Factors Influencing Big Data & Analytics (BD&A) Learning Intentions with Transformational Leadership as Moderator Variable: Malaysian SME Perspective

Ahmad F. Baharuden [a]* , Osama Isaac [b] , Ali Ameen [c]
[a b c] Faculty of Business and Accountancy, Lincoln University College, Selangor, Malaysia
* Correspondence: fazreen.phd@gmail.com

Abstract

As technology and innovation change at extreme velocity, previous knowledge may be rendered obsolete and irrelevant in the era of the digital economy and the "Industry 4.0". In order for organizations to be financially and operationally resilient, they must embrace emerging technologies such as Mobile, Social Media, Big Data and Analytics (BD&A), the Internet of Things (IoT), Cyber Security, and Artificial Intelligence (AI) or risk being left out in the competition. Adoption of these technologies saw a handful of once mighty organizations such as Blackberry, Nokia, Kodak, and Blockbuster being displaced by Google, Netflix, Uber, Amazon, and Waze. In the domestic context, innovation from the SME sector stemmed by latest knowledge absorption and diffusion is pivotal not only to the SMEs themselves but upholding Malaysia's regional and global competitive advantage and economy success. This conceptual article extends the Unified Theories of Acceptance and Technology (UTAUT) with transformational leadership (TL) as a moderating variable on investigating factors influencing Big Data & Analytics (BD&A) learning intentions among Malaysian SME executives. The anticipated findings will provide a guideline for policymakers especially towards the development of human resources transformation focusing on BD&A or other emerging technologies and BD&A program providers.

Keywords: Digital economy; digital disruption; learning intentions; big data; UTAUT, transformational leadership, Malaysia; SME

1. Introduction

Big Data & Analytics (BD&A) are deemed as hot subjects in both academic and industry since the introduction of Business Intelligence (BI) by Howard Dresner, an analyst from Gartner Research Group (Power, 2003). As BI is deemed as the predecessor to BD&A, both are considered as the preferred and ingenious tool for data-driven decision making to provide excellent business benefits (Buchanan & O'Connell, 2006; Haddad et al., 2018; Abd-Elaziz et al., 2015).

BD&A has been a phenomenon as it creates new model of decision support (Sivarajah et al., 2017) that enable organizations to extract and store data not only from internal systems but also with external data sources (Morabito, 2015) such as social media platform sites, online news, blogs, web contents, data generated from interconnected devices known as the internet of things (IoT), and other external traditional and modern databases (Joshi, 2017).

As technology and innovation change at extreme velocity, previous learned knowledge may be rendered obsolete and irrelevant. The advent of the internet and other emerging technologies such as Mobile, Social Media (Ameen, Almari, & Isaac, 2019 (Abd-Elaziz et al., 2015; Abou-Shouk and Khalifa, 2017; Al-Shamsi et al., 2018; Khalifa and Abou-Shouk, 2014; Khalifa and Fawzy, 2017; Khalifa and Hewedi, 2016; Khalifa and Mewad, 2017), Big Data and Analytics (BD&A) The Internet of Things (IoT), Cyber Security, and Artificial Intelligence (SMACIT) (Ross et al., 2016) had truly change the global business landscape from manufacturing to services industries that leverage on these emerging technologies to produce innovations with unique business models as their exclusive competitive advantages (Al-Shamsi, Ameen, Isaac, Al-Shibami, & Sayed Khalifa, 2018). For example, a great number of once mighty organizations such as Blackberry, Nokia, Kodak, and Blockbuster were displaced by Google, Netflix, Uber, Amazon, and Waze. Therefore, to be resilient in the era of digital disruption and Industry 4.0, organizations and individuals must embrace emerging or risk being left out from the competition.

However, to effectively utilize and optimize the said emerging technologies, human resources must be equipped with the necessary knowledge such as digital literacy (Morabito, 2015), complex problem solving (Wamba et al., 2017), and decision making (Haddad et al., 2018b). Workers in all corporate functions will need to improve their digital literacy, moving from the ability to use basic tools to more advanced digital tools

(Bughin et al., 2018). Based on the latest research by McKinsey Global Institute, there are significant skill mismatches among current workforce knowledge versus digital economy technologies with data analytics as the topmost mismatch (Figure 1).
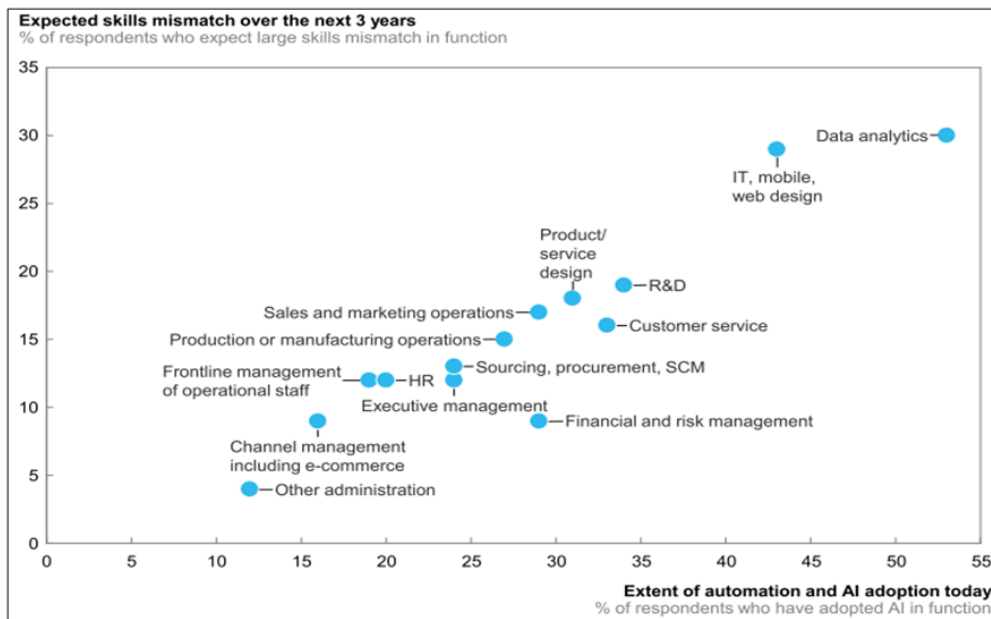

