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A MODEL FOR THE BUSINESS INTELLIGENCE SYSTEM ACCEPTANCE IN THE SOUTH AFRICAN BANKING SECTOR

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ABSTRACT

Due to the rapid growth of new technologies, there is a substantial growth in the Business Intelligence (BI) market caused by the competitive forces making the organizations to adopt their offerings to the needs of the customer. Consequently, the adoption of Business Intelligence system has led to important technological and organizational innovations in modern organizations by promoting knowledge diffusion, and cornerstone of business decision making processes. There are few articles in this research area and this article is intended to fill this gap. Thus, the focus of this research is the development of a model for the BI system acceptance within the banking sector. using the Cronbach Alpha and they were found to be good. BI Systems Acceptance has the highest Cronbach Alpha. The reliability of the constructs was measured value of 0.865. Moreover, the convergent validity of the constructs is satisfied and also the discriminant validity is confirmed for all the constructs. The following variables determine the behavioral intention towards BI system: performance expectancy, effort expectancy, social influence, facilitating conditions and hedonic motivation with effort expectancy being the variable with the highest contribution ($\beta = 0.256$). Multiple regression analysis was used to determine the variables contributing to the behavioral intention towards BI systems. Discriminant and construct validity were confirmed for all the variables and the data is free from multicollinearity ($1.000 < VIF < 2.859$) where VIF is the variance inflation factor. The behavioral intension towards BI was found to influence positively the BI systems acceptance.

Keywords: *Business Intelligence, Decision-making, Unified Theory of Acceptance and Use of Technology (UTAUT), Banking Sector, Regression Analysis.*

1. INTRODUCTION

The concept of business intelligence (BI) came into light during the 1950s and it grew out from a technology known as decision support and decision support is still used by many companies to come up with decisions that would help them to gain competitive advantage amongst their competitors [1]. It was Howard Dresner, an analyst of Gartner consulting company who first came up with the definition of business intelligence as "the scientific management of enterprise information" [2].The goal of business intelligence is making better decision faster and easier. Business intelligence offers an increasing impact on business performance and decision making within organizations [3]. The development of the Internet has created new technologies, such as artificial intelligence, data mining and so on and in the face of the changing market, both large enterprises and small companies must make timely and efficient responses however, these responses must be based on comprehensive, accurate and timely information [4].

Business intelligence (BI) is regarded as a system or technology-driven process that collates data across different sources and transforms that data in order for end users to come up with informed decisions [5]. Business intelligence (BI) systems is referred to as complex technological solutions that can gather information from various data stores that are linked to business intelligence systems thus, allowing users

to access, analyze and present information for better decision making [6].

The introduction of business intelligence in the banking sector is the solution to getting the core business activities effective and efficient [7]**.** Business intelligence in the banking industry has evolved from manual systems to computer-based system implementation and now into management information system (MIS). Business Intelligence concepts like data mining and decision support systems are used in many banking domains such as credit evaluation, online banking and customer retention [8]. According to Acheampong & Moyaid [9], enabling collective access to data as well as allowing intended business users the advantage of performing their tasks are some of the goals of BI system.

BI is used by most organizations to support making better decisions with context so as to acquire better understanding and the management of organizational business processes. According to Aziz [10], the tools of business intelligence are query, report, on-line analytical processing (OLAP) and early warning. BI tools such as data mining and on-line analytical processing (OLAP) have been used to make real time decision that can be recognized around business conditions and day to day business operations [11]. Thus, BI systems cause organizations to gain competitive advantage and to promote strategic achievements.

This study is significantly important and relevant to the banking industry because, the banking industry is slowly moving away from traditional banking of face-to-face contact, and they are using digital systems. Technology changes have brought customer demands and the banking industry needs to be able to forecast future possibilities in order for them to offer products according to the customer's needs. Thus, the acceptance of BI systems might improve the operations and effective functioning of the banking business. Therefore, it is important to develop a model for the acceptance of BI systems in the banking sector since the banks use BI to predict customer's future needs and how they can respond to them and offer better customer experience.

Organizations have invested a lot in business intelligence (BI) in order to achieve market gains [12]. Although, there is an increase in BI investment and its importance, not every organization is successful in implementing and developing BI capabilities [13]. BI encompasses a number of areas and technologies that comes in to one common goal to assist business to gain access to data by facilitating knowledge supporting better decision management [8].

Some authors have used the Unified Theory of Acceptance and Use of Technology (UTAUT) model to study business intelligence systems in organizations ([14]; [15]; [16]). However, according to the literature no author has developed a model for the acceptance of BI systems within the banking sector. Moreover, empirical studies on business intelligence is scarce ([17]; [18]). Consequently, the researchers want to fill this gap by empirically developing a model for the acceptance of BI systems in the banking sector by using the Unified Theory of Acceptance and Use of Technology (UTAUT). This study aims to develop a model for the acceptance of BI systems in the South African banking sector using the UTAUT-2 framework. The main focus of the study is the development of a model for the acceptance of business intelligence in the South African banking sector. However, for BI to achieve its full potential, the process though which organizations acquires the worth of BI needs to be recognized by authors and specialists [19].

The rest of the paper is organized as follows: Section 2 is the literature review. Section 3 describes the conceptual framework. Section 4 indicates the methods and results. Section5 concludes the study while section 6 describes the limitations and future work directions.

