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The Relationship Between Technology Acceptance and Business Intelligence System Use: The Mediating Role of Behavioral Expectations

Mohammed Nagi Alhendi
[1] Faculty of Finance and Administrative Science, Al Madinah International University, Taman Desa Petaling, 57100 Kuala Lumpur, Malaysia
alhendimohammed@gmail.com

Abdoulrahman Aljounaidi
[2] Faculty of Finance and Administrative Science, Al Madinah International University, Taman Desa Petaling, 57100 Kuala Lumpur, Malaysia
abdulrahman.ramez@mediu.edu.my

Alharath ateik
[3] Faculty of Finance and Administrative Science, Al Madinah International University, Taman Desa Petaling, 57100 Kuala Lumpur, Malaysia
alharath.ateik@mediu.edu.my

Abstract
The effects of technology acceptance on systems use have been the subject of a plethora of research in the last few decades. However, scant attention has been given to exploring the behavioral expectation's role in the relationship between technology acceptance and systems use. Using technology acceptance model (UTAUT2), this study aimed to determine if there was a relationship between Technology Acceptance factors (Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC), Information Quality (IQ), System Quality (SQ) and Self-Efficacy (SE)) and BI System Use and whether Behavioral Expectations could be considered a potential mediating variable in this relationship. The research was conducted among university administrators in Gaza Strip. To address the study objectives, a quantitative survey was used. Data were collected from a convenience sample of 334 university administrators who used the information systems at 11 selected universities in the Gaza Strip. The results of the statistical analysis showed that Facilitating Conditions and Self Efficacy are significantly and positively associated with System use. Moreover, Behavioral Expectations do not mediate the relationship between the use of BI systems and Technology Acceptance Factors.
Keywords: *technology acceptance, business intelligence, administrators, behavioral expectations, UTAUT, university.*

1. Introduction

The rapid improvement of Artificial Intelligence (AI) over the past few years enables life to increase its quality and enhance the Information System's progress. Business Intelligence system (BIS) is considered to be a part of the Information System field, and it has its advantages from the advancement of AI (Torres, Sidorova, & Jones, 2018). Accordingly, Business Intelligence (BI) is inseparable from Decision Support Systems (DSS) which can gather, process, and disseminate organizational data to enhance business decision-making (Fink, Yogev, & Even, 2017). It is equipped with different intelligence algorithms that allow decision-makers to convert data into useful information to support the decision made, make a decision quickly, and increase the accuracy of the decision made in comparison to the past (Jaklič, Grublješič, & Popovič, 2018). Furthermore, the advent of BIS was propelled by fast technological growth in the mid-90s (Ain, Vaia, DeLone, & Waheed, 2019). Moreover, BIS is commonly identified as a comprehensive set of practices, methodologies, and systems which promote organizations to study data sets and clarify the data's flaws, strengths, and opportunities (Niño, Niño, & Ortega, 2020).

The success of information systems depends on the level of user acceptability. Therefore, to gauge the degree of system information application success, an analytical model is required. Consequently, there's a need for an analytical model to determine the level of success of the application of system information (Reza, Sunardi, & Herman, 2022). Additionally, various theoretical models, which clarify user acceptance of IS in the domain of IS, Sociology, and psychology, have evolved lately (Alalwan, Dwivedi, & Rana, 2017). Moreover, user acceptance plays an essential role in determining the achievement of the application of system information. Therefore, user acceptance significantly has a huge impact on the application of a system or technology. It's essential to know users' extension of using and accepting the technology to determine the success rate (Reza et al., 2022). The Unified Theory of Acceptance and Use Technology (UTAUT) was selected to assess the implementation of the information system (Reza et al., 2022). The UTAUT was established on four core determinants of intention and usage: Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC) (Hussein & Abdelhamid, 2021). Furthermore, behavioral

expectation can be considered as a predictor that deals with some of the key limitations of technology acceptance and offers a better realization of system use. Therefore, there is a need to describe how the variables affect BIS use among the university's administrators with and without the mediating (Behavioral Expectations) variable. As such, with this study, a gap exists in the development and establish BI System adoption. For this purpose, this study expands the UTAUT model. Moreover, we add important factors that affect the adoption of new information systems such as behavioral expectation and Self-Efficacy.

Gaza Strip contains 23 universities, and its employees are divided into two categories: administrators and academics. According to the latest statistics of the Ministry of Higher Education, the number of employees who working in these universities has reached 6384, including 2522 administrative employees who follow up the administrative tasks (MOEHE, 2022). Several previous studies showed non-acceptance of some administrators to use MIS in universities, as it is shown in this section, which affects the effectiveness of their performance and mandated tasks. Additionally, universities in developing countries encounter several economic and political challenges. They are virtually unable to progress in areas like management and technology (Abdelwahed, Mahmoud et al., 2016). However, the more effective the Management Information system (MIS), the more it can implement managerial operations with accuracy and consistency (Abdelwahed, Mahmoud et al., 2016).

