

Modelling owner's physiognomies & incitements 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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Keywords

enterprise application architecture, supply chain management, owner's physiognomies & incitements, small and medium enterprises & Security Architecture Design

Abstract

The adoption of enterprise application architecture (EAA) for supply chain management (SCM) in small and medium enterprises (SMEs) is influenced by the Owner's Physiognomies & Incitements on a routine basis. EAA is essential for optimum SCM performance since it enlightens and enhances enterprise services, software, and hardware. The purpose of this study is to examine the Owner's Physiognomies & Incitements for using EAA for SCM in SMEs in the Capricorn District Municipality. The empirical analysis is presented using data from a dissertation for a master's degree in commerce from 2018 to 2020. The study employs a quantitative approach based on a linear regression model. Cronbach's Alpha, descriptive statistics on the normality test, the Kolmogorov-Smirnov, Pearson Correlations, analysis of variance (ANOVA), Pearson's Coefficients, and linear regression are all included. Empirical investigation demonstrates that both the Owner's Physiognomies & Incitements are directly associated with EAA adoption. Overall, the model accounts for a substantial proportion of the variation in EAA adoption for SCM in SMEs. This work leads to the conclusion that there is a positive correlation between variables. The findings of this study will confirm the positive and negative impact of owner physiognomies and incitements on the adoption of EAA for SCM in SMEs. More research is required to examine the links between psychographic and behaviouristic owner incitements.

Introduction

The Owner's Physiognomies & Incitements play a significant role in the adoption of EAA for SCM within SMEs. Numerous algorithms are used for programming enterprise systems for SCM in the Fourth Industrial Revolution (4IR). According to Stok (2018), SMEs that survive are managed by entrepreneurs who are passionate about surviving difficult times, although internal and external environmental obstacles manifest with minimal economic benefits. Focusing on the Owner's Physiognomies & Incitements is an essential principle that induces perceived attitudes on three dimensions such as alternative user-base solutions, resistance to change, and technological aversion (Merritt, 2019; Law Insider, 2019). Since many researchers focus on corporate sectors, the current literature on the adoption of EAA for SCM in SMEs is severely underdeveloped (Hazen, Kung, Cegielski & Jones-Farme, 2014; Iyamu & Mphahlele, 2014; Ingram, 2018). According to Ghosh (2015) and Jenkin (2016), SMEs with self-leadership benefit from a positive creativity climate that leverages synergistic creativity and innovation to provide a long-term competitive advantage. As a result, SMEs should regard themselves as ideal EAA for SCM adopters since they operate in a challenging, diverse, and competitive world of business expertise.

SMEs in Capricorn District Municipality have numerous challenges, including a lack of financial viability, a lack of formal education, and a lack of technical skills. They are a wake-up call for SMEs to invest in technology infrastructure for effective SCM operations, such as insourcing, process outsourcing, and so on (Poba-Nzaou, Raymond & Fabi, 2014; Ticlo, 2018). By taking into account the economic nature of the environment in which SMEs operate, there is a need to consider issues that are critical for a better environment for EAA adoption. It consists of reliability, excellence, value, expertise, problem-solving skills, continuous improvement, support, a positive attitude, a global reach, and strong relationships that lead to optimum production within SMEs (Bowman, 2020). In today's competitive business world,

customer relationship management systems (CRMS) assist enterprises in growing by developing relationships with their customers through loyalty and customer remembrance developed for SCMS and long-term connections (Cognite, 2018).

