
Ilyana Janis¹
¹Departament of Technical and Vocational Education Universiti Tun Hussein Onn Malaysia, Malaysia. ilyanajanis@yahoo.co.uk

1 Abstract

Document analysis is one of the analytical methods used in qualitative research to interpret the various type of publications. Documents are ‘unobtrusive’ and ‘non-reactive’ that are not influenced by the research process yet its flexibility allows multiple interpretations among the researchers in order to meet their research purposes. Various publications consist of different perspectives that view Industry 4.0 as a complicated scenario. The complex scenarios of Industry 4.0 and besides, the absence of technical work in document analysis might influence the novice researcher specifically to understand the requirements for Industry 4.0 competencies. Therefore, this paper aims to understand the competencies requirements of Industry 4.0 by using ATLAS ti. Software in document analysis. Methodologically, this paper presents five stages proposed in document analysis procedure; which open coding and pattern coding used in data analysis. From the categorical aggregation, findings discover five emerging themes in reference to the type of literature to ascertain the Industry 4.0 competencies requirement. Findings as well demonstrate that document analysis can be used as a stand-alone method and could be used in triangulation to validate both credible sources and data in research on Industry 4.0 competencies requirement.

Keywords: document analysis; Industry 4.0; competencies issues

2 Introduction

Various publications (such as newspapers, magazine articles, executive summaries, corporate documents, government policy blogs and websites, conference proceedings, and journals) widely discuss the concept of Industry 4.0. The ideation of the Industry 4.0 concept was launched in 2013 by the German government to eliminate mass production, focusing on self-automation and self-optimisation in shop floor production (Zhang & Liu, 2015). The emergence of Industry 4.0 technology, which relies heavily on intelligent automated technology creates an ‘uncertain and unstable’ environment due to new technology proposed in conventional manufacturing (Shamim et al. 2016). Several leading factors discovered in the ‘uncertain and unstable’ environment. For examples, there is no exact definition of Industry 4.0 (Götz and Jankowska, 2017; Mohamed, 2018), low acceptance and readiness among the manufacturers (Müller, Kiel, & Voigt, 2018) and a shortage of high-skilled workers in the transition to Industry 4.0 (Pfeiffer, 2015).
Consequently, the introduction of the Industry 4.0 concept causes disruptive employment among low-skilled and semi-skilled workers (Ballister and Elsheikhi, 2018; Chang et al., 2016), due to the increased requirement for high-skilled workers. The high skilled worker is associated with problem-solving skills, creativity, decision-making, and other related competencies (Gehrke and Kühn, 2015; Jaeger et al., 2014; Prifti et al., 2017) that are highly required in the Industry 4.0 working environment. However, extensive research on competencies and skills requirement for low-skilled and semi-skilled workers suggests that there are remaining relevant in the Industry 4.0 working environment. For instance, low-skilled worker could perform task (related to Industry 4.0) with the use of assistance system (Hirsch-Kreinsen, 2016) operators were remaining important in the human-machine interface application (Tervo & Koivo, 2014), operator will not only run and monitor the machine performance but able to customize machine performance as well (Ansari and Seidenberg, 2016). Figure 1 provides a schematic illustration of the complexity of interpretations of the Industry 4.0 concept.

3 Problem Statement

In document analysis, Bowen (2009) and Pershing (2002) shared the similar view on several benefits using a document analysis such as documents are easy to read, easier to obtain, and are inexpensive, information from document analysis can be more credible and less biased, compared to information obtained from other research methods (such as interviews, field notes, and surveys). Pershing (2002), however, further explained that the document analysis is only useful when the readers (for instance; the analysts, evaluators, and researchers) have an idea of what they are interested in analysing or evaluating (p.37). This scenario leads document analysis is sometimes taken for granted,
where quotations are taken to fit research purpose without understanding the real reasons behind the publication itself.

4 Purpose of Statement

The research aims to verify the source of information (either first-hand information or secondary) from the publications of Industry 4.0 to ensure the credibility of the sources of information and to ascertain the Industry 4.0 competencies requirement. In this study, the main research question is constructed; how to verify the source of information (either first-hand information or secondary) of the Industry 4.0 competencies requirement from the Industry 4.0 publications?

5 Methodology

Methodologically, this paper presents five methodological stages proposed in document analysis procedure; which open coding and pattern coding used in data analysis. From the categorical aggregation, findings discover five emerging themes in reference to the type of literature to ascertain the Industry 4.0 competencies requirement.

6 Findings and Discussion

Based on coding process, there are five themes emerge from the Industry 4.0 publications. There are new competencies requirement for high-skilled worker, new competencies requirement for semi-skilled/high-skilled worker, new competencies requirement for low-skilled/semi—skilled worker, new competencies requirement in general and no Industry 4.0 competencies required. The source of information for each theme is verified based on the first-hand information obtained from the methodological approach when identifying Industry 4.0 competencies requirement.

7 Conclusions

As a conclusion, the source of information from various type of the Industry 4.0 publications could be verified by referring to the first-hand or secondary information in ascertaining the Industry 4.0 competencies requirement. Significantly, the document analysis process enables the author to gain information accurately and to ascertain the credibility of sources of information of the Industry 4.0 competencies requirement. Document analysis is sometimes taken for granted, as quotations can be directly taken to fit the research purpose without understanding the real reason for the publication itself. From the perspective of Industry 4.0, each publication has different views on the purpose and target of the audience, which will influence the purpose of the publication. Concisely, using the ATLAS ti. Software in this document analysis could be used as a tool to illustrate different perspectives of Industry 4.0 and allow to understand the rationale reason behind the proposed Industry 4.0 competencies.

References