Previous studies showed that IT centers at Palestinian universities in Gaza Strip suffer from lacking MIS effectiveness. Author Ibrahim, Adu-Gyamfi et al. (2018) indicated that university administrators have been encountering many challenges in their jobs or duties that require IT applications. Additionally, to date, no comprehensive review is available in the perspective of adoption and acceptance with the most important factors, models, and theories at a personal level or organizational level. It is also suggested in previous studies that BIS adoption decisions are influenced deeply by considering convenient factors (Magaireah, 2019).

The study aimed to determine if there was a relationship between Technology Acceptance factors and BI System Use and whether Behavioral Expectations could be considered a potential mediating variable in this relationship. Linked to these aims, four research objectives were articulated. These included: (1) to check the relationship between Technology Acceptance factors and BI System Use. (2) to investigate relationship between Technology Acceptance factors and Behavioral Expectations. (3) to find out the mediating impact of Behavioral Expectations on the relationship between Technology Acceptance factors and BI System Use. (4) to determine the relationship between Behavioral Expectations and BI System Use.

This study is further structured in different sections, where the next section presents the review of literature on technology adoption and use in the universities sector while explaining the effect of various factors. Based on this, the study proposed the research framework and formulated associated research hypotheses. Thereafter, steps for empirical study, data collection process and analysis are explained. Then the results of statistical tests and main research findings are discussed, followed by the managerial implications of the study along with the conclusion, limitations, and suggestions for future research.

2. Literature Review

2.1 Theoretical background

The attitude toward using technology is influenced by how useful and simple it is thought to be. Since then, this strategy has been used and modified numerous times across a wide range of literary genres. But as a result, it was difficult to determine which model was best for a particular case of technology acceptance. Using this information as a foundation. Authors Venkatesh, Morris, Davis, and Davis (2003) organized the relevant theoretical theories for technology acceptance and proposed the UTAUT model which was used successfully in many fields to describe how consumers accept and adopt new technology, according to several earlier studies (Khechine, Lakhal, & Ndjambou, 2016). The UTAUT model is said to be appropriate right now. Act as a standard for the acceptance of Hawaii International Conference on System Sciences, 41st Annual Proceedings, 2008, acceptance literature by combining and enhancing existing IT acceptance models (Rosen, 2005). Despite being relatively new, the UTAUT model has already demonstrated its suitability, validity, and reliability in studies of technology adoption in a variety of contexts. Finally, the original UTAUT model might be given another look in light of other theories that could explain how people adopt and use different technologies. Even though the UTAUT model's four exogenous constructs can be thought of as representing people's perceptions of the technology and the context, such as performance expectancy and effort expectancy, facilitating conditions, and social influence, they can also be seen as representing technological attributes. Despite evidence suggesting that these four concepts account for a sizable portion of the variation in adoption and usage behaviors, a crucial component of the UTAUT model is the person engaging in the behavior; that is, individual traits that characterize users' dispositions may be important in explaining their behaviors. Previous research has highlighted several personal traits, such as disposition, computer self-efficacy, and inventiveness (Chong, 2013; Venkatesh, Sykes, & Zhang, 2011).

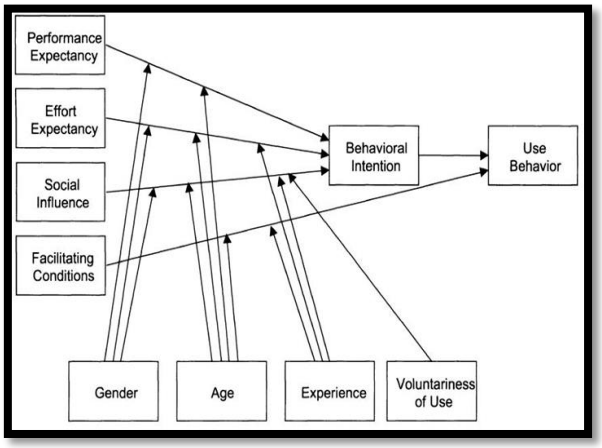

FIGURE 1: UTAUT Model, (Venkatesh, Morris, Davis, & Davis, 2003).

2.2 Business Intelligence System

Business intelligence (BI) is characterized as a system made up of organizational and technical components that present historical data to users for analysis to facilitate efficient decision-making and management support with the overall goal of enhancing organizational performance. In the middle of the 1990s, rapid technological advancement fueled the development of the Business Intelligence System BIS (Ain et al., 2019). Moreover, BIS is commonly identified as an extensive compilation of practices, methodologies, and systems that enable businesses to merge and evaluate large data sets to define their weaknesses, strengths, and opportunities (Niño et al., 2020). In addition, BIS encourages decision-making through the management of big data, the accessibility of ad hoc search, monitoring, predicting, and analysis solutions, and the support of cutting-edge technologies that allow users to discover new knowledge by processing, summarizing, screening, and converging data from various sources (Veeramisti, Paz, & Baker, 2020). As a consequence of tough competition and big knowledge technological developments in businesses, BI technology has been recognized as one of the modern technical objectives by a percentage of decision-making organisms, including company leaders, chief information officers, and chief executive officers (CEOs) (Ain et al., 2019).

