-quality-price relationship* Similarly, it is recommended to identify factors of: • customer satisfaction • customer recommendation (NPS – net promoter score) • customer loyalty (high share of wallet) Compute calculations to identify accurately the importance of each of these factors in consumer decision making process, at each relevant step in the customer journey *Note: while a low price and high quality may many times appear most important factors of choice when asking customers directly their preference, reality may differ. Thus, authors recommend relying on quantitative techniques and experimentation & testing to separate what customers "say" from what they actually "do" – see right*	Direct research through quantitative survey and based on discrete choice modelling, factor analysis and SEM (Structural and/or Simultaneous Equations Modelling) QFD in selected cases (products with heavy technical/technology focus) Indirect research based on historical purchase data if available (with similar techniques as above)

(*continued*)

Table 2. (*continued*)

Step	Step description	Actions to take	Recommended methods
N	Narrow down to desired/target quality role and objectives at specific moments in customer journey	Based on findings from first two steps: • synthesize or prioritize which should be the main business goals: improve acquiring of new customers, improve share of wallet in existing customers/loyalty, retain customers, win-back lost customers, improve customer satisfaction, recommendation, etc. • the target customer journey that the company needs to stimulate/implement • the desired role that quality should play in customer decision-making process, in the different relevant customer journey steps (role here covers also level of perceived quality) • the desired quality level that should be achieved, if case, that requires actual product specifications modification and a (new) product development process	For the second and third bullet point on the left, consider also the possibility of actual defining and testing preliminary ideas with customers in interviews or focus groups – either direct expression of interest/preference/opinion, or indirect observation of customer reactions to changes
S	Set relevant interventions to drive perceived quality in the targeted direction	Define and implement specific actions targeted at changing perception of quality of product or service. These will vary from case by case, from: • simple context or framing modifications, for instance in communication and marketing (ex. displaying 3 alternatives instead of 2 to make middle option seem of adequate or even desired quality) to • more complex modifications (ex. developing a new product with attention to the actual specifications that are considered by customer, and how & when, along the different steps of the customer journey: researching, comparing, deciding, buying, using the product, given biases and heuristics that affect their perception, for instance elimination by aspects or take the best or first heuristics)	Testing of actions recommended in real decision-making contexts (ex. real store with real merchandize for purchase), using test & learn methodology (ex. using one store for test and one as control group)
E	Evaluate results, incorporate in new product development (if case) and adapt continuously	This step refers to evaluating the results of the behavior-perception-change actions designed in first steps on a recurrent basis, and continuously adapt Authors recommend management of the perceived quality and influencing it in the right direction through these steps should be a continuous improvement exercise rather than just a "project"	

Authors propose to treat perceived quality of product or service by customers in the following logical scheme, described below in Fig. 1.

Note that it is important to understand that:

(a) there will be a difference between perceived quality and objective quality, perceived quality and expected quality, differences triggered by a series of factors,
(b) while objective quality likely varies only along product lifecycle (i.e. performance in utilization reduces after a number of years), expected quality may vary along both customer journey steps and product lifecycle (during usage until disposal/replacement),
(c) perceived quality likely varies along the customer journey and later along product lifecycle as customers may change their perceptions along the steps, both until purchase decision and later while using the product or service and re-engaging with the company (either for a re-purchase or other reasons)
(d) the factors described as influencing expected and perceived quality may contribute with different relative powers in each of the customer journey steps (ex. factors important for forming a perception of quality in the research phase may be different than those important in the comparing or testing phase, or in purchasing)
(e) when referring to possibility to perform customer segmentation, in step S of the proposed **SENSE** methodology, segmentation of customers can be performed not only on standard moderating factors such as age or income, but in fact on the factors influencing expected and perceived quality. These can range from more intuitive or simple to separate, like customer needs or preferences, to differences in the importance awarded to the typical purchase factors (utility, brand, price, etc.), to more complex criteria to manage practically like consumer limbic type [40]. (These latter factors are considered more complex to manage in real life as for example allocating a new customer to one limbic type may require rich data for profiling or complex real-time profiling based on advanced analytical models and/or multiple questions).

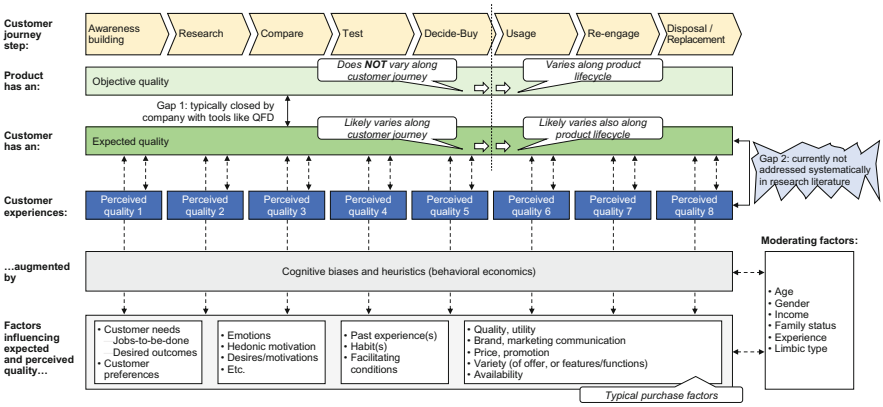

Fig. 1. Quality perception and factors across customer journey

4 Conclusions

Quality management has been extensively researched as a field of study, with a focus on translating customer needs into product specifications and further ensuring product is developed matching customer requirements. Furthermore, studies have shown the differences in types of quality, either at performance level, between adequate or desired quality, and at perception level, between expected quality and actual perceived quality.

Behavioral economics has also benefited of extended research along the last few decades, with popularity of this field growing tremendously in the last decade or so along the Nobel prize winnings of Daniel Kahneman and Richard Thaler, and with the growing utilization of behavioral economics in both public policy and business alike.

Yet there exists little to no extensive research at the intersection of these two fields of studies, research to address in a systematic and exhaustive matter how various cognitive biases and heuristics (studied by behavioral economists) influence the perception of quality of a product or service (studied by quality management or product development researchers and professionals). Furthermore, as this paper discusses, the way quality is perceived varies both along customer journey (from having an underlying need or becoming aware of a need to researching, comparing, deciding, buying a product that serves that need, using it, re-engaging with the company, disposing it) and along product lifecycle. This only adds complexity to the way quality perception needs to be managed and when, drawing attention that it is not sufficient anymore to close the gap between objective and expected quality (with tools like QFD), but also to close several other gaps along the customer journey between objective and expected quality on one hand and perceived quality on the other hand – closing gaps which in turn means from simple actions targeted at managing perception directly (without changing the product or service) to more complex interventions needed (changing the product or service along with managing perception directly).

The paper assumes as contribution and novelty offering a conceptual framework that explains the potential influences of cognitive biases and heuristics on perception of quality, covering most important behavioral economics concepts. It thus represents an exhaustive list that both researchers and professionals can use as a start, without fearing of missing other important elements or concepts from sight. It also provides a comprehensive set of guidelines, or steps, named suggestively the SENSE approach, on how to utilize this conceptual framework and further design actions and interventions aimed at managing the perception of quality. Finally, it provides a logical scheme that summarizes in a comprehensive and exhaustive manner the factors influencing expected and perceived quality of product or service along customer journey, including potential moderating factors. This logical scheme and complete set of factors is derived from multiple angles, from various research in quality management, product development, behavioral economics, consumer psychology, to experience of authors in their consulting careers.

The ideas and hypotheses described in the paper constitute a promising background for further research in the areas of quality perception and behavioral economics alike.

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