


Employees' aptitudes and trepidations for the adoption of enterprise application architecture for supply chain management in small and medium enterprises: A case of Capricorn District Municipality



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Background: This article inspects the internal constituents on employees' aptitudes and trepidations (EATs) for the adoption of enterprise application architecture (EAA) for supply chain management (SCM) in small and medium enterprises (SMEs) within Capricorn District Municipality. EATs trait origins widespread destruction and inflict in the adoption of EAA if not managed amicably, unless, the enterprise accentuate the importance of the 4th Industrial revolution with careful planning to deal with the aftermath and mitigate the inspirations instinctively. Thus, the logistics of EAA adoption is one of the main activities in information technology (IT) that requires meticulous knowledge in algorithms for a successful SCM.

Objective: The principal objective of this study is to determine whether EATs affect the adoption of EAA for SCM in SMEs and to identify gaps and institute state of the art in research for future studies.

Method: This study adopts a descriptive research method with the use of 310 respondents targeted at both SME owners and managers, sculpted over quantitative research. Based on the analyses of data, the linear regression model is executed. As a result, the author realised that 'EATs affect the adoption of EAA' as a dominant research focus of these studies. In this study, the response EATs as a primary influencer of the adoption of EAA, considered on linear regression model for attainable SCM. In practice, SMEs should link EAA to new technologies, enterprise capabilities, objectives and strategies, as well as the existing culture and performance philosophies.

Results: The SMEs' success in SCM activities is dependent on employees' perceptions, attitudes, motivation and learning abilities that could ease the narratives on the adoption of EAA.

Conclusion: These results provide the following comprehensions for future research: applying simplicity by getting them on board, introducing EAA through different channels of learning, building a coalition of willing mindsets, motivating its purpose and celebrating small progress. The research provides a profound understanding relevant in the contextual background to SMEs to adopt EAA for SCM that depends on the enterprise resources (ERs) acquisition and/or availability.

Keywords: coding and programming; employees' aptitudes and trepidations; enterprise application architecture; information technology; motivation; perceptions; small and medium enterprises; supply chain management; technologically accepted models.

Introduction

Employees' aptitudes and trepidations (EAT) are one of the most rapidly diminishing internal factors in the adoption of enterprise application architecture (EAA) for supply chain management (SCM) in small and medium enterprises (SMEs). Several studies thus far have linked EATs with the adoption of EAA, as they allude that the (4IR) could elevate the level of coincidence, with massive mobility and a negative shift in the balance of power in SCM (Bolognese 2018; Merritt 2029; Juneja 2021). To do so, SMEs need to start with an architecture design, which will help them to drive consensus amongst all participants by supporting

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planning, facilitating changes and managing complexity, reducing risks and minimising technical debt, which is the end game of any inventive architecture (Menezes 2021). Enterprise application architecture represents a well-structured system that scales enterprise demands, meeting the intended business and user requirements whilst ensuring that all the concepts are correctly isolated and with comprehensive dependencies amongst each other (Menezes 2021). The 4IR encourages the adoption of EAA in all sectors (Anderson & Perrin 2017; Nickolaisen 2021), challenging the traditional *modus operandi* of enterprise operations encounter resistance because of formal requirements on loan securities for technological capacity (Suhadak & Mawardi 2017; Maverick 2021).

In essence, the competitive threats are embraced with technologically accepted models (TAM) (Escobar-Rodriguez & Bartual-Sopena 2015). Technical hitches might arise; however, when an effort is made to adhere to information technology (IT) policy for aligning SMEs' goals, eliminating and minimising skills gaps, designing consistent job titles, encouraging clear career paths and incentive plans with up-to-date job descriptions and evaluations (Mitache 2021). The competitive threat to the adoption of EAA is unprecedented and suggests that SMEs are increasingly exposed to more competitive IT alternatives, not only in terms of the SCM activities being implemented but also from the number of innovative competitor inventiveness (Reichert & Zawislak 2014; Spacey 2015). The recurrence benefaction and trustworthiness exhibited by SMEs towards the SCM partnerships are therefore diminishing because of switching costs subsiding. This places severe pressure on SMEs on the adoption of EAA to proactively pursue strategies to retain their SCM activities. One such strategy is the provision for the demand-driven operating model, which integrates customers, processes and technology, for a better EAA system (Gemalto 2021; Oracle 2021).

Enterprise application architecture acts as 'dynamic digital incentive schemes' (Merritt 2019) and requires transformation's role in security (Regalado 2021) as well as careful design in algorithms (Ray 2015). By providing a platform to continuously monitor EATs, the theory of planned behavior (TPB) could countenance SMEs the opportunity to assess the value embedded in the rewards structure that does not only improve durable lucrateness. Likewise, the adoption of EAA increases psychological switching barriers established on Ajzen's theory of reasoned action (TRA) in the Social Psychology software (Ajzen 1991; Hackman & Knowlden 2014; Dillon & Morris 2018b). For that purpose, at the very least, EATs are exposed to an effective platform that enables them to monitor and learn more about algorithms involved in the adoption of EAA for SCM (Walport & Rothwell 2013). This in turn SCM has important implications regarding the ability to customise and personalise convenient software systems for proper adoption of EAA (Jacobson 2018). This subject came up, for example, in the discussions of EATs on the following:

- **Enterprise integration and administration:** draw a parallel relationship with TPB that take into account three user determinants, namely effort expectancy, social influence and facilitation conditions that influence EAA adoption (Hazen, Kung, Cegielski & Jones-Farmer, 2014).
- **Disbursing information resources or systems:** The information resources could be intermarried with TRA that maintains that EATs are perplexed by personal beliefs that result in subsequent stimulus (Richards 2021). Moreover, TRA distinguishes two types of behavioural measures as the intentions on the acceptance or rejection of technology (Camadan, Reisoglu, Ursavas & Mcilroy 2018).
- **Adapting Enterprise resource planning:** The combination of enterprise resources and diffusion theory of innovation (DTI) could provide some sustenance for the conceptual premise results that could illustrate a conceptual model explaining the diffusion of technological innovative systems (Beal 2021a; Green 2015).
- **Interpersonal skills:** Sweeney (2011) maintains that the relative advantage of using technology allows SMEs to use alternate methods for incorporating its enterprise activities in SCM in EAA. Jones (2003) argues that the theory of relative advantage (TRA) has devastatingly analysed interpersonal skills in line with barriers that impede the integration of this technology within SMEs (Sweeney 2011).

All these theories, namely TPB, TRA, DTI and TRA go beyond typical rational value-driven considerations within the SCM context.

Likewise, the adoption of EAA considerations includes biometric technology authentication systems such as image detection, fingerprint detection, voice recognition and password encryption (Mayhew 2019; Naser 2021; Sanders et al. 2016). The extent to which employees validate TAM, affected by lack of financial resources, information systems components and working capital (Maverick 2021), thus, the construction of the underlying optimal control problem in a stochastic background in the adoption of EAA (Parise, Lygeros & Ruess 2015). Employees' aptitudes and trepidations may have a vital role in bringing about and play an important role in affecting the SCM activities' intensified (or not) relational state when using the application. Enterprise application architecture focuses on final output for rational-decision making centred on reasonable and sustainable variables included in that and EATs encountering technological challenges such as cybersecurity, cloud computing, perceptions surrounding automation, skill gaps and continuity and disaster planning (Dillon & Morris 1996a; Anderson & Perrin 2017).