Statement of the research problem

Increased demand-driven sales planning triggers mechanisms in other operations. This is an issue for a synchronised SCM in SMEs in satisfying increasingly high customer-service demands, which is a major concern among SME owners and has sparked interest among scholars. There are numerous questions with remarkable responses based on owner physiognomies that influence EAA adoption. As a result, many SME owners are ignorant of the nature and purpose of EAA. EAA's SCM quality is surrounded by many assumptions and forecasts, which contribute to a significant failure rate in SMEs due to inadequate SCM. This problem statement is supported by a large number of researchers. This could be an indicator that SMEs' unwillingness to adopt EAA is caused by inadequate owner physiognomies (Stok, 2018; Broughton, 2018; Hendricks, 2018). Valasseri (2019) echoes this viewpoint in a study that finds that only 95% of organisations experience challenges with the technology they have chosen to strengthen their business objectives.

Aim

The aim of this paper is to provide a conceptual theoretical framework based on owner physiognomies and incitements to the adoption of EAA in SMEs within Capricorn District Municipality, as well as to determine the extent to which it transpires.

Objective

The key objective is to examine whether the physiognomies of the owners influence the adoption of EAA in SMEs for SCM.

Literature Review

Much of the present literature on SCM focuses on the use of EAA in particular. This section summarises the literature review that was utilised to structure the variables for this survey that were included in the questionnaire. The adoption of EAA by SMEs is one of the worldwide problems that nations face. It has been discovered that there is a substantial relationship between owner physiognomies and the use of EAA for SCM operations such as insourcing, processing, and outsourcing (Smit, 2017; Herman & Stefanescu, 2017), which determine the greatest level of efficiency (Sebetci, 2019). According to the literature, SMEs are facing issues in the following areas: distribution network configuration, flexibility for access, number of participants, geographical allocation, suppliers' networks, production facilities, distribution centres, warehouses, customer relations, and distribution strategies (Nair, 2010; Stet, 2014).

This implies that without the adoption of EAA, neither SCM success nor production efficiency can be supplied. According to Hon and Lui (2016), SMEs' owners increasingly acknowledge the importance of integrating their psychographic and behaviouristic incitements, as well as creativity. It is thus vital for SMEs to be transformed into modern enterprises in terms of studying the environmental supply chain dynamics and comprehending how the disruption-driven ripple impact might influence the dynamics of the bullwhip effect (Dolgui, Ivanov & Rozhkv, 2019). By aligning innovation with agility, SMEs are seeing transformation in technology innovation. Furthermore, SMEs get a competitive edge in SCM by creating a statutory framework that defines all roles, responsibilities and relationships involved in programme management and information technology operations (Asetpartners, 2018). According to Chang, Lakovou and Shi (2019), a smart investment in blockchain could lower the level of uncertainty and risk associated with the use of EAA for SCM.

With the expansion of EAA, SMEs are looking for application software that will provide them with a customised and one-of-a-kind experience that will be faultless forever. Furthermore, current SMEs are the adopters looking for an EAA programme that would equip them for an effective SCM (Bawa, Buchholz, de Villiers, Corless & Kaliner, 2017). SME owners as EAA adopters: The value of EAA in SMEs is enormous, particularly in terms of smoothing application performance, high scalability and flexibility, easy integration of new features, cost savings, decreased development time, and high security (Le, 2020; Pavlenko, 2021). With the innovation-driven environment stretching far beyond traditional cyber,

regulatory, operational, and financial challenges, SMEs owners should become more technologically oriented (Briggs, Buchholz & Sharma, 2020).

