

Literature Review of the Kano Model Development Over Time (1984-2016)

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Abstract

This paper is a chronological literature review of the theory of attractive quality and the Kano methodology. Since 1984, when the paper from Kano introduced the classification of different quality attributes, the theory obtained increasing attention in business and literature. This paper shows the development of the literature, which is described with the help of three phases – Genesis, Discovery, and Maturity. In addition to the review of the existing literature, the authors reveal the linkage between the theory of attractive quality and The Kiel School.

Keywords: Kano model, Kano methodology, attractive quality, The Kiel School

Introduction

Since the introduction of the paper of "Attractive Quality and Must-Be Quality" in 1984 by the Japanese Professor Noriaki Kano, the theory of attractive quality and the use of the Kano model has received increasing interest. In the end of the 20th century, when business activities got more global and competitive, the importance of understanding the customers rose. In order to do that, companies started

to use Kano's methodology. This method helps to understand the implications of different quality attributes on customer satisfaction. The increasing implementation of Kano's theory in practice led to a further activity in research, especially as some managers have experienced problems in applying new methods (Löfgren et al., 2013).

In consequence of extensive research in the field of attractive quality and the Kano methodology, papers that review the literature were published. In 1993, a collection of 11 papers which elaborated experiences and theoretical ideas of attractive quality was published in *The Center of Quality Management* (Berger et al 1993). Witell and Löfgren provided a systematic literature research about the first two decades in the *Quality Management Journal* in 2008 and a further overview of how the literature developed over time in 2013. The two literature reviews of Witell and Löfgren (2008, 2013) and their article about the life cycle of quality attributes (2011) attempted to stimulate more research about the very core of the theory of attractive quality.

Methodology

Our literature review of the Kano model aims at the attractive quality theory and on the Kano methodology itself. It summarises the current literature about the Kano methodology and makes a linkage to a suitable school of thought. Thus, future researchers can get a quick overview of the most important existing literature of this topic.

Therefore we examine previous literature related to our topic and the schools of thought because Cooper (1998) claimed, that all scientific research starts with analysing the existing literature to get a broad picture of the world (Cooper, 1998). We outline the development of the Kano methodology from its introduction in 1984 to today in a chronological order, the different usages of the Kano methodology, how several scientists interpreted the theory, their contributions to the theory and then link the Kano model with a school of thought.

The focus of the chronological review of the literature will be the recent development of the research field of attractive quality. After the last literature review from Witell and Löfgren in 2013, the quantity of publications including the theory and the model of Kano was keeping the level, and even showed a further increase in 2016.

Literature Review

Our literature review aims to investigate the most important contributions of the literature which made use of the Kano methodology

and in which way researchers have used, interpreted and modified the methodology of Kano (1984).

First phase - Genesis (1984 – 1999)

Kano and Takahashi (1979) introduced the concept of the motivator-hygiene (MH) property of quality on the basis of Herzberg's theory that factors, which create job satisfaction are different to the ones, which cause job dissatisfaction (Herzberg et al. 1959). Five years later, Kano et al. (1984) introduced their theory of "attractive quality and must-be quality" in the Western world. Through the conceptual basis and the elaboration of the Kano methodology, which includes a specific questionnaire to classify quality attributes, a new field of research was born. Besides the contributions of Kano and his team in the journals of quality management and marketing, they also published some conference papers (Kano 1995; Yamada 1998), which reinforced the diffusion of the theory of attractive quality.

An important contribution within the first 15 years was a compendium of ideas and experiences of using the theory in practice by Berger et al. (1993). The ideas and

conceptualizations of the paper, which was published in *The Center for Quality Management Journal*, are still an essential part of the today's understanding of the Kano methodology. On the basis of this paper, Lee and Newcomb (1997) executed a case study from the NASA, in which new measures and means to simplify the classification of quality attributes were introduced. Furthermore, the authors discussed and identified alternative statistical test and guidelines for their use in practice (Lee and Newcomb, 1997). Another researcher in the Genesis phase that strengthened the foundation for the theory of attractive quality through an extensive empirical investigation in the ski industry (over 1500 customers) was Matzler (Matzler et al. 1996; Matzler and Hinterhuber 1998).