The execution of BIS can improve the competitive nature of an organization's business in today's extremely competitive corporate market, and it plays an essential role in deciding an organization's achievement. However, the literature indicates that the implementation rate of the BI system is low, and it is expected that the implementation rate will not rise much in the near future (Services, 2018). In earlier studies, less attention was paid to this issue. A wide-ranging study that reviewed research papers relating to BIS acceptance prompted discussion of the concerns and research gaps (Richards, Yeoh, Chong, & Popovič, 2019). In the field of BI adoption research, there isn't a clear agenda or roadmap. Also, there is a lack of a specific objective or roadmap.

Academic activities play a significant role in educational institutions, which contain student data starting from registration and tuition fees to graduation (Reza et al., 2022). Moreover, there is always a desire to make the right decision in certain situations, regardless of how intense the decision-making process is condition. Therefore, it appears crucial that every university administrator establish a decision-making process. Good judgment at all levels of management will be able to encourage positive business performance (Alhawamdeh & Alsmairat, 2019). Consequently, like almost all organizations, higher education institutions must adopt information management systems to enable them to handle routine tasks without difficulty and provide ad hoc reports and a wide variety of standardized forms. However, higher education institutions must overcome numerous obstacles to implement their information systems (Mukred, Yusof, Alotaibi, Asma'Mokhtar, & Fauzi, 2019). Therefore, a better digital society can be improved by achieving high-quality education, enhanced with modern technologies (Robles-Gómez, Tobarra, Pastor-Vargas, Hernández, & Haut, 2021).

According to Rahman (2018), effective utilization of IT should play a critical role in the market competition of today in the service and product sectors to maintain profits. Additionally, Kang (2011) demonstrated that colleges could only gain a competitive edge by fostering competition through education service enhancement. Furthermore, Choi and Chung (2014) stated that it is crucial to respond to quick changes in the college educational environment and offer top-notch service while meeting student demands. Finally, according to LEE and SEONG (2020), there is a constant need for service quality development and improvement as universities are currently undergoing rapid changes in the educational environment.

2.3 Hypothesis development

Performance Expectancy

The variable "performance expectancy" has been defined by Venkatesh, Morris, et al. (2003) as the degree to which one anticipates that the use of cutting-edge technologies will enhance job performance.

Performance expectancy is very similar to the perceived usefulness variable within TAM, which has become the most used instrument for predicting technology usage, because it is robust, powerful, and parsimonious (Venkatesh & Davis, 2000). Hence, several past studies uncovered that performance expectancy plays a significant role in intention to use information technology (ALraja, 2015; Carter, Schaupp, & McBride, 2011). Therefore, we propose the following hypothesis:

H1: The Performance Expectancy of Business Intelligence systems directly influences Behavioral Expectations in Palestinian universities.

Effort Expectancy

Similar to "performance expectancy," "effort expectancy" is a significant variable present in the UTAUT model. The study variable "Effort expectancy"

can be defined in terms of ease, which is how a person feels about how easily they use technology and the strength of that ease (Sair & Danish, 2018). By utilizing UTAUT constructs, (Wu, Tao, & Yang, 2008) and (Zhou, Lu, & Wang, 2010) have also highlighted the direct connection between effort expectancy and behavioral intention. Users are more likely to adopt new technology if learning and understanding how to use it doesn't take as much time and effort. So, we propose the following hypothesis:

H2: The Effort Expectancy of Business Intelligence systems directly influences the Behavioral Expectations in Palestinian universities.

Social Influence

The degree to which a person is concerned about the opinions and perceptions of others who are significant to them is referred to as social influence (Venkatesh, Thong, & Xu, 2012). People who want to fit in with others are more likely to conform to expectations, which may support their behavioral intention to use the system (Gruzd, Staves, & Wilk, 2012). Hence our next hypothesis is:

H3: The Social Influence of Business Intelligence systems directly influences the Behavioral Expectations in Palestinian universities.

Facilitating Conditions

Employees' perceptions of the favorable circumstances and the sufficiency of various technical conditions required for the successful use of business intelligence systems are referred to as "facilitating conditions". The degree to which an individual thinks the organizational and technological framework is in place to support the use of the system is known as the "facilitating conditions". The concept of facilitating conditions in this study, however, are concentrated on a technological setting intended to eliminate barriers to technology use. The construct, according to the authors (Cheok & Wong, 2015), reflects how strongly a person believes that an organizational and technological infrastructure exists to support the use of a system.

The results of Tabassum, Roknuzzaman, and Islam (2015) study indicated that facilitating conditions influencing the use of digital libraries include things like the user's familiarity with the search domain, the caliber of the content in digital libraries, system characteristics, and service quality. Therefore, the following hypotheses are proposed:

H4: The Facilitating Conditions of Business Intelligence systems directly influence the Behavioral Expectations in Palestinian universities.