Figure 1: Current Skills Mismatch vs Functional Automation and AI Adoption
Source: Bughin et al. (2018)

2. Malaysia's Vision 2020

In February 1991, the Malaysian government launched a long-term project called "Vision 2020" which laid out a plan towards transforming the nation from industrial-based into knowledge-driven economy by the year 2020 through the development and use of IT, and developing a highly skilled and knowledgeable workforce (Vicziany & Puteh, 2004) to address future economic-growth aiming specifically at the Small Medium Enterprises (SME) segment. In the context of the Malaysian economy, Small Medium Enterprises (SME) play a pivotal role and is considered as the nucleus of Malaysia's industrial and economic development (Musa & Chinniah, 2016). According to Malaysia's Department of Statistics, (Department of Statistics Malaysia, 2017), the Gross Domestic Product (GDP) growth of the SME sector had outpaced the national GDP growth by 5.2 percent and 4.8 percent respectively which translate the overall SME GDP contribution to the nation at 36.6 percent (Figure 2). The role of Malaysian SMEs also is pivotal to the nation as 97% of business establishments in Malaysia are SMEs, which contributed 37% to the country's GDP, 65% to employment, and nearly 18% to exports. The vibrant outlook of the SME economic activities is largely contributed by distinctive innovation capacity driven by diffusion of competitive advantage and value creation (Assink, 2006), together with the proper use of relevant technology (Norzaidi & Salwani, 2014).

Figure 2: Value Added, Percentage Share to Malaysia GDP and Annual Percentage Change for 2015 and 2016 at Constant 2010 Prices
Source: Department of Statistics Malaysia (2017)

3. Practical Background

According to the 2016 Global Information Technology Report, Malaysia ranks second behind Singapore and 23rd globally in the business (firm-level) technology usage. With regards to Malaysia's labour force participation, the percentages had been increasing from 2013 to 2017, according to World Development Index (2013-2017) as illustrated in Figure 3.
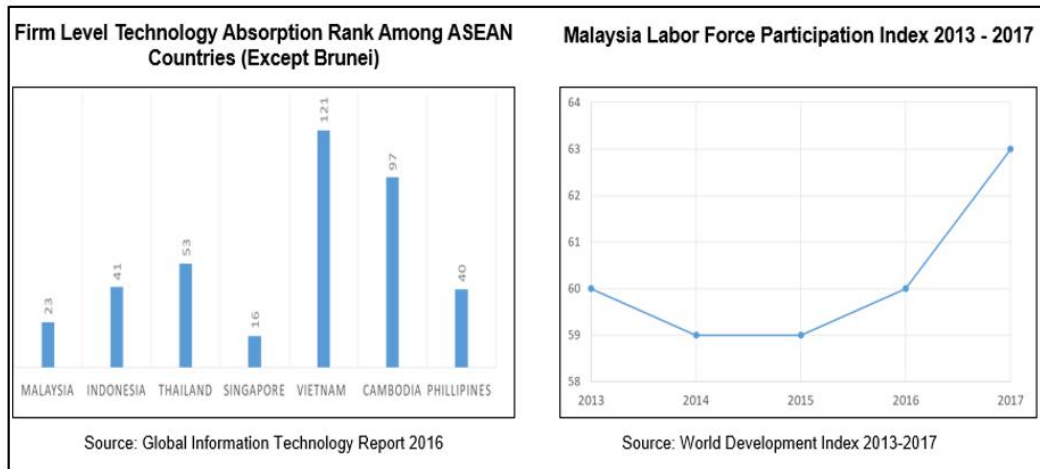

Figure 3: Malaysia's 2016 Firm-Level Technology Absorption Rank and Labour Force
Participation Index, 2013-2017
Sources: Global Information Technology Report (2016) & World Development Index (2013-2017)

However, two years away from reaching Vision 2020, despite the increase in overall technology indicators and the consistent increase in labour force participation (LFP), Malaysia's knowledge workers (KW) are peculiarly in the declining trend (Schwab, 2017) as depicted in Figure.

This gap is contributed to the fact that most of our knowledge workers belong to the 'semi-skilled" workers. Semi-skilled workers are not required to produce a complex solution as their job routine are set by others (Kefela, 2010). The normal qualifications for semi-skilled workers are slightly less than university degree (TalentCorp, 2017). Examples of these types of jobs include bus drivers, retail salespersons, flight attendants, taxi drivers, and security guards.

In the digital economy era, the pool of high-skilled workers are much needed. High-skilled workers or skilled labour are capable of exercising judgment and have particular knowledge on the industry they work along with the necessary tools and technologies that are supporting the job function (TalentCorp, 2017). Examples of these types of jobs include data scientists, scientists, analysts, engineers, doctors, lawyers, statisticians, and accountants.

If this industry gap is not empirically addressed, Malaysian SME businesses position in the regional economy will be in danger as they are unable to produce innovative products and services due to labour workforce's obsolete technological knowledge and not up to par with current emerging technologies.
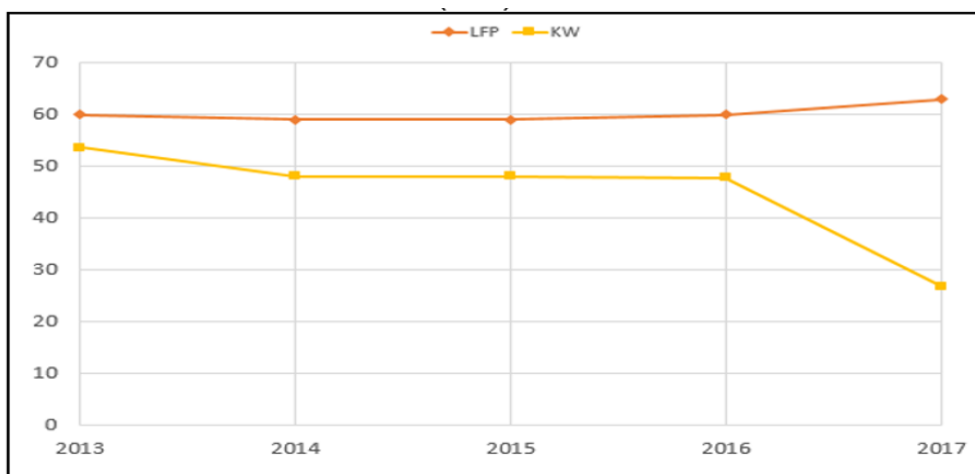

Figure 4: Gap between Labour Force Participation (LFP) and Knowledge Worker (KW)
Sources: Global Innovation Index (2013-2017) & World Development Indicators (2013-2017)

4. Objectives of Study

This study aims to recognize the factors influencing intentions among Small Medium Enterprise (SME) executives toward BD&A learning in Malaysia and the role of transformational leadership (TL) as a moderating variable that influences such intentions. In this decade, BD&A is viewed as one of the most influential current emerging technologies in the digital economy and has emerged as one of the most sought after and studied information systems (IS) and information technology (IT) subjects. However, numerous prior IS/IT, psychological, and social science studies did not empirically investigate on the learning intentions especially in the context of lifelong learners with regards to BD&A but more directed toward user eventual usage or adoption, and purchase intention of purchasing IS/IT technologies.