2.0 LITERATURE REVIEW

2.1 Definitions of Business Intelligence from Various Authors

Table 1 below details the different definitions of business intelligence by various authors.

Table 1: Definitions of Business Intelligence by various Authors

Definition	Author(s)
"A decision-making process supported by the integration and analysis of an organization's data resources".	[20]
"An information system supporting the decision-making process by facilitating systematic integration and management of unstructured data, providing end users with increased processing capabilities to discover new knowledge and offering analysis solutions and forecasting".	[21]
"An umbrella term including the applications, infrastructure and tools, and	[22]

advanced practices that commissions access to and analysis of information to advance and optimize decisions and performance".	
"A system that is inclusive of tools and organizational elements that presents information to intended users".	[19]
"Complex technological solutions with the ability gather information from various data stores connected to BI systems enabling users to access, analyze and to present information to enable better decision making".	[6]; [12]
"An eco-system comprising of databases, architecture, business applications, and methodologies facilitating timely decision making for managers through analysis of available data".	[23]
"A wider classification practices and technologies for collecting, giving access to, and data analysis to assist organizations in making better decisions".	[24]

The above definitions of BI share the basic aspects of BI, which first is the data processing and analysis aspect of BI and secondly, the ability to assist organizations in decision making. Based on the above definitions of business intelligence, we hereby define business intelligence as an information system that aids the decision-making process of an organization by using tools and organizational elements to discover new knowledge and offer analysis solutions and forecasting.

2.2 Impact of Business Intelligence in Organizations

Business intelligence and analytics is used for decision making and is therefore considered the basis for innovation and agility in many organizations [25]. The amount of data is growing enormously across the globe, and this data comes in different formats – which can be structured, semi-structured or unstructured data and has the potential to be mined and become functional information [26]. Organizations require that their employees have the potential to uncover and make use of data to form trends, develop meaningful insights and provide recommendations that can be actioned in order to improve the business [27].

According to Gartner [22], business intelligence is a collective that includes applications, tools and infrastructure, and best practices that enables access to and analysis of information to advance and optimize decisions. Balachandran and Prasad [28] also define business intelligence as a collection of technologies, applications, and practices for the collection, integration, analysis and presentation of business information to support improved and faster business decision-making. Based on these definitions, business intelligence is made up of analytical tools and methods that can be applied to any organizational context for assembling and analyzing its information to give support for decision-making processes.

Business intelligence assists those entrusted with making decisions to make timely and right decisions and by using BI solutions. The decision-makers can improve decisions quality and eventually they can be well organized in fulfilling their organizational business objectives, while contributing to their organizational competitive advantage [29]. Moreover, he pointed out that there are three levels of decision making in an organization:

(a) Strategic level – It requires general information with a wider scope, interactive in real time, intern and external ad-hoc based information to make unstructured decisions. Senior management is involved at this level.

(b) Tactical level – During which semi-structured decisions are made by middle management, and they require focused, specific, and internal information that are interactive in real time.

(c) Operational level – operational management or individual employees and team make structured decisions and it requires specified, real-time, and detailed information.

2.3 Applications of Business Intelligence Systems in the Banking Sector

A growing number of financial institutions are discovering that nowadays advanced analytics and data intelligence potential can lead them to a deeper insight into their client's behavior and expectations [30]. Moreover, customers are becoming knowledgeable and technology savvy, showing increased affection for digital technology and particularly the management of financial transactions online. The main theme among the different definitions of BI is that it embodies tools that gives assistance to decision making. According to Nava [31], by making use of business intelligence, marketers can examine customer relationship management data based on several criteria to reveal the most profitable customer profile. Furthermore, the customer base can be analyzed to recognize and create new cross-sell and sell-up opportunities by

knowing who of their customers to make a marketing pitch to.

Business intelligence solutions for the banking sector can be utilized to examine operational processes to assist in decreasing ongoing costs strengthens existing resources and expertise. A study by [32] focus on two hierarchical levels at which BI can be applied in organization, first at the operational level where BI is of service to workers by monitoring processes and this can be achieved with the assistance from performance indicators and secondly at the strategic level where management monitor, manage, and analyze organizational performance in accordance with strategic objectives like new market development or modifications to business models.

In the digital age, business intelligence is of transformation in organizations is of importance to remain competitive across the growing business trend [33]. Furthermore, customer churn prediction is an out most important process in decision making, which selects the churn users and takes appropriate steps for customer retention. The banking sector is furnished with profitability information, and they can initiate ways of interacting with money lost to customers that are more cost effective [34]. Furthermore, the ability to trace customer habits, their preferences and behaviors gives banks the ability to shape their products and services to meet the needs of their customers, solve problems and advance customer retention and loyalty.

2.4 Benefits of Business Intelligence

Business intelligence systems include tools and techniques that gives historical information to intended users for querying, analysis and reporting that support decision making for intensifying the effectiveness of business processes [35]. Business intelligence systems have the capacity to improve the internationalization process of organizations to by sorting, summarizing, filtering and data integration from multiple channels [36], including host markets, competitors, and government organizations [37]. Business intelligence tool is readily available to allow the collection of storage and processing of information [38]. The major role of BI tools in the effective management of information is the help from management to improve access to information that is accurate when needed [39].

