The modern meaning of "quality": analysis, evolution and strategies

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Abstract

Purpose – Building upon the foundational eight dimensions of quality proposed by Garvin (1987), this research formulates a modern meaning of "quality." This new meaning aligns with and encapsulates the evolving sophistication of consumers, the strategic quality investments made by firms, and the current dynamics of sales.

Design/methodology/approach – Due to the complexity of the concept of quality, a triangulation approach is used, which is composed of the following: a review of the literature, an analysis of consumers' quality dimensions using both qualitative (interviews) and quantitative (survey) methods, as well as a quantitative investigation (survey) of firms' investments in quality dimensions and the links to sales.

Findings – Our findings reveal the existence of 21 new and emerging dimensions through which consumers measure product quality, all of which complement Garvin's dimensions. These dimensions contribute to a fresh and modern interpretation of quality. Although there are 29 dimensions of quality in total, firms should shape their strategies by focusing on usability, customization, efficiency, innovation, performance, perceived quality, serviceability, pricing, conformance quality, ethics, and sustainability. These dimensions align with consumer wants and positively correlate with firms' sales.

Originality/value – This research identifies novel and contemporary dimensions of quality, serving to complement the eight dimensions previously delineated by Garvin (1987). Consequently, it contributes to updating the operations management literature on Total Quality Management, 36 years subsequent to the introduction of Garvin's foundational dimensions.

Keywords Definition of quality, Consumers wants, Total quality management, Quality-based strategy, Machine learning

Paper type Research paper

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Data availability statement: Derived data supporting the findings of this study are available from the corresponding author on request.

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1. Introduction

Over recent decades, quality has been a subject of extensive exploration within the academic and business communities. Researchers, firms, and marketers have made concerted efforts to understand and define this multifaceted concept. This examination has revealed a diverse array of definitions and approaches to quality, often accompanied by discussions about associated real practices (De Giovanni and Zaccour, 2023). Historically, the contributions in the field of quality have been dominated by the issues of identifying and specifying appropriate dimensions of quality (Garvin, 1987). These dimensions include concepts such as performance, features, reliability, conformance, durability, serviceability, aesthetics, and perceived quality, each with its own interpretation and emphasis (Garvin, 1987; Parasuraman *et al.*, 1985). Despite these varied dimensions, a fundamental principle has consistently emerged: Quality is fundamentally shaped by the perspectives and expectations of customers (Buzzell and Gale, 1987). In fact, as highlighted by Feigenbaum's (1983), quality is context-dependent, and there is no singular, universally accepted definition of the "best" quality. Instead, quality's essence lies in being the "best for certain customer conditions." This is not new knowledge but rather a well-established consensus among various scholars. For example, Zeithaml *et al.* (1990) argued that quality's ultimate objective is the customer, which makes all other judgments negligible. On the same vein, Grönroos (1984) argues that the true meaning of quality lies in the perception of customers while Buzzell and Gale (1987) and – more recently – Solin and Curry (2023) states that the quality of a product is exactly what the customers perceive it to be. Though most acknowledge that consumers are the right persons to judge quality, there has been an important gap in showing practical ways of how to effectively measure and incorporate consumer needs into strategies for quality.

Consequently, the traditional definition of quality, which is often linked to technical requirements such as Garvin's dimensions, requires a modification since, as Hauser and Clausing (1988) state, "quality is what consumers want." This shift from an internal, operations-oriented definition of quality to an external, consumer-oriented one requires a deep redefinition of quality since modern consumers' tastes and preferences are intricate and sophisticated. In this respect, two major research gaps can be identified. First, there is a rather unexplored aspect in the literature that sets forth the dimensions of quality that reflect evolving consumer preferences. Second, it is unknown whether quality-centered strategies by firms satisfy the triple consumer preferences, corporate investment, and sales results. In fact, the current research is silent on whether firms strategically allocate resources to quality dimensions in line with consumer preferences and whether such alignment yields sustainable economic advantages.

To pursue our objectives, we employ a triangulation approach in our research design, which comprises the following components: a review of the literature concerning quality dimensions, an analysis of these dimensions from the perspective of consumers, and an investigation into firms' quality-based strategies. Our study begins with an extensive literature review to assess the current state of knowledge regarding the definition of quality. Subsequently, we conduct a qualitative analysis to identify emerging quality dimensions from consumer perspectives and corroborate it with a quantitative analysis to detect the importance of each of these dimensions for consumers. Finally, we synthesize the insights gained from the literature review and consumer inputs in a questionnaire administered to firms. The related empirical analysis, encompassing consumer preferences, firms' investments, and sales, highlights effective quality strategies for firms to consider.

This paper is organized as follows. Section 2 introduces the literature review on the definition of quality. Section 3 describes the methodology and Section 4 reports the discussion and the findings. Section 5 develops the theoretical contributions and the managerial implications while Section 6 concludes and identifies future research directions.

2. Literature review and research questions

In recent decades, numerous attempts have been made by researchers, firms, and marketers to understand and define the concept of quality. According to Reeves and Bednar (1994), discussions and contributions were predominantly influenced by information surrounding associated tools. In most instances, the objectives were to identify and specify the correct quality dimensions (Deming, 1982, 1986; Feigenbaum, 1983; Harlis and Chaney, 1969; Juran, 1951). Concepts and definitions of quality have most often been linked to the value creation process and conformance to specifications (Gilmore, 1974; Juran, 1951), conformance to requirements (Crosby, 1979), design quality (Juran, 1951), fitness for use (Gryna and Juran, 1999), and meeting and/or exceeding customers' expectations (Grönroos, 1984; Parasuraman *et al.*, 1985).