In addition, there is limited research which simultaneously captures the factors influencing learning intentions and effective leadership role to motivate lifelong learners into making the decision to learn. Therefore, this study also will integrate the effects of the theory of TL; whether the TL constructs have significant moderating effects on the UTAUT variables.

Hence, the objectives of this study aimed to address the following:

•To investigate the significant impact of the UTAUT constructs toward BD&A learning intention among Malaysian SME executives.

•To investigate the moderating effects of TL on the UTAUT constructs whether TL can significantly influence the BD&A learning intention among Malaysian SME executives.

5. Theoretical background and hypothesis development

Big Data & Analytics

Big data (BD) refers to the massive data sets that are too convoluted for conventional data processing system to execute (Jain, 2018) and analytics denote as the systematic approach of collecting, processing, and analyzing data sets using statistical and other business analysis methodologies regardless of size and volume to provide better insights in strategic, tactical, and operational decision making (Neetu Jain, 2018; Wamba et al., 2017). Hence, BD&A can be exemplified as the systematic approach of the collection of massive data sets, processing, and analyzing for data-driven decision making (Sivarajah et al., 2017).

Behavioural intentions on learning and adoption

The concept of behavioural intentions has been thoroughly scrutinized and researched by social science, education, and psychology academicians and practitioners (Schunk, Meecce, & Pintrich, 2014). According to Cook & Artino (2016), one of the successful outcomes for the successful learning intentions are the eventual adoption and use of a particular subject that learners are interested to undertake.

According to Cook & Artino (2016), there are five parameters to investigate learning intentions; Expectancy-value, Attribution, Social-cognitive, Goal-orientation, and Self-determination which produce four common themes; competence- the belief that the learner is able to manage the learning tasks, value- anticipated results of the learning tasks on job or other measured performances, attributions- factors such as events that affect the learners' personal behaviour towards the learning tasks, and cognitive- the involvement of mental processes that involves interactions between an individual and a larger social context (Cook & Artino, 2016 Khalifa and Abou-Shouk, 2014).

Similarly, in the context of IT/IS motivations and behavioural intentions, the decision-making process in teaching, learning, and adoptions are based on theories originated from psychology, sociology, communications, and management (Idris, Moghavvemi, & Musa, 2015). Among the most adopted theories are the theory of reasoned action (TRA) by Fishbein & Azbein (1975), the technology acceptance model (TAM) by Davis (1989), the combined TAM and TPB model by Taylor & Todd, (1989), and the unified theory of acceptance and use of technology (UTAUT) by Venkatesh & Davis (2000).

Previous researches indicated that UTAUT model yields better explanatory power, and solid reasoning toward IT/IS behavioural intentions toward learning and adoptions (Rondan-Cataluña, Arenas-Gaitán, & Ramírez-Correa, 2015) over other acceptance theories (Brünink, 2016). In the perspective of BD&A, an extended UTAUT model had been used in measuring the factors surrounding open data technologies (Zuiderwijk, Janssen, & Dwivedi, 2015), organizational willingness to adopt BD&A (Brünink, 2016), and enabling business transformation using BD&A as the key technology (Ballmert, 2017).

UTAUT Model

Previous UTAUT literature catalogued comprehensive studies on the importance of learning intentions, technology acceptance, and continuance of acceptance that posit to be a primary indicator of usage and success (Venkatesh, Thong, & Xu, 2016). Since BD&A is also a form of IS/IT adoption, the success of technology-based learning depends upon learners' acceptance of the technology; therefore, their acceptance should be a key

concern for administrators and educators when considering the implementation of learning (Head, Hoeck, & Garson, 2015).

Performance expectancy

Performance expectancy is defined as the individual belief that the subject system, tools, or framework can improve his or her work performance (Venkatesh et al., 2003). Past researches demonstrated that performance expectancy is the most significant predictors among other constructs (Bawack & Kala Kamdjoug, 2018; Bouznif, 2017; Zuiderwijk et al., 2015; Mutahar, Daud, Ramayah, Isaac, & Abdulsalam, 2018; Mutahar, Daud, Ramayah, Isaac, & Alrajawy, 2017a). According to Davis (1989) and Venkatesh et al. (2003), the integral factor that would influence individuals into learning, using, and continue to use particular technologies is the belief that such technologies can significantly elevate the quality of work and increase work performance. Subsequently, this study proposes that with the strong individual belief of BD&A positive impact on his or her quality of work and performance, there shall be a strong learning intention towards BD&A. Consistent with the above logic, the following hypothesis can be stated:

H1. Performance expectancy has a positive influence on the BD&A learning intentions among Malaysian SME executives.

Effort expectancy

According to Davis (1989), the positive influence of performance expectancy towards learning and adoption can be negated by the difficulty on the technology access and usage. Previous researches indicated that the ease of use of any technology has a direct impact on the eventual and continuous usage (Akbar, 2013; Bawack & Kala Kamdjoug, 2018; Madigan et al., 2016; Mutahar, Daud, Ramayah, Isaac, & Alrajawy, 2017b). Crawford (2014) and Prasad (2016) postulate that with adequate action-based learning, BD&A is relatively easy to use despite the complexity in setting up the technology and data preparation. Taking the above context into perspective, this study proposes the following hypothesis:

H2. Effort expectancy has a positive effect on the BD&A learning intentions among Malaysian SME executives.

