



Quality Management quo Vadis: A Snapshot of the German Quality Management Environment

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Abstract: The present study was a snapshot of the status of quality management in the DACH region. As part of a survey of 229 executives and employees as well as independent consultants, the current state of quality management was investigated. Basically, it can be said that quality management is largely integrated into the companies, with a few exceptions. The majority of the companies use the standardized method of ISO EN 9001:2015, a considerable proportion use the EFQM method, which places great emphasis on the deductible and assessment. The big difference among the companies surveyed is the lived “spirit” of quality management. It is predominantly reported that the companies have a functioning quality management system; however, many report that there is great potential for improvement in the design and use. Here quality management is often seen as a necessary evil because the certificates are needed for the customers. Quality management is seen as a compulsory exercise and not as a facilitator for innovations and continuous improvement. Business excellence - in the freestyle - is a foreign word. The only remedy is a reflection on a desired reflection on future-oriented business excellence. In order to achieve this, both a reengineering of the business processes and a changed mindset and leadership of the executives and the employees involved must find their way into the company.

Keywords: Quality Management, Total Quality Management, Germany, Quality Management Framework, EFQM, ISO EN 9001

1. Introduction

Quality management seems to be a matter of course in the corporate world today. At the beginning of the 20th century, the insight to generate quality started with the industries in the USA (Brüggemann & Bremer 2020). Now it is not quite easy to formulate the terms quality and quality management clearly. Henry Ford described quality as "Quality means doing the right thing when no one is looking" (Frod & Crowther, 1922). In the meantime, this description of quality and quality management has evolved significantly, ultimately through ISO EN 9001:2015, EFQM, TQM and business excellence models (Brüggemann & Bremer 2020). Furthermore, due to Industry 4.0 and digital transformation of business processes, special importance is added to quality management (Mockenhaupt, 2021).

Recent studies underline the outstanding effects and potentials of a functioning quality management; however, they also show that there are great differences between the conceptions and uses of quality management systems (Schmieder, 2017; Forbes Insight, Mai 2017a).

In this study, we will examine how board members, managing directors, quality managers and employees view the topic of quality management, what experiences they have gained in using various systems, and what potential for improvement they see.

2. Theoretical Background

First of all, the term "quality" must be clarified. Generally, there are different ways of looking at it (Brüggemann & Gremer 2020):

On the one hand, special characteristics of products and services are considered from the customer's point of view. Here, among other things, image, product development and technologies are required.

On the other hand, according to DIN EN ISO 9000, quality is defined as the "degree to which a set of inherent requirements is met". According to Brüggemann and Bremer (2020), this means that the "degree of conformity between the specified requirements and the result" is also seen.

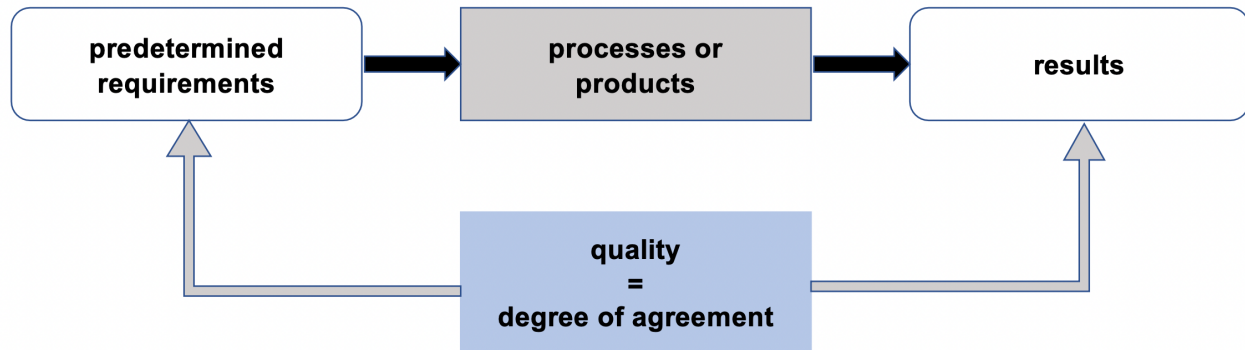


Figure 1: Quality as the degree of conformity (Brüggemann & Bremer 2020).