One of the most interesting advances in cognitive neuroscience in recent decades, according to Spence (2020), has been the rising recognition that perception/experience is significantly more multimodal than other SMEs had realised. The implementation of EAA is dictated by dissatisfaction with the traditional approach in SCM. The major characteristics or elements that influence the adoption of EAA for SCM in SMEs are cost marginalisation through the utilisation of offshore development and total cost of ownership consideration (Schmidt, 2013). A study of perceptions of EAA adoption between EAA adopters and non-adopters indicates that perceptions of EAA aspects change with time. In this context, Gifford, Hine, Muller-Clemm and Shaw (2002) examined the relationship between the enterprise physical qualities of buildings, the perceptions of "attractive" and "pleasurable," and the subject's overall assessment, using the lens model as the framework. The results revealed that both groups based their emotional assessments on completely distinct building elements. However, SMEs are becoming more traditional in their approach to SCM, whereas SCM partners on facilities are becoming more prominent. EAA adoption: Researchers and enterprise practitioners are drawn to EAA adoption for the following reasons: simplicity, succinct but not imperceptible, standardised way of doing things, outstanding supporting tools, short feedback loops, expressiveness, and excellent third-party packages (Young, 2012). Based on cost considerations, it is believed that the adoption of EAA is an essential factor for SMEs' performance in SCM. Employee productivity exceeds the cost, business speed exceeds employee productivity, and security beats business speed (Settle, 2019). Furthermore, it has been observed that the implementation of EAA in many developed and developing economies has resulted in an increased atmosphere of customer satisfaction and has changed the way SMEs approach their internal and external activities (Ndiaye, Abdul, Ruslan & AdamNg, 2018). A well-designed enterprise architecture enables SMEs to achieve consensus among all internal and external stakeholders. This is accomplished through support planning, change facilitation, complexity management, risk reduction, and technical debt minimisation, which is the goal of every well-designed architecture (Menezes, 2020).

Physiognomies and incitements: It have been discovered that the adoption of EAA that provide the features of a well-encyclopaedic SCM in trendy, sustainable and self-regulating ways with a guaranteed by computerisation. However, Ashanti (2018) categorises twelve EAA criteria that are linked with quality work output for SCM activities in SMEs.

Application Performance Review (APR) - APR encrypted in EAA aids in SCM tasks by evaluating its performance and scalability attributes via the application's performance characteristics, which are determined by its architecture and design (Daya, 2019; Le, 2020).

Scalability Web Application (SWA) - SWA is a scalable web application encoded in a website that assists SMEs in handling any margin increase or decrease in production facilities for gradual or abrupt surge, without interfering with end-user activities and with the ability to swiftly intensify the load in SCM (Daya, 2019; Le, 2020).

Interoperability Syntactic (IS) - IS refers to a system that successfully communicates with tools that provide syntactic interoperability for formatting standards in SCM, also known as structural interoperability (Lewis, 2019).

Usability - In a study conducted by Capilla, Kazman, Romera and Carrillo (2020a), the results show that, aside from the very minor modelling and coding work, the organisation of numerous usability mechanisms appears helpful for end-users by offering compatibility of mobile systems that promote satisfaction during the engagement with the system and thus in SCM.

Reliability - SCM's reliability describes the aspect of the system responsible for the system's ability to continue operating under predetermined conditions (Tomaney, 2010). The reliability of SMEs in SCM is envisioned as a distinct field of specialisation that guarantees applications are developed to supply the essential SMEs functionality in a reliable, predictable and cost-effective manner without compromising essential features such as availability, performance and maintainability (Sha, 2020).

Availability - Availability in this context means that a highly available architecture has numerous components working together to assure uninterrupted service for a given period in SCM. Furthermore, it covers the response time to end-user queries in SCM with available systems that are connected to the

internet with high responsiveness. Also, the absence of glitches with a level of usability that does not influence SMEs operations (Jevtic, 2018).

Security Architecture Design (SAD) - SAD denotes that in modern information and communications technological systems, the level of security architecture is critical, which is controlled by architect specialists on technical elements for secure SCM (Kien, 2020). Furthermore, the robust elements of the security architecture, as well as the design of the proactive portions, rely on full and consistent design for the proactive measure that incident detection, response, and recovery will not interfere with SCM activities.

Maintainability Applications (MA) - MA suggests that EAA necessitates the upkeep and testing of standards that expedite change in order to acquire or maintain a competitive edge, making SMEs aware that a high-profile system failure could result in both lost income and failure to meet the market target in SCM (Tomany, 2020; Wayner, 2020).