Social influence

Social influence takes place when other individuals, group, and society believe that the individual should learn, adopt, and use the subject technology or system (Venkatesh et al., 2003; Alrajawy, Daud, Isaac, & Mutahar, 2017) particularly if the technology or system can be useful to the individual (Brünink, 2016). According to Nicolaus et al. (2016), global industry leaders recognize BD&A as one of the key technologies that is vital in the current era of the digital economy. Therefore, successful individuals or organizations that had adopted IS/IT technologies have the potential to influence others that have yet to embark (Bergeron et al., 1995; Popovic et al., 2016). Previous studies also indicated positive relationship between peer recommendation on individual behavioural intentions (Bringula et al., 2018; Furaiji et al., 2012; Kulviwat, II, & Al-Shuridah, 2009; Alrajawy et al., 2018) This study assumes that social influence has a significant effect on the BD&A learning intention among Malaysian SME executives. Hence, the following hypothesis is proposed:

H3. Social influence has a positive effect on the BD&A learning intentions among Malaysian SME executives.

Facilitating conditions

Facilitating conditions in IS/IT researches mainly refer to training, guidance, infrastructure, and help-desk support, and these facilitating conditions can improve or hinder IS/IT usages (Lee et al. 2018; Vela, 2017; Verma, 2017). In the organizational perspective of IS/IT, decision support system (DSS), business intelligence (BI), and BD&A technologies acquisition, both technology, and organizational capabilities are required to ensure implementation success (Işik, Jones, & Sidorova, 2013). Vela (2017) and Lee et al. (2018) agreed that facilitating conditions have a positive effect on the intentions that lead to adoptions in BD&A and another emerging IS/IT technologies. Thus the following hypothesis is proposed:

H4. Facilitating conditions have a positive effect on the BD&A learning intentions among Malaysian SME executives.

Transformational Leadership

In the current age of digital economy, businesses strategies change at the extreme rate of velocity (Chepkasova & Macalintal, 2016) to keep pace with the dynamics of technological innovations. These innovations drive business transformation and organization that lag behind will be decimated or potentially cease to exist (A. H. Aldholay, Isaac, Abdullah, & Ramayah, 2018; A. Aldholay, Isaac, Abdullah, Abdulsalam, & Al-Shibami, 2018; Gago-areces, 2017). In this erratic business environment, effective leadership is crucial to inspire, stimulate, and influence workforce towards executing perennial business transformation (Chepkasova

& Macalintal, 2016; Gago-areces, 2017). James MacGregor Burns (1978) coined a leadership approach that is genuinely adaptable to the current business environment; transformational leadership (TL) (Figure 5). In its ideal form, it creates valuable and positive change in the followers with the end goal of developing followers into leaders. Previous studies proved that TL intensifies workforce motivation, morale, creativity and performance (Jacobs et al., 2013; Jiang et al., 2017; Jyoti & Dev, 2015 (Alkhateri et al., 2018; Badran and Khalifa, 2016; Mona Saeed Mohamed et al., 2018)) by aligning the leadership's vision and workforce readiness through the four constructs of TL; inspirational motivation, intellectual stimulation, idealized influence, and individualized consideration. (Avolio et al., 1991; Burns, 1978).

According to Avolio et al. (1991) and Burns (1978), inspirational motivation indicates leadership acknowledgment on employee contribution towards achieving given tasks that are meaningful to both leader and the organization. Intellectual stimulation points to the encouragement given by the leader towards employees into creating creative methods and means of problem-solving. Idealized influence can be defined as the role-model characteristic of the leader that the follower would trust and appreciate (Husin et al., 2013; Mona Saeed Mohamed et al., 2018; Qoura and Khalifa, 2016). Individualized consideration takes place when a leader recognizes, support and test the abilities of each employee on the basis of understanding the employee current state of readiness and abilities.
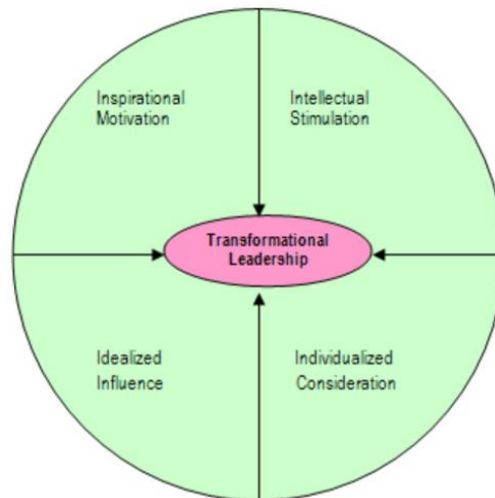

Figure 5: Transformational Leadership Model
Source: Burns (1978)

TL theory was applied to study the effects of leadership either by a single construct or the entire four compositions on employee creativity and motivation (Bongiorno, Rizzo, & Vaia, 2018; Jyoti & Dev, 2015), sustainable performance (Jiang et al., 2017), well-being (Jacobs et al., 2013), and psychological strain (Franke & Felfe, 2011). Incorporating TL factor will inadvertently advocate workforce motivation towards learning BD&A.

As an extension to the UTAUT model, this study proposes the following research hypotheses with regard to the moderating influence of TL as a single construct on the BD&A learning intentions among Malaysian SME executives:

H5: Transformational leadership enhances the positive effect of the performance expectancy on the BD&A learning intentions among Malaysian SME executives.

H6: Transformational leadership enhances the positive effect of the effort expectancy on the BD&A learning intentions among Malaysian SME executives.

H7: Transformational leadership enhances the positive effect of the social influence on the BD&A learning intentions among Malaysian SME executives.

H8: Transformational leadership enhances the positive effect of the facilitating conditions on the BD&A learning intentions among Malaysian SME executives.