Hereby, therefore, both the products/services and processes are considered. Product management and process management are addressed here.

Due to

- the globalization of markets
- the changing worldwide trends
- the necessary conservation of resources and
- the advancing digitalization (Industry 4.0),

the requirements for all companies with regard to their products/services and business processes are currently changing. Due to increasing customer centricity and competition for efficient and willing employees as well as transparency of information, the competitive pressure is constantly increasing. Today, key factors for corporate success are the ability to innovate, business excellence, employees and leadership.

High-quality products and services are an absolute must. Business success, both now and in the future, can only be guaranteed on a sustainable basis by a high-performance business model, coupled with a good business excellence model and effective risk management (Hütte & Kainer, 2021). In addition to the business model, a wide variety of business processes - including risk management - play a special role in this. The diverse business processes are in turn the basis for a functioning quality management system.

Efforts toward quality management have grown steadily historically. Initially, measures were seen as ensuring agreed quality, predominantly quality assurance through quality inspection; later, conceptual ideas and measures were introduced into quality management. The unifying characteristic of all efforts is a proactive approach to preventing of "poor performance" in order to reduce reactive action. The current "procedure models" ultimately also have the goal of establishing business excellence in the enterprises to establish. Thus today the concepts TQM - Total Quality Management (Brüggemann & Bremer, 2020), ISO EN 9001 (Zech, 2019; Brüggemann & Bremer, 2020) and EFQM - European Foundation for Quality Management (Zech, 2019; Brüggemann & Bremer, 2020; Murthy, 2020; Bruhn, 2021) stand as effective instruments for an effective quality management. These measures have given rise to finally developed concepts for practicable business excellence.

