

Summary

The global industry is facing a fourth industrial revolution, called Industry 4.0. It refers to connectivity and integration of systems to gather and analyse data and digitalize the operations of the organization. Quality 4.0 is a concept related to this fourth industrial revolution in terms of the digitalization of quality work in the context of Industry 4.0. This thesis explores how Quality 4.0 is part of the evolution of quality work and proposes a definition based on literature. A case study research was done together with several Swedish and international organizations, focusing on understanding how the organization should transition into Quality 4.0. A definition of Q4.0 is presented and a general roadmap for transition to Q4.0 is proposed, which comprehends six sequential phases and is applicable to different organizations that plan to transition into Quality 4.0.

Aim

Organizations are asking for in depth knowledge about how to transition into Quality 4.0. This study in collaboration with GKN aimed to first understand what the awareness of Quality 4.0 in organizations is, to provide ground for defining a series of steps for transition to Quality 4.0. To address this, the authors proposed the two following research questions:

RQ1: What is the awareness of Q4.0 in organizations?

This question provided information of how the concept of Quality 4.0 is understood in the organization and also provided ground for the next research question.

RQ2: What steps should an organization take to transition to Quality 4.0?

This question provided a roadmap for organizations to transition to Quality 4.0, defining which steps to take for moving towards it.

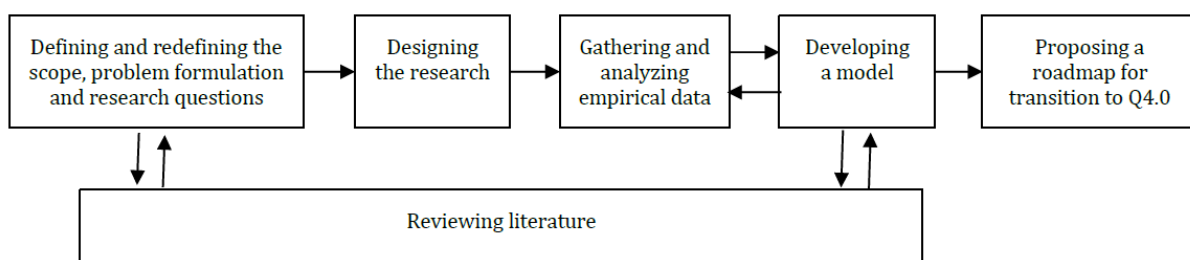
Delimitations

The in-depth information obtained in this study was limited to the Aerospace Engine Systems division at the GKN Aerospace Sweden site in Trollhättan. Other companies provided data, but in-depth studies have not been conducted at other companies outside of GKN Aerospace Sweden.

The data was obtained from a limited number of occupations within the interviewed organizations such as quality engineering, information technology, production development and Industry 4.0. Interviewing a broader range of occupations such as financial, human resources and sales might have enriched our understanding and affected the roadmap for transition to Q4.0. Due to time and scope limitations, no specific plan for implementation of the roadmap for transition to Q4.0 within any organization was developed.

Research Process

The general research process used for this study is depicted in the following figure:



Research design

This study has been realized under a qualitative research strategy with a case study design and an abductive approach, to answer the research questions. Interviews were used to gather empirical data for the development of a roadmap for transition to Q4.0 that was finally enriched with theory.

Method

Non-probability purposive and volunteer sampling techniques were used for selecting interviewees. The interview questions were tested in two rounds. All interviews were completed within eight weeks to facilitate answers being compared within a reasonable timespan. The interviews were performed by two interviewers and conducted in person, by audio link or by telephone.

For the development of a roadmap for transition to Q4.0, process coding was used to imply actions through time that can become strategically implemented. As part of the abductive approach for this work, theory helped to provide a name for the codes which gave way for developing the names for the phases and steps for the roadmap.

Elements of research quality considered for this work were credibility, transferability, dependability and confirmability which are the elements of trustworthiness.

Analysis

The general awareness from the organizations that contributed to this work was that Q4.0 is a concept related to I4.0. It is about how digitalization will change the quality work at an organizational level. It can be argued that the concept of Q4.0 is not clear for Swedish organizations.

The awareness of quality 4.0 and its impact are low and further research should be done in order to fully understand the long-term consequences for humans. Industry 4.0 projects must be aligned with the strategy and goals of the organization. Deciding when to end pilot projects and dare to invest in order to fulfill their strategy and thereby getting closer to industry 4.0 is important for organizations. Investments in competence development of staff throughout the organization must be done in order to learn how to face the implications of industry 4.0.

Conclusion

This work proposed a definition of Q4.0 in the context of using technological developments and innovative digital tools to improve continuously in different areas of the organization such as company culture, competence development, customer satisfaction, knowledge management, data management and integration. This definition can contribute to a better understanding of the term Q4.0.

This thesis provides a roadmap for transition to Q4.0 with a structure for organizations to transition into Q4.0 regardless of business line. It is grounded on known quality theories and principles such as TQM, Lean Six Sigma and ISO 9001:2015. The roadmap should be relevant for companies aiming to include I4.0 in their strategy while considering how the changes within the organization will affect quality work in the future.