6. Proposed Conceptual Framework

A research model based on a modified Venkatesh et al. (2003) UTAUT with TL as moderator variable (Figure 6) is proposed in order to examine the independent variables affecting BD&A learning intentions among Malaysian SME executives as well as the moderating influences of the transformational leadership in the formation of that intention (A. H. Aldholay, Abdullah, Ramayah, Isaac, & Mutahar, 2018; A. H. Aldholay, Isaac, Abdullah, Alrajawy, & Nusari, 2018; Mutahar, Daud, Ramayah, Isaac, & Aldholay, 2018).
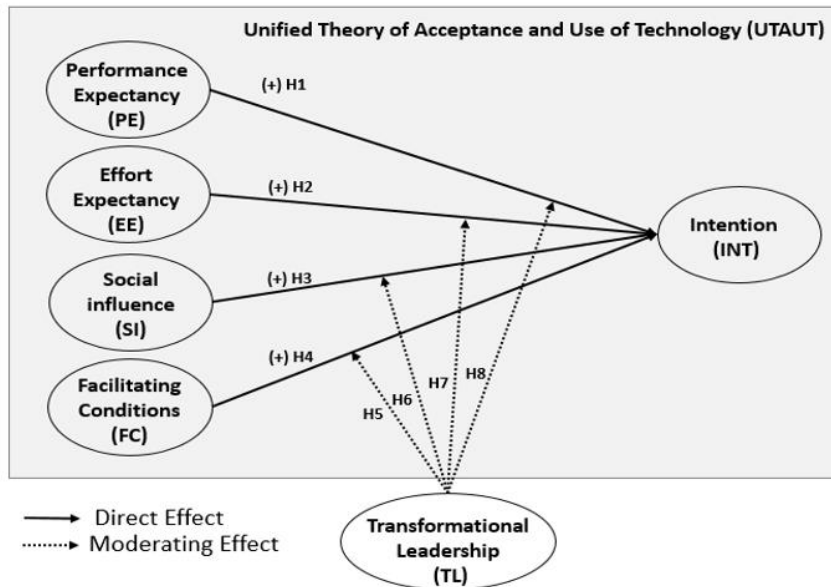
Figure 6: Proposed Conceptual Framework

7. Limitations and Suggestions for Future Work

The population for this study is targeted towards SME executives in the Klang Valley of Malaysia via survey questionnaire. The findings of this research will be perused and used in the relevance of that present technology. In addition, investigating the four UTAUT predictor variables such in another geography, culture or leadership styles may influence learners' behaviour towards BD&A learning will be a clear avenue for future research.

This study is going to do the data gathering by cross-sectional rather than longitudinal in nature. The longitudinal method might improve the understanding of the associations and the causality between variables (Isaac, Abdullah, Ramayah, & Mutahar, 2017; Isaac, Abdullah, Ramayah, Mutahar, & Alrajawy, 2017; Isaac, Abdullah, Ramayah, & Mutahar Ahmed, 2017). Future research should investigate the relationship between variables by conducting cross-cultural studies as recommended by previous studies (Isaac, Abdullah, Ramayah, & Mutahar, 2017a; Isaac, Abdullah, Ramayah, & Mutahar, 2017b; Isaac, Masoud, Samad, & Abdullah, 2016).

8. Conclusion

Organizations should increase spending on research and development in order to increase the organizational effectiveness (Osama Isaac, Abdullah, Ramayah, Mutahar, & Alrajawy, 2018; Osama Isaac, Abdullah, Ramayah, & Mutahar, 2018). Currently, there is limited research which simultaneously captures the factors influencing learning intentions and effective leadership role to motivate lifelong learners into making the decision to learn especially in the BD&A areas. To fill the gap in the current body of knowledge, this paper through a proposed extended UTAUT model with TL as a moderating variable that investigates the factors influencing BD&A learning intentions with regards to Malaysian SME executives. The output from using this framework is critical as proven research demonstrated that transformational leaders promote employee creativity that would bring positive organizational change (Franke & Felfe, 2011; Jacobs et al., 2013; Jiang et al., 2017). As such, the findings from this research can benefit policymakers and training providers to construct necessary action plan to synthesize leadership factor as a significant predictor variable to increase the interest to learn BD&A in organizations.

References

Abd-Elaziz, M.E., Aziz, W.M., Khalifa, G.S., Abdel-Aleem, M., 2015. Determinants of Electronic word of mouth (EWOM) influence on hotel customers' purchasing decision. Int. J. Heritage, Tour. Hosp. 9, 194–223.

Abou-Shouk, M.A., Khalifa, G.S., 2017. The influence of website quality dimensions on e-purchasing behaviour and e-loyalty: a comparative study of Egyptian travel agents and hotels. J. Travel Tour. Mark. 34, 608–623.

Al-Shamsi, R., Ameen, A., Isaac, O., Al-Shibami, A.H., Sayed Khalifa, G., 2018. The Impact of Innovation and Smart Government on Happiness: Proposing Conceptual Framework. Int. J. Manag. Hum. Sci. 2, 10–26

Alkhateri, A.S., Abuelhassan, A.E., Khalifa, G.S.A., Nusar, M., Ameen, A., 2018. The Impact of Perceived Supervisor Support on Employees Turnover Intention: The Mediating Role of Job Satisfaction and Affective Organizational Commitment. Int. Bus. Manag. 12, 477–492.

Akbar, F. (2013). What affects students ' acceptance and use of technology? A test of UTAUT in the context of a higher-education institution in Qatar. Dietrich College of Humanities and Social Sciences at Research Showcase @ CMU. Carnegie Mellon University.

Al-Shamsi, R., Ameen, A., Isaac, O., Al-Shibami, A. H., & Sayed Khalifa, G. (2018). The Impact of Innovation and Smart Government on Happiness: Proposing Conceptual Framework. International Journal of Management and Human Science (IJMHS), 2(2), 10–26.

Aldholay, A. H., Abdullah, Z., Ramayah, T., Isaac, O., & Mutahar, A. M. (2018). Online learning usage and performance among students within public universities in Yemen. Int. J. Services and Standards, 12(2), 163–179.

Aldholay, A. H., Isaac, O., Abdullah, Z., Alrajawy, I., & Nusari, M. (2018). The Role of Compatibility as a Moderating Variable in the Information System Success Model: The Context of Online Learning Usage. International Journal of Management and Human Science (IJMHS), 2(1), 9–15.