According to Zamba et al. [73], the benefits of business intelligence are as follows: (a) The business reports are readily available to employees for decision making. (b) There is an improved sharing of inter-departmental knowledge (c) The organization realizes improved financial viability since the cost ownership is easier to manage and (d) The value of the business is better understood and the capabilities thereof and thus what can be improved or expanded.

2.5 Significance of the research

While the literature has attempted to improve the understanding of the determinants influencing the BI systems acceptance in the banking industry, there is limited research, to our knowledge, to understand the determinants influencing BI system acceptance in the banking sector. Our study attempts to address this gap by developing a model to understand the determinants influencing BI systems acceptance in the banking sector. Consequently, we ask the research question “What are the determinants influencing BI system acceptance in the banking sector?”

This study is significant since the study investigated the determinants that influence BI system acceptance in the banking sector. The regression results found that the following variables: performance expectancy, effort expectancy, social influence, facilitating conditions and hedonic motivation positively influence the behavioral intension towards BI. Moreover, the study found that the behavioral intension towards BI positively influences the BI systems acceptance

2.6 Studies on Business Intelligence

Nithya and Kiruthika study the impact of BI on the performance of an organization [76]. They created a conceptual framework from the literature to measure the impact of BI adoption on bank performance in order to enhance existing views on BI adoption.

Moreover, Hatta et al. [78] investigated the BI system adoption theories in order to understand the determinants of BI system adoption. They studied the BI system adoption by previous researchers before them and proposed a BI system adoption model for small medium enterprises (SMEs) in Malaysia. They stated that the two prominent models used to study BI system adoption are diffusion of innovation (DOI) theory and the technology, organization and environment (TOE) frameworks.

Bhatiasevi and Naglis [79] investigated the adoption and usage of BI among SMEs in the

context of developing countries. They integrated two models namely the TOE and the balance score card to better understand the degree of influence that each factor has on the adoption of BI as well as organizational performance among SMEs in Thailand. They used the SEM model for data analysis. They found that the following factors compatibility, technology readiness, top management support and competitive pressure posited a positive relationship towards BI adoption. Additionally, the adoption of BI had a positive effect on internal process and learning and growth in terms of organizational performance.

3.0 THE CONCEPTUAL FRAMEWORK

The conceptual framework was developed from UTAUT2. Figure 1 shows the conceptual framework for the study.

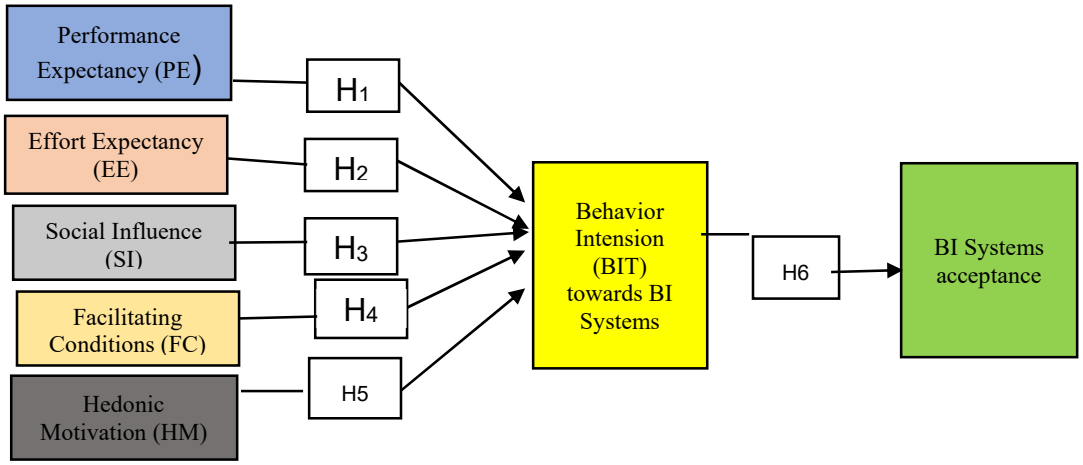

Figure 1. The proposed Conceptual Framework (Adapted from Venkatesh et al., [40])

The variables in the conceptual framework are explained below:

3.1 Performance Expectancy

Performance expectancy is defined as the extent to which individuals or end users perceives the engagement with technology or accepting business intelligence will enhance their job performance [40]. They refer to performance expectancy as one of the most vital constructs in the UTAUT model, asserting that it influences the behavioral intention to use technology. Furthermore, Zhou et al., [41] provide evidence that performance expectancy is one of the key factors that influences the adoption and use of a system or technology by its intended users. The expected performance of a given technology, drives the user's intention to engage with the technology [42].

For this research, other benefits of performance expectancy can be characterized as the system's ability to enhance employee's job performance by applying less effort, increased quality of work, enhanced decision making based on facts, support of critical tasks and more. Thus, we conclude that:

Hypothesis ($\mathbf{H_1}$): Performance expectancy positively influences the behavioral intension towards BI systems.

