DETERMINANTS OF BUSINESS INTELLIGENCE SYSTEM ACCEPTANCE IN AN EMERGING COUNTRY

Kgoramele Joseph Oupa Kgasago *, Osden Jokonya **

* Tshwane University of Technology, South Africa
** *Corresponding author*, University of the Western Cape, South Africa
Contact details: University of the Western Cape, Bellville 7535, South Africa

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Abstract

In today's highly competitive and cumulative uncertainty in the business domain, access to organizations' business intelligence (BI) can mean not only the difference between profit and loss but also the difference between survival and bankruptcy. The use of Business intelligence systems has become an inevitable requirement for profitability, competitiveness and organisational survival. This study objective is to determine factors that influence users' acceptance of BI systems in the South African energy sector and develop a conceptual model to explain factors that influence users' acceptance of BI systems. A survey research strategy was used for the study to empirically test a conceptualised model using collected data. The results of the study found that habit, affect and perceived consequences have a significant influence on users' acceptance of BI systems. Furthermore, the study discovered that habit influences affect in respect of users' acceptance of BI systems. The study contributed to literature and body of knowledge on factors that influence users' acceptance of BI systems in organisations.

Keywords: Business Intelligence System, Acceptance, Usage, Social Factors, Perceived Consequences, Energy Sector

1. INTRODUCTION

Modern organisations create a vast quantity of data, which has become an important competitive factor in todays' highly uncertain world of business. Transforming this data into correct, complete, relevant and useful information is important to support strategic decision making and achieve competitive advantage (Bach et al., 2016). In today's highly competitive business environment and high levels of uncertainty on the business domain, access to organizations' business intelligence (BI) can mean not only the difference between profit and loss but also the difference between survival and bankruptcy (Han & Farn, 2013). The use of business intelligence system has become important to achieve profitability, organisational survival (Bach et al., 2016) and organisations competitiveness (Han et al., 2014). According to Karim (2011), the new era of globalisation has transferred business competitive advantage to those who know how to use technology to improve business processes and increase information sharing instead of those who possess the expertise in how to implement new technologies. BI systems enhance the understanding of the business' external and internal environment and boost decision-making process by providing easy and fast access to reliable business insight (Han et al., 2014). Business intelligence system provides a treasured resource for many organisations by providing insightful and innovative information which helps organisations in putting more focus on their customers in a highly competitive environment. While BI systems' market appears to have grown, the adoption and implementation of a BI system is a financially huge and intricate undertaking that can never be underestimated (Yeoh et al., 2010). Even though business executives championed and authorised investment in BI system to support their roles; most executives are still unenthusiastic about using BI systems. Despite the accumulative interest in BI systems, there has been significant adoption of BI systems to support decision making (Popovic et al., 2016).

Although organisations continue to commit significant amount of resources to implement BI systems, users' acceptance and use of BI systems continue to be the shortcomings across organisations (Popovic et al., 2016). This raises a concern organisations fail to fully exploit the

benefits of BI systems. Organisation users' failure to accept and use BI systems can result in loss of competitive advantage in the target business market (Bach et al., 2016). The business value of a BI system can only be realised after acceptance and use by the intended organisation users (Popovic et al., 2016). Several studies have been undertaken to understand determinants for users' acceptance and use of IS systems (Venkatesh et al., 2012; Jooste et al., 2014; Mudzana & Maharaj, 2015). This study objective is to determine factors that influence users' acceptance of business intelligence systems in the South African energy sector. The primary research question of the study is "What are the factors that influence users' acceptance of Business Intelligence Systems in the South African energy sector?" The following secondary questions assisted answering the main research question: "What are social factors that influence users' acceptance of BI System in the South African energy sector? What are organisational factors that influence users' acceptance of BI System in the South Africa energy sector? What is the influence of habit and affect on users' acceptance of BI System in the South African energy sector?"

This paper is organised as follows: Section 2 reviews the literature on BI systems, the previous studies on BI systems acceptance as well as relevant theories and the conceptual models. Section 3 covers the research methodology used for the study. Section 4 presents the results of the study. Section 5 discusses the results and conclusion.

2. LITERATURE REVIEW

Business intelligence system is defined as a set of technologies, processes, programmed products with methodologies deployed to accumulate, integrate, analyse data from different sources, and provide relevant on-time, reliable information to enable accurate business decisions making process (Han & Farn, 2013; Popovic et al., 2016). According to Jooste et al. (2014), BI system is a tool that collects, integrate and analyse structured and unstructured data from different source by taking advantage of the modern technologies to present meaningful business insight that enables good decision making (Jooste et al., 2014).

But while the first definition emphasizes the notion of easy decision making, the second one accentuates on the aspect of taking better decisions. The point is business intelligence system supports decision making and that clarifies why the term "Decision Support" is often used in business intelligence literature. BI system is, therefore, understood to be a decision support system that has two perspectives in its definition and this can be a bit confusing. Firstly, from technology perspective in which it is defined as a system that collects, store, analyse and transform data from different sources into information, secondly from a business perspective it is defined as a system that provides relevant on-time, reliable information to enable accurate decisions making process (Han & Farn, 2013; Popovic et al., 2016).