Aldholay, A. H., Isaac, O., Abdullah, Z., & Ramayah, T. (2018). The role of transformational leadership as a mediating variable in DeLone and McLean information system success model: The context of online learning usage in Yemen. Telematics and Informatics, 35(5), 1421–1437. https://doi.org/10.1016/j.tele.2018.03.012

Aldholay, A., Isaac, O., Abdullah, Z., Abdulsalam, R., & Al-Shibami, A. H. (2018). An extension of Delone and McLean IS success model with self-efficacy. International Journal of Information and Learning Technology, IJILT-11-2017-0116. https://doi.org/10.1108/IJILT-11-2017-0116

Alrajawy, I., Daud, N. M., Isaac, O., & Mutahar, A. M. (2017). Examine Factors Influencing the Intention to use Mobile Learning in Yemen Public Universities. Asian Journal of Information Technology, 16(2), 287–297. http://doi.org/10.3923/ajit.2017.287.297

Ameen A., Almari H., Isaac O. (2019) Determining Underlying Factors that Influence Online Social Network Usage Among Public Sector Employees in the UAE. In: Saeed F., Gazem N., Mohammed F., Busalim A. (eds) Recent Trends in Data Science and Soft Computing. IRICT 2018. Advances in Intelligent Systems and Computing, vol 843. Springer, Cham

Analytics, H. B. (2018). The Importance of Innovation with Business Analytics. Retrieved from https://analytics.hbs.edu/blog/innovation-business-analytics/

Alrajawy, I., Isaac, O., Ghosh, A., Nusari, M., Al-Shibami, A. H., & Ameen, A. (2018). Determinants of Student's Intention to Use Mobile Learning in Yemeni Public Universities: Extending the Technology Acceptance Model (TAM) with Anxiety. International Journal of Management and Human Science (IJMHS), 2(2), 2590–3748.

Assink, M. (2006). Inhibitors of disruptive innovation capability: a conceptual model. European Journal of Innovation Management, 9(2), 215–233. https://doi.org/10.1108/14601060610663587

Avolio, B. J., Waldman, D. A., & Yammarino, F. J. (1991). Leading in the 1990s: The Four I 's of Transformational Leadership. Journal of European Industrial Training, 15(4), 9–16. https://doi.org/http://dx.doi.org/10.1108/03090599110143366

Badran, N., Khalifa, G., 2016. Diversity Management: Is it an Important Issue in Hotel Industry in Egypt? Intlernational J. Heritage, Tour. Hosp. 7, 275–286.

Ballmert, M. (2017). Adoption of Innovative Technology for Business Transformation with Big Data in an Oil and Gas Company in South Africa, 68.

Bawack, R. E., & Kala Kamdjoug, J. R. (2018). Adequacy of UTAUT in clinician adoption of health information systems in developing countries: The case of Cameroon. International Journal of Medical Informatics, 109(October 2017), 15–22. https://doi.org/10.1016/j.ijmedinf.2017.10.016

Bergeron, F., Raymond, L., Rivard, S., & Gara, M. F. (1995). Determinants of EIS use: Testing a behavioral model. Decision Support Systems, 14(2), 131–146. https://doi.org/10.1016/0167-9236(94)00007-F

Bongiorno, G., Rizzo, D., & Vaia, G. (2018). CIOs and the Digital Transformation. https://doi.org/10.1007/978-3-319-31026-8

Bouznif, M. M. (2017). Business Students' Continuance Intention toward Blackboard Usage: An Empirical Investigation of UTAUT Model. International Journal of Business and Management, 13(1), 120. https://doi.org/10.5539/ijbm.v13n1p120

Bringula, R. P., Moraga, S. D., Catacutan, A. E., Jamis, M. N., & Mangao, D. F. (2018). Factors influencing online purchase intention of smartphones : A hierarchical regression analysis. Cogent Business & Management, 5(1), 1–18. https://doi.org/10.1080/23311975.2018.1496612

Brünink, L. (2016). Cross-Functional Big Data Integration: Applying the Utaut Model, (September), 1–31. https://doi.org/10.1063/1.332044

Buchanan, L., & O'Connell, A. (2006). A Brief History of Decision Making. Retrieved from https://hbr.org/2006/01/a-brief-history-of-decision-making

Bughin, J., Hazan, E., Lund, S., Dahlström, P., Wiesinger, A., & Subramaniam, A. (2018). Skill Shift: Automation and the Future of the Workforce. Retrieved from https://www.mckinsey.com/featured-insights/future-of-organizations-and-work/skill-shift-automation-and-the-future-of-the-workforce

Burns, J. M. (1978). Leadership (1st Editio). New York: Harper & Row.

Chepkasova, E., & Macalintal, M. C. F. (2016). TRANSFORMATION IN THE ERA OF DIGITIZATION : A study of organizations implementing digital transformation projects with integrated project management and change management. Umea University.

Cook, D. A., & Artino, A. R. (2016). Motivation to learn: an overview of contemporary theories. Medical Education, 50(10), 997–1014. https://doi.org/10.1111/medu.13074

Crawford, J. (2014). Building an Effective Organizational Analytics Capability Presentation Thesis • For organizational analytics to be maximally effective , you must :

Davis, F. D. (1989). Perceived Usefulness , Perceived Ease of Use , and User Acceptance of lnformation Technology. MIS Quarterly, 13(3), 319–340. https://doi.org/10.2307/249008

Department of Statistics Malaysia. (2017). Statistics Malaysia. Kuala Lumpur. Retrieved from https://www.dosm.gov.my/v1/index.php?r=column/pdfPrev&id=YzI2NWE2U0tXS1VEdnFsWHpqM1Fudz09

Franke, F., & Felfe, J. (2011). How does transformational leadership impact employees' psychological strain?: Examining differentiated effects and the moderating role of affective organizational commitment. Leadership, 7(3), 295–316. https://doi.org/10.1177/1742715011407387

Furaiji, F., Łatuszyńska, M., & Wawrzyniak, A. (2012). An empirical study of the factors influencing consumer behaviour in the electric appliances market. Contemporary Economics, 6(3), 76–86. https://doi.org/10.5709/ce.1897-9254.52

Gago-areces, M. (2017). Business Strategy in the Digital Age . Digital Transformation , Disruption and Cybersecurity Á Digital transformation Á Cybersecurity Á Network. Advanced Sciences and Technologies for Security Applications, 75–94. https://doi.org/10.1007/978-3-319-54975-0

Haddad, A., Ameen, A. A., & Mukred, M. (2018). The Impact of Intention of Use on the Success of Big Data Adoption via Organization Readiness Factor, 2(1), 43–51.

Head, A. J., Hoeck, M. Van, & Garson, D. S. (2015). Lifelong learning in the digital age: A content analysis of recent research on participation. First Monday, 20(2), 21. https://doi.org/http://dx.doi.org/10.5210/fm.v20i2.5857

Husin, I.E., Abou-Shouk, M.A., Khalifa, G.S.A., 2013. Evaluating tourism and hospitality graduates: perceptions of stakeholders in Egypt., in: Proceedings of the 3rdRegional Conference on Tourism Research, 29-31 Oct, 2013, Langkawi, Malaysia. pp. 764–774.