According to Crosby (1979), quality is a complex construct that is often mistaken for imprecise adjectives such as "goodness," necessitating a comprehensive conceptualization before utilization. Among the contributions that introduce the general term quality, seminal papers by Garvin (1987) have provided clear directions and a well-operationalized concept of quality by proposing the following eight dimensions:

(1) *Performance*. This corresponds to the primary operational characteristic of a product and implies the identification of a series of measurable attributes.

(2) *Features*. This represents the additional options that complement the basic functions, making the product more attractive and the service more useable.

(3) *Reliability*. This signifies the period during which the product offers high-level performance without malfunctioning.

(4) *Conformance*. This is the ability of a product or service to meet specified standards, considering the number and type of defects found in a product during its life cycle and use.

(5) *Durability*. This measures the lifespan of a product, defined as the period during which the consumer extracts value and utility from a product before it reaches the end of its useful life.

(6) *Serviceability*. This refers to the ease with which a consumer obtains a repair service, the responsiveness of the staff in offering services, and the speed with which the product can be put into service after a malfunction.

(7) *Aesthetics*. This pertains to a sensory dimension linked to appearance, the sensation of pleasure, and the sounds, tastes, and smells of a product. It is subjective, reflecting individual preferences.

(8) *Perceived quality*. This is an assessment of quality based on a series of indirect measures.

Although quality and its dimensions have been defined in various different ways, many scholars have continually focused on a unified theme: "quality is whatever the customer says it is" (Buzzell and Gale, 1987). As Reeves and Bednar observe: "all prior definitions of quality ignored the idea of emphasizing the need to focus on "customer wants," and no development of operational insights and practical guidance has been generated on how to truly measure and provide for "consumer wants." In this regard, the literature differentiates between objective and subjective quality (Holbrook and Corfman, 1985). Objective quality, also termed as actual or mechanistic quality, pertains to the actual technical superiority or excellence of a product. It comprises measurable and verifiable superiority against some predetermined ideal standards (Zeithaml, 1988). In contrast, subjective quality (or humanistic quality) entails subjective reactions of human beings to things, being a highly relativistic phenomenon that

generates important differences in judgments (De Giovanni, 2019). Most definitions and concepts of quality have historically been framed with an emphasis on objective quality, with the purpose of receiving favorable appraisals from as broad a consumer segment as possible.

A number of authors have supported the imperative to concentrate on consumer wants for the identification of optimal quality strategies. As Zeithaml *et al.* (1990) note, "*... only customers judge quality; all other judgments are essentially irrelevant ...*". Grönroos (1984) claims that "*... it should always be remembered that what counts is quality as it is perceived by the customers.*" Finally, Buzzell and Gale (1987) claim that "*the quality of a particular product ... is whatever the customer perceives it to be.*" One of the main unresolved issues is how to design a quality strategy on the basis of consumer wants.

In this context, Reeves and Bednar (1994) propose identifying consumer wants by dissecting the specifications and components that constitute the final product. Consequently, as posited by Feigenbaum (1983), quality must be molded accordingly, given the absence of a universally accepted "best" definition and interpretation of quality in any absolute sense. In fact, quality represents the "best for certain customer conditions" (Feigenbaum, 1983).

Within the outlined framework, our objective is to pinpoint new dimensions and specifications for the modern concept and meaning of quality, commencing with subjective quality and subsequently addressing consumer wants (De Giovanni, 2019). As readers will observe, contributions to the definition of quality extend back several decades, when researchers and philosophers strived to clarify and operationalize this intricate concept. In this paper, our aim is to rejuvenate the concept of quality by incorporating contemporary factors and trends directly derived from consumers, by addressing the following research question (RQ):

RQ1. Which modern and emerging "consumer wants" dimensions should be incorporated in the definition of quality, alongside the traditional eight dimensions defined by Garvin?

Garvin's (1987) work stands out as one of the few contributions suggesting concrete product attributes, in contrast to other research that delves into general concepts and abstract definitions, susceptible to varied interpretations and transformations. For instance, quality excellence is characterized as the investment in optimal skill and effort to produce the finest outcomes and achieve commendable results (Tuchman, 1980). In a recent review, De Giovanni and Zaccour (2023) disclose that numerous articles employ the generic term "quality improvement" to signify both the strategy that firms adopt (namely, objective quality) to elevate quality, and the persistent pursuit by consumers for products whose quality surpasses predecessors, benchmark goods, or competitive items (namely, subjective quality). Nonetheless, the broad term "quality improvement" is rarely associated with Garvin's dimensions. Hence, subsequent to mapping consumer wants and determining a comprehensive list of quality dimensions, we aspire to discern the quality-based strategies firms ought to adopt, by addressing the subsequent research question:

RQ2. What quality-based strategies should firms implement, considering modern and emerging consumer wants alongside the traditional quality dimensions defined by Garvin?

3. Methodology

Given the multifaceted nature of the concept of quality, our research employs a triangulation methodological framework consisting of three components: literature review, qualitative and quantitative analysis with consumers, and quantitative analysis with firms. This study design can be summarized in four steps. The initial step involves conducting a literature review, which has already been accomplished in Section 2. This forms the foundation of our

research, allowing us to uncover the historical connections between quality dimensions and identify the research gaps related to their associations with consumer preferences. Notably, over the past four decades, quality dimensions predominantly utilized in operations management have been frequently associated with Garvin's seminal work.