Self-Efficacy

Self-efficacy is described by (Bandura, 1986) as individuals' assessments of their capacities to organize and execute the actions required to accomplish various predetermined performance types. Instead of focusing on one's skill set, this topic considers assessments of what one can accomplish using their current set of abilities. The self-efficacy construct's most important feature is highlighted by this definition. It emphasizes how crucial it is to distinguish between individual skills and the ability to "plan and carry out actions". Authors Mujalli, During the pandemic, Khan et al. (2022) sought to determine and put to the test the variables that affect how accounting students and faculty use the Blackboard platform. The study validated the hypotheses concerning the platform influence on self-efficacy and found that Self Efficacy did positively and significantly influence Behavioral Intention. Based on the abovementioned discussions, the following hypotheses are proposed:

H5: The Self-Efficacy of Business Intelligence systems directly influences the Behavioral Expectations in Palestinian universities.

BI System use

System use is a behavioral outcome that can be measured objectively based on how much time an employee spends using a computer-based system directly. In line with earlier studies (Venkatesh & Davis, 2000). Several research frameworks have suggested usage as a benchmark for MIS success (Ein-Dor & Segev, 1978); (Hamilton & Chervany, 1981). Taxonomies of success also place a strong emphasis on system usage (DeLone & McLean, 1992); (Doll & Torkzadeh, 1991). The importance of using the system as a gauge of technology acceptance has long been acknowledged in the literature. The MIS community's understanding of the system use construct has been shaped by an upstream research agenda that focuses on system implementation. Based on the above, the following hypothesis is proposed:

H6: The Performance Expectancy of Business Intelligence systems directly influences the BI System use in Palestinian universities.

H7: The Effort Expectancy of Business Intelligence systems directly influences the BI System use in Palestinian universities.

H8: The Social Influence of Business Intelligence systems directly influences the BI System use in Palestinian universities.

H9: The Facilitating Conditions of Business Intelligence systems directly influence the BI System used in Palestinian universities.

H10: The Self-Efficacy of Business Intelligence systems directly influences the BI System use in Palestinian universities.

Behavioral Expectations

Behavioral expectation (BE) is the self-reported subjective likelihood that an individual will engage in a particular behavior, based on their cognitive evaluation of the behavioral factors that are both voluntary and nonvoluntary (Warshaw & Davis, 1984). Due to the presence of control beliefs and other variables that ultimately affect behavior, expectation is highly predictive of future system use (Warshaw & Davis, 1985). It has been proposed that behavioral expectation (BE) can get around these restrictions of facilitating conditions and behavioral intention (Warshaw & Davis, 1984). Behavioral intention is the extent to which a person has made conscious plans to engage in or refrain from engaging in a particular future behavior (Warshaw & Davis, 1985), but is constrained in its capacity to fully

take into account the outside factors that can influence how well a behavioral model performs. Because the behavioral expectation is formed by combining anticipated changes in behavioral determinants, it addresses this limitation. Limitations in capability, behavioral intention, and environmental facilitators or inhibitors are examples of behavioral determinants that can change over time (Warshaw & Davis, 1985). Numerous such factors outside of behavioral intention are included in behavioral expectations (Warshaw & Davis, 1985). The inability of behavioral intention and facilitating conditions to consider uncertainty and a lack of information is another drawback. In these circumstances, the behavioral expectation might serve as a more reliable predictor of behavior (Warshaw & Davis, 1985).

According to the research by Armitage, Norman, Alganem, and Conner (2015), behavioral expectations significantly moderated the impact of past behavior on future behavior and were a better predictor of actual behavior than behavioral intention. Additionally, they contend that many items and scales intended to measure intention have most frequently been created by combining behavioral intentions and expectations. In Konerding (2001) initial effort to focus on the issue, using statistical equations to differentiate the formation of behavioral expectations and behavioral intention judgments, the results confirmed the causal relationship between behavioral expectations and actual behavior, which lays the groundwork for further study. Moreover, Mahardika (2013) described how several studies had compared the ability of behavioral intentions and behavioral expectations to predict behavior, with those that measured the constructs over a single time interval showing that behavioral expectations were more predictive. The study also showed that behavioral intentions can evolve more easily over time, and behavioral expectations were less fluctuant. Moreover, Gordon (1989) discovered that, when compared to behavioral intentions, behavioral expectations more accurately predicted academic performance.

In a longitudinal field study, Venkatesh, Brown, and colleagues (2008) used a mediator construct, behavioral expectations, and two independent constructs, behavioral intentions and facilitating conditions, to explain the System Use construct more effectively. This explanation accounted for between 60% and 65 % of the variance of the dependent construct, System Use. Accordingly, the following hypotheses are proposed:

H11: The Behavioral Expectations of Business Intelligence systems directly influence the BI System used in Palestinian universities.