These underlying drivers of value inherent to EATs on the adoption of EAA are the focal concentration of this study. More specifically, the study investigates the internal factors 'highlighted as EATs towards the adoption of EAA for SCM in SMEs within Capricorn District Municipality' and their impact on relational results that lead to augmented usage of the application. Even though the available literature on EATs, in general, is widespread in the South African context, it is, however, limited with specific reference to EAA. Supply chain

management pays specific attention to ever-increasing competition, and service delivery demands are forcing SMEs to revisit the operational efficiencies of their supply chains (SC) facing barriers to the adoption of EAA. Whilst the study of Sewdass (2012) investigates the proposition of a competitive intelligence (CI) framework for public service departments to enhance service delivery, it does not make the distinction between the EATs when proposing CI and the ensuing behaviour of repeat patronage through increased usage for service delivery. Sewdass's study (2012) also does not clearly make the distinction between effective and figurative value drivers of rewards on service delivery. Taking the discussion further, Lechesa, Seymour and Schuler (2012) investigate the ERP Software as a Service (SaaS) indicated that network limitations and security concerns are strongly impacting potential adoption in South Africa. Enterprise application architecture is receiving more focus from ERP vendors such as SaaS and Systems, Applications and Products in Data Processing as a market leader. This, nevertheless, does not provide any confirmation of the relationship between specific factors affecting EAA software and the impact on continued usage of the application. For example, Nickolaisen (2021) investigates why EAA strategy is still needed and if the business environment is heterogeneous.

Drawing from this, application architecture has countless ways to either design for development towards standardisation. However, none of these studies provided a comprehensive evaluation of the EAA adoption linked to SCM that SMEs have the zest to advance their routine with the positive influence on the 4IR. This study, therefore, contributes to the existing body of information by conducting a more comprehensive investigation into the adoption of EAA for SCM in SMEs that EATs impact the relational outcomes between the internal and external users. The results obtained from the preliminary analysis of EATs may be used to influence the employee perceptions on a structured approach to address problems in the adoption of EAA. Given that numerous EAA applications are consistently ranked in the top five software architecture patterns on how to make the right choice for the SMEs (Wayner 2019) and the digital transformation's role in security (Merritt 2019). Nevertheless, critics have also argued that not only do surveys provide an inaccurate measure of EATs but given all facts; the study provides valuable insight for the adoption of EAA for SCM in SMEs.

Research objectives

- The key objective is to examine whether the EAT influences the adoption of EAA in SMEs for SCM.
- The secondary objective is to develop a conducive working model that orientates employees towards the adoption of EAA for SCM in SMEs.

Literature overview

Theoretical review: Technological acceptance model (TAM)

Technological acceptance model (TAM) is a theory that is used to analyse the adoption of new technologies by enterprises

(Escobar-Rodriguez & Bartual-Sopena 2015). Technological acceptance model was developed by Davis, Bagozzi and Warshaw in 1989. Many analysts in this day and age argue that the approach on TAM has not been successful based on high level of criticisms. Firstly, Ajibade (2021) alludes that TAM could be considered for learning in electronic learning systems. Secondly, Salovaara and Tamminen (2008) allude that TAM is pursued by lack of credit leading to passive absorbers of technological applications with differences in SCM activities, or the features of interpersonal cooperation. Thirdly, incapability of observing other issues, such as cost and structural imperatives that push users to adopt an innovation in the form of EAA (Malatji, Van Eck & Zuva 2020). Technological acceptance model encounters some determinants of technology rejection (Ajibade 2021). Using the TAM for analysing the adoption of EAA for SCM in SMEs improves the low actual adoption (AA) of EAA (Shilman 2017). Technological acceptance model is a theory used to analyse the adoption of new technologies by organisations (Escobar-Rodriguez & Bartual-Sopena 2015). It concentrates on rational decision-making for technological implications that would bring substantial modifications and transformations within the enterprise (Anderson & Perrin 2017; Dillon & Morris 1996a). For SMEs to be more efficient and effective in SCM, enchanting calculated risk by disseminating capital structure in TAM could bring positive benefits for the entire enterprise. The intended AA of new technology is influenced by dual factors, namely, (1) perceived usefulness and (2) perceived ease of use for AA of EAA for SCM (Schnädelbach 2010; Travis 2017).

The speculative principle's essential view about perceived usefulness as a component in TAM explicates to a degree in which an EAT believes that using a particular electronic device could improve their performance (Fenech 2021). On the contrary, perceived ease of use of computer systems refers to a degree to which employees use a computer system with the expectation that the target system be effortless (Davis 1989). In a modern study by Shields (2021), 15% of employees are frustrated on collaborative work schedule, nevertheless, automation with in-house solutions. Their daily work was surveyed to determine whether; when it comes to the digital tools employees use in their day-to-day jobs, that relationship status is best described as "it is complicated"? and if so, what kind of technological application could be adopted. A much more systematic approach would identify how TAM interacts with other variables that are believed to be linked to the AA of EAA for SCM in SMEs.

Conceptual review

Employees' aptitudes and trepidations are sophisticated human traits (Hendricks 2018) as encoded in the dual-theory of Frederick Herzberg on two aspects: (1) Motivation that is replicated by achievement, recognition, the work itself, responsibility, advancement and growth and (2) hygiene factors that embrace company policy, supervision, relationships, work conditions, remuneration, salary and security (Herzberg 1968). Positive traits are achieved through

the level of personal zest and enthusiasm. These goals are accomplished through the drivers of value embedded in the rewards they offer. They specifically include passion, independent thinking, optimism, self-confidence, resource, problem-solving, tenacity and ability to overcome hardship and action oriented with vision and focus (Duermyer 2017; Gao & Hafsi 2015). Employees' aptitudes and trepidations rely on several mandatory factors that require a specific educational background and experience from an IT background (Jabbour et al. 2015; Knox & Haupt 2015). Assessing EATs includes using a variety of psychometric instruments, such as self-assessments and 360-degree assessments of the routine role and work situation (Metcalf 2015; Rees & Porter 2015). It is affirmed that formal education and training can enhance EATs (Esposito, Freda & Bosco 2015; Kubberød & Pettersen 2021; Robbins & DeCenzo 2014) (see Table 1). The value provided to the EATs is evident in SMEs' performance and user satisfaction (Camadan et al. 2018). Thorough training for employees could close the gap for knowledge deficit as a tool for leading to EATs (Esposito et al. 2015; Kihn 2021). Identifying the drivers of enterprise resource planning and assessing its impacts on SC performances create a distinctive value proposition that is personalised per enterprise during the building-up and fundamental stage for adopting EAA (Hwang & Min 2015). Attitudes and behaviours could shape employees' attitudes and their willingness to adopt new technologies. In this regard, two distinct incentives are postulated; this is improved efficiency and rewards that improve their status (Duarte, Sethi & Staley 2017). By embracing human-capital development, SMEs foster employees' talent by developing blue-collar formation on technical talent (Lawrence 2017; Mlangeni 2017). The skills development courses enhance employees' development and growth and link it with their level of specialisation (Zaugg & Warr 2018); this could build a long-term relationship that leads to employee retention

(Duarte et al. 2017). In 2021, Price Water House Coopers published an article on its website reporting that employees' attitudes and behaviours could be the primary motive for shaping people's willingness to adopt new technologies that including motivation through two distinct incentives on improved efficiency and rewards that improve their status (Duarte, Sethi & Staley, 2017). Consequently, the possibility that TAM would be efficient in SMEs that are willing to invest more financial resources allows a roof for the learning, implementation and execution of EAA.