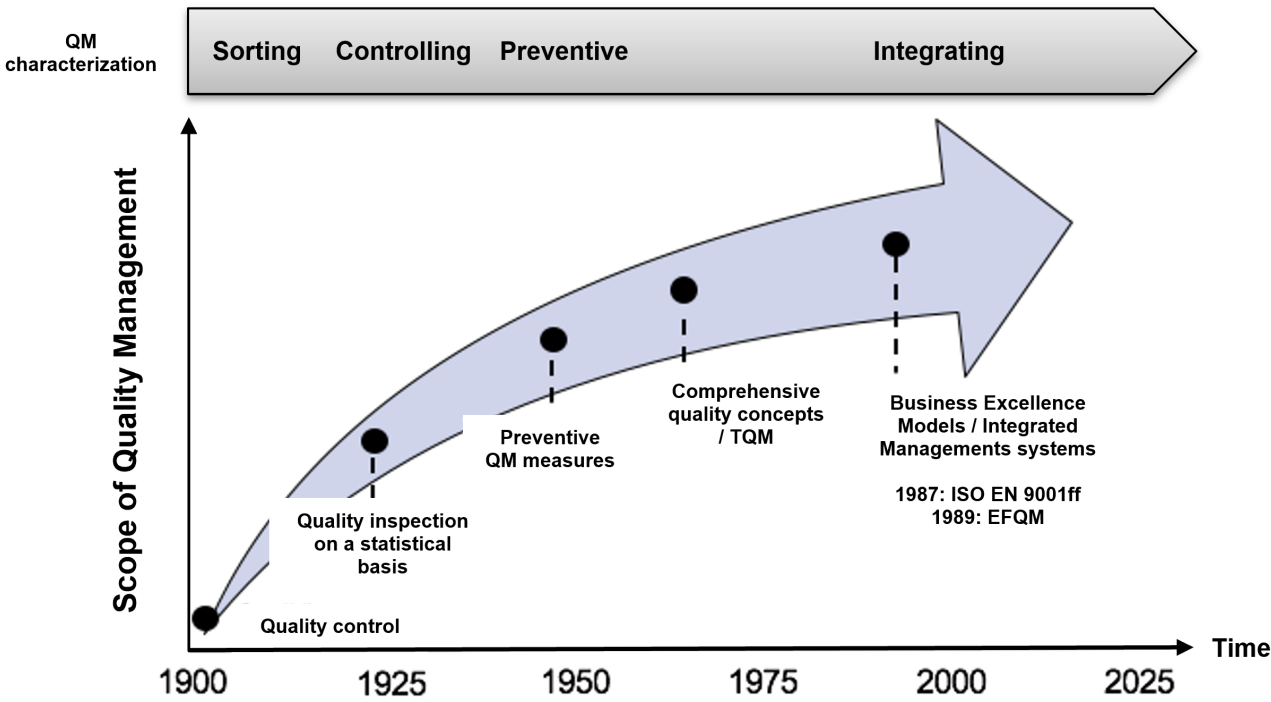


Figure 2: Development of quality management based (Brüggemann & Bremer, 2020; extend)

The DIN ISO EN 9001:2015 standard has clearly moved in the direction of processes, customer satisfaction and employee involvement. It is and remains a standard that must be adhered to. Auditors watch for compliance. In contrast, the EFQM is designed for self-determination and self and self-assessment. It should also be mentioned that the amended EFQM (EFQM 2020) pays special attention to a sustainable-on-sustainable corporate management in accordance with the 17 "Sustainable Goals" of the UN (EFQM, September 2021). The "new" EFQM 2020 focuses on Leadership as a success factor and takes into account the topics of agility, digitalization, transformation capability, and sustainability of the companies. The topic of agility in the context of ISO EN 9001:2015 is, among other things, the subject of a research project of the University of Hanover (Adam, 2018).

The topic of quality management is regularly the subject of cross-industry studies, including in Germany and the USA. Although quality management has always been an important topic of management in companies, science and literature for decades, there is still no uniform picture of it. Very high still seems to exist a lack of acceptance in companies, although the relationship between quality management and business success is proven (Forbes Insight, 2017b). However, in recent years, there is a growing understanding of the importance of customer orientation and employee involvement (DQG, 2008; Foidl & Felderer, 2016). The relationship between quality management and business excellence is mentioned only occasionally (Foidl & Felderer, 2016).

The newer topics such as sustainability and Digital Transformation or Industry 4.0 have arrived in the corporate worlds (Foidl & Felderer, 2016; Torella, da Silva & Vargas, 2018; DGQ, April 2018; Staufen, December 2018; Müller, 2019; Forero & Sisodia, 2020; Mockenhaupt, 2021). The opportunities are given by the capabilities of the newer sensors, variety and quality of the available data and the capabilities of the data analytics methods. This will result in improved transparency of process data and quality data.

3. Methodology

The purpose of this study is to examine the various currents, insights and sensitivities on the subject of quality management with regard to business excellence and future viability. In doing so, the technological possibilities and the changes in the working environment should also be taken into account.

For this purpose, board members, managing directors, quality managers, executives, employees and consultants in the B2B business in the DACH region were surveyed online using a questionnaire. The survey was available for a period of four weeks. The questionnaires were sent to the networks from the authors via mail or shared in social media (e.g.,

LinkedIn, Xing, Facebook, etc.). No target groups or differentiations were deliberately made, as it is assumed here that all employees - from management to the gatekeeper - are responsible for quality. Company size is also irrelevant to the design and attitude of those involved. The results are presented unedited below so as not to distort the results.

The questionnaire contained closed questions and preset answers. Open questions were avoided to receive more standardized results. For the presetting of those answers an analysis were done to evaluate, based on existing standards, the most meaningful answers. As the survey were conducted as an online survey, the evaluation tool Google forms were used to avoid any browser or system related barriers for participants. In addition, this tool allowed a systematic evaluation without delay.

4. Research Results

As described the online survey was opened for four weeks and distributed to people which are involved in the field of quality management. The survey was closed with at the end 229 valid participants which filled out the survey completely and which agreed to use the result for science, further research and scientific publications (Kainer et al, (2021).

4.1 Participants and Their Understanding of Quality Management

Half of the respondents are members of management and middle management, i.e., at the executive level of the companies. Of the participants, 35.4% worked in management, 27.1% in middle management, 10% as senior manager quality assurance, 20.5% as employees without a supervisor function, 7% in other positions. This result is gratifying in that it clearly shows that quality management is understood as a management task.