2.1. The business value of BI system

Users' acceptance of information systems is increasingly gaining much interest in IS research since researchers investigating theories and models that could help to predict and explain the behaviour across different domains (Chen, 2012; Dawson & Belle, 2013). Successful investment in technology is expected to yield positive results such as market competitiveness, enhanced productivity, profitability and revenue growth, and cost reduction which will all imply good returns on investors. Grandhi and Chugh (2013) assert that the use of the BI system can help organisations to enhance their profitability by gaining market competitive advantage through consolidation and management of organisational corporate performance. BI system provides business value by consolidating data from different sources to improve the decision-making process (Daryaei et al., 2013; Hartley & Seymour, 2015). Anjariny et al. (2012) further affirms that BI systems allow management to do proper capacity management against forecasted demand as well as asset management and resource planning. The BI system's ability and flexibility in executing several functions such as data mining, monitoring business activities, performance management, and budgeting make it inevitable solution to invest on (Han & Farn, 2013).

2.2. Information system acceptance

There is often confusion between what is technology acceptance and adoption whereas there is clear distinction between the two concepts (Muriithi & Kotze, 2013). Technology adoption is a process that begins with user's awareness of the technology, followed by acquisition, or implementation and finally ending with the embracing and full use of technology by the user. But acceptance is defined as an attitude towards technology, and it is influenced by various factors (Chen, 2012). Additionally, a broader and good understanding of determinants for BI System's acceptance can ensure effective and successful future implementations of BI System. Muriithi and Kotze (2013) claim that, despite the anticipated potential business benefits associated with BI systems, the acceptance and use of BI System within enterprises still remains low.

The adoption or implementation of a business intelligence system in an organisation is one thing; however, accomplishing its acceptance and utilisation by its potential users is another aspect. According to (Oliveira & Matins, 2011), the adoption of a new information system is perceived as technological innovation and so will be the case with the acceptance and use of the BI system. Grublješič & Jaklič (2014) highlighted that organisational factors, such as organisational social influence, facilitating conditions and focus on customers' needs can boost BI System use. Daryaei et al. (2013) noted that perceived usefulness, social influence, and task fit have a positive influence on the users' acceptance of BI systems. Chen (2012) added that perceived usefulness of BI system strongly influences the behavioural intention to use the system. He claims that the perceived ease of use of information system is not a significant predictor of perceived usefulness.

Bischoff's et al. (2014) study on the factors that influence the continuous use of BI systems found that system's characteristics, its development as well as peer influence, organizational, and governance-related factors have an effect on the users' continuous use of BI systems. Oei (2014) suggests that the acceptance and use of business intelligence

system across different operational areas of an organisation dependent on appreciation of contextual requirements that form minimal context of acceptance. Grublješič & Jaklič (2014) note that organisational focuses on customers, influences on management to support users' acceptance of BI system, which in turn as indirect or direct support, leads to more embedded and extended use of BI System. He revealed determinants which are used in studies to explain users' acceptance of IT comprise determinants relating to technological, social, macro environmental, individual, and organisational characteristics. According to Antoniou & Papoglou's (2015) study, users' acceptance and continued utilisation of the BI system is positively influenced by training. The next section discusses a theoretical framework used for the study.

2.3. Theoretical framework

Triandis (1980) proposed a theoretical framework of interrelated hypotheses around the constructs of attitude and behaviour and placed them in the broadest context. Triandis's (1980) Theory of Interpersonal Behaviour (TIB) has a broader scope in the sense that, it also considers facilitating conditions, habit, intention, and cultural, social, attitudes, biological and moral factors which are not comprehensively covered by most theories (Moody & Siponene, 2013). According to Triandis (1980), behaviour is influenced by relevant arousal, intentions, facilitating conditions and habit. Behavioural Intention which refers to the individual's inspiration in respect of the performance of a given behaviour. Triandis (1980) defines habit as "instructions that people give to themselves to behave in certain ways". Intentions are influenced by social factors, affect, and behaviour's consequences.

Social factors are reliant on of the social situations, on the individual's opinion of the subjective culture variables. Affects relates to the individual's feelings of pleasure, displeasure, joy, delight, disgust or hate towards a given behaviour. Positive feeling will enhance the probability for a given behaviour; meanwhile, negative feelings will reduce them. Affect is influenced by the person's habits and by a person's perceptions of subjective culture variables. Facilitating conditions refers to impartial factors that can make understanding of a given behaviour easy to perform. Triandis (1980) point out that, it may happen that an individual desire to do something but become unable to do it because the environment inhibits the act to be undertaken.