Data mining collaboration with enterprise application architecture

Today's SC activities are more aggressively competitive than ever before, because of technological encroachments that are intended to eliminate elements of patchiness in customer demand relations. Corporate industries and businesses use data mining as a sophisticated programme designed for categorisation of large data sets to identify patterns and relationships that could provide analytical solutions (Stedman 2016). Data mining techniques are the main non-intrusive method used for enabling enterprises to predict future trends and make more-informed business decisions on customer databases, transaction records and log files from web servers, mobile applications as well as sensors (Olavsrud 2020). It, therefore, includes computational algorithms that include all computer systems for the entire enterprise (Hiltbrand 2021). In some circumstances, parallel algorithms have been included for several reasons: parallelises each algorithm category, illustrates how to implement parallel algorithms on multithreaded parallel computers and further describes how to develop special purpose on parallel machines for effective adoption of EAA in SCM (Gebali 2011). Small and medium enterprises need their internal and external stakeholders to use effective and efficient technological standards that will improve customer relations. In addition, the adoption of EAA

TABLE 1: Summary table.

Authors	Country	Purpose	Summary points	Type of source
Hon and Lui (2015)	United Arab Emirates	This study aims to examine the impact of workplace happiness, co-worker support and job stress on employee innovative behavior. The mediating effects of co-worker support and job stress are also explored.	While this exploratory model proved very useful and conclusive, future research could consider including other variables in the framework that could also have a major impact on employees' propensity to innovate.	Journal article
Kuntz, Connel & Naswa (2017)	United States	Training efforts aimed at building employee resilience have traditionally been aimed at developing employees' stress-management techniques or building personal resources such as PsyCap.	Current research and theory on interpersonal emotion management and leader-facilitated emotion management, and by pointing out connections between these phenomena and contemporary models of resilience.	Journal article
Sanders, Zeng, Hellicar & Fagg (2016)	Melbourne Hong Kong	The purpose of "All Roles Flex" was to adopt a new, disruptive position to mainstream flexibility and thereby amplify the productivity benefits, lift engagement, improve gender balance, enable flexibility for all Telstra people (not just promote it as an issue for women), and establish a clear market proposition, with technology linked very strongly to enabling this.	Applying advanced technology like video conferencing as standard practice, smartphone technology for all employees, and a new attitude to flexibility; Flexibility as a real component of team and individual discussions around performance planning and expectations, and performance evaluation; and Involvement in programs such as the Workplace Gender Equality Agency's Equilibrium Man Challenge, creating new norms around men and flexibility.	Internet
Esposito, Freda & Bosco (2015)	Italy	To analyze the level of expertise (novice, intermediate and advanced) of the competences expected, developed and inferred from performed tasks. To explore the relation between the practicum facility and the competences expected, developed and inferred from performed tasks.	A different relevance has been considered for some competencies within our degree program and the facilities where the practicum activities were performed, reflecting social and cultural phenomena typical of the Italian academic psychological formation.	Journal article

Source: Esposito, G., Freda, M.F. & Bosco, V., 2015, 'Examining perception of competency through practicum competencies outline', *European Journal of Training and Development* 39(8), 700–720. <https://doi.org/10.1108/EJTD-05-2015-0037>; Hon, A.H.Y. & Lui, S.S., 2015, 'Employee creativity and innovation in enterprises: Review, integration, and future directions for hospitality research', *International Journal of Contemporary Hospitality Management* 28(5), 862–885. <https://doi.org/10.1108/IJCHM-09-2014-0454>; Sanders, M., Zeng, G., Hellicar, M. & Fagg, K., 2016, *The power of flexibility: A key enabler to boost gender parity and employee engagement*, viewed 04 August 2021, from <https://www.bain.com/insights/the-power-of-flexibility/>; Kuntz, J., Connell, P. & Näswall, K., 2017, 'Workplace resources and employee resilience: The role of regulatory profiles', *International Journal of Career Development* 22(4), 419–435. <https://doi.org/10.1108/CDI-11-2016-0208>

for SCM will compel SMEs to reinforcement learning in setting up a conducive environment when applying an appropriate algorithm or strategy (Becca 2019).

In some instances, data scientists could be appropriate personnel when working with machine learning depending on their knowledge revolving around emotional data, algorithmic composition and dataset creation (Ahmad 2020). Likewise, SMEs need to secure their data in cloud computing protected against unforeseen circumstances that include information security (Delony 2019; Sharma & Pendyal 2021), security architecture on cyber-hacking (Ritchot 2013) and biometric security on sensor networks (De Groot 2014). Cloud computing, a part of the remote server network connecting two peripheral hemispheres, 'end-user and stored data' for decrypting it, may be more or less extreme in unindustrialised SMEs (Sharma & Pendyal 2021). Data mining may have played a vital role in bringing about the practical application of statistical analysis and technologies on SMEs' data management in SCM for gaining agility and efficiency in identifying trends and predicting SMEs' productivity (Olavsrud 2020). Furthermore, Olavsrud (2020) maintains that so far, six roles have been identified as being potentially important: (1) Improving operational efficiency on a routine basis, (2) broadening the understanding of customers dynamic more precisely, (3) providing data visualisations for future projections, (4) providing insights in decision-making and for future planning, (5) measuring performance and driving growth and (6) discovering hidden trends by generating leads, which assist in scaling SMEs in the right direction. Georgiadis and Poels (2021) view database management as a collaborative measure of data that are harnessed by analytics to acquire and conjecture inside composed from online footprints, sensors and sensory systems, conspicuously without a pre-established goal, and are stored in dispersed databases thereby presenting an attractive target for assailants. Quantitative mechanisms could aid in redesigning SMEs' approach to the adoption of EAA adhering to three design values (Anderson et al. 2013): (1) Adapting architecture that reallocates resources and assets to support the dynamic configuration for enterprise operating models, (2) developing creative methods to adopt best practices in innovation and (3) demonstrating resilience for maintaining operational effectiveness when facing disruptions, growth, rightsizing and downsizing (Sliwa 2021). Data governance prompts initiatives criteria that require SMEs to have experience in terms of manual record keeping and preventing error system that will depend on a well-integrated information hub that is complementary with SCM operations (Wisner, Tan & Leong 2012). The analysis of EAT undertaken here has extended the knowledge of data mining collaboration with EAA for SCM in SMEs.

