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Tomorrow's digital worker: a critical review and agenda for building digital competency models

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Abstract. In competency management studies, scholars call for the importance of digital savviness to hire, train, and develop new digital workers. Yet, the knowledge about the development of such a competence is still scarce. For this endeavor, we followed a systematic literature review to identify a sample of 103 published scientific articles and book chapters dealing with the development and implementation of competency tools in the past 10 years. To our surprise, our review suggests that the landscape of competency tools is surprisingly obsolete and that contemporary requirements of digitization have not yet been incorporated into updated usable competency tools. Through this review our hope is to provide competency managers and researchers with a framework to advance and upgrade their competency tools to address the gap between existing know how and the needed expertise of the digital world.

Keywords: competency models · competency tools · digital competencies · digitization · digital worker · systematic review

1 Introduction

In the recent times the development and implementation of digital competencies became an important topic within organizations facing the digital transformation. The rapid technological advancement and the increased complexity and changing of customer preferences led to complex situations where the emerging of the new technological opportunities is disruptive, but employees are uncertain on how to handle it and use it in their job [25]. Despite the increasing importance in today's business environment, there is no unitary definition of what digital competencies are, most of the researchers agree in defining digital competencies as the technology-related skills [17] needed to successfully perform in today's business environment. Nevertheless, it is important to specify that with the term competencies we do not only refer to knowledge and skills but also to the ability to fulfill at best the requirements of complex environments and situations utilizing psychosocial resources appropriate to the context and critical thinking [29]. Competency, in this instance, represents an umbrel-

la concept including all aspects that can have an impact on the performance [4] and specifically digital competencies are considered as a “set of knowledge, skills, attitudes (thus including abilities, strategies, values and awareness) that are required when using IT and digital media to perform tasks, solve problems, communicate, manage information, collaborate; create and share content, and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work, leisure, participation, learning, socializing, consuming, and empowerment” [12, p.3]. The debate about digital competencies does not regard only the business and organizations but also the educational field. Many studies indeed focus on the digital competencies needed in the educational and teaching field, developing competency frameworks. Nevertheless, this paper will not include this area. In light of this considerations, this paper will focus on the analysis of the available competency models to point out to what extent the implementation of competency models allows to identify competencies needed in the digital era to perform effectively in an organization. By reviewing journals in the field of Business Management and Accounting the present study maps the extant research in competency models implementation, pointing out gaps and improvement areas. According to the criteria set in this analysis, the review considers 103 articles on competency tools, published in scientific journals in the last 10 years. On the basis of the results of this review we provide suggestions about the main issues future research should tackle.

2 Classification of competency models

The fast changes in today’s organizational environment requires the implementation of more flexible methodologies, able to anticipate and capture new competencies needed rather than describing past behaviors [9]. In this situation, competency models represent a step further to job analysis indeed while job analysis focus on the tasks and the characteristics needed to perform that specific task, the competency models focus on personal characteristics needed to success in a broader role [9]. Furthermore, competency models if deployed in the right manner have the potential to connect individual KSAs (knowledge, skills and abilities) to the organizational strategy [32, 9]. Despite the huge amount of competency-based approaches proposed in the literature, giving a satisfactory definition of competency is still complicated [28] and proposing a solid competency model applicable in different situations is still difficult [30]. A competency model, generally speaking describes the competencies requested to successfully perform in a specific job, organization and industry sector [34]. Competency models are usually tailored according to the organizational characteristics and needs and the way the specific competencies are described and developed depends on the specific organizational culture, market, type of organization and strategic objectives [9]. Therefore, competency models are more oriented to identify competencies that enable a long term fit with the organization rather than short terms objectives [10]. As above mentioned it is difficult to define a structured procedure for the competency models’ implementation [30], however, the main common steps are: gathering data about the organization, the strategic business objectives, the specific job characteristics and performance indicators, analyzing the extant literature and devel-

oping measurements focusing on behaviors rather than only on technical skills [19], collecting data and validating the tool through focus groups or surveys [6].