3.2 Effort Expectancy

Effort expectancy refers to the extent of ease associated with the use of technology [40]. The setting of business intelligence systems requires a certain level of skills and knowledge; therefore, effort expectance might play a crucial role in determining the individual's intention to adopt such technologies. Davis [43], concludes that an easy-to-use application is easier to be accepted by its people. For the purpose of this study, effort expectancy represents the degree of organizations' (banks) perceptions of the ease or difficulty of using business

intelligence systems. Furthermore, the employee's perception that the use of business intelligence system is free of effort may leads to their positive intention to use business intelligence systems. Thus, we conclude that:

Hypothesis (H_2): Effort expectancy positively influences the behavioral intension towards BI Systems.

3.3 Social Influence

Social Influence refers to the extent to which a user perceives the importance others (peers, colleagues and friends) or people holding significant positions believe that technology use is important [40]. In the context of business intelligence, social influences are focused on impacting a role of social setting (opinion leaders, colleagues, family and friends) on the individual's intention to use the technology ([44]; [45]; [41]).
Al-Shafi et al., [46] highlight that employees are socially influenced by their peer's belief about e-government services, therefore influencing their behavioral intentions to use e-government services. This was confirmed by Fidani and Idrizi [47], that there is a significant relationship between social influence and behavioral intentions to accept technology.
For the purpose of this study, employee's intention towards business intelligence systems usage may be influenced by important other's beliefs about business intelligence systems. Thus, it is hypothesized that:

Hypothesis (H_3): Social influence positively influences the behavioral intension towards BI Systems.

3.4 Facilitating Conditions

Facilitating conditions refer to the extent to which the users trust that the technology, infrastructure, and organizational conditions supports the use of technology [40]. Individual users usually require guidance when working with a new information system, especially one that uses innovative technology [15]. Facilitating conditions can be adequate or in adequate in situations where adequate resources are available, the reasons to engage in behavior are limited and therefore the chances for individuals to form positive attitudes is increased. While in the case where facilitating conditions are inadequate, individuals are likely to display negative attitude towards the situation [15].

For the purpose of this study, facilitating conditions may be measured by the perception of individuals within the organizations of whether access to required resources is available and the necessary support in terms of infrastructure and technologies to use business intelligence systems. Thus, we conclude that:

Hypothesis (H_4): Facilitating conditions positively influences the behavioral intension towards BI systems.

3.5 Hedonic Motivation

Hedonic motivation is defined as the pleasure or fulfilment attained from the use of technology. The contentment can be in a form of fun or pleasure and contributes positively in the determination of acceptance of technology [48]. Therefore, hedonic motivation can also be used to envisage consumer's behavioral intensions to use technology. Customers who perceive using the technology that includes element of fun, playfulness and enjoyment would be more willing to spend much needed time in using this technology [49].
In information systems research, hedonic motivation has been conceptualized as perceived enjoyment and has been reported to have a direct effect on technology use ([50]; [51]). Hedonic motivation has been found to be a key predictor of behavioral intention to use technology [48]. If hedonic motivation of using BI systems increases or its high, the inclusive benefits perceived by using this technology will increase, and in turn, that will contribute to the performance expectancy or the price value of using business intelligence systems.
Bank employees derive fun and pleasure from using BI systems, which influences their intentions to use BI systems. Thus, we conclude that:

Hypothesis (H_5): Hedonic motivation positively influences the behavioral intension towards BI systems.

3.6 Behavioral Intension

Behavioral intension is a person's intention to utilize a specific technology to do various tasks [52]. Behavioural intension plays a huge role in the shaping the actual use and adoption of new technology ([40] ; [53]). Furthermore, a person's commitment to be involved in a specific behaviour can be mediated by behavioural intension. Previous studies have indicated that the intention to use based on behaviour has a noticeable impact on the usage of

the actual technology ([54]; [55]; [56]). Behavioural intention impacts significantly to shaping the usage and acceptance a new technology ([40]; [53]). In line with previous research, for this study we expect a positive relationship between behavioural intention to use and actual use in the context of BI system usage. Thus, we conclude that:

Hypothesis (H_6): Behavioral intension towards BI systems positively influences BI systems acceptance.

4.0 METHODS AND RESULTS

4.1 Respondent's Demographics

Table 2 illustrates the demographics of the respondents that were involved in the data acquisition.

Table 2. The Demographics of the Respondents

Company/Bank		
FNB	216	98.2%
ABSA		
Standard Bank	2	0.9%
Nedbank		
Capitec	2	0.9%
African Bank		
Respondent Post Level (IT Specialist)		
Developer/IT Administrator	48	21.8%
Analyst	78	35.5%
IT Manager	10	4.5%
Programme Manager	6	2.7%
Other		
Respondent Post Level (Non IT Staff)		
Executive Manager	14	6.4%
Senior Manager	14	6.4%
Manager	6	2.7%
Human Resources	4	1.8%
Other		
Gender		
Male	112	50.9%
Female	98	44.5%
Prefer Not to Disclose	10	4.5%
Race		
African	114	51.8%
Indian	32	14.5%
Coloured	24	10.9%
White	50	22.7%
Age		
< 25 years	42	19.1%
26 – 35 years	62	28.2%
36 – 45 years	68	30.9%
46 – 55 years	42	19.1%
55 + years	6	2.7%
Number of Years in Company		
2 years or Less	40	18.2%
3 – 5 years	96	43.6%
6 – 10 years	48	21.8%
Over 10 years	36	16.4%

Two hundred and twenty (220) respondents completed the questionnaire accurately in this study. Most of the respondents were working at First National Bank (FNB) (98.2%), while the least number of respondents were from Standard bank and Capitec (9%). None of the respondents came from ABSA, Nedbank and African banks. Most of the respondents were data analysts (35.5%) while the least number of respondents were from Human Resources (1.8%).