Habit is situation-behaviour sequences that are automatic, so that they occur without self-instruction. Habit relates to an individual's experience and the ability to perform a given act or task. Traindis (1980) asserts that, for much behaviour, habit is more important than intentions. Consequences factor is regarded as a function of the perceived consequence of an act or behaviour and the value of each consequence. Usefulness which refers to that, the performance of a given behaviour will result in the probability of specific consequences. Consequences are influenced by an individual's perception of subjective culture variables as they do to social factors and affect variables. The model further highlights that consequences influences behaviour although they are also influenced by behaviour. In addition to influencing behaviour, through intentions, consequences are influenced by it. The model states that the Relevant Arousal directly influences behaviour and that the relevant arousal is influenced by both social situation and biological factors, that is, the behaviour setting

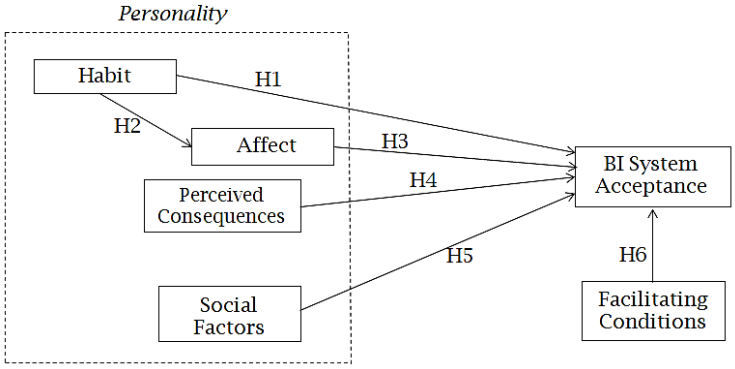
2.4. Conceptual model

The study adopted a subset of Traindis (1980)' TIB framework to determine factors that influence users' acceptance of BI System in the South African energy sector. Behavioural intentions were excluded in this model because the study was interested in the acceptance of the BI Systems. The study objective focussed on a subset of the model that encompasses variables which are relevant to help determine factors that influence business intelligence system's acceptance and utilisation. Figure 1 shows the conceptual model adopted for the study. Some variables such as biological and intentions were not included in the conceptual model because they were not relevant to explain the acceptance of the BI system. The conceptual model suggests that the acceptance of BI systems as a dependent variable is positively influenced by facilitating conditions, habit, perceive consequences, social factors, and affect. Also, the habit has a positive influence on affect to influence the acceptance of BI systems' acceptance.

According to Triandis (1980) habits are situation behaviour sequences that are or have become automatic, such that they occur without self-instruction and that; they are closely related to an individual's past ability and experience to perform a given act. Triandis's (1980) framework and other previous studies (Venkatesh et al., 2012; Kim et al., 2005) emphasizes that habit is a strong and a major predictor of behaviour and that, habits manifests the like or dislike (Affect) which explains behaviour while habits themselves directly explain behaviour. Previous literature support that information systems users' habit is a determinant of users' attitudes toward information systems in terms of comprehension and participation (Venkatesh et al., 2012).

According to Triandis's (1980) theory, behaviour intention is influenced by social factors, which depend on messages received from others and specific interpersonal agreements that the individual has made with others, in a social situation. Subjective culture which consists of norms, roles and values forms part of the social factors which influence users' intention to acceptance of information systems. Subjective norms are defined as the degree to which a person has faith in that the people who are important to him think he should conduct himself in a certain way (Fishbein & Ajzen, 1975). Previous study by Daryaei et al. (2013) showed that the influences of superiors, peers and subordinates in a workplace are strong determinants of subjective norms in the technology domain.

Figure 1. Proposed research model for acceptance of business intelligence system



The organisational processes through which the systems are developed, rolled out and managed create a condition in which the system will be used (Yeoh & Koronios, 2010). The study looked at what are the facilitating conditions that influence the use of business intelligence system. Based on Triandis framework, behaviour consists of durations, frequency and/or intensity of reaction by a creature to provocations and finally, the acceptance of BIS as dependent variable was conceptualised as the users' internalisation of the use of BI system. Bergeron et al. (1995) have previously assumed the measurement of this construct with two variables. Firstly the frequency at which users uses the systems and secondly the internalisation of the system by determining the users' probabilities and values associated with the use of the system. According to Bergeron et al. (1995), the intensity of behaviour, i.e. the extent to which behaviour is "internalised" by the actor; is one of the fundamental aspects of behaviour which can be measured.

Grublješič & Jaklič (2014) further affirms that this dimension of the intensity of use most commonly employed in the literature to measure the acceptance of IS. According to the Grublješič & Jaklič, this element of acceptance has most often been conceptualised as the duration and the frequency, based on the duration of their usage via system logs or users' self-assessment of the amount of time that they spent on the system. Consequences variable refers to the perceived consequences on the performance of behaviour and the value or the outcome of each consequence. Perceived consequence is consistent with what Venkatesh's et al. (2003) UTAUT model defines as performance expectancy and effort expectancy. Performance expectancy is what Davis's (1989) TAM names perceived usefulness, which refers to the extent to which a user believes that using a particular technology will provide benefits to or enhance their job performance. TAM's perceived ease of use construct asserts that the degree to which the user expects the system usage to be free of effort correlates to behavioural intention (Jokonya, 2015).
The following hypotheses were therefore tested by the study:

1. Habit has direct positive influence on users' acceptance of BI system.
2. Habit has a direct positive influence on the affect in respect of users' acceptance of BI system.
3. Affect has a direct positive influence on users' acceptance of BI system.
4. Perceived consequences have a direct positive influence on users' acceptance of BI system.
5. Social Factors have direct positive influence on users' acceptance of BI system.
6. Facilitating conditions have a direct positive influence on users' acceptance of BI system.