Almost half of the 229 respondents are from companies with more than 250 employees. Most of the respondents were in the manufacturing industry (43.7%) and simultaneously or in parallel in the service sector (38.0%). Interestingly, the percentage of participants from the public sector (4.4%) was relatively low. Likewise, participants from the energy and tourism sectors were very poorly represented. 127 of the 229 respondents stated that they were certified according to the usual standards such as ISO EN 9001 and EFQM. 71.1 % of the respondents' companies are thus fully or partially certified according to standards or a TQM. Only 11.8 % stated that they had no certification/accreditation. Here, the results show quite clearly that certified standards and models are part of the general standard at the vast majority. When asked which quality management method is trusted, the survey showed that ISO 9001 leads the field here (56.8%). Other standards do not play a role and, for the most part, are not measurable. It is worth mentioning, however, that 13.5% of the participants stated that they did not trust any quality management method.

The survey continued by asking whether the participants perceive the quality management currently used in the company as meaningful. 64.2% of the respondents feel that the quality management established in the company is lived and meaningful. This is pleasing in those other studies (Forbes Insight, 2017b; DGQ, 2018; Minder, 2020) show that quality management was only introduced due to customer requirements. Many companies rate themselves as pioneers here in the areas of process management (33.3%), mission statement and values (32.3%), and dealing with errors, complaints, and grievances (34.9%). In contrast, around 26% of respondents were very cautious, stating that they were not pioneers in any area and that they still had potential for improvement. The survey also aimed to find out why quality management rarely delivers added value from a user perspective. The most frequently cited causes here are:

- Lack of knowledge / awareness (50.2%).
- Meaning and purpose unclear (45.9%)
- Lack of prioritization (37.6%)
- Lack of resources (31.4%).

More than half of the respondents indicated that lack of knowledge/awareness is the reason for the negative attitude towards the added value generated by quality management. It can therefore be assumed that the benefits are currently only insufficiently communicated within the companies and that employees are not sufficiently involved. The other causes mentioned should also be considered.

4.2 Further Development of Quality Management

The participants themselves, who come from the area of quality management, were further asked for a personal assessment of where they would classify themselves as pioneers in the company. Only 15.7% of the participants stated

that they were not pioneers in any area within the company. The other participants showed very clearly in which area quality management can take on a pioneering role:

- Risk-based approach (34.9%)
- Process management (33.2%)
- Mission statement, guiding principles and values are lived (32.3%)
- Use of data and its measurability (25.8%)
- Dealing with errors and complaints (19.7%)
- Audits (especially internal) and reviews (23.6%)

Here it became apparent that it is a matter of course for the respondents to start optimizing and questioning existing processes. Now that we have presented the areas in which the participants' companies are pioneers and in which quality management generates added value for the company, we went on to investigate why quality management is not being adopted by the participants' companies in the way it is hoped. Here, the answers showed that knowledge about quality management itself and its effects is assumed to be the strongest reason why quality management is not accepted in a company. The answers to this question showed the following results:

- Lack of knowledge / awareness (50.2%).
- Meaning and purpose are not known to the employee (45.9%)
- Lack of prioritization / importance in the company (37.6%)
- Lack of resources (31.4%)
- Poor quality of data and processes (29.3%)
- QM is not part of the corporate and IT strategy (24.9%)
- Lack of reference to the balance sheet / QM hardly measurable (24.9%)

Overall, most of the questions support the picture that knowledge about quality management must be increased and more firmly anchored in the company in order to be successful. In the further questions we turned also therefore to the future development of quality management in the enterprises of the participants. In the next step we asked the two questions, what has to be changed in the short and medium term, as well as in the long term in the company from the point of view of quality management. These questions also revealed a focus on the area of process management. The three most frequently mentioned short- and medium-term change requests were:

- Question and optimize processes (69.4%).
- Strengthen all processes through digitalization and Industry 4.0 (42.4%)
- Use internal audits as a tool (33.6%).