Coding and programming in enterprise application architecture for supply chain management

Enterprise application architecture revolves around thorough coding and programming for the successful adoption of EAA for SCM within SMEs. The challenge in coding and

programming are linked with the coordination of algorithms and enterprise activities in SCM (Kumar 2000). Borowski (2021) discusses the challenges and strategies for promoting coding and programming types that could be considered by SMEs in the adoption of EAA. This includes the following:

- **Top coder:** The Top Coder's frequent use is almost certainly because of a widespread of SCM activities that provides a list of algorithmic challenges that SMEs could not complete on their own directly online using their code editor. The SCM is increasingly recognised as a worldwide enterprise functional activity that involves dynamic algorithms for managing internal and external enterprise activities (Fish 2019; Pashaei & Olhager 2015; Stet 2014). Enterprise application architecture supports every activity involved at the strategic level for high-performing ratings for the enterprise (Lawrence 2017; Vetráková, Smerek & Seková 2017). Compatibility of technology entails the specific technical skills applied by software architects with the responsibility of executing proper system operational activities with ease in SCM (Desmet, Maerkedahl & Shi 2014). A primary concern for customers and distribution is in the SCM activities that provide agile services just-in-time (Crain 2018; Rouse 2021). Cross-functional activities lead to sustainable economic success for SMEs, depending on the marginalisation of economic and financial costs (Fotheringham & Saunders 2014; Jenner 2016; Mills, Purchase & Parry 2013). A natural progression of this top coder is an ease in SCM activities as well as the compatibility in EAA through coding and programming.
- **Coderbyte:** The Coderbyte is almost assured that the more extreme for coding, it eases a collection of algorithms accessed through introductory videos and interview preparation courses as well as programming for SCM activities. The SCM activities are increasingly recognised as a worldwide enterprise functional motion that involves dynamic algorithms for managing internal and external enterprise activities (Fish 2019; Pashaei & Olhager 2015; Stet 2014). Algorithms are protocols to be followed in the execution of SCM activities, which include computer programming that is aligned with internal and external users and different enterprise activities (Riezebos 2017; Suhadak & Mawardi 2017; Walport & Rothwell 2013). Enterprises are operating in a digital age with hierarchies and different elements of administrative protocols and algorithms for SCM with quality assurance, timely delivery and adherence to responsible business practice (Chadwick 2018; Ingram 2018b). The precise mechanism of Coderbyte in the adoption of EAA remains to be elucidated in many ways as it focuses on a list of challenges such as bracket combinations on; min window substring, tree constructor, bracket matcher, code and username validation, finding intersection just to list a few.
- **Project Euler:** Project Euler is likely that provide a large collection of challenges in the domain of computer science and mathematics that could compel SMEs to outsource their EAA project to software architects through work output. Factors found to be influencing SCMs have been explored in several studies, which include a broader SCMs

framework coupled with risk analysis and management of product architectures for SCMs design, testing and implementation (Pashaei & Olhager 2015). A well-regulated computer system could design a flexible architecture model that is based on efficiency and effectiveness in all input requirements in SCM (Bawa et al. 2017). For enterprises to have a flexible working environment, reasonable computer systems should be in place with flexible work interchange (Sanders et al. 2016). Considerably more work needs to be done to determine challenges linked with Project Euler for the desired results in the adoption of EAA.

- **HackerRank:** The HackerRank may be that HackerRank delivers encounters that SMEs could not solve; alternatively, they could detect them directly online for several different domains such as algorithms, mathematics, SQL, functional programming, artificial intelligence (AI) and more to have a compacted EAA, but this requires a deep capital injection in the adoption of EAA. Flexible technologies could ease the use of manual recordkeeping with the use of programmed order forms (Goldenberg & Dyson 2021). Also, EAA could legitimate workplace-based activities for SMEs through programming in SMEs (Chen 2017). By planning demand forecasting with programmed EAA, flexibility will be experienced as a key factor in enabling a low-cost structure in SCM. The subject of coding and programming is an intriguing one, which could be usefully explored further by considering some challenges such as Bayesian approximation, Hacker Rank admins decision and code plagiarism that will result in disqualification in the adoption of EAA.
- **CodeChef:** The CodeChef as a coding and programming software might permit SMEs capable to write code in their online editor and view a collection of challenges that are separated into different categories based on their conceptual and technical skills level in the adoption of EAA. Information system components need to be purchased with a thorough understanding of their functionality, especially for computerised data on software systems (Claudio 2016; Sharma 2018b). During the EAA AA, SMEs can use mobile applications being linked with computer software from different software technologies and architecture (Filho et al. 2015). More broadly, some focus on CodeChef is needed to determine the actual impediments in the coding and programming, such as bacteria synthesis, Mathison and data warehouse, embedding a tree and servers, just listing a few.
- **Exercism.io:** Exercism.io may resolve extreme EAA challenges for coding challenges on the website with several offers 3100+ challenges spanning 52 different programming languages could compel SMEs to mentor each challenge as it might differ from other challenges websites and enterprise preference with compatibility. Stochastic programming includes models with random settings with discrete realisation being capable to create a strong decision-making framework in SCM (Domenica, Mitra & Birbilis 2007). Well, in digital computers there is a positive strong indication that stochastic behaviour can be tolerated in the adoption of EAA where systems are in place to increase SCM performance (Vasilaki & Allwood

2021). It would be interesting to compare experiences of individuals with the same output, specialisation and credentials within SCM by using Z-critic for better statistical results.

- **Codewars:** The Codewars possesses credible enlightenment, and it provides a large collection of coding challenges, submitted and edited by a programming specialist applying algorithms on behalf of EAA users. Perhaps the most serious advantage of Codewars is that it provides instantaneous online solutions with many language selections. Expert personnel is regarded as IT specialists with technical expertise in the use of EAA, particularly for the implementation, monitoring or maintenance of IT systems, whilst the IT specialists focus on a specific computer network, database or systems administration functions (Beal 2021b; Heakal 2021; Kocoglu & Kirmaci 2012). Large randomised controlled trials could provide more definitive evidence in understanding dynamics in Codewars such as alphabetic anagrams, all balanced parentheses, Huffman encoding, a chain adding function and duplicate encoder, amongst others.
- **LeetCode:** The LeetCode is a depiction of an electromagnetic system that solves the challenges directly online in one of nine programming languages as they provide statistical results for SMEs solutions in SCM based on programmable users' codes. If the debate is to be enthused forward, a better understanding of LeetCode needs to be developed. Small and medium enterprises could face appropriate approaches in SCM content for enhanced inert-changing systems with ease and comfort without tempering with the existing data or information (Szigligetius 2021). For example, SMEs could be considered for data collection concerning the new competing product as a case study on how parameters of a stochastic individual-based model can be acknowledged from existing data and how the experimental model can be used to solve an optimal control problem in a stochastic background (Parise et al. 2015). However, a critical appraisal of the importance of EAA in SCM is lacking (Zhou & Ning 2017). A reasonable approach to tackle this issue could be to consider challenges in LeetCode such as the importance of data structures and algorithms, planning for software development, using brute force and hash map, amongst all others.
- **CodinGame:** A possible enlightenment on CodinGame is that it is based on a few elements such as level of experience using the websites, intercom Google searches and managing the software development lifecycle. Small and medium enterprises could deal with appropriate approaches in SCM content to have a better inert-changing system with ease and comfort without tempering with the existing data or information (Szigligetius 2021). This substance came up for instance in a discussion of parameters on stochastic capability on the individual-based model for solving optimal-control challenges (Parise et al. 2015). Enterprise application architecture is a description of the structure for the applications and software used crosswise the enterprise in which the systems are broken down into sub-systems

and connected based on their ultimate relationships and functionalities (Benade & Pretorius 2012; Flower 2021; Sangam 2010). However, a critical valuation of the importance of EAA in SCM is lacking (Zhou & Ning 2017). Although this is the most comprehensive account of coding and programming produced so far, it does suffer from several flaws. CodinGame could be applied to develop targeted intermediations aimed at expediting all beginner, intermediate and advanced users within the confines of EAA linked in SCM during coding and programming.