To gain deeper insights into the quality dimensions that resonate with consumers, we employ a qualitative approach through interviews in the second step. The analysis of the interviews involves capturing those dimensions that consumers consider essential and those that actually influence their quality perception. In this way, we complement and enrich these findings with a quantitative analysis in terms of quantifying the significance of emerging dimensions and, hence, providing empirical evidence for their importance.

Therefore, in the third step of our research, we carry out a quantitative analysis via a structured questionnaire targeting companies. This analysis will seek to define, from a quality point of view, the dimensions on which companies are investing and how they might affect sales. By doing so, we close the gap between the preferences of consumers and strategies by firms and put the basis to find out how the quality dimensions oriented to consumer desires are capable of fulfilling the goals stated in step 4 by answering the research questions.

3.1 Qualitative and quantitative analysis with consumers

This section explains the details of step 2 of the research design and investigates the quality dimensions with respect to consumers. According to a seminal paper by Hauser and Clausing (1988), *The House of Quality,* quality is what consumers want. Therefore, we begin our analysis by considering that consumers are highly sophisticated. In other words, they have access to information and have capability of making wise and efficient purchases. This is in line with the definition of quality by Feigenbaum (1983), according to whom, *"Quality does not have the popular meaning of "best" in any absolute sense. It means best for certain customer conditions."* Accordingly, firms cannot implement any total quality management strategies without interacting with and understanding their customers.

To gain information regarding the quality dimensions that consumers evaluate when thinking about product quality, we interviewed 1,172 people in Italy through an internal survey service. The people who participated in the research ranged in ages from 20 to 60, with 52% of the sample being female and 48% being male. This diverse group represented various educational backgrounds, including individuals with high school diplomas (15%), bachelor's degrees (50%), master's degrees (25%), and a few with doctoral degrees (10%). The sample also included participants from different professional sectors, such as healthcare (12%), finance (30%), education (26%), and engineering (16%), while the rest was students at university (16%). Additionally, participants came from geographically diverse regions, including urban (36%), suburban (30%), and rural areas (34%), ensuring a broad representation of both urban and rural lifestyles. A broad, diverse, and inclusive sample of participants provided the basis for a comprehensive exploration of the research questions and enriched the findings of this study. Each subject has been approached twice: the first time for a qualitative study; the second time for follow-up, involving a quantitative study.

During the qualitative phase, each interviewee was afforded the opportunity to define the concept of quality in a broad and general sense. Participants accessed the Qualtrics platform and responded in writing to the question: "*What are the 'wants' dimensions that you wish to be included in your definition of quality?*" This question is inherently linked to RQ1 and enables the identification of subjective quality dimensions derived directly from consumers' experiences and perceptions, without being restricted to contemplating a specific product or bundle of products. Subsequently, interviewees were presented with a set of stimuli and information gleaned from the outcomes of the literature review — specifically, the details and descriptions of Garvin's dimensions. Upon receiving these stimuli, the participants were once

again asked to respond to the initial question. Notably, the responses remained consistent in 92% of the instances, even post-stimuli. Upon completion of the interviews, the collected data were subjected to analysis utilizing machine learning and text mining methodologies. In particular, the data were processed in Python using the following algorithms:

(1) unicodedata. This library is used to eliminate non-ASCII characters from text data, which can cause issues during text analysis or processing.

(2) str.lower. It is applied to strings to convert all characters into lowercase letters, which helps in text consistency and analysis.

(3) re.sub. This command is used for text cleaning by eliminating punctuation, like periods, commas, and question marks, which may not carry significant meaning in some text analysis.

(4) Stopwords. To improve the quality of text analysis results, words like "and," "the," "in," etc., are removed from text data during text analysis; in fact, they are considered noise words because they appear frequently in language but may not be informative.

Afterward, we treated the text using the function CountVectorizer, which converts a collection of text documents to a matrix of token counts. Each row in the matrix represents a document, and each column represents a unique word (or "token"). The value in each cell of the matrix is the count of how many times that word appears in the corresponding document. Furthermore, we used Scikit-learn (Sklearn) technique to analyze and processing the data, particularly applying the RandomForest methodology for predictive modeling tasks. The latter has been employed because of its predictive accuracy, the resistance to overfitting, and the capacity to be robust to outliers and missing data. Accordingly, the reached outcome ensures a predictive value of 78%, representing the model's accuracy and predictive performance on a test dataset.

After identifying new dimensions of quality through qualitative analysis, we conducted a quantitative analysis by administering a questionnaire among the same sample of consumers. In this phase, consumers were contacted again and invited to indicate their level of agreement (strongly agree) or disagreement (strongly disagree) using a 7-point Likert scale to evaluate the dimensions of quality that emerged from the qualitative analysis. Specifically, we provided consumers with a set of emerging dimensions and their related descriptions, detailed in Section 4. Subsequently, we asked them to respond to the question: "*According to my personal judgment, the definition of quality includes . . .*". The data collected were later compared with firms' investments in various quality dimensions, as well as firms' sales. All of the empirical results are displayed in Section 4.

3.2 Quantitative analysis with firms

Utilizing the outcomes of Step 2, we proceeded to investigate the related firms' investments and strategies. For Step 3 of the research, a questionnaire was administered to Italian companies, aiming to understand firms' investments in all emerging quality dimensions and assess the alignment of these investments with consumers' evaluations of all dimensions and their correspondence with the companies' economic performance—particularly, with sales. The structure of the questionnaire administered to firms mirrored that given to consumers to ensure comparable dimensions. Data collection began in November 2021 and concluded in March 2022. The data were collected in Italy by contacting 1,100 companies affiliated with Confindustria (General Confederation of Italian Industry), with which our university partners. This direct connection with this set of companies resulted in a total of 805 responses, 663 of which were useable for statistical analysis with a final response rate of 60.3%.