African people were in the majority of the respondents that participated in the study (51.8%)

and they were mostly males (50.9%) and relatively young people between the ages of 36 to 45 years (30.9%). Most of the respondents had worked for their organizations for three to five years (43.6%).

4.2 Reliability Analysis

The reliability of the constructs was measured by using the Cronbach Alpha Value (σ) of each construct and the results are depicted in Table 3. The construct with the highest Cronbach Alpha value is BI Systems Acceptance and it is 0.865 while the construct with the lowest Cronbach Alpha value is Hedonic Motivation with the value 0.626. Thus, the Cronbach Alpha values for all variables were between 0.626 and 0.865. The acceptable threshold of the Cronbach Alpha value is 0.6 ([57]; [58]; [59]). Consequently, the Cronbach Alpha values of the variables meet the acceptable threshold. The Cronbach Alpha value of Performance Expectancy is O.819 and this is beyond 0.8, thus indicating good reliability.

Table 3 The Reliability of the Constructs

Construct	Represented By	Cronbach Alpha Value (σ)
Performance Expectancy	B	0.819
Effort Expectancy	C	0.781
Social Influence	D	0.682
Facilitating Conditions	E	0.686
Hedonic Motivation	F	0.626
Behavioral Intensions towards BI	G	0.815
BI Systems Acceptance	H	0.865

4.3 Composite Reliability and Convergent Validity Analysis

The assessment of goodness-of-fit indications were proposed by Gefen et al. [71]. These assessment standards are: (a) The composite reliability (CR) of all factors should be greater than 0.7 and (b) the factor loadings of the factors are significant. Also, (c) Average variance extracted (AVE) is higher than 0.5. Fornell and Larker [60] add another criterion that if AVE is less than 0.5, but composite reliability (CR) is higher than 0.6, then convergent validity of the factors is satisfied [61].

From Table 4, most of the factors have their CR greater than 0.7, with the exception of social influence and hedonic motivation, however, their AVEs are less than 0.5 and CR higher than 0.6, thus, convergent validity of the factors is satisfied.

Moreover, the composite reliability of all the variables is over 0.6 and they range from 0.655 to 0.844. The maximum shared variance (MSV) was also computed and the MSV is the square of the highest correlation coefficient. The results confirmed that the items are reliable, and the constructs have convergent validity.

Table 4. Estimation of LF, AVE and MSV

Constructs/Items	LF	AVE	CR	MSV
Performance Expectancy (B)		**0.483**	**0.788**	**0.373**
B1	0.708			
B2	0.655			
B3	0.704			
B4	0.710			
Effort Expectancy		**0.437**	**0.755**	**0.570**
C1	0.614			
C2	0.604			
C3	0.700			
C4	0.718			
Social Influence		**0.329**	**0.655**	**0.281**
D1	0.429			
D2	0.514			
D3	0.688			
D4	0.628			
Facilitating Conditions		0.454	0.766	0.570
E1	0.577			
E2	0.635			
E3	0.790			
E4	0.674			
Hedonic Motivation		**0.348**	**0.677**	**0.245**
F1	0.477			
F2	0.556			
F3	0.640			
F4	0.667			
Behavioural Intensions towards BI		**0.377**	**0.706**	**0.410**
G1	0.561			
G2	0.576			
G3	0.629			
G4	0.681			
BI Systems Acceptance		**0.575**	**0.844**	**0.410**
H1	0.708			
H2	0.789			
H3	0.793			
H4	0.740			

Construct Validity, Multicollinearity and Discriminant Validity Test

Discriminant validity is said to be satisfied according to Gaski and Nevin [61] if these two conditions are met: (a) The correlation coefficient between the two determinants is less than 1 and (b) the correlation coefficient of the two determinants is less than the individual Cronbach Alpha value (σ) and also (c) that the correlation coefficient of the two determinants is less than the average variance (AV) [60].

Table 5 illustrates the average variance (AV), the Cronbach Alpha value (σ) and variance inflation factor (VIF).

Table 5. Estimation of Cronbach's alpha, VIF and AV (Discriminant Validity Test)

	TransB	TransC	TransD	TransE	TransF	TransG	AV	σ	VIF
TransB	**0.484**						0.694	0.819	1.549
TransC	0.366	**0.399**					0.661	0.781	2.380
TransD	0.555	0.755	**0.458**				0.574	0.682	1.455
TransE	0.427	0.357	0.487	**0.484**			0.673	0.686	2.859
TransF	0.553	0.631	0.530	0.662	**0.495**		0.590	0.626	1.533
TransG	0.619	0.423	0.460	0.622	0.408	**0.640**	0.614	0.815	1.000

From Table 5, The correlation coefficient between the two determinants is less than 1, also, the correlation coefficient of the two determinants is less than the individual Cronbach Alpha value (σ). Therefore, discriminant validity is confirmed for the constructs.