The conceptual model was adapted because it is an inclusive framework that encompasses a number of variables that can help to gain a deeper understanding of users' behaviour. The selected variables are appropriate to explain users' interpersonal traits that influence BIS users' acceptance from individual users' perspective. This model includes cognitive factors (perceived consequences and affect), social factors (social situations, normative and role beliefs) as well as organisational factors (facilitating conditions) which have been often used to explain the users' acceptance of IS (Davis, 1989; Venkatesh et al., 2012; Grublješič & Jaklič, 2015). The next section discusses the research methodology for the study and rationale behind the selection.

3. RESEARCH METHODOLOGY

The literature review was used to identify BI system determinant acceptance factors from previous studies. Based on the literature review, constructs identified for the conceptual model and an instrument in a form of close-ended questionnaire was developed. The developed instrument was used to collect the primary data from the pre-identified and sampled participants. Quantitative methods were used to analyse the collected data.

3.1. Research philosophy

The study adopted a positivist philosophical paradigm that provides a deep insight into "the complex world or lived experiences from the point of view of those who live it, objectively" (Guba & Lincoln, 1994). Given the nature of the question, the adopted a positivist paradigm to determine factors that influence the BI system users' acceptance using collected empirical data (Chilisa & Kawulich, 2012). The research question and objective influenced the philosophical paradigm of the study. In addition, the quantitative approach was found suitable for the study.

3.2. Research strategy

There are different kinds of research strategies (case study analysis, interview, observation, experiments; survey) which could be applied in a research study (Bell, 2005). The study used survey research strategy to study research phenomenon. A SurveyMonkey questionnaire was used to collect primary data from respondents. A questionnaire was distributed to sample of participants which were selected from South African energy organisations.

3.3. Sampling

The study applied purposive sampling method and selected participants based on their roles and responsibilities in their job functions in terms of decision making or the relevance of BI systems to their function. A sample size of 288 individuals occupying different roles from different companies in the energy industry were asked to participate in this study by answering a questionnaire. The sample size was taken from South African energy companies in Western Cape, KZN and Gauteng. A size of the sample that was taken for this study and to whom the questionnaire was distributed, was of 286 individuals. Out of the 286 questionnaires that were distributed, a total of 113 respondents participated in the survey. The response rate was therefore 40 percent. However; only 90 of the returned questionnaires were usable. The other 23 were incomplete and could not be used for analysis.

3.4. Data collection

A questionnaire was adapted from an instrument used by (Bergeron, 1995) in a study about the Determinants of Executive Information Systems and an instrument used by Nkuna's (2011) in a study for Business Intelligence usage determinants. The constructs were measured by applying a five point Likert scale instead of the original seven points Likert scale used by Nkuna (2011) and the different scales used by Bergeron (1995). Because the level of all the participants' literacy could not be established prior to the data collection, the Likert scale was adjusted to minimize and reduce the level of confusion. Each measurement item bared a 5-Point Likert-type instead of 7-Point Likert type in the following manner: SA = Strongly Agree, A = agree, N = Neutral (Neither disagree nor agree), D = Disagree and SD = strongly disagree.

3.6. Data analysis

The data gathered is this study was also coded and thereafter separated into constituent parts as per the instrument used. This study used R Statistical Software to analyse the data collected in order to draw patterns and inferences. Confirmatory Factor Analysis (CFA) technique was used to analyse the captured data and the developed model was validated by Structural Equation Modeling (SEM). The statistical results from the analysis were presented in different forms.

3.7. Reliability

For each composite research variable, the reliability or internal consistency was assessed by calculating the Cronbach alpha coefficient. Cronbach's alpha is a reliability testing technique that is mostly used to measure reliability. Cronbach's alpha is the average value of the reliability coefficients one would obtained for all possible combinations of items when split into two half-tests (Gliem & Gliem, 2003). Cronbach's alpha reliability tested for the internal consistency of the items in the Likert scale and obtained Cronbach's alpha of 0.95, which indicates a high level of internal consistency.

The individual alpha scores for each of the constructs are shown in Table 1 and all of them are acceptable as they are close to 1. The next section presents the research results from the analysed collected data of the study.

