Employee behavior towards big data analytics: A research framework

W. Ahmed, S.M. Hizam, H. Akter & I. Sentosa
Universiti Kuala Lumpur Business School (UBIS), Kuala Lumpur, Malaysia

ABSTRACT: Big data analytics (BDA) is heralded to generate vast-scale business prospects. Employee acceptance of BDA system is of utmost significance, as digital transition in organizations can be crippled by employee behavior. Therefore, an in-depth analysis of theory-based research is vital to comprehend the major instigations towards digital tools integration from the employee viewpoint. This study aims to develop the conceptual framework of BDA adoption factors by taking the technology acceptance model (TAM) as the point of departure. External constructs of digital optimization such as digital dexterity, technology–task fit, big data dimensions and self-efficacy are incorporated with TAM variables, namely perceived usefulness, perceived ease of use and behavioral intention. Hypotheses are developed to outline the relationships among the variables. The proposed conceptual framework of the extended TAM model will specify and assess employee behavior in acceptance of big data analytics. The research endeavors to oversee talent in the digital workplace.

1 INTRODUCTION

In this era of disruptive innovation, organizations are striving to achieve the maximum level of digital optimization in business activities. Big data analytics (BDA) is one modern-day business analytics technique to perform various analyses on huge volumes of data sets, such as weather data for accurate forecasting, patient data for timely diagnostics, customer transaction data for buying preferences, airline user data for traveling patterns, and employee activities data for job engagement, etc. BDA applies the complex machine-learning algorithm to datasets to perform predictive analysis for pertinent decision-making to overcome future challenges and mitigate costs. It empowers the transportation sector to be more efficient and smart, as road congestion, traffic level, safety measures, etc., can be predicted with data analytics by analyzing the data of daily traffic, driver patterns of roads usability, commuter usage frequency of public transport, number and nature of traffic violations, accidents on highway, etc. It envisages real-time estimation to assist in route planning, congestion management, and suggesting secure areas to travel, etc. Organizations step into the big data analytics to acquire the industry advantages by predicting customer preferences, enhancing operational efficiency, and achieving employee enablement (Bonnet et al., 2015).

   As enterprises work at digital optimization and corporate revolution endeavors, the disparity of IT and business crumbles. Each section and segment of the organization, then, can be equipped with digital tools to perform the various activities. Durodolu (2016) explained that the adoption of digital tools advances the skill capability of employees. Big data analytics tools realize employee productivity uplift with new skills development (Ren et al., 2017). By implementing innovative systems, do organizations succeed in realizing suitable digital talent at the workplace? The answer to this expression is provided by Gartner's (2018) report that 83% of firms are found unable to reach their required level of digital transformation and missed their objectives in spite of system implementation. The main reason discerned was none other than human behavior and preferences towards the use of technology. Employees are a core part of innovative initiatives, and their intuition and mindset affect organizational policies. Individuals' technological ability and ambition inspires them to perform the task in the digital environment.

This behavioral manifestation is coined as digital dexterity at work. It has proven an active catalyst to make sure of system adoption and integration with advantages. However, there is a clear distinction between the deployment of a digital tool and its adoption (Bonnet et al., 2015). Adoption is backed by a belief system (i.e., behavioral intention), to accept or reject the innovation influenced by several factors. The study will seek to uncover the relevant constructs of behavior shaping for smooth digital transition and will answer the following questions:

1. What are employee's main motivations in terms of behavior towards the adoption of BDA?
2. Do digital workplace factors such as digital dexterity, big data dimension, task–technology fit, and self-efficacy influence BDA acceptance behavior of employees?

There are various theoretical expressions and frameworks regarding digital tools (i.e., big data analytics adoption), but it still requires more vigorous and systematic work to explain and depict the willingness of employees to accept big data (Al-Rahmi et al., 2019). The literature on big data in the transportation industry is quite sparse. The technology acceptance model (TAM) is proved to be a suitable predictor of user behavior towards technology acceptance (Sentosa & Mat, 2012) such as employee behavior towards big data (Okcu et al., 2019). However, previous studies couldn't portray the individual contexts in digital implementation, such as digital dexterity that guarantees the employee enablement in digital skills management (Bonnet et al., 2015). The objective of this study is to conceptually propose a technology adoption framework that could depict the significance of the digital workplace setting and direct the key factors in the adoption of big data analytics. The study is envisaged through a theoretical lens of TAM. This underpinning theory is broadly validated for employee behavioral assessment and corroborated through external factors of the adopting technology scenario. Therefore, numerous variables of digital tool implementation are analyzed and included in extended TAM model; for instance, big data dimensions, digital dexterity, task–technology fit and self-efficacy. This research will explore an internal belief system of adoption that builds on personal understanding of technology, technical ability, and ambition to perform the task with proper use of technology features.