- **Policy as Code:** A probable description of 'Policy as Code' is that it is constructed upon the notion of infrastructure as code, which brings similar benefits to the architecture level with notable trends, that could assist the SMEs to arrange SCM activities as a structure around the desired system state (Bettes & Humble 2020). According to Marais (2021), South African SMEs are instituted with policy and regulatory measures on economic principles for full employment that narrow the scepticism towards the adoption of EAA. Consequently, these policies harm the TAM such as the adoption of EAA. The institutional conditions prohibit and hinder entrepreneurial skills development in education through science, technology, engineering and mathematics (Halabisky 2017). With the help of software architects, the adoption of EAA is anticipated with architectural design systems that are capable of supporting the SMEs' concepts and processes incorporated with SCM activities (Menezes 2021). Nevertheless, difficulties arise when an attempt is made to implement the free-error application system on information governance and security, without the violation of the policy on coding and programming for EAA in SCM.

Research gap

To date, little is recognised about the adoption of EAA, and it is not clear what factors constitute resilience to the 4IR. Nevertheless, amid the resurgence of interest in such academic researcher, the literature review designates that:

- Many scholarship readings have scrutinised the effects of EAA as well as the technical aspects on data mining collaboration and coding and programming in conjunction with SCM within SMEs. Conversely, little attention dedicated on the connexion between EAA physical characteristics to ease its adoption, specifically if SMEs that developed a mutual trust on the use of Internet on cyber security.
- Even though exploration of investigations on both disciplines is chronicled in developed economies, it requires intensive skills and professional competencies in developing economies including South Africa.
- The significant role of EAA in large firms and corporations has contributed noteworthy results that are evident in their financial statements projection over the epochs.

- Even though the existing literature advocates that the adoption of EAA may imply unfathomable apprehension about the SMEs' internal strength and weakness; however, there is no tangible evidence to encounter how technological standards affect SCM activities.

Research strategy

Research approach

To meet the objective of the study, a quantitative methodology was employed. An initial objective of the project was realised through the identification and perusal of a pragmatic literature review. The realistic research comprised three sub-divisions. Primary data used collected through questionnaire distribution for Master of Commerce between academic years' 2018 and 2020 (Appendix A and Appendix B). The *first sub-division* indicated the empirical research consisted of pilot-study where SMEs' owners and managers were presented with 310 questionnaires to respond to in Polokwane Municipality that sheltered; Blouberg (Bochum) Municipality, Molemole (Dendron) Municipality, Polokwane Municipality and Lepelle-Nkumbi (Lebowakgomo) Municipality to measure concentration in all enterprises. Stratification was based on the percentages of the SMEs in each area. Stratified sampling was used to ensure that each area was proportionally represented in the sample. In each area, the sample was drawn using random numbers to ensure that the results could be used as representative of the whole population in each area. In the SMEs, the researcher used stratified random sampling to draw. The sample size was calculated as 330 (Figure 1). Only 20 questionnaires were eliminated based on respondents' errors. The municipalities are chosen with the objective of assembling certain presumptions with the SMEs in respect of making informed decisions, exploring and identifying some hidden factors restraining employees to adopt EAA and to strengthen their perceptions towards technological innovation. The second sub-division was regarded as a diagnostic test where the Cronbach's alpha between EATs and the AA of EAA were accumulated at 0.867 and 0.873, respectively (see Table 2). The second sub-division utilised SPSS version 25 to conduct data analysis, where the following instruments were processed: Pearson

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{1900}{1 + 1900(0.05)^2}$$

$$n = \frac{1900}{1 + 1900(0.0025)}$$

$$n = \frac{1900}{1 + 4.75}$$

$$n = \frac{1900}{5.75}$$

$$n = 330$$

Source: Leedy, P.D. & Ormrod, J.E., 2014, *Practical research, planning and design*, 10th edn., British Library Cataloging-in-Publication Data

FIGURE 1: Sample size.

TABLE 2: Cronbach's Alpha per construct.

Constructs	Scale mean if item deleted	Scale variance if item deleted	Corrected item total correlation	Cronbach's alpha if item deleted
Item-total statistics				
Employee aptitudes and trepidations	365.0529	1509.826	0.591	0.867
Actual adoption of EAA	381.6029	1641.880	0.310	0.873

coefficients, analysis of variance (ANOVA), Pearson correlations and linear regressions. The third sub-division focused on an evaluation of the data through a normality test of EATs and EAA.

Questionnaire development

A more systematic approach identified how EATs interact with each other and have all been believed to be linked to EAA adoption. All such variables include enterprise integration and administration, information resource management, enterprise resource planning, spreadsheet use as well as document merging, communications skills, interpersonal skills, using the internet (Microsoft Windows), enterprise integration and administration, standardization and web-interface, and asset management.

Data reliability

The degree to which items in a questionnaire exhibit consistency on the phenomenon they are measuring is referred to as reliability (Pallant 2013). Cronbach's alpha was used as a measure of the reliability of research hypotheses due to its flexibility; it was calculated by using software and software systems, and it only required one sample to estimate the internal consistency (Koushik 2013).

A reliable factor analysis was made based on the sample size of 310 (Costello & Osborne 2011). Both EAT and adoption of EAA are at 0.867 and 0.873, chronologically.

Stability diagnostics test

The current statistical analysis on EATs contributed positive annotations for further statistical examination of the Linear Regression Model on the AA of EAA for SCM in SMEs. The sample distribution for EATs produced a distribution curve with a μ of 40.95 and σ of 6.211 (Figure 2). The results indicate that the model is the best fit for homoscedasticity that fulfils three assumptions: the relationships between variables should be linear, the responses (AA of EAA) and descriptive (EATs) should have a normal distribution, and the standard deviations for both Y and X should be equal. Employees' aptitudes and trepidations produced a negative skewness at -0.695 and Kurtosis at 0.178 . A 'peak' distribution has a positive Kurtosis whereas a 'peak' distribution has a negative Kurtosis. The Kurtosis percentage should be near 0, and the 178% indicates that it is a normal distribution, which is slightly peaking and slightly skewed to the left. The

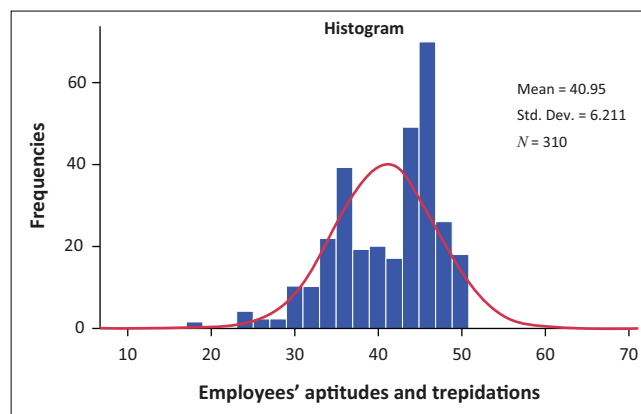


FIGURE 2. Normal distribution indicates an asymmetric distribution with acquiescent tails. The mean, median and mode are all equivalent @ 40.95. $\sigma = 6.211$. $N = 310$.