H12: The influence of Performance Expectancy on BI System use in Palestinian universities is mediated by Behavioral Expectation.

H13: The influence of Effort Expectancy on BI System use in Palestinian universities is mediated by Behavioral Expectation.

H14: The influence of Social Influence on BI System use in Palestinian universities is mediated by Behavioral Expectation.

H15: The influence of Facilitating Conditions on BI System use in Palestinian universities is mediated by Behavioral Expectation.

H16: The influence of Self-Efficacy on BI System use in Palestinian universities is mediated by Behavioral Expectation.

2.4 A conceptual technology acceptance development model

Maruping, Bala et al. (2017) suggested new model might be able to get around some of the issues with behavioral intention and facilitating conditions that were found in their UTAUT model. The use of modified UTAUT can be seen in studies relating to technologies in organizational as well as non-organizational backgrounds. This model has been used in part or its entirety in many scholarly works on organizational settings and this has contributed to fortifying the model in terms of its generalizability. So, the model proposed in this study was combine the modified UTAUT from (Maruping, Bala et al., 2017) with the original UTAUT. On the other hand, the UTAUT model doesn't investigate self-efficiency. Without taking this factor into account, actual internet usage does not give a full overview of how technology is used in organizations. This additional element was crucial for understanding how technology was used within the company (Gorla, Somers et al., 2010). Additionally, users' perceptions of their behavioral expectations must first be measured to gauge or predict system usage; this perception can then be used as a predictor of system usage.

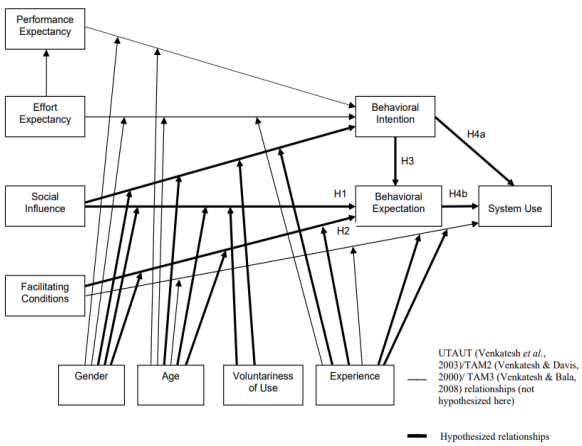

Figure 2 Modified UTAUT Model, (Maruping, Bala, Venkatesh, & Brown, 2017)

Consequently, the framework model consists of Independent Variables (IV) namely: Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC), and Self-Efficacy (SE), dependent Variable (DV) namely BI System Use (SU), and the Mediator Variable (MV) namely Behavioral Expectations (BE). The major area to be covered by this study's literature review comprises the

comprehension of the demographic factors known to significantly affect the adoption of Business Intelligence Systems. This review assists this research in evaluating and measuring these factors in terms of their influence. Figure 3 shows this Framework model.

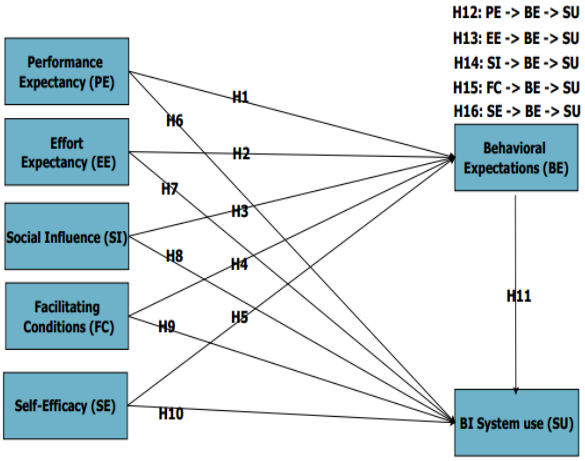

Figure 3: A conceptual model for technology acceptance development.

3. Research Methods

3.1 Research design and approach

A positive research philosophy was embraced. In line with this, a deductive approach using a quantitative survey. The approach was appropriate for a study of this nature wherein relationships between different variables were examined and inferences made to the wider population about the findings.

3.2 Selection and description of participants

The target population consisted of 23 universities including 2522 administrators in Gaza Strip (MOEHE, 2022). Referring (Sekaran & Bougie, 2003) a population of 2400 should have 331 respondents overall, and a population of 2600 should have 335 respondents overall. Consequently, this study needs a total of 334 respondents. Random sampling was used in this study to randomly select University Administrators in Gaza Strip.