Table 1. Cronbach's alpha reliability of the constructs

Construct	*Measuring items*	*Cronbach alpha*
Habit of using BIS	7	0.89
Effect on use of BIS	5	0.88
Perceived consequences of using BIS	15	0.91
Social factors	27	0.91
Facilitating conditions on use of BIS	5	0.81
Overall	*59*	*0.95*

4. RESEARCH RESULTS

This section presents the results of the study from the analysed collected data. The analysis of the data was carried out using a statistical package. The rest of this section is structured as follows: The first sub-section presents the respondents' demographics characteristics, and the second sub-section presents the descriptive statistics from the study results. The constructs' correlations results and regression results are presented in sub-sections three and four respectively. Lastly, sub-section five presents the discussion and conclusion of the study.

4.1. Demographic characteristics

This section presents the demographic characteristics of the respondents from the study. The demographic characteristics include the gender, age, educational background, experience and years of service in the organisation.

The demographic characteristics presented in this sub-section for the 90 completed and usable responses from the distributed questionnaire. Table 2 shows that 24 percent of the respondents were males and 58 present were females and 18 percent did not state their gender category.

Table 2. Respondents' gender

Gender	*Percentage*
Female	58
Male	24
Undisclosed	18
Total	*100*

The ages of respondents ranged from 26 years to over 55 years and only 30 percent were between 26 and 35 years, 45 percent were between 36 and 45 years, 22 percent were between 46 and 55 years while only 4 percent were above 55 years. There were proportionally more females' respondents in the 26 to 35 years age group that is 41 percent

compared to 25 percent as well as in the 36-45 age groups 59 percent compared to 42 percent and less female proportion of respondents above the median age. No female respondents were above 55 years.

Table 3. Respondents' age categories

Age	*Percentage*
26-35 years	30
36-45 years	44
46-55 years	22
Above 55 years	4
Total	*100*

The respondents' educational qualifications ranged from Matric to a Master's degree. According to Table 4, the largest percentage of the managers (36%) had a Master's degree, followed by 21 percent with honours degree while another 21 percent had either a bachelor's degree or a diploma. There were no females with only a national certificate as their highest educational qualification while 2 percent of the males were only National certificate holders. There was more male diploma holders (24.9%) compared to female diploma holders (4.5%). However, there were proportionally more females with a bachelor degree (27%) than males (17%) and more females with honours degree 36 percent compared to 17 percent for male managers. At Master degree level, there were proportionally more males compared to females.

Table 4. Respondents' educational qualifications

Education Level	*Percentage*
National Certificate	1
Diploma	21
Bachelor's Degree	21
Honours Degree	21
Master's Degree	36
Total	*100*

Table 5 shows the respondents' experience in the use of computers and business intelligence systems as well as their experience in information systems and the number of years spent in their roles. According to Table 5 over 80% of the respondents have more than 13 years using information systems while less than 20% have less than three years of using information systems.

Table 5. Respondents' experience in information systems

IS Experience	*Percentage*
Less than 13 Years	20
13 years and above	80
Total	*100*

All the respondents both male and female indicated that they use computers several times every day (Table 6). There was no variation by any demographic characterises. However, in terms of the period, the respondents have been using computers there were some variations. Most of the managers (53 percent) have been using computers for the past 20 years while a very small fraction 6 percent had only been using computers in the past 5-9 years. There were also statistically significant differences between female and male manager with most female managers having fewer years of computer usage compared to the male managers. Most of the female managers had 10-14 years of computer use while most of the male managers had over 20 years of computer use.

Table 6. Respondents' period of using computers

Use of computers	*Percentage*
9 years and below	6
10-14 years	16
15-19 years	25
Above 19 years	53
Total	*100*

Even though all the managers use computers every day in the workplace, according to Table 7 some of them 10 percent rated their computer literacy as novice frequent user while 72 percent rated themselves as expert frequent users and 18 percent as casual knowledgeable users. Among the male mangers, 75 percent rated their computer skills as expert frequent user compare to 59 percent of the female managers. The next sub-section presents the descriptive statistics from the study results.

Table 7. Ability to use computers

Ability to use computers	*Percentage*
Novice user	10
Casual user	18
Expert user	72
Total	*100*

4.2. Descriptive statistics

Descriptive statistics analysis was undertaken to understand the results from the collected empirical data of the study. Table 8 presents a summary of all the conceptual model constructs indicating their standard deviation and the mean. The mean is used to determine the average score that is representing the central value of the collected data based on the Likert Scale. The standard deviation was also used to measure the variability. The standard deviation (SD) is used to provide a measurement for the variability or dispersion of the responses. It provides an indication of how the individuals' responses are varying or deviating from the mean.

The descriptive statistics on Table 8 shows that the mean for each construct ranged from 3.55 to 4.13 with perceived consequences having the highest rated with 0.49 standard deviations. There was a proportional increase in standard deviation where rating was lower. The least rated construct was habit and had the highest deviations from mean as compared to all other constructs.