Modifiability - Modification of EAA in SCM determine the system could influence a single item, which could be difficult, if not impossible, if a number of actions rely on it (Wayner, 2020). However, Mäkitalo, Taivalsaari, Kiviluoto, Mikkonen and Capilla (2020b) propose that system developers construct and reuse code modules in SCM for future changes in a systematic algorithm.

Testability - In SCM, testability for EAA denotes the level of accountability for executing tests that are measured against predetermined criteria and result in a fully functional system (Wayner, 2020).

Reusability - Reusability focuses on the possibility of using a specific component or encrypted in SCM for reuse on assets associated with EAA that scale an opportunistic design (Mäkitalo *et al.*, 2020).

Supportability - The ability of EAA and the system to give handy information for recognising and fixing problems in SCM that is carried out through enterprise operations is referred to as supportability (Settle, 2019).

Research Methodology

A quantitative survey method was developed to collect primary data in this study. A questionnaire was created and tested to ensure data accuracy and the intended results. Self-administered questionnaires were used to collect data using a Likert scale. 310 respondents were chosen using a non-probability sampling method. Questionnaire design: The questionnaire was made up of Likert scale questions, and respondents were given five options from rating scales with a range of described classifications that reflected a variety of responses. Each set of questions was created with the intention of achieving the study's research objective(s). The Likert scale worked well as a tool for framing questions, coding, and analysing data. In order for respondents to have a clear comprehension, there was no sense of ambiguity in questionnaire development.

Questionnaire development

This section of the questionnaire respondents was asked to provide information on the owners' physiognomies and incitements, as well as the actual adoption of enterprise application architecture questions. Originally, the questionnaire included eight mandatory categories, two of which were used in this publication from the Owner's Physiognomies & Incitements (table 1) as well as the actual adoption of enterprise application architecture (table 2).

Owner's physiognomies & incitements questions

The respondents were asked to express their feelings about the following aspects of owner physiognomies and incitement for adopting EAA for SCM.

Sigma Notations	Please tick an appropriate box (✓) from 1.1 to 1.6.	Strongly Disagree (1)	Disagree (2)	Moderate (3)	Agree (4)	Strongly Agree (5)
1.1)	D Demonstrate passion for being successful with the business.	(1)	(2)	(3)	(4)	(5)
1.2)	Try out new ideas in the business.	(1)	(2)	(3)	(4)	(5)
1.3)	Set goals and guidelines to achieve them.	(1)	(2)	(3)	(4)	(5)

1.4)	Demonstrate passion for hard work.	(1)	(2)	(3)	(4)	(5)
1.5)	Ignore distractions and focus on the immediate C challenges.	(1)	(2)	(3)	(4)	(5)
1.6)	Demonstrate "fight back" when problems threaten.	(1)	(2)	(3)	(4)	(5)

Table 1: Owner's physiognomies & incitements

Source: Author Conceptualisation

6.1.2) Actual adoption of enterprise application architecture questions

Once again, respondents were asked to voice their views on the following assertions regarding the actual adoption of EAA for SCM.

Sigma Notations	Please tick an appropriate box (✓), from 2.1 to 2.3	Strongly Disagree	Disagree	Moderate	Agree	Strongly Agree
		(1)	(2)	(3)	(4)	(5)
2.1)	Information Technology improves my job satisfaction.	(1)	(2)	(3)	(4)	(5)
2.2)	Information Technology supports all aspect of my job requirement.	(1)	(2)	(3)	(4)	(5)
2.3)	Information Technology allows me to accomplish more work than in manual process.	(1)	(2)	(3)	(4)	(5)
2.4)	Information Technology simplifies my day-to-day activities.	(1)	(2)	(3)	(4)	(5)
2.5)	Information Technology highlights technical errors for me.	(1)	(2)	(3)	(4)	(5)
2.6)	It makes workflow straightforward.	(1)	(2)	(3)	(4)	(5)

Table 2: actual adoption of enterprise application architecture

Source: Author Conceptualisation

Stability diagnostic tests

Normality test for variables

The evidence was tested by using the descriptive statistical technique for the Owner's Physiognomies & Incitements were arranged to contribute to further statistical examination on Linear Regression.