Over 334 collected questionnaires, Men (66.2%) provided 221 useful responses, while women (33.8%) provided 113. Age-specific questions were posed to the respondents. As a result, 31.2% of respondents indicated that they are between the ages of 30 and 40, 36.8% that they are between the ages of 40 and 50, and 15.3% that they are over the age of 50. Additionally, respondents were asked to describe their previous employment. In response, 22.8% of respondents claimed to have more than 15 years of experience. 15% of respondents have less than five years of working experience, 29.2% have between five and ten years, and 33% have between ten and fifteen years, the job's specifications position of the respondents, 37.1% of them were Administrators, 27.5% were Head of Department, 13.2% were Dean, 22.2% were Director of Department, Lastly, the respondents were prompted to describe their educational level. As a result, 36.9% of them have master's degrees, 39.8% have bachelor's degrees and 12% have Doctoral degrees. Table 1 represents the demographic variables' frequencies and percentages.

TABLE 1: Demographic information

Group		Frequency	Percentage
Gender	Male	221	66.2
	Female	113	33.8
Age	Under 30 years old	56	16.7
	30 to 40 years old	104	31.2
	40 to 50 years old	123	36.8
	Above 50 years old	51	15.3
Experience	Less than 5	50	15
	5 – 10	98	29.2
	10 – 15	110	33
	more than 15	76	22.8
Job	Administrator	124	37.1
	Head of Department	92	27.5
	Dean	39	13.2
	Director of	79	22.2
Education	Diploma	38	11.3
	Bachelor degree	133	39.8
	Master degree	123	36.9
	Doctoral Degree	40	12

3.3 Data collection

A descriptive survey design was used. Assessments provide significant information on all categories of public information and research areas, while descriptive analyses seek to collect comprehensive and realistic information that labels a current phenomenon. The researchers will conduct a survey to collect information about the anticipated phenomenon (Aljounaidi & Mohamed, 2017). Inside the university, the questionnaires were personally distributed to the staff members. Moreover, online questionnaires using Google Forms, which are used as Google Surveys, were distributed. The data collected include respondents' socio-demographic characteristics, Experience, Job Position, and Education. Many items that assess the BI System Use (dependent variable), Behavioral Expectations (Mediating Variable), and independents variables were developed under the guidance of (Venkatesh et al., 2003) and (Venkatesh, Brown, Maruping, & Bala, 2008). The Constructs and components of the questionnaire were shown in Appendix A. Furthermore, the items were measured by a five-level Likert scale labelled 1 = strongly disagree to 5 = strongly agree.

3.4 Data analysis

The statistical analysis was undertaken by using SmartPLS and SPSS software packages. Descriptive statistics, reflecting the percentage distribution of the demographic profiles of the participants, were computed, as well as the mean, and standard deviation. To investigate the research objectives, inferential statistical tests were performed to determine the relationships among the different variables. Multiple regression analysis was used to examine the relationships between BI System Use, Technology Acceptance Factors and Behavioral Expectations.

3.5 Reliability and validity

Reliability refers to the consistency of a measuring instrument (Saunders, Lewis, & Thornhill, 2003). There were seven measuring instruments used in this study and each consisted of multiple items. Thus, establishing internal reliability was deemed appropriate and this was assessed, using Cronbach's alpha coefficient. In this regard, the average of the split-half reliability coefficients was computed for the seven measuring instruments.

TABLE 2: Reliability of the underlining constructs

Construct name	Reliability
BI System use	0.863
Behavioral Expectations	0.815
Effort Expectancy	0.760
Facilitating Condition	0.755
Performance Expectancy	0.834
Self-Efficacy	0.777
Social Influence	0.785

According to table 2, all constructs' composite reliability in the samples ranged from 0.755 to 0.863, which is a high value. These numbers show that all constructs have internal consistency because they are higher than the typical reliability cutoff of 0.7. In light of this, it can be said that the constructs are suitable for additional study (Davcik, 2014; Hair Jr, Sarstedt, Hopkins, & Kuppelwieser, 2014).

Whether or not a set of indicators represents the same underlying construct can be determined by its convergent validity (Fornell & Larcker, 1981; Hair Jr et al., 2014). The Average Variance Extracted (AVE) standard was suggested by (Fornell & Larcker, 1981) as a way to test convergent validity to look into that. The amount of variance that each indicator shares with its corresponding construct is denoted by the AVE. Indicators must, according to theory, exhibit greater variance when compared to their respective constructs than when compared to other constructs in the model (Fornell & Larcker, 1981b; Hair, Ringle, et al., 2011; Hair Jr, Joe Sarstedt, et al., 2014; Henseler, Ringle, et al., 2009; Sarstedt, Ringle, et al., 2014).

The outcomes in table 3 show what the AVE was for each construct in the sample. It demonstrates that the range of AVE was between 0.339 and 0.604. According to the general rule, sufficient convergence validity is ensured by an AVE value of greater than 0.5. It is argued that a construct can be said to explain more than half of the variance in its indicators if its AVE value is greater than 0.5 (Fornell & Larcker, 1981b; Hair, Ringle, et al., 2011; Hair Jr, Joe Sarstedt, et al., 2014; Henseler, Ringle, et al., 2009; Sarstedt, Ringle, et al., 2014). Consequently, the AVE analysis's findings show that the sample's convergent validity is sufficient and satisfied. Furthermore, table 4 displays the findings of validity and reliability in summary.