Hereby, we give some details of the sample. In terms of employees, 59% of the interviewed companies employ fewer than 50 people, 26% employ between 50 and 99 people, 10% employ

between 100 and 200, and the remaining 5% employ more than 200 people. Regarding sales, 76% of the firms in the sample have sales of less than one million euros, while 20% have sales between 1 million and 50 million euros. The remaining percentage of firms in the sample have sales exceeding 50 million euros.

In our questionnaire, we inquired about the firms' nature, whether they were manufacturers, wholesalers, distributors, suppliers, retailers, or service distributors. Accordingly, the sample primarily consisted of manufacturers, representing 39% of the sample, which is indicative of their heightened interest in the management and production of quality products. Additionally, the sample included distributors and suppliers, each constituting 20% of the total, while the remaining categories were marginally represented. The sample was diverse, spanning various sectors with a concentration in fashion and luxury (21%), agri-foods (20%), service and consulting (8%), healthcare (7%), building and construction (14%), and food and beverages (19%). Other sectors included energy-intensive manufacturing (5%), telecommunications and ICT (3%), retail and e-commerce (2%), and automotive (1%).

Considering our research focuses on dimensions of quality emerging from the analysis of consumer wants, we employed Factor Analysis (FA) to condense the number of dimensions and analyze them effectively. In our analysis, we employed the principal components extraction method, which allows one to reduce the dimensionality of a dataset by a transformation of the original variables into a set of linearly uncorrelated variables called principal components. Principal components capture the maximum variance within the data while minimizing information loss. In order to extract these components, we used the criteria based on the eigenvalue method of the principal components and chose only those whose eigenvalue was greater than 1, which is defined as a rule of thumb to choose the most meaningful component. In addition to that, we chose the varimax rotation method as the further step in our analysis to better the interpretation of the principal components. The varimax rotation, in particular, aims to simplify the interpretation since it is able to maximize the variance of the squared loadings within each component. Loadings represent the correlations between the original variables and the extracted components. We suppressed those components for which loadings were less than 0.5, which allows us to focus only on those significant relationships between the original variables and the extracted components while simplifying the interpretation.

4. Results and discussion

4.1 Qualitative and quantitative analysis with consumers

To fulfill the analysis explained in step 2, we use the clean data from Machine Learning as input into WordArt, which gave rise to the word cloud depicted in Figure 1.

From the textual analysis, together with the eight dimensions of Garvin (1987), 21 additional quality dimensions emerge. We list these dimensions below, along with the links to the operations management literature:

(1) *Traceability*. Modern consumers are very sophisticated and evaluate quality by accessing all information regarding the origin of raw materials, type of production, procedures adopted, and modes of transport used. Therefore, traceability supplies consumers with true information regarding product quality (Biswas *et al.*, 2022).

(2) *Authenticity*. The authenticity of the product seeks to guarantee quality, through which consumers verify the originality and identity of the product, thus preventing the purchase of counterfeit products. According to Algharabat *et al.* (2017), ensuring authenticity signifies verifying the authorship and the origin of a product where

Source(s): Figure made by author

Figure 1.
WordCloud of the quality dimensions

imitations, fakes, and copies are not a concern. These beliefs enhance consumers' judgments of high-quality products (Algharabat *et al.*, 2017).

(3) *Customization.* Customization is the ability to make high-quality goods designed for the specific needs of consumers. When consumers shape their products according to their specifications, the associated quality is higher than commodities.

(4) *Sustainability and ethics.* Consumers appreciate and recognize the value of high-quality products made using sustainable procedures, materials, and processes, as well as ethical procedures adopted in respect for people and safety in the workplace.

(5) *Connectivity and compatibility.* This dimension relates to the ability of a product to connect and/or communicate with other products and systems. Especially for electronics and high-tech goods, consumers search for a high level of connectivity and compatibility with other systems to enhance product quality (Vessal *et al.*, 2022).

(6) *Upgrade.* Changes in technologies and innovations stimulate product and service updates. Consumers rate quality based on a product's ability to update itself quickly and on an ongoing basis, adapt to new trends, and continually upgrade standards.

(7) *Accessibility.* Accessibility is the extent to which a product or service is useable by people with the widest range of abilities, limitations, and preferences, also considering people's diversity, disabilities, and cultures and also using several channels (De Giovanni, 2023).

(8) *Usability.* Usability is the extent to which the product can be easily used to achieve certain goals and meet consumer needs. Recent articles by De Giovanni (2020) and Vessal *et al.* (2022) highlight how making complex and rich goods, especially digital specifications, can easily generate the feature fatigue effect. In contrast, user friendly products are preferable in most of the cases.

(9) *Desirability.* Desirability is the expression of many sides of consumer behavior that shows ownership can fulfill psychological and emotional needs far beyond immediate functional use. This dimension explains why consumers may wish to own certain products and also how these choices relate to their identity, status, and emotional well-being.

(10) *Efficiency*. Efficiency is the ability of a product to satisfy the consumer and achieve expected performance with the minimum use of resources, time, and efforts.

(11) *Pre-purchase and refund policies*. Companies offer the opportunity for consumers to secure a trial period of experience for both products and services in order to test their quality before deciding whether to continue with their purchase. According to Reeves and Bednar (1994), pre-purchase options play a major role in subsequent customer evaluations of quality.