TABLE 3: Pearson correlations.

Variable	Actual adoption of EAA	Employees' aptitudes and trepidations
Actual adoption of EAA		
Pearson Correlation	1	0.346**
Sig. (2-tailed)	-	0.000
N	310	310
Employees' aptitudes and trepidations		
Pearson Correlation	0.346**	1
Sig. (2-tailed)	0.000	-
N	310	310

EAA, enterprise application architecture.

** Correlation is significant at the 0.01 level (2-tailed).

distribution is symmetric because the μ is 40.95 and the median is 0.430.

Research findings

Pearson correlations employees' aptitudes and trepidations and actual adoption of enterprise application architecture

Table 3 shows the results on correlations between EATs and AA of EAA. The p -value is near zero at ' $<.001$ ' with the requisite value set at 0.05. The statistical technique 'ANOVA' was used to test the hypotheses between the dependent variable, namely AA of EAA, and the independent variable.

Employees' aptitudes and trepidations and AA of EAA are positively correlated with Pearson correlation coefficients of 0.346, indicating a positive relationship. Based on the change in sign, the findings suggest a positive correlation between EATs and the adoption of EAAs.

Analysis of variance on employees' aptitudes and trepidations and actual adoption of enterprise application architecture

Table 4 indicates that the ANOVA results attained for scores on EATs as independent variables and AA of EAA as the dependent variable. The general F -statistic is significant ($F = 41.936$, $p < 0.001$), thus signifying that, overall, the model accounts for a significant proportion of the variation in the

adoption of EAA for SCM in SMEs. Because of the exact significance level of $0.001 < \alpha$ at 0.05, the results are statistically significant. Employees' aptitudes and trepidations play a role in the adoption of EAA for SCM in SMEs according to alternative sub-Ha1, whereas the sub-H01 'EATs do not play a role in the adoption of EAA for SCM in SMEs', is rejected. Pearson Coefficient on EATs and AA of EAA.

Table 5 presents the coefficients result for EATs and AA of EAA. The *t*-test is considered for testing as both samples have similar values in the mean.

In conditions where the estimated \hat{Y} consists of Perceived Attitudes towards the Adoption of EAA and EATs with the score = $16.120 + 0.190x$, then the *t*-test shows that the \hat{Y} constant $a = 16.120$ and the \hat{Y} constant $b = 0.190$ are significantly different from zero. The independent *t*-test could be used to determine the confidence interval of the coefficient, in case the 95% confidence interval for the *t*-test is [13.278, 6.551]. The results on coefficient exhibit a positive correlation between EATs and the AA of EAA.

Linear regression on employees' aptitudes and trepidations and actual adoption of enterprise application architecture

As established, summaries on different typescripts, where $\hat{Y} = \text{AA of EAA}$, $a = y\text{-axis intercept as AA of EAA}$, $b = +$ slope and $x\text{-axis intercept as EATs}$ (Figure 3). The R^2 value is 0.120 of the variances that are being accounted for this scatter plot from the independent variable, EATs. The positive linear regression satisfies three assumptions on a model for best fit (Figure 2). The linear regression where $\hat{Y} = 16.12 + 0.19x$. The slope of +0.19 will bring the same intensification in \hat{Y} . The $R^2 = 0.120$ indicates that the level of variation in the prognostic variable could be termed by variation in the independent variable. Moreover, the R^2 is adapted to r as thus $\sqrt{0.120} = 0.346$, which is established in Table 5 for Pearson coefficients. This approves that the model is adequate with a positive slope and the model is of a positive fit.

TABLE 4: Analysis of variance^a.

Model	Sum of squares	df	Mean square	F	Sig.
Regression	429.298	1	429.298	41.936	0.000 ^b
Residual	3152.973	308	10.237	-	-
Total	3582.271	309	-	-	-

EAA, enterprise application architecture.

^a, Dependent Variable: Actual adoption of EAA

^b, Predictors: (Constant), Employees' aptitudes & trepidations

TABLE 5: Pearson coefficients.

Model	Unstandardized Coefficients		Standardized Coefficients	<i>T</i>	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	B
Constant	16.120	1.214	-	13.278	0.00	-	-
Employees' aptitudes and trepidations	0.190	0.029	0.346	6.551	0.00	1.000	1.000

EAA, enterprise application architecture.

^a, Dependent variables: Actual adoption of EAA.

Discussions

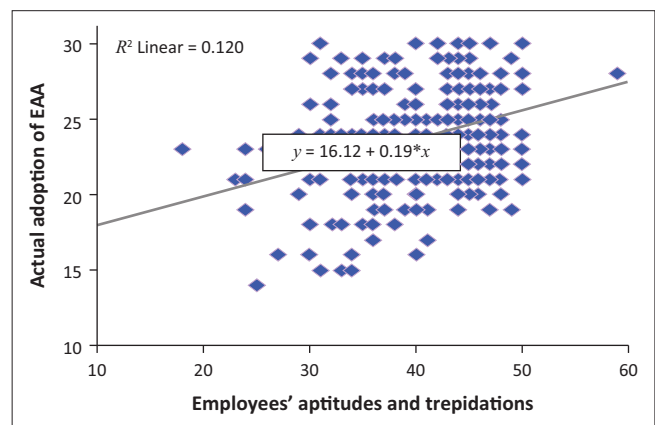
Findings

Employees' aptitudes and trepidations findings

With reverence to the adoption of EAA Knox and Haupt (2015), EAT reacted here; a notch of association was, found to be evident in the trinity of dimensional diagnosis as a set of; analytical skills, transferring informational skills and proficiency skills needed for the adoption of EAA in SCM. However, unlike any other internal factors, EAT is considered the most primitive although acted as an element of buffer in calibrating algorithms in SCM (Tolstoshev 2017). Moreover, the EAT classification could be well thought out even less eye-catching from TAM theory, with these SMEs having given up on any opportunity of evolution and accomplishment.

Enterprise application architecture findings

Centred on the findings obtainable at present, it is anticipated that taking into account the perceived attitudes and perceived usefulness of IT in the future descriptive study that may propose a better framework in the adopting EAA rather than focusing on EAT single handedly. The intended AA of new technology is influenced by dual factors, namely (1) perceived usefulness and (2) perceived ease of use for AA of EAA for SCM (Schnädelbach 2010; Travis 2017). Perceived usefulness and perceived ease of use were conventionally used as uncorrelated concepts, responsible for eliminating any uncertainties between EATs



EAA, enterprise application architecture.

Where $R^2 = 0.120$.