Multicollinearity defect results when the inner meanings of the variables become very close to each other. Thus, the variance inflation factor (VIF) must be estimated. According to Ringle et al. [62], the maximum acceptable value of VIF is 5, however Hair et al. [63] put the maximum value of VIF to be 10. The values of VIF ranges from 1.000 to 2.859, thus, confirming that the data is free from multicollinearity defect.

4.4 Multiple Linear Regression

Table 6 indicates the summary of the first regression model. The R square value is 0.573, that is, the following factors: performance expectancy, effort expectancy, social influence, facilitating conditions and hedonic motivation collectively predict 57.3% for the behavioral intension towards BI.

Table 6. Summary of the First Regression Model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Sig. F Change
1	0.757	0.573	0.563	0.306	0.573	0.000

The P-value (or the calculated probability) is used to estimate the probability of the event occurring by chance provided that the null hypothesis is true [64] and it is a numerical value between 0 and 1.

In the first regression table (Table 7), the P values of the factors are as follows: performance expectancy is 0.001, effort expectancy is 0.000, social influence is 0.000, facilitating conditions is 0.005 and hedonic motivation is 0.027.

This implies that all the P values are less than the maximum threshold of 0.05 and thus all the factors meaningfully contribute to the prediction of behavioral intension towards BI. Effort expectancy with the Beta value of 25.6% is the factor contributing to the highest prediction of behavioral intension towards BI from the standardized coefficients.

Table 7. Contribution of Individual Constructs (First Regression Table)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.613	0.252		2.432	0.016
	Performance Expectancy (B)	0.168	0.051	0.184	3.308	0.001
	Effort Expectancy (C)	0.208	0.056	0.256	3.710	0.000
	Social Influence (D)	0.209	0.056	0.203	3.761	0.000
	Facilitating Conditions (E)	0.183	0.064	0.215	2.847	0.005
	Hedonic Motivation (F)	0.137	0.062	0.123	2.222	0.027

In Table 8, the R square value of the second regression model is 0.409 and this means that the factor behavioral intension towards BI predicts 40.9% of BI systems acceptance.

Table 8. Summary of the Second Regression Model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Sig. F Change
1	0.640	0.409	0.407	0.578	0.409	0.000

In the second regression table (Table 9), the P-value of the variable is as follows: behavioral intension towards BI is 0.000, thus behavioral intension towards BI meaningful contribute to the prediction of BI systems acceptance. From the standardized coefficients, behavioral intension towards BI contributes 64% (from the beta value) towards BI systems acceptance.

Table 9. Contribution of Individual Constructs (Second Regression Table)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.739	0.383		-1.928	0.055
	Behavioural Intensions towards BI (G)	1.037	0.084	0.640	12.288	0.000

Hypothesis Evaluation

Table 10 illustrates the hypothesis testing from the two regression models. Anaesth [64] states that: if P value < 0.01, then the result is highly significant, and the null hypothesis should be rejected. Also, If P value > 0.01 and P value < 0.05, then the result is significant, and the null hypothesis should be rejected. If P value > 0.05, then the result is not significant and the null hypothesis should not be rejected. In Table 10, all the six hypotheses are supported since their P values are less than 0.05.

Table 10. Hypothesis Testing Outline

Hypothesis Symbols	Hypothesis	Beta (β)	P – Values	Is P < 0.05 ?	Remarks
H_1	PE → BI	0.184	0.001	YES	Supported
H_2	EE → BI	0.256	0.000	YES	Supported
H_3	SI → BI	0.203	0.000	YES	Supported
H_4	FC → BI	0.215	0.005	YES	Supported
H_5	HM → BI	0.123	0.027	YES	Supported
H_6	BI → BISA	0.640	0.000	YES	Supported

The Resulting Model

The final model is shown in figure 2 based on the six hypotheses.

H_1: Performance expectancy positively influences the behavioral intension towards BI.

The first hypothesis (H_1) of the research predicted a positive relationship between the performance expectancy and behavioral intension towards BI in financial institutions. It is significant (β = 0.184, P-value < 0.05) with a P-value of 0.001 which is less than the threshold of 0.05 and is therefore supported.

H_2: Effort expectancy positively influences the behavioral intension towards BI.

The second hypothesis (H_2) of the research predicted a positive relationship between the effort expectancy and behavioral intension towards BI in financial institutions. It is significant (β = 0.256, P-value < 0.05) with a P-value of 0.000 which is less than the threshold of 0.05 and is therefore supported.

H_3: Social influence positively influences the behavioral intension towards BI.

The third hypothesis (H_3) of the research predicted a positive relationship between the social influence and behavioral intension towards BI in financial institutions. It is significant (β = 0.203, P-value < 0.05) with a P-value of 0.000 which is less than the threshold of 0.05 and is therefore supported.

H_4: Facilitating conditions positively influence the behavioral intension towards BI.

The fourth hypothesis (H_4) of the research predicted a positive relationship between the facilitating conditions and behavioral intension towards BI in financial institutions. It is significant (β = 0.215, P-value < 0.05) with a P-value of 0.005 which is less than the threshold of 0.05 and is therefore supported.

H_5: Hedonic motivation positively influences the behavioral intension towards BI.