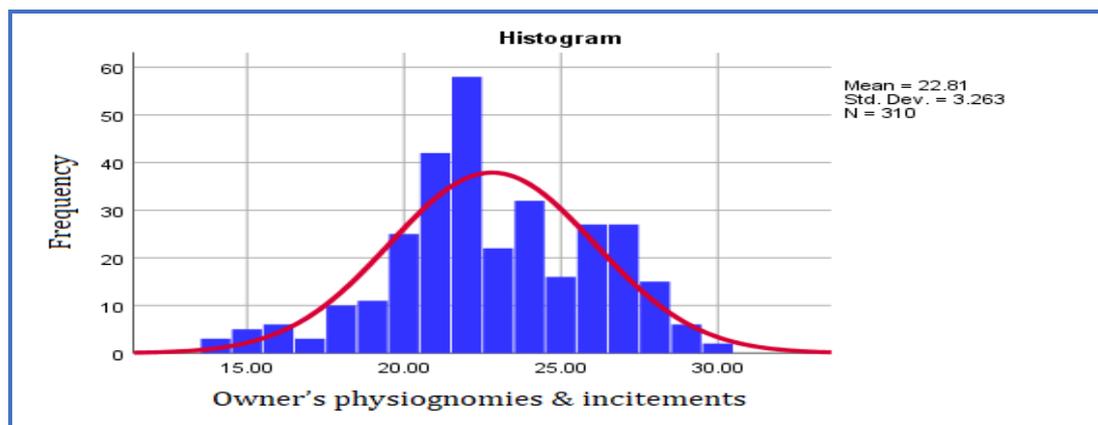


Figure 1: Normal Distribution on Owner's Physiognomies & Incitements

Source: Author Conceptualisation

Model. As indicated in Table 3 and Figure 1, Cauchy normal distribution is processed with a symmetric distribution with well-behaved tails. This is indicated by a mean (μ) @ 22.81, standard deviation (σ) @ 3.263 and the N @ 310. Owner's physiognomies & incitements produced a positive skewness at -0.196 and Kurtosis at -0.141. The standard normal distribution has a Kurtosis of zero and a negative Kurtosis indicates a "peaked" distribution and negative Kurtosis indicates a "flat" distribution.

The Kurtosis figure should be near 0, and the figure of -.141 indicates that it is a normal distribution, which is slightly peaking is slightly skewed to the left. The distribution is symmetric as the μ is 0.228 and median is 0.220 *This indicates that the model provides the greatest match for homoscedasticity.*

Kolmogorov-Smirnov test for normality of owner's physiognomies & incitements

Table 3 presents the results for the Kolmogorov-Smirnov test for normality of owner's physiognomies & incitements and the results indicate that they do follow a normal distribution, $D(310) = 0.123$ which is greater than $p = 0.05$.

Table 3: Kolmogorov-Smirnov and Shapiro-Wilk Test on owner's physiognomies & incitements

Tests of Normality									
	Kolmogorov-Smirnov ^a			Shapiro-Wilk			Median	Skewed ness	Kurtosis
	Statistic	df	Sig.	Statistic	df	Sig.			
Owner's physiognomies & Incitements	.123	310	.000	.974	310	.000	22.000	.196	-.141
a. Lilliefors Significance Correction									

Source: Author Conceptualisation

The confirmation process resulted in the conclusion that the Owner's Physiognomies & Incitements can be used for statistical examination with a Linear Regression Model for analysing the relationship between the Owner's Physiognomies & Incitements and the Actual Adoption of EAA in SMEs for SCM.