Most stakeholders probably understood that it always has to start with questioning processes. The answer "no longer maintain QM as a department" was still given by 31.4% of respondents. It can probably be assumed that quality management as a department or competence center is maintained in most cases only to ensure that regular reviews or audits are passed. Finally, only 8.7% indicated that they still need to discuss it (internally)

This trend, with a focus on changing and adapting processes as a core element of quality management, was also evident when asked, "What would you change in the long term?" Here, the most strongly mentioned answers were:

- Holistic process reviews involving all stakeholders (54.6%).
- Measuring quality management costs and contribution to goal achievement (36.2%)
- Checking whether the quality management strategy fits with the corporate and IT strategy (34.5%)
- Develop my organization consciously in the area of QM (33.6%)

Interestingly, in this question, which also allowed multiple answers, no other answer options were selected as being worth mentioning. With the other answer possibilities it came only to isolated approvals...

The answers to the question, what should be changed in the long term, show that companies with these mentioned wishes achieve the last mentioned change: to develop organizations consciously with quality management.

4.3 Conclusion of the Survey

Overall, it must now be stated once again that quality management and the various methods are predominantly introduced and used in the companies. Previous studies (DQG, 2008; Forbes Insight, 2017b; DQG, April 2018; Staufen, December

2018; Minder, 2020) have shown a similar picture. However, there are also clear indications that there are some reservations. Is quality management really lived in the companies? Many responses indicate that there are doubts about its usefulness and necessity. However, this overlooks the fact that the path to business excellence is severely restricted as a result. This is where change processes in general must begin. Recommendations for action are given below.

It is also exciting that Industry 4.0 and the digitalization possibilities that already exist are opening up new paths for effective quality management (Foidl & Felderer, 2016; Tororella, da Silva & Vargas, 2018; Müller, 2019; Forero & Sisodia, 2020; Mockenhaupt, 2021). This is seen in the same way by many participants. With the data and information now available, products and processes can be understood and influenced more easily and better.

A significant and effective role is attributed to managers or leaders. They must learn to move with the times and adapt to a strong change in the mindset of customers and employees.

5. Recommendations for the Design of a Future QM System

In order to cope with the tasks and measures ahead, it is suggested that one simply recalls the basic principles of TQM and/or quality management. It is important to involve the key stakeholders' customers, suppliers and employees and not to impose any systems and tools on them. It is suggested to work out the following concrete procedure of a future quality management step by step, partly with appropriate methods/tools. Basically, the quality management principles according to ISO EN 9001:2015 should be taken into account, which are applicable for every company, even if they do not want to be certified:

- 1. customer orientation
- 2. leadership
- 3. involvement of employees
- 4. process-oriented approach
- 5. system-oriented management approach
- 6. continuous improvement
- 7. fact-based approach to decision-making
- 8. supplier relations for mutual benefit

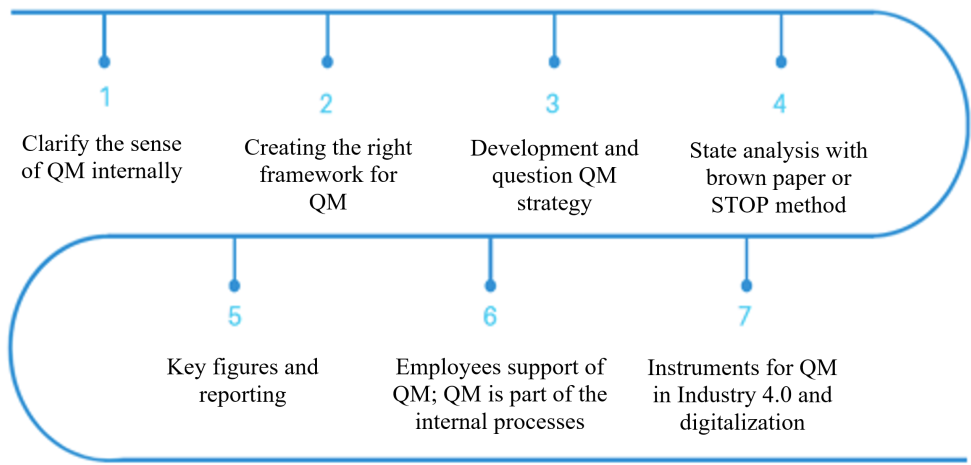


Figure 3: Seven Steps for a future oriented Quality Management (own work)

The data used in this analysis is focus on long period dynamic behavior for share price of BIMB. The data selected for this research is collected from year of 2010 until 2016.