FIGURE 3: Linear regression model on employees' aptitudes and trepidations and actual adoption of enterprise application architecture slope (+0.19) of good results. Given the average change in the y-variable (in this case: Actual adoption of enterprise application architecture) for a change in the x-variable (employees' aptitudes and trepidations) on one unit.

that seek exceptional attention as a way of adopting EAA (Schnädelbach 2010; Travis 2017). The intention to adopt EAA by SMEs, who rely on traditional systems for conducting SCM activities. Where SMEs want to support the adoption of EAA, the perceived usefulness and the perceived ease of use might be the correct means of identifying some negative elements in employees. To end with, more ground research is needed to test the hypotheses whether there is any relationship between EATs, information systems components and enterprise resources are evident in the adoption of EAA for SCM.

Empirical literature

Employees' aptitudes and trepidations

In its contemporary evolution as with TAM, EATs are being technologically advanced through off-the-job training (that includes role-playing, in-basket training and syndicate training) and on-the-job training (that includes coaching, job rotation, junior boards, job instruction training, mentoring, learner-controlled instructions, behavioural modelling and vestibule training) (Nel, Werner, Haasbroek, Poisat, Sono & Schults, 2009). Although literature indicates its originality from data processing, creating, spreadsheets utilisation, using email and the creation of business value (Lee & Rhim 2014; Svärd 2013) but these were few. The modern developments point towards the development of enterprise application integration, anticipated to integrate the sustainability information in switching to the Cloud, shifting to data centrality and runtime analytics see, for example (Smith 2021). However, there is no literature that incorporated EATs into a sustainable perspective with EAA shown to enhance SMEs' SCM and cost-effective manner. Therefore, the employees have to attempt to adventure in technological modernisation to add more value in the sustainability measurement through the adoption of EAA.

Enterprise application architecture

The framework on EAA is based on a comprehensive analysis of the relevant literature and identification of major theories that are incorporated in SCM activities. This is in connection with the global use of theoretical models built from conceptions as proposed by Davis, Bagozzi and Warshaw (1989). Consequently, we learn the benefits of EAA, as noted by Nair (2010) and Stet (2014). The EAA adoption goes in hand with the regulatory acquiescence from the state in relation to socio-economic, environmental sustainability linked to the ecosystem (exercised in corporate social responsibility). Such considerations and compassions would great motivation to SMEs to invest in justifiable EAA with simplicity. The general methodology taken was to study the EATs in SCM towards the adoption of EAA within the Capricorn District Municipality. Such study was not explored before within the context of South Africa, and this study is likely to bring more impact on theory and practice in other municipalities, with the country and in the global arena.

Empirical contributions

Employees' aptitudes and trepidations

Employees' aptitudes and trepidations are considered as a success and mandatory factor that requires a specific and contextual educational instrument that yield experience towards EATs from diverse prominences (Jabbour et al. 2015). Assessing EATs includes using a variety of psychometric instruments, such as self-assessments and 360-degree assessments of the routine role and work situation of employees (Metcalf 2015; Rees & Porter 2015). Formal education and training can enhance EATs (Esposito et al. 2015; Kubberød & Pettersen 2021; Robbins & DeCenzo 2014). Thorough formal training the knowledge gap, in SCM, could be marginalised leading to a greater realisation of financial returns in SMEs. The value provided to the ECs is evident in SMEs' performance and user satisfaction (Camadan et al. 2018; Jiang & Liu 2015). The development and management activities central to professional and productive activities that are embodied in intellectual gratification (Filson 2021). These validate a need to be unambiguous about exactly what is meant by the word EATs.

Enterprise application architecture

The extensive adoption of EAA perceived as an essential dynamic factor for SMEs that yearn a paramount gain from the 4IR. To archive all-encompassing use, the study suggests that SMEs that adopt EAA should consider off-the-job training and on-the-job training programmes (Nel et al. 2009). Enterprise application architecture is defined as the degree to which the organisation structures its software applications in a scalable and reliable process, under a single component to fulfil enterprise requirements (Ferguson 2022). In this study, a set of drives on a degree of SME acceptance of EAA is examined. The TAM and TPB literature suggest multiple enterprise interventions that may play a vital role in building the relationship between the past records, such as EAA, and acceptance. Some of the key encounters in programming include algorithmic challenges (Borowski 2021) policy regulations (Walport & Rothwell 2013) and enterprise security programme (Ritchot 2013). Programming has been perceived as a way of synthesising business activities (Abraham, Burnett & Erwig 2008). For that reason, in this research exertion, the mediating factor on programming needs a scarce skills application that would ease EAA adoption. Essentially, the purpose of the study is to determine whether EATs affect the adoption of EAA for SCM in SMEs and to identify gaps and institute state-of-the-art in research for future studies. The study also contributes to the literature regarding post-adoption innovation diffusion by demonstrating the efficacy of SMEs' training in promoting a widespread practice of EAA.

Theoretical contributions

Employees' aptitudes and trepidations

The conclusions on this learning provided livelihood that EATs be eased with proper educational training programmes

for understanding key objectives and goals set to encapsulate the SCM activities. Identifying relevant service providers in conjunction with programming would make the adoption of EAA more effective. They specialise and deliver core results, master different algorithms per product specification, minimise hidden cost on the system back up and system crash, identify errors by using codes, update the application through automation and identify new technologies. The magnified results indicated that end-users are more effective if presented with a well-atomised SCM. Prioritising modern tools for SCM in line with shipping status alarms (provide just-in-time information), order management implements (analyse order processing and process optimisation), warehousing organisational software (marginalise cost from different locations) and vendor management tools (use quantitative tools to analyse supplier transactions). The study provides authentic and bona fide knowledge in literature by discussing programming data mining collaboration.

Enterprise application architecture

The concept EAA will undoubtedly be much dissected, but there are some proximately dependable conclusions that are notable, for instance, four enterprise systems such as manufacturing and production, finance and accounting, human resources and sales and marketing. Contributions were intended at explicating the conception of EAA with proper data mining and coding and programming. In some SMEs, little is known about the adoption of EAA and how it will enhance SCM activities. Where it has revolutionised the routines is SCM in well-developed economies and created considerable benefits; minimising the level of complexity, increased efficiency in standardisation, marginalising costs and increased agility in change analysis, to name a few ... Moreover, in the small business sector, EAA education and orientation, various aspects such as application portfolio management, that marginalise costs through application rationalisation, greater agility linked with leaner portfolio and reduce IT risk (Ziehr 2022). The study has made some guiding principles in the path of enhancing EATs for easy-going towards the adoption of EAA in SMEs.

Definition of SMEs

Whilst a diversity of definitions of the word SMEs, it is suggested, in this paper, that the concept concomitant with the adoption of EAA studies demonstrating ways in the South African perspectives. The Small Business Development describes SMEs in quantitative and qualitative approaches guided by the *National Small Enterprise Act, 1996* (Act No. 102 of 1996), *National Enterprise Amendment Act, 2003* (Act No. 26 of 2003) and the *National Small Enterprises Act, 2004* (Act No. 29 of 2004) (Small Business Development 2019).

SMEs' economic contribution

Gross domestic product (GDP) contribution: Small and medium enterprises' contributions are significantly indicated

on GDP growth, which is measured through contribution towards employment, wealth formation, poverty alleviation and innovation conception. The contributions are categorised into three spheres, namely economic, industrial and firm-based benefits with limited control over the market and macro business environment (Rees & Porter 2015; Schwab 2016; Singh 2018).