The first 15 years after Kano's theory of attractive quality was based on few strong academic papers that opened the field of research. Besides the theory of attractive quality itself, including the Kano methodology and suggestions to put the theory into practice, several new ways of measuring and testing were added to the given construct of quality attributes to improve the practical use of it.

Second phase – Discovery (2000-2008)

In the discovery phase are papers included, which were published between 2000 and 2008. The total number of papers is almost four times bigger compared to the total number in the Genesis phase. A reason for the huge increase in a number of papers is, that the papers were published in an expanded spectrum of journals and also the field of application for the case studies extended e.g. from products to services.

The first paper within this phase was published from Noriaki Kano in 2001. It is from a conference in Sweden and the title of the paper is "Life cycle and creation of attractive quality" (Kano, 2001). In this paper, Kano (2001) examines available remote controls for television in the years 1983, 1989 and 1998. His conclusion out of this investigation is, that a remote control was an attractive quality attribute in 1983, a one-dimensional attribute in 1989 and a must-be quality attribute in 1998 (Kano, 2001). A few years later Nilsson-Witell and Fundin released a research paper, which examines the early stage of the life cycle of the attractive quality in 2005. The findings

in their paper are, that new attributes are firstly apathetic before they become attractive.

The results of these two papers confirm with empirical evidence the life cycle of successful quality by Kano et.al. (1984). But there is a shortcoming in empirical research on other life cycles for quality attributes e.g. some attributes, which failed in the market.

Within this phase, the focus of the research was on three topics. These topics are (1) categorization of quality attributes, (2) other ways to classify quality attributes and (3) the connection between the Kano methodology and other methods e.g. QFD.

The first topic in the Discovery phase was the classification of quality attributes. After revising several research papers, 17 used the five-level Kano questionnaire, in which every question has five answer alternatives given. But only six out of the 17 have employed the way how to create a questionnaire, which is described in the textbook. In order to improve the outcome of the empirical investigation, some authors proposed to modify the questionnaire, the evaluation table or

the sort of analysis. One example for some changes is the wording of the answer possibilities because they were obsolete in nearly all the papers. To provide evidence for this statement, Nilsson-Witell and Fundin (2005) compared the answer possibilities of an American (Berger et al., 1993) questionnaire with a Japanese (Kano et. al., 1984) questionnaire. With this comparison, Nilsson-Witell and Fundin proofed, that the portion of ambiguous classifications dropped. This means, that the validness of a study can be enhanced by selecting answer possibilities with the correct wording.

Considering the second topic within this phase, other ways to classify quality attributes, ten out of 27 empirical studies dealt with this topic. Some examples are Jacobs (1999), who analysed the satisfaction of customers with a TV service and Martensen and Grönholdt (2001), who evaluated staff satisfaction. Both of them classified the attributes based on their importance with the help of a dual-importance grid. In addition, there is Kano (2001) with the release of a three-level questionnaire. Furthermore, Emery and Tian (2002) and Zhang and von Dran (2002) employed an approach with direct questions.

Kano et. al. (1984) invented the traditional approach to classifying attributes and Witell and Löfgren (2007) compared this approach with some substitute approaches (Emery and Tian, 2002; Martensen and Grönholdt, 2001) in an empirical study. However, the study shows, that none of the other approaches led to an outcome, which has any parallels with the outcome of the traditional Kano methodology. Moreover, the results from the three-level questionnaire consistently differ from the results of the five-level Kano questionnaire (Witell and Löfgren, 2007).

With this knowledge, Witell et. al., (2013) draw the conclusion in their literature review, that more exploration of other approaches is required and for this reason, they advise to use the traditional five-level Kano questionnaire.