3 Review methodology

In order to have a complete picture of the competency models available in the literature, we conducted a systematic literature search in the field of competency management involving peer reviewed journal articles published in the period between 2010 and 2020. The key words used were competency and its plural form competencies together with the word tools or models and their possible variants in the abstract or among the key words. The research criteria include journal articles at the final stage, written in English in the field of Business Management and Accounting. This search lead us to the identification of 103 articles. The 103 articles were analyzed by the authors applying inclusion criteria, that means identifying if the article effectively presents or develops a competency tool or methodology in the identified field. After the pre-analysis 43 articles were selected and the authors proceeded with the full text analysis. The full text analysis was conducted following a systematic approach, classifying each article according to the purpose and the methodology used. This process led to the identification of 27 articles relevant to the scope of presenting competency tools with a satisfactory description and use. The articles were than analysed according to the characteristic of the methodology. In the following session we present and discuss the results in detail.

4 Results

Table 1 classifies and summarizes the results of the literature review listing the articles included and the steps of the implementation of the competency models. As visible in **Table 1** most of the articles adopt a competency model based on the analysis of the extant literature and of the documentation, on which the authors develop the competency model. Following, in most of the studies a panel of experts is consulted to discuss and better tailor the methodology to the case company or sector. After this, the competency model is tested and validated through qualitative and quantitative methods. The output of the competency model implementation and validation is a list of competencies grouped according to different criteria. From the review we deduce that competency models' implementation is extremely strategic in hospitality sector, indeed in the literature there are many studies carried out in this area. Only one study covers entirely the topic of digital organization analyzing the competencies needed to work in a virtual team in different business sectors.

5 Discussion and Conclusions

The results of the review show that research on competency models' implementation is fragmented and mostly characterized by a prescriptive approach where competencies are presented as job descriptions rather than as predictors of future needs [31, 37].

To our surprise, the results of the review suggests that the landscape of competency models is very obsolete and that contemporary requirements of digitization have not yet been incorporated into updated usable competency tools. Being competency models, frameworks implemented to identify the competencies needed to operate in a specific job or organization [34] their objective is to link human resource development and organizational strategies. In the actual organizations undertaking the digital transformation, competency models should be developed to be interactive and adaptable to the organizational change and strategy [31, 40]. According to this definition we identified and analyzed 27 competency tools presented in articles published between 2010 and 2020, that are useful and appropriate to be implemented in digital organizations. The 27 tools included in this review seems to be based on a very structured methodology, the majority of competency tools are based on a deep analysis of the extant literature on the basis of which the model is developed, another recurrent element is the discussion with a panel of experts. On this regard many studies adopt the Delphi method, that consists of collecting data from a panel of experts implementing an iterative process to make forecast and decisions about a specific topic. The methodologies implemented are both quantitative and qualitative, since the Delphi method supports both, as well as mixed methods. As emerged from this analysis, competency tools are flexible and adaptable at different business sectors and different scopes. The current review systematizes and improves the knowledge about competency models therefore it makes easier to research and practitioners the choice of the appropriate framework according to their scope. An additional contribution regards the theoretical and methodological discussion in the field of competency management. Indeed, the review shows the fragmentation of the field and the lack of interconnection in the tool development. The available methodologies do not build on each other, despite the development process is explained in detail in most of the articles, only in few cases the theoretical background is clearly and explicitly described. Furthermore, a weakness of the discussion about competency tools is the lack of empirical evidence about their applicability and usefulness within the organizations facing the digital transformation. Indeed, providing evidence of their usefulness would encourage managers and practitioners to adopt the model, adding practical value to the academic research. The future contribution should be oriented at finding how competency models should look like to support organizations facing the digital transformation, pointing out competencies needed to work in an effective way in the digital organization.

