

Understanding the Self-Efficacy of Data Scientists

Alamir Costa Louro, Federal University of Espírito Santo, Vitória, Brazil

Marcelo Moll Brandão, Federal University of Espírito Santo, Vitória, Brazil

Larissa Alves Sincorá, Federal University of Espírito Santo, Vitória, Brazil

ABSTRACT

The self-efficacy of Brazilian data scientists' professional profiles was analyzed to launch new views on this profession, marked by fast technological changes and with a body of knowledge and an incommensurable scope of skills, as understood by these professionals. A grounded theory was built using a qualitative approach. It found the coping theory to explain the phenomenon after the emergence of self-preservation, as an adaptation strategy, and self-efficacy, as a striking feature of the profession. A practical implication is that self-efficacy has trade-offs both to threats and opportunities in the process of becoming a data scientist. The present article describes the value of the coping theory makes possible an in-depth view of the analytical expertise influence on threats and opportunities, and on technology adaptation choices.

KEYWORDS

Coping Theory, Data Scientist, Self-Efficacy, Technology Adoption

INTRODUCTION

Data scientist is one of the most coveted professions of the moment (Davenport & Patil, 2012, Acito & Khatri, 2014), since professionals who dominate new technologies tend to position themselves differently in the face of market demands, which recently seek individuals with developed knowledge in statistics, mathematics, and computing (Braganza, Brooks, Nepelski, Ali, & Moro, 2017). The present work gives more in-depth insights into the characteristics of this relevant professional.

According to Grublješić and Jaklič (2015), data science professionals' self-efficacy is considered the main human factor for the initial acceptance process of new technologies. In the IT industry, there are diverse factors to study such as human and organizational factors (HOF) (Misra, Colomo-Palacios, Pusatli, & Soto-Acosta, 2013; Fernández Sanz, Gómez Pérez, Díez-Folledo, & Misra, 2016), but the present work opted to emerge from the psychology literature, like in the work of Xu and Maitland (2019) that also relates data science and self-efficacy.

Self-efficacy, in its common conceptualization in the IT literature, deals with individuals' beliefs about their abilities to competently use computers (Compeau & Higgins, 1999). However, the IT approach is an adaptation of the seminal concept of self-efficacy, a foundation of human agency, meaning a belief in the ability to adapt to a specific situation (Bandura, 1999). The present work

DOI: 10.4018/IJHCITP.2020040104

Copyright © 2020, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.

assumed the seminal, broader understanding from psychology to cover the ability of individuals to solve problems using science competently.

Thus, self-efficacy is understood here as the central point of this profession. It has demanded the researchers to hold a deeper understanding of the dichotomy of its self-perception and market requisites. Thus, aside from the self-efficacy literature related to IT, and usually from 90ths (Compeau & Higgins, 1995; Compeau & Higgins, 1999), the researchers understand that this construct requires a broader meaning for future studies about data science, assuming it as different from common IT careers. Researchers assumed that data science involves more science than data.

In Brazilian culture, there both incentives for new ideas and a permanent invitation to creativity (Fleith, 2011). In this way, with Brazilian data scientists as the research sample, it is pertinent to discuss the chosen professional profile, marked by characteristics primarily related to creativity, high expectations about original ideas, and abstraction potential (Provost & Fawcett, 2013). This new profession also needs to be understood from the point of view of a management discipline because data science allows academics to expand possibilities regarding further organizational questions and better responses to old ones (George, Osinga, Lavie, & Scott, 2016).

Data scientists are marked by quick and continuous technological changes and by demand for peculiar behaviors and expertise (Chen, Chiang, & Storey, 2012)—factors that the researchers conjecture in the course of the interviews as related to self-efficacy, which in turn influence the effort expectancy and technology anxiety.

In an effort to respond to perceived limitations, the present qualitative research was not confined to a description of findings, and it ultimately reached a different place than initially intended. The initial caveat of using the Adoption and Use of Technology Theory was in setting the starting point for the research instrument. The original context was the understanding of two constructs with different positions and degrees of importance in the global scenario of this literature—the “effort expectancy” and “technology anxiety” constructs. From the data, during the interview process, the theoretical focus of the research changed to Coping Theory with the emergence of self-efficacy as a striking feature found among data scientists.

As a self-perception, self-efficacy may not be a particularly realistic goal when a professional has relatively little information about the behavior he or she intends to control. This factual issue about the self-perception measurement can be understood as a challenge to an in-house premise (Alvesson & Sandberg, 2011, p. 254) to this adoption and use of technology literature family, especially in the context of data science, assumed by the present work as a profession still with its ontology and its limits waiting to be delimited. This gap became clear with a better understanding of self-efficacy construct effects.

Alvesson and Sandberg (2011) understand that only the shared quest to “fill theoretical gaps” can sub-problematize an academic work. The theoretical objective of this paper is to criticize the Adoption and Use of Technology Theory, considered established and mature in the field of information systems research (Maruping, Bala, Venkatesh, & Brown, 2017; Venkatesh, Thong, & Xu, 2016). However, the present work considers this insufficient to understand the adoption of technologies in a data scientists’ professional profile. Thus, as a result of this discussion, Coping Theory will be used to explain the phenomenon of adaptation strategies to the technological changes of this profession, using the point of view of self-efficacy.

The eminence of this profession in the area of MIS, marketing, and operations (Chen, Chiang, & Storey, 2012; Acito & Khatri, 2014; Wedel & Kannan, 2016) justifies the present work and prompts a discussion about the difficulty of training a professional on the path of descriptive and inferential statistics, quantitative methods, algorithms, and substantial business content (Provost & Fawcett, 2013). Following Colquitt and George (2011), the relevance of the research effort rests precisely on the novelty of the theme and on the significance of the challenge in studying a profile that is complex and permeated with trade-offs with repercussions for professionals and organizations.

12 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/article/understanding-the-self-efficacy-of-data-scientists/249144

Related Content

Twitting for Talent by Linking Social Media to Employer Branding in Talent Management

Deepika Pandita (2021). *International Journal of Human Capital and Information Technology Professionals* (pp. 1-12).

www.irma-international.org/article/twitting-for-talent-by-linking-social-media-to-employer-branding-in-talent-management/273697

Universal Site Accessibility: Barrier Free for All

Beth Archibald Tang (2002). *Managing Web Usage in the Workplace: A Social, Ethical and Legal Perspective* (pp. 286-301).

www.irma-international.org/chapter/universal-site-accessibility/26102

Assessing Foreign Language Learning Through Mobile Game-Based Learning Environments

Manuel Palomo-Duarte, Anke Berns, Alberto Cejas, Juan Manuel Dodero, Juan Antonio Caballero and Iván Ruiz-Rube (2016). *International Journal of Human Capital and Information Technology Professionals* (pp. 53-67).

www.irma-international.org/article/assessing-foreign-language-learning-through-mobile-game-based-learning-environments/148610

It's the Exception, Not the Norm

Robert Jones, Rob Oyung and Lisa Shade Pace (2005). *Working Virtually: Challenges of Virtual Teams* (pp. 22-25).

www.irma-international.org/chapter/exception-not-norm/31462

Organizational Impacts and Social Shaping of Web Management Practice

Kristin R. Eschenfelder (2002). *Managing Web Usage in the Workplace: A Social, Ethical and Legal Perspective* (pp. 130-147).

www.irma-international.org/chapter/organizational-impacts-social-shaping-web/26094