The third research topic is based on Matzler and Hinterhuber's (1998) paper and is about the connection between the Kano methodology and other methods, like QFD, SERVQUAL and FMEA. Most commonly used is a combination of the Kano methodology and QFD. Examples therefor are Tan and Shen (2000), Shen et al. (2000)

and Tan et. al (1999). They modified the weights of the importance of the customer needs in the House of Quality in QFD with the categorization of attributes. Tan and Pawita's (2001) and Pawita and Tan's (2003) approaches prioritise attractive quality attributes and in contrast to that, Tan and Shen (2000), Shen et. al. (2000) and Tan et. al. (1999) prioritise must be quality attributes.

The research, which has been pursued in this phase, analysed other approaches and explored new fields for the employment of the Kano methodology. The substitute wordings, approaches and types of analyses turned out to be beneficial because they offer variety in the classification of quality attributes. But the difference between the alternatives to the traditional Kano methodology is the outcome because it often differentiates from each other. So, the problem is, that the most effective method still has not been identified.

Third phase – Maturity (2009-2016)

From 2009 on the rate of published academic papers about the theory of attractive quality or academic papers including the Kano methodology was increasing heavily. Compared to the

time between 2000 and 2008, the number of papers published each year quadrupled. In 2009, the number of papers reached 26 in total. One reason for the increased outcome of papers was the establishment of new channels for publishing. The African Journal of Business Management, which was established in 2007, contributed seven publications within two years. Moreover, new fields of research were used. The range by then which was consisting out of quality, management, and service journals got expanded by domains like *Building and Environment* and *Quality of Life Research Journal*.

However the number of papers were increasing, the types and the content of the preceding phases remained the same. Hence, services were still the dominant empirical context and the combination of methods like QFD and SERVQUAL with the Kano methodology remained the most common research approach.

Although the number of other domains increased, the number of research that was questioning and challenging the theoretical and methodological foundations of the theory was scarce. A high number of papers instead are using Kano's model and modify it.

Examples for that is the fuzzy approach for a more objective questionnaire (Lee and Huang, 2009) and the modified cross axis of Kano's model from Shyu et al. (2013)

Nevertheless, there were some exceptions: a special issue of *The TQM Journal* for instance, which was published in 2011, had the intention to discuss and contribute the further development of the theory of attractive quality. The traditional wording of questions, answering alternatives and the evaluation table got challenged by Högström in 2011.

A further exception was Gruber et al. (2011). The paper investigated the attributes of effective frontline employees which are involved in personal interactions. The study revisited the life cycle of quality attributes, which was introduced by Kano (2001), concluding that the attributes of service employees differ from country to country in a systematic pattern. Another paper of the Maturity phase that included the dynamics of quality attributes in terms of the existence of the life cycle of quality attributes was Löfgren et al. (2011). Their research proved the existence of three life cycles of quality attributes,

which supports the significance of the theory of attractive quality. Furthermore, their research paper examined the possibility for companies to create reverse movements for certain quality attributes.

Conclusively it can be said that in the phase between 2009 and 2016 the number of papers increased, the content, however, remained largely the same. The amount of paper which are questioning and pushing the research on the theory of attractive quality is scarce. Instead, researchers published papers that entail new application fields for empirical studies and modified versions of the Kano model.

Discussion

The research field of the theory of attractive quality and the Kano model can be described with a steady increase of interest. Furthermore, according to Tontini et. al. (2013), a key challenge to success is, to identify the relation between attributes performance and customer satisfaction (Tontini et. al., 2013). Therefore more research in this field should be conducted.

While the yearly output of papers was only one or two, in the beginning, the

output of papers in the last years was always above 20 per year. This development of research, however, is connected with the trend that many researchers are simply applying the Kano methodology for new business contexts. The majority of the contributions are missing the discussion about the consequences for the theory of attractive quality. Löfgren et al. (2013) pointed out in their paper that new research agenda for the future is needed. Research areas like the life cycles of quality attributes or the customer satisfaction on the level of the whole product or service must be further investigated. In the last three years, however, the research agenda did not change, which is leading to a stagnant level of new research on the core theory of attractive quality.