(12) *Community and loyalty programs*. Companies that sell high-quality products and services want to create a community of consumers, especially by using online platforms. Community members receive instant updates, news, and support, while businesses receive richer information, accurate feedback, and updates on ongoing trends (Lindstorm *et al*., 2023).

(13) *Durability (resistance to shocks)*. This corresponds to the product's capacity to resist hurts and shocks. However, as explained by De Giovanni (2021), product resistance can be verified only when an accident occurs and, consequently, consumers can develop positive feelings regarding product durability by verifying ISO certifications, gleaning information from social media, or using digital tools to continuously check performance.

(14) *Design*. Products are made to meet specific requests, or for well-defined purposes. Therefore, an appropriate design allows products to be of higher quality by including attributes that consumers prefer more, using the best materials available, and expending efforts to understand consumers before engineering the product (De Giovanni, 2020)

(15) *Innovation*. The product are requested to embed the latest innovations and technologies available. In a recent survey, Singh and Singh (2015) demonstrate that innovation is a key part of the continuous improvement principle, which plays a vital role in determining the final quality of a product.

(16) *Safety*. The use of the product is safe for consumers' life and health throughout the entire life cycle. Safety procedures can include a set of standards to demonstrate that a good fulfills applicable safety obligations, has in place an ad-hoc recall policy, and includes a product accident monitoring system.

(17) *Confidence and trust*. A quality product transfers positive feelings to consumers regarding the product's ability to satisfy basic needs. In fact, confidence is linked to specific knowledge about and faith in a product's capacity to guarantee performance, and such trust is accumulated through experience with the product and a dynamic assessment of its quality.

(18) *Truthfulness*. The quality of the product is true, and the seller has honestly described the real quality of a good. These dimensions have been studied by De Giovanni (2021) to demonstrate that communicating to consumers the true quality of a good increases brand value and consumers' repurchasing intentions.

(19) *Security*. The quality of the product must guarantee the protection and security of data and consumer privacy. These ingredients have a positive impact on consumers' purchasing behaviors and can induce positive feelings toward product quality.

(20) *Exclusivity*. The product provides unique and original satisfaction and pleasure. Exclusive products appeal to consumers' desire to be different from others. Consumers become more attached to such goods, as they are unique and non-replaceable.

(21) *Price*. A high-quality product is reflected in an average higher price induced by high production costs (Feigenbaum, 1983). When consumers associate high price with high quality, the price can be called the "exclusive price," "symbolic price," "premium price," or "prestige price".

These new and emerging 21 dimensions contribute to give a modern definition of quality that includes the product *per se* (e.g. durability in terms of resistance to shocks, efficiency, design, innovation, price), the supply chain (e.g. traceability), production flexibility (e.g. customization), product uniqueness (e.g. authenticity, desirability), orientation toward sustainability (e.g. sustainability and ethics, accessibility), digital transformation (e.g. compatibility and connectivity, upgrade, usability), proactive sales (e.g. pre-purchase and refunds), product engagement (e.g. community and loyalty programs, confidence and trust, exclusivity), and customer protection (e.g. security, safety, truthfulness). Note that, unlike Garvin's dimensions, durability for consumers refers to the product's resistance to hurts and shocks. Rather, the product's capacity to last for long life cycles is identified as longevity by consumers. Therefore, from now on, we will refer to longevity as durability according to Garvin definition; in contrast, our research highlights that durability has a different meaning in consumers' perception of quality and signifies resistance to shocks.

4.2 Quantitative analysis with firms

To achieve step 3 of this research, we make use of the results of the FA displayed in Table 1 with the loadings, which suggest the existence of three components. After analyzing the three components, we examined their composition and found valid theoretical support in the research by Chiu *et al.* (2014). In fact, the three components can be described as:

(1) *Utilitarian dimensions of quality*, which consist of all the quality dimensions that provide value to consumers, who understand what they need at an individual level and focus on their own utility. The quality dimensions belonging to this component are longevity, customization, connectivity and compatibility, upgrading, accessibility, usability, efficiency, design, innovation, performance, durability, serviceability, and perceived quality.

(2) *Hedonic dimensions of quality*, which reflect the value that consumers receive from the multisensory, fantasy, and emotive aspects of a purchasing experience. The hedonic dimensions of quality are desirability, pre-purchasing experiences and refunds, social community and loyalty programs, exclusivity, pricing, features, and aesthetics.

(3) *Perceived risk dimensions of quality*, which refers to an individual's subjective evaluation of an adverse outcome linked to the purchase and the consumption of a good (Solin and Curry, 2023). The quality dimensions belonging to this component are traceability, authenticity, sustainability and ethics, safety, confidence, trustworthiness, security, reliability, and conformance.

Finally, as Table 1 reports, each component is well supported by the respective Cronbach's alpha, ensuring the reliability of each dimension.

Figure 2 summarizes the results of the FA and displays the evaluation of consumers (in green) with respect to the each of the identified dimensions of quality, relative investments of the companies (in blue), and the correlation between investments and firm sales (in red). Note