TABLE 3: Average variance extracted (AVE) of underlining constructs

Construct name	Average variance extracted (AVE)
BI System use	0.568
Behavioral Expectations	0.604
Effort Expectancy	0.445
Facilitating Condition	0.339
Performance Expectancy	0.504
Self-Efficacy	0.411
Social Influence	0.423

Table 4: Results of Reliability and Validity Summary

Constructs	Items	Indicator Loading	Cronbach's alpha	Composite Reliability	AVE
PE	PE 1	0.5615	0.7604	0.8335	0.5037
	PE 2	0.7709			
	PE 3	0.7916			
	PE 4	0.6663			
	PE 5	0.7338			
SI	SI 1	0.6656	0.6565	0.7846	0.4227
	SI 2	0.5973			
	SI 3	0.6453			
	SI 4	0.7272			
	SI 5	0.6071			
FC	FC 1	0.547	0.6111	0.7545	0.3394
	FC 2	0.5976			
	FC 3	0.527			
	FC 4	0.6047			
	FC 5	0.6221			
	FC 6	0.5914			
EE	EE 1	0.6911	0.5901	0.7603	0.4447

Constructs	Items	Indicator Loading	Cronbach's alpha	Composite Reliability	AVE
	EE2	0.5761			
	EE4	0.6356			
	EE5	0.7519			
SE	SE2	0.6058	0.6413	0.7767	0.4107
	SE3	0.6799			
	SE4	0.6183			
	SE5	0.634			
	SE6	0.6634			
BE	BE1	0.7482	0.6607	0.8152	0.5955
	BE2	0.8098			
	BE3	0.7556			
SU	SU-	0.7386	0.8018	0.8629	0.5
	SU2	0.8164			
	SU3	0.6958			
	SU4	0.7275			
	SU5	0.7511			

4. Ethical considerations

Ethical standards as prescribed by the researchers' affiliated institution were adhered to throughout the research process. Ethical clearance was obtained before the commencement of data collection. The researchers endeavoured to act with integrity and transparency when dealing with participants. All participants were assured anonymity by not disclosing their names in the study findings. The confidentiality of their responses was also preserved. Informed consent was obtained from all participants.

5. Results Statistical tests

The mean, standard deviation, skewness and kurtosis were computed for all variables. These are reflected in Table 5. The mean scores on a 5-point Likert scale were comparatively high for the Performance Expectancy (PE) (3.798) and Effort Expectancy (EE) (3.720).

The result of the assessment of the normality has shown that all items' skew and kurtosis, as well as the variables, were placed among ±3 and ±7 respectively. Consequently, we can conclude that a normal distribution accurately predicted the data set of all item constructs, we can see from the Table 5 shows that the skew and kurtosis ranged from -0.706 to -0.476 and 0.407 to 0.896, respectively.

Constructs	N	Mean	Std. Dev	Skewness	Kurtosis
Behavioral Expectations	334	3.697	0.606	-0.476	0.706
Effort Expectancy	334	3.720	0.458	-0.541	0.676
Facilitating Condition (FC)	334	3.606	0.465	-0.614	0.693
Performance Expectancy	334	3.798	0.594	-0.706	0.896
Self-Efficacy (SE)	334	3.711	0.451	-0.477	0.407
Social Influence (SI)	334	3.706	0.516	-0.543	0.420
BI System use (SU)	334	3.690	0.627	-0.689	0.809

A correlation analysis was performed to show the relationships among the seven variables of Performance Expectancy, Social Influence, Facilitating Condition, Effort Expectancy, Self Efficacy, Behavioral Expectations, and BI System Use. The correlation matrix is shown in Table 6. There is a positive and significant correlation between Facilitating Conditions and System use (c.r. $= 0.016, p \leq 0.05$). In addition, Self-Efficacy and System Use show a positive and significant correlation (c.r. $= 2.21, p \leq 0.05$). (See figure 4 for standardized path coefficients and significance level).

TABLE 6: Evaluating the outcomes of predicted direct effects of the constructs

Hypothesis	Hypothesized Path	Unstandardized Estimate		Standardized Estimate	critical ratio (c.r.)	P-value	Hypothesis Result
		Estimate	S.E.	Beta			
H1	PE ->	-	0.06	-	0.4	0.4	Not
H2	EE ->	-	0.08	-	0.0	0.4	Not
H3	SI ->	0.20	0.07	0.1719	1.4	0.0	Not
H4	FC ->	0.24	0.08	0.1875	1.3	0.0	Not
H5	SE ->	0.30	0.08	0.2277	1.8	0.0	Supp
H6	PE ->	0.25	0.05	0.2410	1.0	0.1	Not
H7	EE ->	0.02	0.07	0.0145	0.0	0.4	Not
H8	SI ->	0.07	0.06	0.0642	0.7	0.2	Not
H9	FC ->	0.38	0.07	0.2842	2.1	0.0	Supp
H10	SE ->	0.29	0.07	0.2152	2.2	0.0	Supp
H11	BE ->	0.23	0.0g	0.2316	2.1	0.0	Supp