In order to develop and implement an effective quality management system, the seven most important steps - as shown in Figure 3 - should be considered:

In principle, the individual actions can begin in their own specific order. Nevertheless, it is suggested to start with the internal clarification of the meaningfulness. Without a common understanding, there will be no consensus on this topic in the companies.

5.1 Clarify Meaningfulness Internally

Why should the quality management approach be maintained, regardless of whether a certificate is sought or not? The reason may be the customer or an earlier management decision. Now is the time to question this again with the current team. Define with the team what quality means to them. As a cause of missing added value of quality management in the companies "lack of awareness" is mentioned with 50% as well as "sense and purpose are not known to the employees" with 46%. It will be difficult to communicate the sense of purpose to employees if it is not completely clear and convincing even to the managers.

5.2 Creating the Right Framework

With what framework can quality management be lived? This is an absolutely key question. Especially if the goal is for quality management to really contribute to the corporate strategy, it is necessary to find out whether the framework conditions are in place. The basic idea must be developed further and the employees must be able to contribute to the achievement of the goal. The fields of action must be identified and discussed in meetings with the team. What internal and external challenges does the company face? This also includes the causes. 5 aspects deserve special mention here, now that the meaningfulness is questioned, supplemented by the answers from the question "Why does QM generate added value in most cases?"

1. Resources: are sufficient resources available for the projects or is the company willing to make them available? Only after this clarification can a follow-up step be taken.
2. Importance in the company: Now that the team has developed and understood the importance of quality or quality management, weight is given to the quality management principles.
3. Responsible persons must be named who will bring the upcoming projects or these processes to success. A clear mandate must be given without defining the "how".
4. Dealing with mistakes: room must be allowed for mistakes to be made. Successes and failures always go together. Without willingness to address mistakes, a team will not work transparently, but rather cautiously. Courage is needed to be a role model and to allow mistakes. Ideas - arising from mistakes or innovative ideas - must be consistently appreciated and followed up. Employees are multipliers in the company in the sense of a learning organization. In his book "Der Mitarbeiter als Mitdenker" (Steiner, 2021), Christian Steiner gives practical tips on idea and workshop events and shows great successes that have been achieved as a result.
5. Involving employees in continuous improvement processes is an important principle. This makes the awareness or the benefit of a lived quality management.

5.3 Develop QM Strategy and Align it with Corporate, IT and Knowledge Strategy

A functioning and "living" quality management contributes to the corporate strategy. Analogous to a corporate strategy, a quality management strategy must be developed from it. Even if customers are the reason for certification, it is worth taking the time to ask: "What are the benefits of structured quality management?" Answering this contributes to understanding the meaningfulness of quality management. The following questions are helpful in developing a strategy:

- a) Where do you want your business to be in 5 or 10 years?
- b) Do you already have a digitization strategy? Are you already using "state-of-the-art" solutions? Are you already data-driven?
- c) Where do you want to be compared to your competitors?
- d) Which standards, norms, industry solutions and knowledge are relevant?
- e) What is the current situation? What insights do you have from the past gap analysis? Define questions to be answered in the "As-is analysis" step.
- f) What knowledge gap do you have and how do you close this gap? External/internal, make or buy?
- g) What do you want to achieve with your quality management strategy? What do you want to achieve with the time gained, e.g. after automation?

- h) Have you appointed a responsible person, for the development and for the implementation of your knowledge strategy?
- i) Do you really need a department for quality management or are there other solutions? If yes, with what specific mission?