Idris, A., Moghavvemi, S., & Musa, G. (2015). Selected Theories in Social Science Research (2nd Editio). Kuala Lumpur: University of Malaya Press.

Isaac, O., Abdullah, Z., Ramayah, T., & Mutahar, A. M. (2017). Internet usage, user satisfaction, task-technology fit, and performance impact among public sector employees in Yemen. International Journal of Information and Learning Technology, 34(3), 210–241. http://doi.org/10.1108/IJILT-11-2016-0051

Isaac, O., Abdullah, Z., Ramayah, T., & Mutahar, A. M. (2017a). Internet Usage and Net Benefit among Employees Within Government Institutions in Yemen: An Extension of Delone and Mclean Information Systems Success Model (DMISM) with Task-Technology Fit. International Journal of Soft Computing, 12(3), 178–198. http://doi.org/10.3923/ijscomp.2017.178.198

Isaac, O., Abdullah, Z., Ramayah, T., & Mutahar, A. M. (2017b). Internet Usage within Government Institutions in Yemen: An Extended Technology Acceptance Model (TAM) with Internet Self-Efficacy and Performance Impact. Science International, 29(4), 737–747.

Isaac, O., Abdullah, Z., Ramayah, T., & Mutahar, A. M. (2018). Factors determining user satisfaction of internet usage among public sector employees in Yemen. International Journal of Technological Learning, Innovation and Development, 10(1), 37–68. http://doi.org/10.1504/IJTLID.2018.10012960

Isaac, O., Abdullah, Z., Ramayah, T., Mutahar, A. M., & Alrajawy, I. (2017). Towards a Better Understanding of Internet Technology Usage by Yemeni Employees in the Public Sector: An Extension of the Task-Technology Fit (TTF) Model. Research Journal of Applied Sciences, 12(2), 205–223. http://doi.org/10.3923/rjasci.2017.205.223

Isaac, O., Abdullah, Z., Ramayah, T., Mutahar, A. M., & Alrajawy, I. (2018). Integrating User Satisfaction and Performance Impact with Technology Acceptance Model (TAM) to Examine the Internet Usage Within Organizations in Yemen. Asian Journal of Information Technology, 17(1), 60–78. http://doi.org/10.3923/ajit.2018.60.78

Isaac, O., Abdullah, Z., Ramayah, T., & Mutahar Ahmed, M. (2017). Examining the Relationship Between

Overall Quality, User Satisfaction and Internet Usage: An Integrated Individual, Technological, Organizational and Social Perspective. Asian Journal of Information Technology, 16(1), 100–124. http://doi.org/10.3923/ajit.2017.100.124

Isaac, O., Masoud, Y., Samad, S., & Abdullah, Z. (2016). The mediating effect of strategic implementation between strategy formulation and organizational performance within government institutions in Yemen. Research Journal of Applied Sciences, 11(10), 1002–1013. http://doi.org/10.3923/rjasci.2016.1002.1013

Işik, Ö., Jones, M. C., & Sidorova, A. (2013). Business intelligence success: The roles of BI capabilities and decision environments. Information and Management, 50(1), 13–23. https://doi.org/10.1016/j.im.2012.12.001

Jacobs, C., Pfaff, H., Lehner, B., Driller, E., Nitzsche, A., Stieler-Lorenz, B., … Jung, J. (2013). The influence of transformational leadership on employee well-being: Results from a survey of companies in the information and communication technology sector in Germany. Journal of Occupational and Environmental Medicine, 55(7), 772–778. https://doi.org/10.1097/JOM.0b013e3182972ee5

Jiang, W., Zhao, X., & Ni, J. (2017). The impact of transformational leadership on employee sustainable performance: The mediating role of organizational citizenship behavior. Sustainability (Switzerland), 9(9). https://doi.org/10.3390/su9091567

Joshi, N. (2017). Top 5 sources of big data. Retrieved August 14, 2018, from https://www.allerin.com/blog/top-5-sources-of-big-data

Jyoti, J., & Dev, M. (2015). The impact of transformational leadership on employee creativity : The role of learning orientation, (January). https://doi.org/10.1108/JABS-03-2014-0022

Khalifa, G.S.A., Abou-Shouk, M.A.A., 2014. Investigating the Success Factors of Hotel Websites: The Case of Egyptian Hotels. Asia-Pacific J. Innov. Hosp. Tour. 3, 1–21.

Khalifa, G.S.A., Fawzy, N.M., 2017. Measuring E-Service Quality (Expectation Vs. Perception) From Travel Agencies' Perspective: An Empirical Study on Egyptian Hotel Websites. Int. J. Recent Trends Bus. Tour. 1, 36–48.

Khalifa, G.S.A., Hewedi, M.M., 2016. Factors Affecting Hotel Website Purchasing Intentions: Evidence from Egypt. J. Fac. Tour. Hotel. 8, 50–69.

Khalifa, G.S.A., Mewad, E.-H.A., 2017. Managing drivers and boundaries of information technology risk management (ITRM) to increase Egyptian hotels market share. Int. J. Recent Trends Bus. Tour. 1, 12–31.

Kefela, G. T. (2010). Knowledge-Based Economy and Society Has Become a Vital Commodity to Countries, 1(December), 68–75.