Research Findings

Pearson Correlations on owner's physiognomies & incitements and actual adoption of EAA

Table 4 demonstrates the results on correlations between owner's physiognomies & incitements and Actual Adoption of EAA. The p-value is near zero at " $<.001$ " with the required value set at 0.05. The statistical technique "ANOVA" is used to test the hypotheses between the dependent variable, namely, Actual Adoption of EAA and the independent variable, namely, owner's physiognomies & incitements indicated in Table 1.

Table 4: Pearson Correlations on owner's physiognomies & incitements and actual adoption of EAA

Pearson Correlations			
		Actual Adoption of EAA	Owner's Physiognomies & Incitements
Actual Adoption of EAA	Pearson Correlation	1	.185**
	Sig. (2-tailed)		.001
	N	310	310
Owner's Physiognomies & Incitements	Pearson Correlation	.185**	1
	Sig. (2-tailed)	.001	
	N	310	310
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: Author Conceptualisation

Pearson Correlation Coefficients is .185, thus indicating that there is a positive relationship between owner's physiognomies & incitements and Actual Adoption of EAA. The findings on association suggest that, in general, there is a positive relationship between owner's physiognomies & incitements and Actual Adoption of EAA bearing the change of the sign in mind.

ANOVA on owner's physiognomies & incitements and actual adoption of EAA

Table 5 shows the ANOVA results attained for scores on owner's physiognomies & incitements and Actual Adoption of EAA. The independent variable is regarded as owner's physiognomies & incitements and the dependent variable is regarded as Actual Adoption of EAA.

Table 5: ANOVA on owner's physiognomies & incitements and actual adoption of EAA

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	122.708	1	122.708	10.925	.001 ^b
	Residual	3459.563	308	11.232		
	Total	3582.271	309			
A a. Dependent Variable: Actual Adoption of EAA						
b. Predictors: (Constant), Owner's Physiognomies & Incitements						

Source: Author Conceptualisation

The general F-statistic is significant ($F = 10.925$, $p < .001$), thus signifying that, overall, the model accounts for a significant proportion of the variation in the adoption of EAA for SCM in SMEs. Since the exact significance level is $.001 < \alpha$ at .05 the results are statistically significant. The alternative sub- H_{a1} that; "owner's physiognomies & incitements affect the adoption of EAA for SCM in SMEs" is accepted, whilst the sub- H_{01} that; "owner's physiognomies & incitements does not affect the adoption of EAA for SCM in SMEs" is rejected.

Pearson Coefficient on Owner's Physiognomies & Incitements and Actual Adoption of AA

Table 6 presents the coefficients results for Owner's Physiognomies & Incitements and Actual Adoption of EAA. The t-test is considered for testing as both samples have similar values in the mean @ 22.81 (confirmed in figure 1: normal distribution on owner's physiognomies & incitements and table 3: Kolmogorov-Smirnov and Shapiro-Wink test on owner's physiognomies & incitements).

Table 6: Pearson coefficients on owner's physiognomies & incitements and actual adoption of EAA

Pearson Coefficients								
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	B
1	(Constant)	19.486	1.346		14.47	1		
	Owner's Physiognomies & Incitements	.193	.058	.185	3.327	.001	1.000	1.0
a. Dependent Variable: Actual Adoption of EAA								

Source: Author Conceptualisation

In conditions where the predicted \hat{Y} consists of Perceived Attitudes towards the Adoption of EAA and owner's physiognomies & incitements with the score = $19.486 + 0.193x$, then the t-test shows that the \hat{Y} constant $a = 0.193$ and the \hat{Y} constant $b = 119.486$ 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 [14.476, 3.327].