	Hedonic quality dimension	Utilitarian quality dimension	Perceived risks quality dimension
Desirability	0.848	0.144	0.058
Pre-purchasing experiences and refunds	0.881	0.006	0.129
Social community and loyal programs	0.891	0.045	0.054
Exclusivity	0.742	0.173	−0.119
Pricing	0.853	0.133	0.049
Features	0.763	0.011	0.120
Aesthetic	0.702	−0.199	0.182
Longevity	0.063	0.780	−0.130
Customization	−0.264	0.856	0.237
Connectivity and compatibility	0.108	0.844	0.250
Upgrading	0.256	0.799	0.057
Accessibility	0.284	0.783	0.019
Usability	0.220	0.750	0.027
E-ciency	0.164	0.673	0.208
Design	0.233	0.831	0.063
Innovation	−0.056	0.795	0.256
Performance	−0.046	0.841	0.305
Durability	0.245	0.745	0.026
Serviceability	−0.331	0.825	−0.054
Perceived quality	0.149	0.824	0.068
Traceability	0.326	−0.087	0.690
Authenticity	0.066	0.156	0.824
Sustainability and ethics	0.108	0.064	0.850
Safety	0.049	−0.099	0.757
Confidence and trust	−0.284	0.183	0.802
Truthfulness	0.220	0.050	0.727
Security	0.164	−0.267	0.808
Reliability	0.233	−0.031	0.697
Conformance	0.056	0.195	0.826
Cronbach's alpha	0.805	0.823	0.811

Source(s): Table made by author

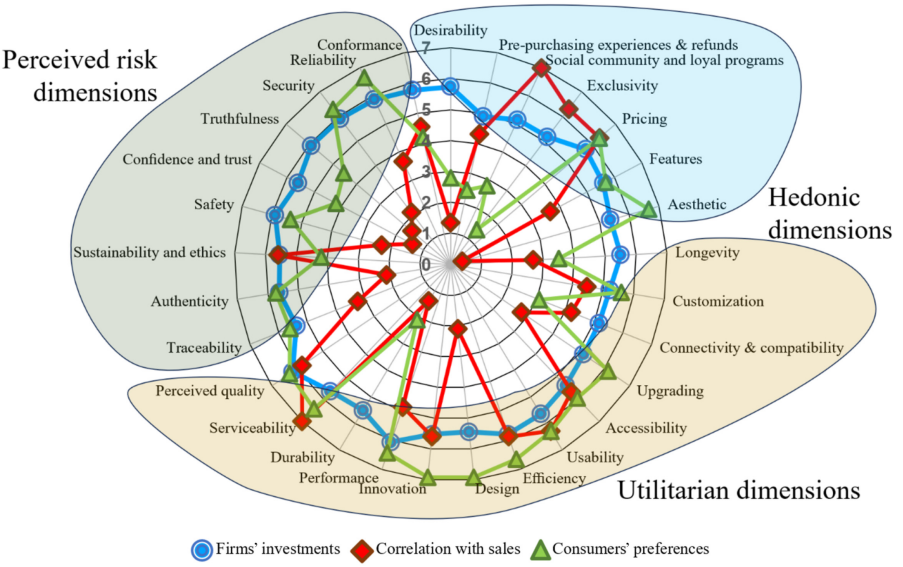
Table 1.
Factor analysis on the quality dimensions

that each correlation index has been multiplied by 7 to align it with the other scales and make the three measures displayable in a unique radar chart.

4.2.1 The utilitarian dimensions of quality. In this section, we analyze the utilitarian dimensions of quality, four of which bear a link to Garvin's established dimensions while the others are new; specifically:

(1) *Perceived quality* emerges as a key dimension in firms' quality strategies, aligning with Hauser and Clausing's statements that "quality is what consumers want." Firms heavily invest in shaping consumer perceptions, being aware that low perceived quality can deter even high-quality products. Our findings highlight a substantial correlation between investments in perceived quality and sales, emphasizing its key role in shaping quality-based strategies.

(2) *Performance*, a core dimension in Garvin's view, aligns real quality with consumer expectations. Consumers highly prioritize performance, and its strategic importance is evident in the significant correlation between firm investments and sales, making it a requirement in modern quality management strategies.



Source(s): Figure made by author

Figure 2.
The interplay between sales, firms' investments, and consumer preferences in the context of emerging quality dimensions

(3) *Serviceability* is recognized by consumers as a vital dimension: Firms investing in serviceability garner higher sales, as consumers value the capacity for easy product restoration, effective maintenance, and ideal support. Serviceability should, therefore, constitute an integral part of quality strategies.

(4) *Longevity* finds itself less appreciated by consumers and loosely correlated with sales. This result is attributed to consumers' inclination for product renewal, indicating a need for firms to reconsider the dimension.

(5) *Durability,* concerning resistance to shocks, attracts significant investments but registers low consumer scores and minimal sales correlation. Consumers tend not to prioritize shock resistance during purchase decisions, with evaluation often deferred due to its post-purchase relevance.

(6) *Efficiency*, exemplified by resource-conscious product creation, garners considerable consumer attention and correlates moderately with firm investments and sales, making it a key aspect for modern quality strategies.

(7) *Innovation* investments, aligned with technological advancements, resonate well with consumers and significantly correlate with sales. Given consumer awareness of innovation, firms must perform and sponsor product innovativeness. This connects to product design investments that, although appreciated by consumers, exhibit a low correlation with sales. This result underlines the complexity of expecting consumers to actively participate in product design, suggesting firms should maintain control over design aspects.

(8) *Usability* garners high consumer scores, emphasizing consumers' desire for user-friendly products. Firms should prioritize this dimension, ensuring that products satisfy diverse user needs without creating complexity.

(9) *Accessibility* investments, guaranteeing equitable product access, align with consumers' values and show alignment with sales, underscoring the societal role consumers recognize in firms.

(10) *Customization* investments yield favorable outcomes, as consumers prioritize tailored products. Therefore, firms benefit from investments in production systems enabling customization.

(11) *Connectivity, compatibility, and product updates,* although have received a high score regarding investments and consumers' appreciation, show low correlations with sales. This highlights that these features are of the type "nice-to-have" rather than "must-have".