Kulviwat, S., II, G. C. B., & Al-Shuridah, O. (2009). The role of social influence on adoption of high tech innovations: The moderating effect of public/private consumption. Journal of Business Research, 62(8), 7. https://doi.org/10.1016/j.jbusres.2007.04.014

Lee, H. J., Roh, E. H., & Han, K. S. (2018). A Study on Factors of Information Security Investment in the Fourth Industrial Revolution. International Journal of Advanced Science and Technology, 111, 157–174. https://doi.org/10.14257/ijast.2018.111.14

Madigan, R., Louw, T., Dziennus, M., Graindorge, T., Ortega, E., Graindorge, M., & Merat, N. (2016). Acceptance of Automated Road Transport Systems (ARTS): An Adaptation of the UTAUT Model. Transportation Research Procedia, 14(0), 2217–2226. https://doi.org/10.1016/j.trpro.2016.05.237

Mona Saeed Mohamed, Gamal S. A. Khalifa, Mohammed Nusari, Ali Ameen, Ahmed Hamoud Al-Shibami, Abu-Elhassan El-Shazly Abu-Elhassan, 2018. Effect of Organizational Excellence and Employee Performance on Organizational Productivity Within Healthcare Sector in the UAE. J. Eng. Appl. Sci. 13, 6199–6210. https://doi.org/10.3923/jeasci.2018.6199.6210

Morabito, V. (2015). Big Data and Analytics: Strategic and Organizational Impacts. (R. Bapna, Ed.), Springer. Milan: Springer International Publishing. https://doi.org/10.1007/978-3-319-10665-6

Musa, H., & Chinniah, M. (2016). Malaysian SMEs Development: Future and Challenges on Going Green. Procedia - Social and Behavioral Sciences, 224(August 2015), 254–262. https://doi.org/10.1016/j.sbspro.2016.05.457

Mutahar, A. M., Daud, N. M., Ramayah, T., Isaac, O., & Aldholay, A. H. (2018). The effect of awareness and perceived risk on the technology acceptance model (TAM): mobile banking in Yemen. *Int. J. Services and Standards*, *12*(2), 180–204.

Mutahar, A. M., Daud, N. M., Ramayah, T., Isaac, O., & Abdulsalam, R. (2018). The Mediating of Perceived Usefulness and Perceived Ease of Use : The Case of Mobile Banking in Yemen. *International Journal of Technology Diffusion*, *9*(2), 21–40. https://doi.org/10.4018/IJTD.2018040102

Mutahar, A. M., Daud, N. M., Ramayah, T., Isaac, O., & Alrajawy, I. (2017a). Examining the Intention to Use Mobile Banking Services in Yemen: An Integerated Perspective of Technology Acceptance Model (TAM) with Percieved Risk and Self-Efficacy. *Asian Journal of Information Technology*, *16*((2-5)), 298–

311.

Mutahar, A. M., Daud, N. M., Ramayah, T., Isaac, O., & Alrajawy, I. (2017b). Integration of Innovation Diffusion Theory (IDT) and Technology Acceptance Model (TAM) to Understand Mobile Banking Acceptance in Yemen: The Moderating Effect of Income. *International Journal of Soft Computing*, *12*(3), 164–177.

Neetu Jain. (2018). Big Data and Predictive Analytics: A Facilitator for Talent Management. Studies in Big Data Book Series (SBD, Volume 38), 199–204.

Nicolaus, H., Bughin, J., Chui, M., Manyika, J., Saleh, T., Wiesman, B., & Sethupathy, G. (2016). The age of analytics: Competing in a data-driven world. McKinsey Global Institute, (December), 136. https://doi.org/10.1111/bjet.12230

Norzaidi, M. D., & Salwani, M. I. (2014). Campus-Wide Information Systems Article information : Research Paper, 9(2001), 460–466. https://doi.org/10.1080/15700763.2013.810274

Popovic, A., Hackney, R., Tassabehji, R., & Castelli, M. (2016). The impact of big data analytics on firms' high value business performance. Information Systems Frontiers, 1–14. https://doi.org/10.1007/s10796-016-9720-4

Power, D. J. (2003). A Brief History on Decision Support System. Retrieved from http://dssresources.com/history/dsshistory.html

Prasad, Y. L. (2016). Big Data Analytics Made Easy (1st Editio). Chennai: Notion Press.

Rondan-Cataluña, F. J., Arenas-Gaitán, J., & Ramírez-Correa, P. E. (2015). A comparison of the different versions of popular technology acceptance models a non-linear perspective. Kybernetes, 44(5), 788–805. https://doi.org/10.1108/K-09-2014-0184

Ross, J. W., Sebastian, I. M., Beath, C., Scantlebury, S., Mocker, M., Fonstad, N., … Group, boston consulting. (2016). Designing digital organisations. MIT Center for Information Systems Research.

Schunk, D. H., Meecce, J. L., & Pintrich, P. R. (2014). Motivation in education : theory, research, and applications (4th ed.). Boston: Boston Pearson.

Schwab, K. (2017). The Global Competitiveness Report The Global Competitiveness Report 2017-2018. World Economic Forum (Vol. 5). https://doi.org/92-95044-35-5

Sivarajah, U., Kamal, M. M., Irani, Z., & Weerakkody, V. (2017). Critical analysis of Big Data challenges and analytical methods. Journal of Business Research, 70, 263–286. https://doi.org/10.1016/j.jbusres.2016.08.001

TalentCorp. (2017). Visioning Malaysia's Future Of Work: Kuala.

Qoura, O., Khalifa, G.S., 2016. The Impact of Reputation Management on Hotel Image among Internal Customers: The Case of Egyptian Hotels. Intlernational J. Heritage, Tour. Hosp. 7, 261–274.

Vela, J. V. (2017). The employees ' perception on the adoption of big data analytics by selected medical aid organisations in Durban. University of Kwazulu-Natal.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. Source: MIS Quarterly, 27(3), 425–478. https://doi.org/10.2307/30036540

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2016). Unified Theory of Acceptance and Use of Technology: A Synthesis and the Road Ahead. Journal of the Association for Information Systems, 17(5), 328–376.

Verma, S. (2017). the Adoption of Big Data Services By Manufacturing Firms: an Empirical Investigation in India. Journal of Information Systems and Technology Management, 14(1), 39–68. https://doi.org/10.4301/S1807-17752017000100003

Vicziany, M., & Puteh, M. (2004). Vision 2020, The Multimedia Supercorridor and Malaysian Universities. In 15th Biennial Conference of the Asian Studies Association of Australia (pp. 1–21). Canberra: Monash University.

Wamba, S. F., Gunasekaran, A., Akter, S., Ren, S. J. fan, Dubey, R., & Childe, S. J. (2017). Big data analytics and firm performance: Effects of dynamic capabilities. Journal of Business Research, 70, 356–365. https://doi.org/10.1016/j.jbusres.2016.08.009

Zuiderwijk, A., Janssen, M., & Dwivedi, Y. K. (2015). Acceptance and use predictors of open data technologies: Drawing upon the unified theory of acceptance and use of technology. Government Information Quarterly, 32(4), 429–440. https://doi.org/10.1016/j.giq.2015.09.005