Link to School of Thought

The authors of this paper identified a linkage of the theory of attractive quality and the Kano methodology with a school of thought, which is "The Kiel School". The following paragraph will explain this linkage more in detail.

"The Kiel School" belongs to the Kiel Institute of World Economic. It was

founded 1914 by Bernhard Harms and the leader from 1926 to 1931 was Adolph Lowe. After Hitler stepped to power "The Kiel School" was demolished and the members of the school spread over the whole world but some of the members build up the New School for Social Research in New York (HETwebiste, 2017). Moreover, the research field of "The Kiel School" can be described as "structural theories of growth and the business cycle" (HETwebiste, 2017). It claims, that the origin of the growth and cycles is a relation between different divisions in the real economy (HETwebiste, 2017).

The identified linkage is more specific between the life cycle of quality attributes and the business cycle. A cycle is, "something that comes and goes and returns again with some regularity [...], rather than a singular incident" (HETwebiste - Cycle, 2017). So, the life cycle of quality attributes can be compared with a business cycle. According to Kano (2001), are quality attributes changing from an attractive quality attribute to a one-dimensional attribute and finally to a must-be quality attribute. A reason for it is the competition and therefore the fast technological development and

release of new innovations. In the approach of Kiel School, "technical progress continuously modifies the real rate of return on capital, thereby causing for sectoral maladjustments, permanent excess capacity and technological unemployment during the process of growth" (HETwebiste, 2017). This means technical innovations are changing the business cycle and as well quality attributes.

Conclusion

The introduction of the theory of attractive quality and must-be quality by Kano et al. (1984) was the start of a theory with high impact in business and literature. Until today, the field of research got continuously growing interest and knowledge. Nevertheless, the research field of attractive quality is not fully explored yet. In order to do that, research content has to focus more on the theory and its implications itself. Instead of doing that, many contributions are recently applying the

Kano model in specific contexts without questioning the implications. Other examples are modifying the model, without showing the differences and implications in detail. Thus, the opportunity to make constructive research in this field remains to be given.

One example for that is the knowledge about the dynamics of quality attributes. Research in this direction was made, but there is still some more empirical evidence required. This is the case especially for quality attributes that follow alternative life cycles. The dynamics of the attributes, however, are already a key aspect of the theory of attractive quality and were used from the authors to set a linkage to the school of thought of Kiel. This school is showing the influence of technological development on business cycles. Hence, the impact of technological innovations on the life cycle of quality attributes would be a further field of research.

References

Berger, C., Blauth, R., Boger, D., Bolster, C., Burchill, G., DuMouchel, W., Pouliot, F., Richter, R., Rubinoff, A., Shen, D., Timko, M. and Walden, D. (1993). Kano's methods for understanding customer-defined quality. *The Center for Quality of Management Journal*, 2(4), 2–36.

Cooper, H. M. (1998). *Synthesizing research: A guide for literature reviews* (Vol. 2). Sage.

Emery, C. R., & Tian, R. G. (2002). Schoolwork as products, professors as customers: a practical teaching approach in business education. *Journal of Education for Business*, 78(2), 97-102.

Gruber, T., Abosag, I., Reppel, A. and Szmigin, I. (2011). Analysing the preferred characteristics of frontline employees dealing with customer complaints – A cross-national Kano study. *The TQM Journal (Kano Special Issue)*, 23(2), 128–144.

Herzberg, F. M. (1959). B. & Snyderman, B.(1959). *The motivation to work*.

HETwebiste, (2017). The Kiel School.

Link: <http://www.hetwebsite.net/het/schools/kiel.htm> [Access: 19.02.2017].

HETwebiste - Cycle, (2017). Business Cycle Theory.

Link: <http://www.hetwebsite.net/het/schools/business.htm> [Access: 19.02.2017].

Högström, C. (2011). The theory of attractive quality and experience offerings. *The TQM Journal*, 23(2), 111–127.

Jacobs, R. (1999). Evaluating customer satisfaction with media products and services: An attribute based approach. *European Media Management Review* (Winter).

Kano, N. (2001). Life cycle and creation of attractive quality. *Quality Management and Organizational Development Conference*, Linköping University, Sweden.