4.2.2 The hedonic dimensions of quality. Figure 2 also illustrates a general overview of hedonic quality dimensions regarding consumer judgments, firm investments, and their relationship with sales. The FA indicates that hedonic dimension includes price, features, aesthetics, pre-purchasing experiences and refunds, desirability, exclusivity, membership in a social community, and fidelity programs, for which we obtain the following results:

(1) *Pricing* is an important driver of the choices consumers make when buying goods. This explains why firms have turned to creative means of setting price at the optimal levels according to market dynamics.

(2) *Product exclusivity, desirability, pre-purchase experiences and return, social community, and loyalty programs* do not determine the consumer definition of quality. However, companies continue to invest in all these dimensions because they know that they could drive sales. Interestingly, the positive impact on sales is confirmed mostly for product exclusivity and social community and loyalty programs. This result suggests that these factors may not determine the product quality in the minds of customers, but they enhance customer engagement, build brand loyalty, and create a community, which help in increasing possible sales in the future and long-term consumer interest.

(3) *Aesthetics,* although it is highly rated by consumers at the time of purchasing, correlates minimal with sales, thus making it a fairly significant but somewhat limited dimension for companies. Thus, an unattractive product that performs poorly will be clearly rated low in quality.

(4) *Features* is the dimension of performance where less firm investment exists than for the previous, and there is a strong positive pattern of relative performance. The score pattern on this dimension is positive but not as high as in the core product quality dimension. The consumer seems to appreciate the new options of product features but puts much more weight on the quality of the core product. Therefore, features provide complements, not substitutes, to primary quality dimensions; the low correlation between firm investment in features and sales suggests that consumers put a low weight on the features when making a purchasing decision.

4.2.3 The perceived risks quality dimension. In this section, we examine the quality dimensions connected to the consumption and buying views of consumers regarding risks. Our analysis reveals several quality dimensions, such as product traceability, authenticity, sustainability, ethics, safety and health compliance, consumer trust, absence of defects, and product performance over time, as seen on Figure 2.

(1) *Sustainability and ethics* dimension show that firms invest significant budgets, given the sensitivity of ethical working practices, environmental conservation, and climate

change issues. Consumers are vigilant on firms' effects on the environment and society, hence prefer products using sustainable and ethical procedures. Consumers, therefore, choose such products that reflect their values, hence promoting sales and for firms creating competitive advantages.

(2) *Traceability and authenticity* scores show that firms invest in each dimension, but consumers attach low scores; these investments do not relate to sales. Firms invest in traceability because consumers associate traceable information with product origin and distribution and, therefore, traceability reflects quality. Even though consumers exhibit some interest in traceability, it does not relate to sales, as in the case above; traceability cannot generate huge economic output alone. Similar is the case to authenticity where consumers experience counterfeit products on a daily basis; while there is alignment with consumer preferences, firms cannot rely on authenticity to generate sales.

(3) *Product safety* is also one dimension that witnesses huge investments by firms to be driven by consumer concern for health and safety. Consumers hugely value safe products but in minimal correlation to sales. The assumption that purchased goods will always prioritize safety makes the dimension non-impactful on sales.

(4) Firm investments in *privacy and security* do not impact sales significantly because, to consumers, these factors are given when buying products.

(5) *Truthfulness* dimension shows that firms are dedicated to clear communication to the consumers regarding product characteristics and also the consistent after-sale assistance. Consumers very much value honesty of companies but, once again, these dimensions do not affect the sales.

(6) *Confidence and trust* follow the path of truthfulness because firms invest heavily in making trust amongst consumers but, even though this dimension has high importance in consumers' minds, it does not relate to sales significantly and so, new customer relationship management mechanisms are required to bring out the potential of quality management.

(7) *Reliability* indicates that consumers hold a high desire for products that maintain high levels of performance during the life cycle. However, reliability reveals only marginal correlation with sales, which indicates that economic sustainability cannot be only based on it. This is probably due to the fact that consumers do not think about the possible reliability of a product during the purchasing phase, giving it for granted.

(8) *Conformance* quality garnered sufficiently high consumers' scores and correlated with the sales. The alignment of conformance quality with sales throws light on the fact that firms' quality management strategies rely very much on conformance quality as consumers prefer defect-free products and feel that a product will conform to the current standards at the time of purchase and realize detrimental consequences of product defects.

5. Theoretical contributions and managerial insights

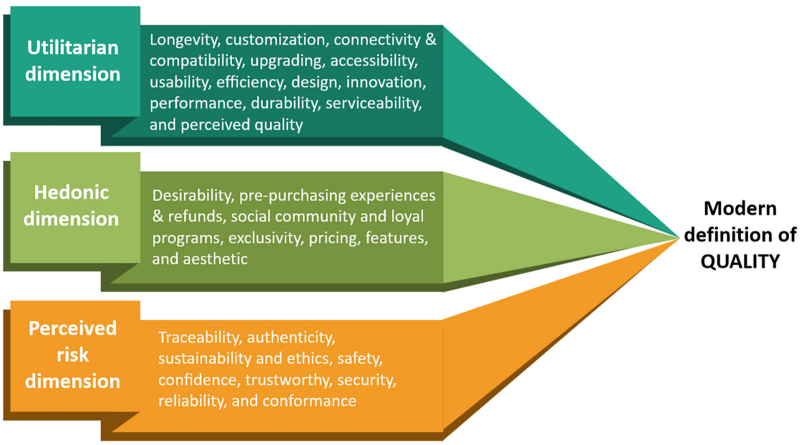
The theoretical development of this paper includes extensive consideration of quality in its manifold dimensions. Quality has gone through revolutionary changes from a functional and internally-oriented concept to a more holistic and consumer-based orientation. This transformation reflects the recognition that quality cannot be defined solely by operational characteristics or conformance to standards. Therefore, our research builds on the quality

dimensions defined by Garvin (1987) and enriches consumer desires, experiences, and values. These ingredients, although heavily sponsored by various research (e.g. Buzzell and Gale, 1987) have never been formalized in quality dimensions complementing the Garvin's contribution.