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AUTHOR	SECTOR	METHOD
Suhairom, N. et al., 2019	Hospitality	Document analysis - consultation of a panel of experts - Semi-structured interviews through BEI (behavioral event interview) - Thematic data analysis and content validation
Xiao, Y., et al., 2019	Real estate project management	Data collection through BEI (behavioral event interview) - Data analysis and test
Lou, N.M., et al., 2019	Hospitality	Review of previous studies - Delphi method – Survey - Data analysis
Aishaa, A.N., et al., 2019	SMEs	Literature review
Shum, C., et al., 2018	Hospitality	Review of previous studies - Development of the model - Consultation of a panel of experts Validation of the model - Implementation of the model
Brown, L.A., et al., 2018	Medium-scale power utility company	Literature review- Document analysis – Interviews - Competencies identification - Toolkit development
Fernandez-Ronquillo, M., et al., 2018	Microentrepreneurs	Document analysis - Development of the model - Validation through a panel of experts
Bharwani, S. and Talib, P., 2017	Hospitality	Literature review
Goldman, E. and Scott, A.R., 2016	Different industry sector	Analysis of the competency models in use - Semi-structured interviews - Data analysis and triangulation
Krumm, S., et al., 2016	Virtual team in different sectors	Literature review- Implementation of the Great Eight competency model - Data collection through questionnaires - Data analysis
Jaafar, M., et al., 2016	Construction industry	Literature review - Development of the model on the basis of the literature - Content validity Data collection through questionnaires and semi structured interviews and Data analysis
Salleh, K.M., et al., 2016	HRD	Implementation of the ASTD competency model (American Society for Training and Development) - Grouping competencies - Survey - Data analysis
Arafeh, L., 2015	Entrepreneurship	Literature review - Development and implementation of a soft computing - Based entrepreneurial key competencies' model
Kwon, S., et al., 2014	Workplace learning and performance competencies	Exploratory interviews - Literature review - Competency model development - Interviews - focus groups with experts to validate the model - Data analysis - Finalization of the model
Asili, G.R., et al., 2014	Project-oriented organizations in oil and gas industry	Review of technical books to identify competencies - Competency model development - Consultation with a panel of experts and clients - Implementation of the model
Lambert, B., et al., 2014	Services	Literature review - Definition of a list of competencies by four sets of experts - Test through a modified version of Delphi technique-Reliability and validity - Data analysis
Wang, 2013	Hospitality	Literature review - Development of the model through Delphi method and survey - Reliability and validity - Data analysis
Busch, T.K., 2013	Sales management	Literature review - Delphi method - Survey - Data analysis
Zhang, F., et al., 2013	Construction Project Management	Tailoring and implementation of Emotional Competencies model – Survey - Data analysis
Koenigsfeld, J.P., et al., 2012	Hospitality	Implementation of the Sandwith five domain competency model - Data collection Validation
Testa, M.R., and Sipe, L., 2012	Hospitality	Development of the model linking competencies to business goals - In depth interviews Inductive classification of results and creation of operative definitions
Madter, N., et al., 2012	Project Management in construction ind.	Literature review - Development and implementation of a meta list competency model
Hatala, J.-P. and Hisey, L., 2011	Career coaching professionals	Literature review - Focus group with experts - Implementation of the Career Coach Competency Model (CCCM) - Statistical validation of the final model
Garman, A. and Scribner, L., 2011	Healthcare	Development of a draft model - Validation through survey - Follow-up analyses
Hu, M.L.M., 2010	Hospitality	Deep interviews to explore the subject - Delphi method and ANP (Analytic Network Process)
Soderquist, K.E., et al., 2010	HRM in Banking and Maritime	Identification of competency categories - Identification and coding of competencies In depth interviews - Data analysis and validation of the results
Lee, J.G., et al., 2010	Consumer goods	Selection and development of the competency model - Validity and reliability measurement

Table1. Results of the Literature review