Kano, N. (1995). Upsizing the organization by attractive quality creation. In *Total Quality Management* (pp. 60-72). Springer Netherlands.

Kano, N., Seraku, N., Takahashi, F., & Tsuji, S. (1984). Attractive quality and must-be quality.

Kano, N., & Takahashi, F. (1979). On MH property of quality. In *Nippon QC Gakka, 9th Annual Presentation Meeting, Abstracts*, Japanese Society of Quality Control (pp. 21-26).

Lee, M. C., & Newcomb, J. F. (1997). Applying the Kano methodology to meet customer requirements: NASA's microgravity science program. *Quality Control and Applied Statistics*, 42, 537-538.

Lee, Y. C., & Huang, S. Y. (2009). A new fuzzy concept approach for Kano's model. *Expert Systems with Applications*, 36(3), 4479-4484.

Löfgren, M., & Witell, L. (2008). Two decades of using Kano's theory of attractive quality: a literature review. *The Quality Management Journal*, 15(1), 59.

Löfgren, M., Witell, L., & Dahlgaard, J. J. (2013). Theory of attractive quality and the Kano methodology—the past, the present, and the future. *Total Quality Management & Business Excellence*, 24(11-12), 1241-1252.

Löfgren, M., Witell, L., & Gustafsson, A. (2011). Theory of attractive quality and life cycles of quality attributes. *The TQM Journal*, 23(2), 235–246.

Martensen, A. and Grönholdt, L. (2001). Using employee satisfaction measurement to improve people management: An adoption of Kano's quality types. *Total Quality Management*, 12(7–8), 949–957.

Matzler, K., & Hinterhuber, H. H. (1998). How to make product development projects more successful by integrating Kano's model of customer satisfaction into quality function deployment. *Technovation*, 18(1), 25-38.

Matzler, K., Hinterhuber, H. H., Bailom, F., & Sauerwein, E. (1996). How to delight your customers. *Journal of Product & Brand Management*, 5(2), 6-18.

Nilsson-Witell, L., & Fundin, A. (2005). Dynamics of service attributes: a test of Kano's theory of attractive quality. *International Journal of Service Industry Management*, 16(2), 152-168.

Pawitra, T. A., & Tan, K. C. (2003). Tourist satisfaction in Singapore—a perspective from Indonesian tourists. *Managing Service Quality: An International Journal*, 13(5), 399-411.

Shyu, J. C., Chang, W., & Ko, H. T. (2013). Comparative analysis of experience-oriented customer needs and manufacturer supplies based on the Kano model. *Total Quality Management & Business Excellence*, 24(11-12), 1272-1287.

Shen, X. X., Tan, K. C., & Xie, M. (2000). An integrated approach to innovative product development using Kano's model and QFD. *European journal of innovation management*, 3(2), 91-99.

Tan, K. C., & Pawitra, T. A. (2001). Integrating SERVQUAL and Kano's model into QFD for service excellence development. *Managing Service Quality: An International Journal*, 11(6), 418-430.

Tan, K. C., & Shen, X. X. (2000). Integrating Kano's model in the planning matrix of quality function deployment. *Total quality management*, 11(8), 1141-1151.

Tan, K. C., Xie, M., & Shen, X. X. (1999). Development of innovative products using Kano's model and quality function deployment. *International Journal of Innovation Management*, 3(03), 271-286.

Tontini, G., Sølten, K. S., & Silveira, A. (2013). How do interactions of Kano model attributes affect customer satisfaction? An analysis based on psychological foundations. *Total Quality Management & Business Excellence*, 24(11-12), 1253-1271.

von Dran, G. M., & Zhang, P. (2002). A Theoretical Model of Quality Websites: A Multi-Disciplinary Conceptualization. In the Annual Meeting Proceedings of the Decision Sciences Institute.

Yamada, S. (1998). Idea generation in attractive quality creation. In Proceedings of the Second International Congress on Total Quality Management, Belgrade (pp. 542-7).