The fifth hypothesis (H_5) of the research predicted a positive relationship between the hedonic motivation and behavioral intension towards BI in financial

institutions. It is significant (β = 0.123, P-value < 0.05) with a P-value of 0.027 which is less than the threshold of 0.05 and is therefore supported.

H_6: Behavioral intension towards BI positively influences the BI systems acceptance.

The sixth hypothesis (H_6) of the research predicted a positive relationship between behavioral intension towards BI and the BI system acceptance in financial institutions. It is significant (β = 0.640, P-value < 0.05) with a P-value of 0.000 which is less than the threshold of 0.05 and is therefore supported

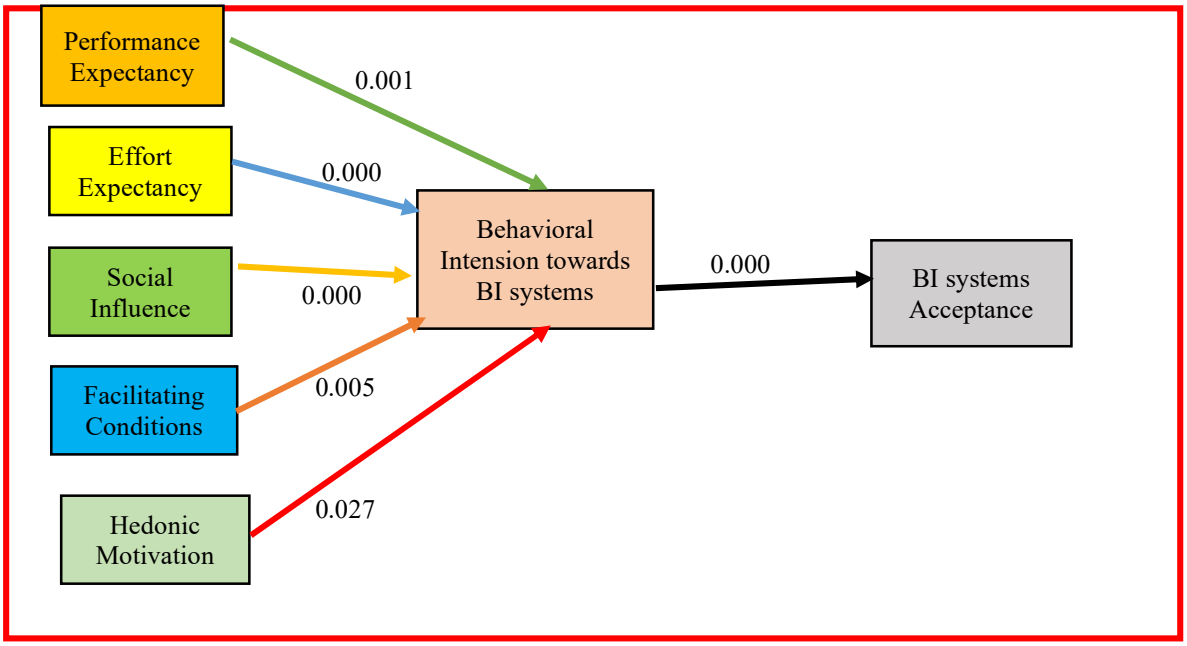

Figure 2. The Final Model

Related Work

Odeh [72] investigates the factors affecting the adoption of financial information systems based on the UTAUT model. His findings revealed that performance expectancy, effort expectance, social influence and facilitating conditions effect significantly on the adoption of financial information systems by small and medium-sized organization.

In another dimension, Zheng and Khalid [74] developed a conceptual framework for the adoption of enterprise resource planning and business

intelligence systems in small and medium enterprises by using the Technology-Organizational-Environment (TOE) model. Their technological factors include Artificial intelligence tools, Perceived usefulness, Compatibility, Big data analysis and cloud computing facility. Their organizational factors include Top management support, Training, Communication and relative advantage. Their environmental factors include: Competitive pressure, Firm size and Pandemic recovery plan.

Indriasari et al. [75] investigated the adoption of cloud BI in Indonesia's financial services sector by using a combination of the Diffusion of Innovation (DOI) framework and TOE framework. Their TOE factors include Technology readiness, Top management support, Competitive pressure and regulatory support. Their DOI factors include Relative advantage, complexity and compatibility. They also added two more factors that is security concerns and cost savings. - They found that cost savings have a positive and significant effect on the relative advantage. Relative advantages have a positive and significant effect on the cloud BI adoption. Security concerns have not significant effect on relative advantage. Complexity has no significant effect on cloud BI. Moreover, compatibility, firm size, technology readiness, competitive pressure, top management support, and regulatory support are not statistically significant.

Saeed et al. [77] also provide an in-depth analysis toward understanding the critical factors which affect the decision to adopt BI in the context of banking and financial industry. They used the TOE model as the conceptual framework to decide the adoption of BI by an organization. They used the structural equation modelling (SEM) for data analysis and also to test the hypotheses. They found that perceived tangible and intangible benefits, firm size, organizational readiness, strategy, industry competition and competitors absorptive capacity affect BI adoption.