Table 8. Summary of descriptive statistics

Construct	*Mean*	*Std. Deviation*
Perceived Consequences	4.1263	0.49399
Social Working Relations	3.9072	0.60599
Normative Believe	3.8474	0.50988
Social Role Believe	3.8331	0.54196
Social Norms	3.7787	0.55417
Affect	3.7448	0.69663
Facilitating conditions	3.5876	0.77604
Habit	3.5540	0.82171

4.3. Correlation results

Correlation analysis was conducted to measure the association of constructs. The relationship between the predictor variables and a predicted variable was measured by Pearson's correlation coefficient. The correlation result was computed for all measurement items, and comparisons between related items indicated statistically significant values at 0.05 level.

Table 9 shows the correlation results of the conceptual model constructs. The next sub-section presents the regression analysis results.

Table 9. Correlation results

		Habit	*Affect*	*Perceived Consequences*	*Social Factors*	*Facilitating Conditions*	*BIS Acceptance*
Habit	Pearson Correlation	1					
	Sig. (2-tailed)						
Affect	Pearson Correlation	.866**	1				
	Sig. (2-tailed)	.000					
Perceived consequences	Pearson Correlation	.750**	.649**	1			
	Sig. (2-tailed)	.000	.000				
Social Factors	Pearson Correlation	.529**	.458**	.624**	1		
	Sig. (2-tailed)	.000	.000	000			
Facilitating Conditions	Pearson Correlation	.507**	.439**	.414**	.543**	1	
	Sig. (2-tailed)	.000	000	000	.000		
BIS Acceptance	Pearson Correlation	.929*	.564**	.456**	.320**	.341*	1
	Sig. (2-tailed)	.000	.000	.000	.007	.020	

*Notes: **. Correlation is significant at the 0.01 level (2-tailed)*
**. Correlation is significant at the 0.05 level (2-tailed)*

4.4. Regression results

Table 10 presents results from the statistical package for the standardised significance levels obtained from the model's regression analysis. Representation of the acronyms on the table below is that AF stands for Affect, H stands for Habit, BIA stands for Business Intelligence Acceptance, PC stands for Perceived Consequences, SF stands for Social Factors and FC stands for Facilitating Conditions.

Table 10. Regression Weight Results

Hypothesis	*Estimate*	*std.Err*	*z-value*	*p(>|z|)*	*Comments*
AF~H	0.806	0.06	13.342	0.000	Rejected Null Hypotheses
BIA~ H	2.083	0.438	4.751	0.000	Rejected Null Hypotheses
BIA~ AF	-0.957	0.394	-2.431	0.015	Rejected Null Hypotheses
BIA~ PC	-0.59	0.189	-3.119	0.002	Rejected Null Hypotheses
BIA~ SF	-0.023	0.138	-0.166	0.868	Accepted Null Hypotheses
BIA~ FC	-0.154	0.12	-1.28	0.201	Accepted Null Hypotheses

The hypotheses testing and confirmation results are presented in Table 10. These results indicate that some of the hypotheses could not reject a null hypothesis besides for the influence of habit, affect, perceived consequences on BIS and the influence of habit on affect. The results indicate that there is a significant relationship between habit and affect in relation to the acceptance of business intelligence. Furthermore, a direct causal relationship regarding the influence of facilitating conditions to the acceptance and use of BIS could not be confirmed (Table 10). A positive influence of social factors on the acceptance and the use of the BI system were not confirmed. The results show that some hypotheses were rejected whereas others were supported (Table 10). From the accepted hypotheses, the new model helps to clarify the factors that influence users' acceptance of BI system in the South African energy sector. The next section discusses the results in relation to the literature findings followed by the conclusion of the study.

5. DISCUSSION AND CONCLUSION

The objective of the study was to determine factors that influence the acceptance of BI System in the South African energy sector. Six hypotheses were established to confirm the importance of each construct to BI system acceptance. Structural equation modelling was used to establish the explanatory power of each category. The study results confirmed the hypothesized impact of habit, affect and perceived consequences on users' acceptance of the BI system. The study results supported the fact that there is a significant causal relationship between BI system acceptance and habit hence a null hypothesis was rejected. Han et al. (2014) maintain that habit has a direct effect on BI System usage and that is the main driver of continued usage of the BI system. The results are supported by other studies which have found that habit directly affect IT usage (Kim et al., 2005).

The study results show that users' acceptance of BI system is influence by habit. Secondly, the study has found that there is a significant relationship between habit and affect in respect of users' acceptance of BI Systems. The implication of this is that, formations of a habitual use of business intelligence system will results into manifestation of like or dislike or joy or delightfulness of using such a system. Affect is influenced by a person's habits and a person's perceptions of subjective culture variables. This implies that users' habitual use of business intelligence system could manifest a like or dislike attitude on users' acceptance of business intelligence system.

The study further found that affect has a positive influence on users' acceptance of business intelligence system. By implications, these results have concurred with a theory that asserts that a dislike or like feeling, that is potentially manifested by habitual use of a business intelligence system as well as subjective culture has positive influence on the acceptance and the use of the system. This is supported by Triandis (1980)'s theory that postulates that affect has influence on users' acceptance of information systems. The results suggest that amongst others, the users' acceptance of BI system is also certainly influenced by the fact that users have a dislike or like feeling in the use of the BI system. In addition, the study found that there is a causal relationship between the perceived consequences and users' acceptance of the BI system. The study results suggest that users' acceptance of BI system is influenced by perceived consequences (Davis, 1989). This is supported by previous studies on information systems and business intelligence systems (Chen, 2012; Daryaei, 2013).