Contribution towards employment: The South African economy suffers a low employment rate because of an under-skilled population despite available job vacancies (Vuba 2019). Small and medium enterprises contribute towards employment at 15.4% to the South African economy (Small Enterprise Development Agency 2019). The AA of EAA could lead to scarce skills recruitment to manage systems configurations data mining collaboration coding and programming in SCM (Ronny 2017). Small and medium enterprises play a significant role in economic stimulation through employment (Weber, Geneste & Connell 2015). In a study by Ansara, Endres and Mothibatsela (2019), it was found that approximately 98% of registered small, medium, and micro enterprises (SMMEs) contribute less than 28% towards employment with the government's aspirations to increase it to 90% in 2030.

Contribution to wealth formation: A growing turnover contributes towards increased profitability of SMEs that stimulate economic wealth (Blackburn et al. 2013). Weber et al. (2015) maintain that enterprise growth is determined by the level of growth in sales, market share, assets accumulation, profitability and the number of employees. In some instances, entrepreneurs find themselves in a detrimental position wherein they use their personal savings for the business (Sjögrén, Puumalainen & Syrjä 2011). *Poverty alleviation:* It could be regarded as an act of practising economic principles through full employment. Small and medium enterprises play a significant role in providing employment (Ardley et al. 2016). Tax compliance from SME perspective leads to a better distribution of income within the economy (Ardley et al. 2016).

Innovation conception: Innovation conception is demarcated as a modification to processes by adopting technological systems that bring a productive output (Sarri, Bakouros & Petridou 2010; Sun 2011). In a study by Blackburn et al. (2013), it was found that it is critical for SMEs to develop for successful adoption of EAA in SCM; SMEs as prospectors play an important role as major job creators, innovators and sources of growth in free market economies with long-term aspirations on modernisation of systems (Weber et al. 2015).

Limitations of the study

The discussion on the TAM revealed that the adoption of EAA for SCM in SMEs requires profound financial resources to architect expect costs and coding and programming that covers Top Coder, Coderbyte, Project Euler, HackerRank, CodeChef, Exercism.io, Codewars, LeetCode, CodinGame and Policy as Code. The questionnaire was developed in the

form of Likert Scale and thus limited the respondents an opportunity to express their in-depth experiences about the adoption of EAA. The South African SMEs are instituted with policy and regulatory measures on economic principle for full employment that narrows the use of technology as a disadvantage to SMEs. Notwithstanding these limitations, the study demonstrates that South African policies governing IT for SMEs promote a slow development in entrepreneurial skill development in the education in science, technology, engineering and mathematics.

Recommendations

It is recommended that further investigation be undertaken in two areas: (1) the knowledge base, skills and experience of software architect should be prioritised in setting-up algorithms to avoid a number of errors in implemented solutions and (2) coding and programming should be edited directly in the integrated code editors within EAA being incorporated with SCM activities.

Conclusion

A much more systematic approach would identify how EATs would be eased towards the adoption of EAA for SCM in SMEs. As a matter of fact, the level of interactions amongst all other variables, just to list a few, information system components, enterprise resources, entrepreneurial characteristics and many other outliers could have a significant influence on the adoption of EAA. A thorough coding and programming during the adoption of EAA could ease the work procedure encrypted in the SCM domain. Finally, yet importantly, EAA is easily distorted by an EAA that is not free of errors. Errors such as runtime, logic, compilation, syntax, interface and arithmetic are beyond the end-users' capability to resolve them. As such, an architect specialised would be recommended to configure automated solutions through EAA adoption for SCM within SMEs. Continuous modifications in the world of technology seem to have become the biggest encounter in the modern world, which emphasises the constant need to integrate the SMEs into its changing environment. Aiming at modifying the integration challenges, EAA is anticipated as a solution.

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Competing interests

The author makes a declaration that there are no financial or personal gains that may have improperly influenced him in

writing this article, rather for providing insight into SMEs' adoption of EAA for SCM, developing framework theory and links with appropriate methods used in research.

Author's contribution

The manuscript is written solely by Kingston Xerxes Theophilus Lamola. The author used a formal structure that included abstract, introduction, literature review, theoretical review, methodology, questionnaire development, stability and diagnostic test. Last but not least, the research findings that included Pearson correlations, ANOVA, Pearson coefficient and linear regression.

Ethical considerations

Turfloop Research Ethics Committee (TREC) registered with National Health Research Ethics Council, approved this research study. Registration Number: REC-0310111-031. Prior to the collection of primary data, participants were requested to sign a consent form for their permission, stating that their participation is voluntary, and that their feedback will be treated with confidentiality and anonymity.

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Data availability

The data that support the findings of this study are available on request from the corresponding author [K.X.T.L.]. The data are not publicly available because of restrictions on confidentiality stated in ethical considerations, as the questionnaire contains the personal information of the respondents that could compromise the privacy of research participants.

Disclaimer

K.X.T.L. accomplished this research article, in his personal capacity. The thoughts articulated in this article are the author's own and do not reflect the views of the Turfloop Research Ethics Committee (TREC) registered with the National Health Research Ethics Council and the University of Limpopo.

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Appendix start on the next page →

Appendix A: Questionnaire

TABLE 1-A1: Employees' competencies.

Sigma notations	Please tick an appropriate box (✓), from 4.1 to 4.10.	Strongly disagree (1)	Disagree (2)	Moderate (3)	Agree (4)	Strongly agree (5)
1)	Do the employee have the skills for using the internet?	(1)	(2)	(3)	(4)	(5)
2)	Do the employees have the ability for creating and formulating word documents?	(1)	(2)	(3)	(4)	(5)
3)	Do the employees have the ability to use tables and columns?	(1)	(2)	(3)	(4)	(5)
4)	Do the employee have the ability for using spreadsheets and merging documents?	(1)	(2)	(3)	(4)	(5)
5)	Do the employees have communication skills for dealing with customers?	(1)	(2)	(3)	(4)	(5)
6)	Do the employees have network channel with suppliers and customers?	(1)	(2)	(3)	(4)	(5)
7)	Does the employees control website information?	(1)	(2)	(3)	(4)	(5)
8)	Does the employees manage administration files on-line?	(1)	(2)	(3)	(4)	(5)
9)	Does the employees manage information resources?	(1)	(2)	(3)	(4)	(5)
10)	Does the employees manage resources as planned?	(1)	(2)	(3)	(4)	(5)

Appendix B: Questionnaire

TABLE 1-B1: Actual adoption of enterprise application architecture.

Sigma notations	Please tick an appropriate box (✓), from 7.1 to 7.3.	Strongly disagree (1)	Disagree (2)	Moderate (3)	Agree (4)	Strongly agree (5)
1)	Information Technology simplify my day-to-day activities.	(1)	(2)	(3)	(4)	(5)
2)	Information Technology highlight technical errors for me.	(1)	(2)	(3)	(4)	(5)
3)	It makes workflow straightforward.	(1)	(2)	(3)	(4)	(5)
4)	Information Technology improves my job satisfaction.	(1)	(2)	(3)	(4)	(5)
5)	Information Technology support all aspect of my job requirement.	(1)	(2)	(3)	(4)	(5)
6)	Information Technology allows me to accomplish more work than in manual process.	(1)	(2)	(3)	(4)	(5)