5.0 IMPLICATIONS FOR RESEARCH AND PRACTICE

Our findings could provide several insightful implications and assist both researchers and academicians since there are few studies that assess the determinants of BI system adoption in the financial sector

Managerial Implications

The positive relationships between performance expectancy and behavioral intension towards BI system suggests that BI system is considered as a matured approach by organizations to improve decision-making ability and improve organizations to achieve competitive advantage. For managers and decision makers, it suggests that the organizational performance will be enhanced and increase their competitive advantage over their competitors. Moreover, managers will perceive that employees using the BI system will be using the technology so easily since there is a positive relationship between effort expectancy behavioral intention towards BI. Lastly, since hedonic motivation has a positive relationship with behavior intension towards BI, then managers will see more employees deriving pleasure when using the BI system.

Implications for Research

This study is one of the few research projects conducted about BI system adoption within the financial sector using the UTAUT model and empirically tested the factors influencing BI system adoption within the financial sector. This study prolonged the knowledge of BI system adoption in the financial industry. Our findings will enhance financial enterprises to obtain the benefits of BI system at work. The UTAUT model was used in this study and the performance expectancy indicates that financial enterprises will have improved competitive advantage if they adopt the BI system. Moreover, this study is among the first and few studies to investigate the role of organizations on the BI systems adoption within the financial sector. Our study revealed that organizations with strategy orientation have more interest to use BI systems to preserve competitive position in the financial industry.

6.0 LIMITATIONS AND FUTURE RESEARCH

This study has several limitations that are important to be noted. Firstly, the research was based on the UTAUT model to test the key determinants associated with BI systems adoption. For future research, adoption decision could be investigated by other theoretical perspectives such as TOE framework, the diffusion of innovations theory, TAM or the institutional theory. Secondly, our sampling strategy is based only within the financial

sector, therefore we cannot generalize the results to other industries. Future research can prove and generalize the results of this study by investigating within other industries. Moreover, cultural diversity can influence the results of this study, so it is recommended for future research to focus on cultural issues.

The paper has contributed to a strong foundation for future studies encompassing the acceptance of BI systems within the banking sector. It combines knowledge from different perspectives and presents a comprehensive view of BI systems adoption in the banking sector. Future research can use other determinants or models to investigate the BI systems acceptance by the banking institutions.

7.0 CONCLUSION

The study was aimed at understanding the influence of the following variables: performance expectancy, effort expectancy, social influence, facilitating conditions and hedonic motivation on the behavioral intension towards BI and also to determine if the behavioral intension towards BI influences positively the BI systems acceptance. The research objective was met by investigating the hypothetical relations using the multiple regression analysis of the constructs.
The regression results found that the following variables: performance expectancy, effort expectancy, social influence, facilitating conditions and hedonic motivation positively influence the behavioral intension towards BI. Moreover, the study found that the behavioral intension towards BI positively influences the BI systems acceptance

Although BI systems concept came up several decades ago, however, many organizations are yet to adopt the system. BI has established its importance in contributing to organizational competitive advantage

Many financial institutions have adopted BI system, but they are yet to adapt the system. Determinants such as performance expectancy, effort expectancy, social influence, facilitating conditions and hedonic motivation affect BI system's implementation and integration. Understanding these determinants is very important in the adoption of the system by organizations.

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APPENDIX A: QUESTIONNAIRE ITEMS WITH AUTHORS

Factors/Authors	Question Identifiers	Questions
Performance Expectancy ([65]; [66]; [67])	**B1**	I believe that using business intelligence systems has a significant impact on my job performance.
	B2	I believe that using business intelligence systems enhances job performance.
	B3	Using BI systems increases productivity in my work.
	B4	I believe using BI systems helps to accomplish tasks quickly in my organization.
Effort Expectancy ([68]; [69]; [21]; [66])	**C1**	I find BI systems are easy to use.
	C2	My interaction with BI systems available in my organization is clear and understandable.
	C3	I believe it will be easy for me to become skilful at using BI systems available in my organization.
	C4	I believe learning how to use BI system would be easy
Social Influence ([65]; [66]; [21])	**D1**	Most people surrounding with me use BI systems
	D2	People who influence my behaviour think that I should use BI systems.
	D3	My colleagues who are important to me think that I should use BI systems.
	D4	People whose opinion I value think that I should use BI systems.
Facilitating Conditions ([66]; [67]; [21])	**E1**	I have the resources necessary to use the BI systems in my organization.
	E2	BI systems are well matched with other technologies that I use.
	E3	I have the knowledge necessary to use BI systems.
	E4	I have help available to assist when difficulties arise with BI systems.
Hedonic Motivation ([21]; [66]; [67])	**F1**	I enjoy using BI systems.
	F2	I believe working with BI systems makes my job enjoyable.
	F3	Using BI systems is entertaining.
	F4	Using BI systems to complete my work is fun.
Behaviour Intensions towards BI ([4]; [69]; [68]; [70])	**G1**	I intend to use BI systems at workplace in the near future.
	G2	I will always try to use BI systems in my day to day work.
	G3	I plan to use BI systems more frequently
	G4	I predict I would BI solutions provided by my company.
BI Systems Acceptance ([68]; [21]; [67])	**H1**	I tend to use BI systems frequently in my current role.
	H2	I depend on BI systems to complete my tasks at work.
	H3	I spend a lot of time working on BI systems.
	H4	I am using BI systems at work currently.