2 LITERATURE REVIEW

2.1 *TAM model*

TAM model proposed to assess the usability of the information system in the organization. TAM has proved to be a profound approval measure for adoption analysis with its basic two constructs that extol the level of advantage gain in the productivity (i.e., perceived usefulness) and level of convenience achieved by accepting technology (i.e., perceived ease of use). Convenience in system use also enhances the usefulness of the technology. Big data analytics embrace is measured by adding the environmental context factors with TAM (Verma et al., 2018). It can best predict data analytics used by combining it with other theories and concepts. Recent studies have proven the impact of perceived usefulness and ease of use on behavioral intention (Al-Rahmi et al., 2019). Thus, we hypothesized that

H1: Perceived usefulness will positively influence the behavioral intention towards BDA.
H2: Perceived ease of use will positively influence the behavioral intention towards BDA.
H3: Perceived ease of use will positively influence the perceived usefulness of BDA.

2.2 *Digital dexterity*

Digital dexterity is a novel term describing the ability and yearning agility of the workforce to adopt and actively be involved in the technology transition process for advantageous organizational objectives. It is a combination of attitude, mental approaches, and behaviors to enable employees to perform effectively. Individuals with a higher level of digital dexterity are open to innovation, flexible to the environment, focused and skillful in computational process, and display shrewdness and practical knowledge of data to make the decision. Elevated digital dexterity in employees' performance appears to predict more effective adoption and

integration with an innovative system to make better results by keeping the organizational objective in mind (Gartner, 2018). Digital dexterity helps the organization to improve organizational efficiency and ensure a high digital talent level by accepting and making use of digital skills like big data analytics (Soule et al., 2016). Therefore, we hypothesize that:

H4: Digital dexterity will positively influence the behavioral intention towards BDA adoption.

2.3 *Task–technology fit (TTF)*

The efficient level of acceptance of innovation depends on rectification of proper 'fit' between the implemented technology and employees' assigned task. This task–technology fit enables the effective adoption of any decision-making system. Such a system's value can dwindle to the least level if employee task level is unable to match the technology provided. TTF has demonstrated its contribution in various recent technology adoption studies including BDA (Shahbaz et al., 2019). Therefore we hypothesize that:

H5: TTF will positively influence the behavioral intention towards BDA.

2.4 *Big data dimensions*

Big data analytics functions through 3V's model. Initially deducing the efficient value from the enormous volume of data sets of a wide variety with higher velocity control and analysis, this model is known as the dimensions of big data. Volume explains large data sets pertaining the certain valuable information. Variety describes the amalgamation of various kinds of data obtained through several informants. Velocity is analyzing the speed of data to conclude information. These dimensions have proven the association towards perceived usefulness of the TAM model in updated studies (Okcu et al., 2019). Therefore, we hypothesize that:

H6: Big data dimensions will positively influence the perceived usefulness of BDA.

2.5 *Self-efficacy*

The term self-efficacy refers to individuals internal belief that they are capable of performing certain activities in order to accomplish their tasks. The concept is mainly connected with the adoption of new technology at the workplace and employees' acceptance of their ability to complete their task successfully. The relationship between perceived ease of use and self-efficacy is much tested and proven in various innovative systems. In big data analytics, self-efficacy is also an effective factor towards perceived ease of use (Okcu et al., 2019). Thus, we hypothesize that:

H7: Self-efficacy will positively influence the perceived ease of use towards BDA.