5.4 As-is Analysis with the Brown Paper Method

The brown-paper method is a practical tool for depicting processes on a "large sheet of paper" together with a team during the topic workshops as they are really currently running and then analyzing them (Fleig, 2019). The quality management approach can be derived from the quality management strategy: Process steps, process duration, error rate, costs, applicable tools, data and objects. Lack of measurability are possible "Pains" that need to be eliminated.

With the brown paper method, each process can now be analyzed. It is important to find out where the best-practice examples and quick-win's can be found, for example? In addition, the necessary resources, data and times are determined. After this step, the measures are then prioritized and an assignment of responsibilities is made. Using the STOP method (Schadt, 2017), which is well known in accident prevention, individual process steps can be checked in the same way for reasonableness, susceptibility to faults and effectiveness. Finally, the processes are optimized. A decision must then be made as to which IT tools can be used to provide support and how. A digitization strategy is absolutely desirable.

It should also be mentioned here that today there are also digital possibilities - such as interactive whiteboards - with which process recordings and discussions can be carried out efficiently. After a final change or optimization of the individual business processes, these should be documented e.g. with the BMPN 2.0 method. This can ultimately ensure a common understanding of the process in conjunction with the necessary data and document management (Freund & Brücker, 2017). The notation then applied can also be used at the same time as a basis for the use of a digital transformation of business processes (Bulut, 2021).

5.5 Key Figures and Reporting

The definition and use of relevant key figures is an important topic in quality management. Only with relevant processes can be evaluated and optimized. The process owners play an important role here. If no key figures exist yet, the necessary meaningful data must first be recorded. It is important to work out what is really to be achieved with the use of data.

At every management, quality management or project meeting, the relevant key figures or process indicators must be discussed. Target definitions should always be linked to the key figures. This makes responsibilities transparent and effective. Finally, key figures can be used to accelerate and/or ensure the achievement of corporate goals by management/leadership and employees. Each key figure should have a reference to the company balance sheet and/or P&L - directly or indirectly. The target indicators should be traceable at all times in bottom-up and top-down reporting.

5.6 Employees Contribute - Quality is an Integral Part of the Processes.

The goal should be that everyone is responsible for the availability of quality and the knowledge so that the results can be used by many. This includes that the employees are informed about the purpose, trained about their roles.

By ensuring that quality management is an integral part of your own processes, the employees involved will automatically be informed. Pay particular attention to the following milestones and points of contact:

- a) Values and guiding principles include your commitment to quality management and are well known
- b) On-boarding process must be transparent and professional
- c) Refreshers of necessary trainings, events, celebrating successes must be a matter of course
- d) Only result-oriented reports are required that address the status of goal achievement or objectively describe problems.
- e) Reviews after project completion.

5.7 Targeted Use of Instruments and Digitization

After the above points have been worked on, the company has a usable foundation. All steps 1-6 contribute to improving effectiveness and achieving or improving business excellence. Now that the processes have been optimized - "re-engineered" - the digitalization of the processes - also with the help of Industry 4.0 approaches - can be used to make them efficient. Tools such as IoT, IIoT and artificial intelligence then play a special role here. The basis is of course and always the existence of optimized processes and the data then available in real time (Mockenhaupt, 2021; Bulut, 2021).

6. Conclusion

This study was a snapshot of the state of quality management in the German speaking area of Europe. As part of a survey of 229 managers and employees as well as independent consultants, the current status of quality management was investigated.

It can be stated that quality management is firmly integrated into the companies to the greatest possible extent, with a few exceptions. The majority of companies use the standardized method of ISO EN 9001:2015. In addition, a considerable proportion use the EFQM method, which places a great deal of emphasis on self-involvement and self-assessment.

The big difference among the surveyed companies is the lived "spirit" of quality management. Overwhelmingly, companies are reported to have a functioning quality management system; however, many report that there is great potential for improvement in its design and use. Here, quality management is often seen as unavoidable because certificates are needed for customers. Quality management is seen as a compulsory exercise rather than a processor for innovation and continuous improvement. Business excellence - in the freestyle - is a foreign word.

The only remedy is a reflection on an aspired reflection on a future-oriented business excellence. In order to achieve this, a reengineering of business processes as well as a changed mindset and leadership of the managers and the employees involved must find their way into the companies.

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