



# The future shop-floor operators, demands, requirements and interpretations

Magnus Holm

University of Skövde, Box 408, 541 28 Skövde, Sweden



## ARTICLE INFO

### Article history:

Received 15 November 2017  
Received in revised form 21 February 2018  
Accepted 13 March 2018

### Keywords:

Future shop-floor operators  
Manufacturing industry  
Interview study  
Survey study

## ABSTRACT

The evolution of the manufacturing industry reveals continuous progress and development throughout the years. This evolution not only includes production methodologies and the production equipment, it also includes the working environment of the shop-floor operators. The demands faced by the shop-floor operators have developed from strictly controlled, simple and monotonic tasks to self-controlled team work requiring a holistic approach that aims at continuous improvements and achieving a high degree of flexibility, adaptability and initiative.

This paper describes the evolution of the shop-floor operator, according to the research literature and interviews with manufacturing managers and human resources specialists. In addition, the paper presents the response of future Swedish shop-floor operators, today's high-school students, to a description of their possible future work as shop-floor operators. The Swedish manufacturing industry competes, to a large extent, on and responds to the international market. The findings made in this paper are thus also interesting for other industries and countries acting on the international market.

© 2018 Published by Elsevier Ltd on behalf of The Society of Manufacturing Engineers.

## 1. Introduction

In recent times, Sweden has had a positive national trade surplus [1]. The competition in the international marketplace is constantly increasing and, as an export-dependent country, it is vital that the nation's manufacturing industries are competitive and adaptive, in order for them to maintain a leading position. The challenges faced by manufacturing companies not only include variables of productivity, but also an increased level of knowledge among staff that enables them to fully utilise the production systems. Future production challenges are anticipated to emphasise the importance of developing the knowledge, abilities and scope of the employees, not only in the engineering departments, but also on the shop-floor [2,3]. Good collaboration within shop-floor teams that have both novice and highly experienced operators is vital, when complexity and the demands of adaptability in future production systems increase and time-to-market decreases. An increasing pace together with more advanced machines and complex production systems lead to a more information intensive working environment. It raises demands of technical support systems to help the shop-floor operators handle, prioritise and act on available and

incoming information, in order to maintain a high production output.

The production industry in Sweden has identified the need for extended technical knowledge and competence in handling future production systems, in order to maintain a high level of competitiveness and productivity [3–6]. Among the key employees are the ones closest to the production systems, the shop-floor operators.

This paper aims to investigate current, as well as future, demands and requirements of shop-floor operators in order to gain insights on competences and skills needed for successfully undertake competitive production. Such insights are of high importance for the manufacturing industry to be able to be pro-active in their requirement of new personnel as well as their competence development of existing personnel. Data for the study is collected through interviews with managers and human resources specialists from six different manufacturing companies in Sweden, as well as from over 200 youngsters constituting the future's shop-floor operators. As far as the author is aware, there is no previous similar study that is based on such extensive amount of data, but the majority of previous studies are based either on a limited set of data or purely on theoretical reasoning. It should be pointed out that although the study is undertaken in Sweden, its results are generally applicable to all modern manufacturing industries acting on a global market, since when acting globally the challenges and competitive conditions are the same regardless of which country the

E-mail address: [magnus.holm@his.se](mailto:magnus.holm@his.se)

production site happens to be located in. The next section continues with describing the evolution of the industrial shop-floor operator over time. In Section 3, the interviewed managers' views of the future shop-floor operator are presented, followed by a response on their thoughts given by high school students in Section 4. In Section 5 conclusions from the study are outlined and future work is discussed.

## 2. Evolution of the industrial shop-floor operator

Yesterday's shop-floor operators were stationed at one machine or focused on one specific task. In contrast, today's shop-floor operators face an increasing range of tasks, demands and responsibilities. Parallel to this transformation, the difference between blue collar and white collar responsibilities and scope has faded. Many of the engineering duties formerly carried out by white collar workers are today within the responsibilities of the shop-floor teams.

The development of the shop-floor is, of course, a mirror of the changing conditions faced by the production industry in general. Shifting management strategies have obviously affected all employees in one way or another. The concept of Scientific Management presented at the beginning of the last century focused on efficiency. The shop-floor operator was almost considered as a machine along with other machines on the shop-floor. According to Scientific Management, the shop-floor operator was in need of firm supervision and a rigid structure, in order to reach high productivity. The areas of explicit knowledge, decisions and conclusions belonged to the white collar workers who were not expected to emerge from their offices onto the shop-floor [7–9].