Specifically, this research derives a theoretical framework according to which 21 new dimensions of quality exist and, along with the eight dimensions proposed by Garvin can be classified in three main areas, as displayed in Table 1 and in Figure 3: utilitarian, hedonic, and perceived risk quality dimension. The utilitarian dimensions of quality revolve around the functional aspects of a product. Differently, the hedonic dimensions shift the focus from functionality to the experiential and emotional aspects of quality. These dimensions contribute to consumers' subjective perceptions of quality and their emotional connection with products. Finally, the perceived risk dimensions of quality are associated with consumers' concerns about potential risks related to a product.

Contrary to the literature that focuses on defying quality in terms of operations, the proposed framework complements this original view with modern and consumer-centric approach to quality. Firms that integrate utilitarian, hedonic and perceived risk dimensions into their quality strategies can better satisfy consumers, enhance their competitive edge by properly directing operations, and contribute to economic sustainability.

Although we discovered that the modern definition of quality includes 21 dimensions instead of the 8 dimensions found by Garvin, the analysis sales, consumers' appreciation of quality dimensions and firms' investments suggests that firms should integrate only 10 of these 21 dimensions into a quality-focused strategy. Specifically, as summarized in Figure 4, firms should primarily include only a few of the traditional quality dimensions, such as performance, perceived quality, and serviceability. Besides this, the firms should also consider quality-based pricing policies according to the consumers' expectations and the dynamics in the market and also pre-purchase experiences and refund policies. Also, it is essential to be updated with the latest available innovations to be competitive and to continue catering to evolving consumer preferences while at the same time maintaining the efficient use of natural resources, even in the case of tailor-made products, to ensure sustainability and minimize environmental impacts. In the final analysis, the firms should be quality-based, including the elements related to utilitarian, hedonic, and perceived risk dimensions. Therefore, our conclusion is that:



Source(s): Figure made by author

Figure 3.
A new framework to modern definition of quality

Figure 4.
Defining a modern quality-based strategy

Source(s): Figure made by author

A successful quality-based strategy should consider the intrinsic characteristics of a product through which consumers have positive perceptions and can satisfy their primary needs, accessing services that consistently guarantee high performance, and using the product over the entire life cycle without facing defects or environmental and social sustainability issues. Furthermore, a successful quality-based strategy should follow proper pricing policies, embed the latest innovation available, and efficiently use natural resources, even for customized goods.

6. Conclusions

This paper represents the first attempt, following Garvin's seminal contribution in 1987, to redefine the concept of quality in light of the contemporary desires of consumers and to delineate novel quality-based strategies for firms to adopt. To contribute to theoretical advancements in the field, offering a fresh, modern, and authentic conceptualization of quality, we employ a triangulation approach that comprises a literature review, qualitative analysis, and quantitative analysis, involving both consumers and firms.

The literature review identifies that, although the concept of quality has been guided primarily by operational aspects, a consumer-centric approach that focuses on the preferences of consumers has relatively been overlooked. A qualitative survey of consumer interviews indicates that the Garvin's dimensions should be complemented by new dimensions, including traceability, authenticity, customization, sustainability and ethics, connectivity and compatibility, upgradability, accessibility, usability, desirability, efficiency, pre-purchase experiences, refund policies, community and loyalty programs, durability in terms of resistance to shocks, design, innovation, safety, confidence, and trust, security, exclusivity, price, and truthfulness.

After gathering data on the significance consumers attribute to each dimension, we also collected data from firms to investigate their investments in quality and their correlation with sales. Consequently, we categorized the quality dimensions into three categories: utilitarian dimensions, which provide consumers with objective value; hedonic dimensions, which offer consumers subjective value; and perceived risk dimensions, which provide reassurance concerning potential quality-related risks. Subsequently, we formulated a quality-based strategy designed to ensure that firms invest in quality aspects appreciated by consumers

and impacting sales positively. This quality-based strategy should encompass usability, customization, efficiency, innovation, performance, perceived quality, and serviceability within the utilitarian dimension. The aspect of pricing must be included in the hedonic dimension; whereas all the other quality dimensions such as sustainability and ethics, along with conformance quality, should be covered within the perceived risk dimension.

This work has some limitations which are stated below to offer a guideline for future studies in the same area. First, this study mainly focuses on product quality. Other dimensions of quality may be considered in future studies of services. In addition, both qualitative and quantitative analyses were conducted using samples from Italy. Future studies should replicate the findings of this study in other countries and samples. Other directions for future studies may consider the relationship between the quality dimensions identified in this study and the proposed quality-based strategy in view of the recent global trends, including sustainability, the COVID-19 pandemic, the worldwide semiconductor shortage, and the consequences of the Ukraine-Russia crises. Finally, the future change in the relationship between quality and digital technologies promises to be an interesting direction. Quality has usually been related to fulfilling defined standards and customers' expectations. With digital technologies, real-time monitoring, predictive maintenance, and personalized and unique experiences (such as the case of the metaverse De Giovanni, 2023) may bring in new dimensions of quality in the future.

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