Linear Regression on owner's physiognomies & incitements and actual adoption of EAA

Figure 2 indicates the results on \hat{Y} = assembled as Actual Adoption of EAA, where; a = y-axis intercept, b = + slope and x-axis intercept as owner's physiognomies & incitements. A natural progression of this work was to analyse the relationship between owner's physiognomies & incitements and actual adoption of EAA for SCM in SMEs. The R^2 value is 0.034 of the variances is being accounted for this scatter plot from the independent variable, as owner's physiognomies & incitements. The positive linear

egression satisfies three assumptions on a model for best fit discussed in Figure 1. *The linear regression where; $\hat{y} = 19.48 + 0.19*x$.*

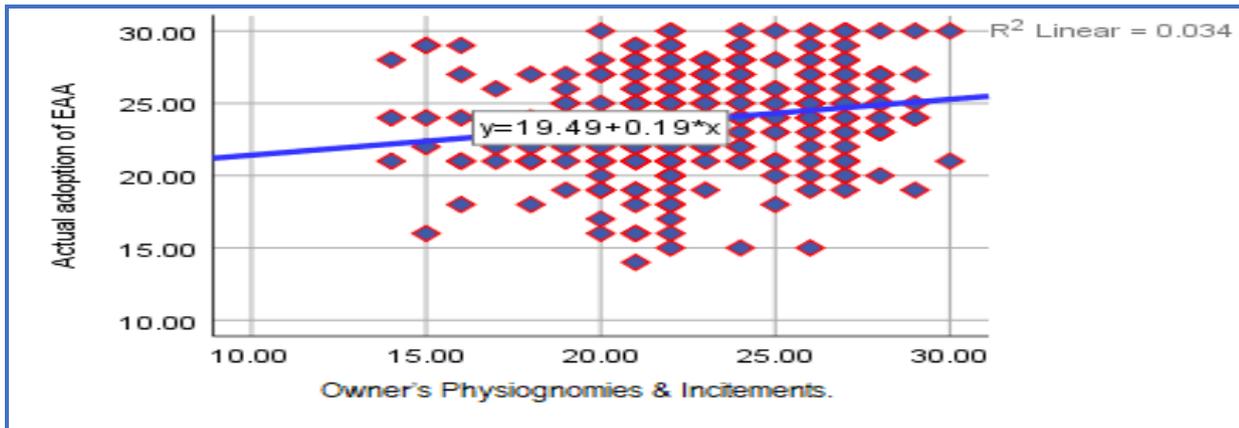


Figure 2: Linear Regression Model on owner's physiognomies & incitements and Actual Adoption of EAA

Source: Author Conceptualisation

The slope of +0.19 will bring same increase in \hat{y} . The $R^2 = 0.034$ indicates that, the level of variation in the prognostic variable could be described by variation in the independent variables. *Moreover, the R^2 is converted to r as; thus, $\sqrt{0.034} = 0.184 \approx 0.185$ which is confirmed in Table 4 for Pearson Correlation Coefficients. This validates that the model is adequate with positive slope and the model is of a positive fit between owner's physiognomies & incitements.*

Limitations

The present study has several limitations. First, IRM is known as a leading enterprise architecture value and authorised Sparx Systems Enterprise Architect license reseller in South Africa and in the international markets, unfortunately only few SMEs will benefit from preferential procurement scores from level 2 of broad-based black economic empowerment (BBBEE) status (Sparks Systems & Enterprise Architect, 2020). Secondly, it compels SMEs to determine which techniques will be applied in practice to stimulate conformance to EAA (Foorthuis, van Steenberg, Mushkudiani, Bruls, Brinkkemper & Bos, 2020). Lastly, it is conceivable that number of SMEs with ethical practices that conform with government regulations would get an access to the adoption of EAA for SCM.

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Conclusions

The findings of this investigation show that the Owner's Physiognomies & Incitements influence the adoption of EAA for SCM in SMEs in Capricorn District Municipality. Both psychographic and behaviouristic incitements have a significant impact on general perceptions and attitudes, which may stimulate the level of interest in the adoption of EAA for SCM in SMEs. Risk-averse SME owners will incur significant forfeiture in SCM unless they retract from bleeding edge and new-fangled.

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