In 1948, the concept Method Time Management (MTM) emerged and during the following years it was introduced to industry. Through analyses of manual tasks, focusing on and evaluating possible improvements, MTM enabled improved ways of working. The MTM-concept has had a substantial impact on the development of the manufacturing industries' productivity and competitiveness, also, of course, on the working environment of the shop-floor operators. In the 1980's, the Toyota Production System (TPS), a production and management concept, began its triumphal march over the world, also strongly influencing Swedish industry. Along with yet another management philosophy, Total Quality Management (TQM), the focus was set on the expectations and requests of the customer, as well as the production variables, quality and flexibility. These somewhat new shop-floor focuses resulted in an increased motivation to work with continuous improvements and the elimination of waste, not only for the engineers but also including the shop-floor operators. A high level of commitment and a broad range of adaptability are keys to the successful implementation of any management and/or production philosophy, not least on the shop-floor. The production philosophies emerging from TPS, TQM and Lean have strongly influenced most of the world's production companies on both management and shop-floor levels, and still do so today [10–20].

Having a pro-active approach on the shop-floor is an important strategy that facilitates greater flexibility and a possible reduction of the total lead time at assembly stations. Such approaches can counteract possible uncertainty caused by stochastic events (errors, breakdowns, etc.) during production [21,22]. One of the strengths of a human operator is the ability to adapt to different situations, make a decision and act upon it. However, in a dynamically changing workshop environment with stochastic events that negatively affect the production system, shop-floor operators neither possess all the available information nor do they have the capability to process or evaluate it in real time. To make good decisions, the operators need a system that supports decision-making, communication and collaborative work, as well as facilitates a learning

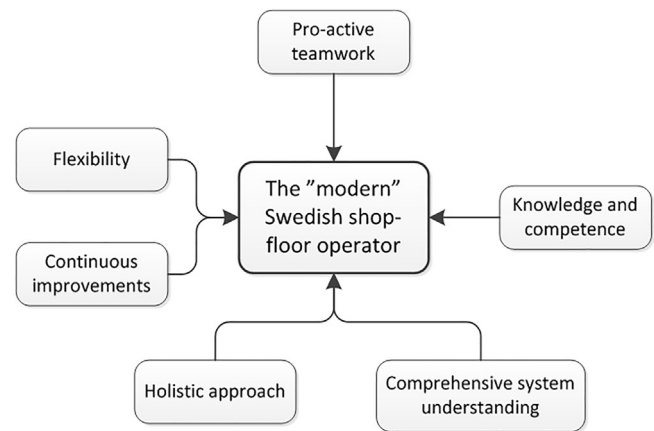


Fig. 1. Demands on today's shop-floor operator according to interviews and literature.

process enhancing a proactive shop-floor [11,23–25]. Views of and demands on the shop-floor operators of today, provided during the interviews and from the research literature, are described in Fig. 1.

As indicated in the research literature, the evolution of industry has not had the shop-floor operators in focus. Research has concentrated on management, methodologies and the production systems. Though the role and importance of the shop-floor operators are eventually going to change.

## 3. Managers' views of the future Swedish shop-floor operator

In addition to reviewing the published research literature, as presented in the previous chapter, data for the study has also been collected through in-depth interviews and through a survey. The interviews target production managers and human resources specialists from the manufacturing industry and have the purpose to obtain their perspective on the future shop-floor operator. In total eight in-depth interviews have been undertaken at six different manufacturing companies in Sweden. These companies have been selected to be representative for the Swedish manufacturing industry, and they therefore represent different sizes as well as manufacturing businesses, including engine manufacturing, metal cutting, and wood processing. The shop-floor operators at these companies are engaged in machining as well as assembly operations. The goal of the interviews was to capture each individual manager's understanding and predictions for the future shop-floor and the questions used are listed in Appendix A in Supplementary materials. The interviews were performed individually at each company, with one manager/specialist at a time. In the presentation of the results from the interviews in this paper, the names of the participants and the companies are anonymous, to avoid any possible identification of the sources.

During the interviews with the production managers and HR specialists, a model describing four quality areas when developing industrial work was used as a basis for the interviews [24]. The four areas are:

- Individual – team
- Skills
- Improvement and development work
- Management and communication.

A team-based approach on the shop-floor and operators within the teams that rotate workplaces are used by all companies engaged in the interviews. The vital importance of social interaction and

Download English Version:

<https://daneshyari.com/en/article/8048264>

Download Persian Version:

<https://daneshyari.com/article/8048264>

[Daneshyari.com](https://daneshyari.com)