The study found that there was no causal relationship between social factors and users' acceptance of the BI system. This was contrary to previous studies that discovered that social factors have influence on users' acceptance of business intelligence system (Daryaei, 2013; Grublješič & Jaklič, 2015). The previous studies suggested that users' acceptance of BI system was a result of the fact that users are expected by their managers, peers, subordinates or the clients' expectation. The study results were in contradiction with previous studies. In addition, the study found no relationship between users' acceptance of the BI system and facilitating conditions. The implications of this are that the conditions such as involvement of the users in the design of the system, the training provided during implementation, the support provided by the IT team, the systems' relentless availability do not have a significant influence on users' acceptance of BI system. This was in contradiction to previous that showed that facilitate conditions plays a major role to influence use of information system (Grublješič & Jaklič, 2015).

The study results highlighted that habit, affect and perceived consequences have positive and significant influence on the users' acceptance of the BI system. Furthermore, the study revealed that habit has a positive and significant influence on the acceptance of BI system. It is therefore understood to be of utmost importance for BI systems designers, technology implementers and IT Managers to be conscious of the greater importance of the individual users' affect, perceived usefulness and ease of use to BI system as well as users' habits about the use of the BI system. To a certain degree, the study results are in supported by previous studies. The difference in results from previous similar studies may be based on industries and other factors.

In conclusion, the study achieved its objective to determine the factors that influence users' acceptance of BI System users' acceptance in the South African energy sector. The study established that users' acceptance behaviour of BI system as measured by the frequency of use, is determined in order of importance by habit, affect and perceived consequences. Although this study does have some limitations to be recognised, it has however provided results which contributed to understanding of users' acceptance factors for the BI system. The study results contribute to our knowledge on factors that influence BI system acceptance which is important to both academic and practitioner world of practice. The results are useful for BI systems implementation practitioners to maximise the potential benefits of users' acceptance of BI System.

REFERENCES

1. Anjariny, A. H., Zeki, A. M., & Hussin, H. (2012). Assessing organizations readiness toward business intelligence systems: A proposed hypothesized model. Paper presented at the *International Conference on Advanced Computer Science Applications and Technologies (ACSAT),* Kuala Lumpur.
2. Antoniou, G., & Papoglou, N. (2015). *Business Intelligence & Analytics (BI&A) systems/ Measuring End-User Computing Satisfaction (EUCS)* (Master thesis 15 HEC, course INFM10 in information systems, Lund University School of Economics and Management). Retrieved from the World Wide Web: http://lup.lub.lu.se/student-papers/record/7365779
3. Bach, M. P., Čeljo, A., & Zoroja, J. (2016). Technology acceptance model for business intelligence systems: Preliminary research. *Procedia Computer Science, 100,* 995-1001. https://doi.org/10.1016/j.procs.2016.09.270
4. Bell, J. (2005). *Doing your Research Project: A guide for first-time researchers in education, health and social science* (4th ed.). Berkshire, UK: Open University Press.
5. Bergeron, F., Raymond, L., Rivard, S. & Gara, M.-F. (1995). Determinants of EIS use: Testing a behavioral model. *Decision Support Systems, 14(2),* 131-146. https://doi.org/10.1016/0167-9236(94)00007-F
6. Bischoff, S., Aier, S., & Winter, R. (2014). An exploration of factors influencing the continuous use of business intelligence systems. *Multikonferenz Wirtschaftsinformatik, 15,* 221-235. Retrieved from the World Wide Web:
7. Chen, M. (2012). *Applying business intelligence in higher education sector: Conceptual model and users acceptance* (Master of science, University Of Bedfordshire).
8. Chilisa, B., & Kawulich, B. (2012). Selecting a research approach: Paradigm, methodology and methods. In C. Wagner, B. Kawulich, & M. Garner (Eds.), *Doing social research: A global context.* Berkshire: McGraw Hill Education.
9. Daryaei, M., Shirzad, M., & Kumar, V. (2013). Adoption of business intelligence in hotel industry. Paper presented at the *4th International Conference on Computing, Communications and Networking Technologies, (ICCCNT 2013),* Tiruchengode, India.

10. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13(3),* 319-340. https://doi.org/10.2307/249008
11. Davis, F. D. (1993). User acceptance of information technology: System characteristics, user perception and behavioral impacts. *International Journal of Man-Machine Studies, 38(3),* 475-487. https://doi.org/10.1006/imms.1993.1022
12. Dawson, L., & Belle, J.-P. V. (2013). Critical success factors for business intelligence in the South African financial services sector. *South African Journal of Information Management, 15(1),* 483-495. https://doi.org/10.4102/sajim.v15i1.545
13. Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research.* Reading, MA: Addison-Wesley.
14. Gliem, J. A., & Gliem, R. R. (2003). Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. Paper presented at the *Midwest Research to Practice Conference* in Adult, Continuing, and Community Education, the Ohio State University, Columbus.
15. Grandhi, S., & Chugh, R. (2013). The value of business intelligence tools: Aligning business intelligence governance with corporate governance. Paper presented at the *International Conference on E-Technologies and Business on the Web,* Bangkok, Thailand.
16. Grublješič, T., Coelho, P. S., & Jaklič, J. (2014). The importance and impact of determinants influencing business systems embeddedness. *Issues in Information Systems, 15(1),* 106-117.
17. Grublješič, T., & Jaklič, J. (2015). Business intelligence acceptance: The prominence of organisational factors. *Information Systems Management, 32(4),* 299-315. https://doi.org/10.1080/10580530.2015.1080000
18. Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin, & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105-117). Thousand Oaks, CA: Sage Publications.
19. Han, Y. M., & Farn, C. K. (2013). A study on the effects of empowerment and habit on continuance usage of pervasive business intelligence systems. Paper presented at the *46th Hawaii International Conference on System Sciences,* Wailea, HI, USA IEEE Computer Society. https://doi.org/10.1109/HICSS.2013.62
20. Han, Y.-M., Shen, C.-S., & Farn, C.-K. (2014). Determinants of continued usage of pervasive business intelligence systems. *Information Development, 32(3),* 424-439. http://doi.org/10.1177/0266666914554811
21. Hartley, M. K., & Seymour, L. F. (2015). Key success factors for implementing business intelligence in South African public sector organisations. Paper presented at the *9th International Development Informatics Association conference (IDIA),* Nungwi, Zanzibar. Retrieved from the World Wide Web: http://www.developmentinformatics.org/conferences/2015/papers/17-Hartley-Seymour.pdf
22. Jokonya, O. (2015) Validating Technology Acceptance Model (TAM) during IT adoption in organizations. Paper presented at the *7th IEEE Conference Cloud Computing Technology and Science (CloudCom),* Vancouver, Canada. http://doi.org/10.1109/CloudCom.2015.56
23. Jooste, C., van Biljon, J. A., & Mentz, J. (2013). Usability evaluation guidelines for business intelligence applications: A user support perspective. *South African Computer Journal, 53,* 32-44. http://dx.doi.org/10.18489/sacj.v53i0.198
24. Karim, A. J. (2011). The value of Competitive Business Intelligence System (CBIS) to stimulate competitiveness in global market. *International Journal of Business and Social Science, 2(19),* 196-203. Retrieved from the World Wide Web: http://ijbssnet.com/journals/Vol_2_No_19_Special_Issue_October_2011/24.pdf
25. Kim, S. S., Malhotra, N. K., & Narasimhan, S. (2005). Two competing perspectives on automatic use: A theoretical and empirical comparison. *Information Systems, 16(4),* 418-432. https://doi.org/10.1287/isre.1050.0070
26. Moody, G. D., & Siponene, M. T. (2013). Using the theory of interpersonal behaviour to explain non-work-related personal use of the Internet at work. *Information & Management, 50,* 322-335. http://doi.org/10.1016/j.im.2013.04.005
27. Mudzana, T., & Maharaj, M. (2015). Measuring the success of business-intelligence systems in South Africa: An empirical investigation applying the DeLone and McLean Model. *South African Journal of Information Management, 17(1),* 1-7. https://doi.org/10.4102/sajim.v17i1.646
28. Nkuna, D. (2011). *Business intelligence usage determinants* (Master's degree in Commerce (Information Systems), University of Witwatersrand).
29. Oei, M. H. H. (2014). *Acceptance of operational business intelligence in organisation* (Master of Science Thesis, Delft University of Technology).
30. Oliveira, T. & Martins, M. F. (2011). Literature Review of information technology adoption models at firm level. *The Electronic Journal Information Systems Evaluation, 14(1),* 110-121.
31. Popovic, A. &Yeoh, W. (2016). Extending the understanding of critical success factors for implementing business intelligence systems. *Journal of the Association for Information Science and Technology, 67(1),* 134-147. https://doi.org/10.1002/asi.23366
32. Rouhani, S., Asgari, S., & Mirhosseini, S. V. (2012). Review study: Business intelligence concepts and approaches. *American Journal of Scientific Research, 50,* 62-75.
33. Triandis, H. C. (1980). *Values, attitudes, and interpersonal behaviour.* In M. M. Page, & H. E. Howe (Eds.), *Nebraska Symposium on motivation, 1979: Beliefs, attitudes and values.* Nebraska, USA: University of Nebraska Press.
34. Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly, 36(1),* 157-178. https://doi.org/10.2307/41410412
35. Yeoh, W., & Koronios, A. (2010). Critical success factors for business intelligence systems. *Computer Information Systems, 50(3),* 23-32. https://doi.org/10.1080/08874417.2010.11645404