3 CONCEPTUAL FRAMEWORK

The proposed framework (Figure 1) illustrates the relationship of TAM with external constructs of employee behavior towards the adoption of big data analytics (BDA) through seven hypotheses.
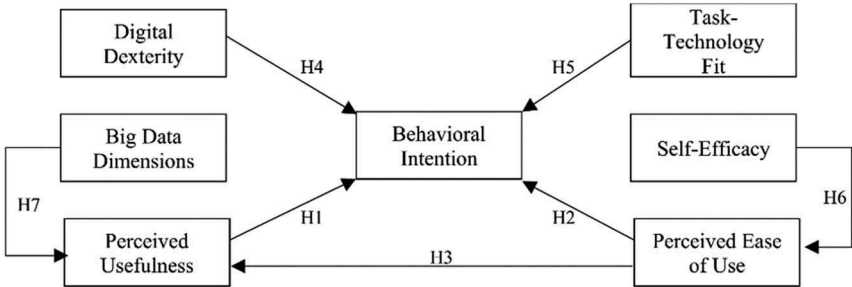

Figure 1. Conceptual framework.

4 CONCLUSION

This study develops the conceptual framework for describing the constructs that influence employee behavior for big data analytics acceptance. The study adds that the digital capability of the organization does not depend on mere deployment of resources and training programs but rather that gaining insight into employee intention in terms of digital tool acceptance entails unconventional factors. By highlighting digital dexterity, task–technology fit, big data dimensions and self-efficacy, this theoretical analysis will contribute to technology adoption literature from the point of view of employee enablement in the digital environment, an element that has not been focused on in previous research. The proposed conceptual framework is intended to support businesses in successful adoption of digital technology in the transportation sector. The empirical study in this regard can better validate the significance of relationships with behavioral intention and explanatory power of the model. It will also postulate the foundation for further research into acceptance of digital tools from the viewpoint of employee enablement. The study supports the policymakers, academics, governments and society in understanding and reaping benefits from smart mobility. The research has presented the novel factor (i.e., digital dexterity), to better understand talent in the digital workplace. Future studies can deduce better ways of managing digital dexterity at the workplace by understanding the role of managers and organizational policies.

REFERENCES

Al-Rahmi, W.M., Yahaya, N., Aldraiweesh, A.A., Alturki, U., Alamri, M., Bin Saud, M.S., Kamin, Y. Bin, Aljeraiwi, A.A., & Alhamed, O.A. 2019. Big data adoption and knowledge management sharing: An empirical investigation on their adoption and sustainability as a purpose of education. *IEEE Access*, 7, 47245–47258.

Bonnet, D., Puram, A.D., Buvat, J., KVJ, S., & Khadikar, A. 2015. Organizing for digital: Why digital dexterity matters organizational design is key to reaping the rewards from technology adoption. Capgemini Consulting, 1–17.

Durodolu, O.O. 2016. Technology acceptance model as a predictor of using information system to acquire information literacy skills. *Library Philosophy and Practice (e-journal)*, (November).

Gartner. 2018. *Executive Guidance: Digital Dexterity at Work*.

Okcu, S., Koksalmis, G.H., Basak, E., & Calisir, F. 2019. Factors Affecting Intention to use Big Data tools: An Extended Technology Acceptance Model. Springer, 401–416.

Ren, S.J.-F., Fosso Wamba, S., Akter, S., Dubey, R., & Childe, S. J. 2017. Modelling quality dynamics on business value and firm performance in big data analytics environment. *International Journal of Production Research*, 55(17), 1–16.

Sentosa, I., & Mat, N.K.N. 2012. Examining a theory of planned behavior (TPB) and Technology acceptance model (TAM) in internet purchasing using structural equation modeling. *Journal of Arts, Science & Commerce*, 2(2), 62–77.

Shahbaz, M., Gao, C., Zhai, L.L., Shahzad, F., & Hu, Y. 2019. Investigating the adoption of big data analytics in healthcare: The moderating role of resistance to change. *Journal of Big Data*, 6 (1).

Soule, D., Puram, A., Westerman, G., & Bonnet, D. 2016. *Becoming a Digital Organization: The Journey to Digital Dexterity*. MIT Center for Digital Business. No. 301.

Verma, S., Bhattacharyya, S.S., & Kumar, S. 2018. An extension of the technology acceptance model in the big data analytics system implementation environment. *Information Processing & Management*, 54(5), 791–806.