"*p< 0.05 ،**p< 0.01, ***p< 0.001"

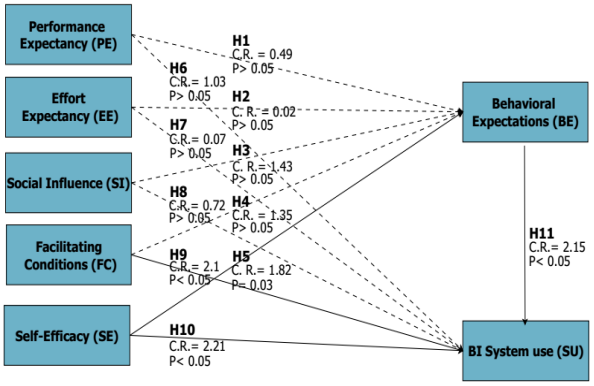

Figure 4: Structural model results.

As shown in Table 7, Behavioral Expectations do not mediate the effects of Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC), and Self-Efficacy (SE) on BI System use. Thus, hypotheses H12, H13, H14, H15, H16, H17 and H18 were rejected.

DV = BI System use	Independent Variables (IVs)				
M = Behavioral Expectations	Performance Expectancy	Effort Expectancy	Social Influence	Facilitating Condition	Self-Efficacy
Total Effect of IV on DV without M (path a)	0.16035	0.46981	0.1357	0.0039	0.0
	-0.136	0.008	0.119	0.335	0.29
Direct Effect of IV on DV with M (path a')	0.15097	0.470448	0.236941	0.016394	0.013885
	-0.122	0.009	0.081	0.295	0.237
Indirect Effect of IV on DV through M (path bc)	0.014	0.001	-0.038	-0.04	-0.053
Effect of IV on M (path b)	-0.0695	-0.0018	0.1727	0.193	0.222
Effect of M on DV (path	0.2232	0.2232	0.2232	0.2232	0.2
Effect of IV on M S. E	0.1432	0.1124	0.1209	0.143	0.122
Effect of M on DV S. E	0.1037	0.1037	0.1037	0.1037	0.1037
Sobel test > +/- 1.96	-0.47344807	-0.01601379	1.19018985	1.14344373	1.390338211
Two-tailed probability .05	0.63589354	0.98722339	0.23397178	0.2528544	0.164426262
Mediation Path	PE -> BE -> SU	EE -> BE -> SU	SI -> BE -> SU	FC -> BE -> ISU	SE -> BE -> SU
Mediation Effect	no	no	no	no	no
Hypothesis	H12	H13	H14	H15	H1

"*p< 0.05 ،**p< 0.01, ***p< 0.001

Research objective 1: To examine the relationship between Technology Acceptance (TA) factors and BI System Use (SU)

A multiple regression analysis was conducted with Performance Expectancy, Social Influence, Facilitating Condition, Effort Expectancy, Self Efficacy, and Behavioral Expectations as the independent variables and System use, the dependent variable. The results reflected in Table 6 show that Facilitating Condition and Self Efficacy are significantly and positively associated with System use (c.r. = 2.14, $p \leq 0.05$) , (c.r. = 2.21, $p \leq 0.05$).

Research objective 2: To investigate the relationship between Technology Acceptance factors and Behavioral Expectations

A multiple regression analysis was conducted with Performance Expectancy, Social Influence, Facilitating Condition, Effort Expectancy, and Self Efficacy as the independent variables and Behavioral Expectations as the dependent variable. The results reflected in Table 6 show that Self Efficacy is significantly and positively associated with Behavioral Expectations (c.r. = 1.82, $p \leq 0.05$).

Research objective 3: To test the mediating impact of Behavioral Expectations (BE) on the relationship between Technology Acceptance (TA) factors and BI System Use (SI)

The results reflected in Table 7 show that Behavioral Expectations do not mediate the connection between the use of BI systems and the following variables: performance expectations (PE), effort expectations (EE), social influence (SI), facilitating conditions (FC), and self-efficacy (SE).

Research objective 4: To determine the relationship between Behavioral Expectations and BI System Use.

A multiple regression analysis was conducted with Behavioral Expectations as the independent variable and System Use, the dependent variable. The results reflected

in Table 6 show that Behavioral Expectations is significantly and positively associated with System Use (c.r. = 2.15, $p \leq 0.05$).

6. Discussion

There is voluminous research that investigates the effects of technology acceptance factors on the use of various systems. However, scant attention has been given to Behavioral Expectations. To date, not much is known about whether Behavioral Expectations mediate the influences of the relationship between technology acceptance and employees' BI Systems usage. We sought to address this gap in literature by articulating and accomplishing four key objectives.

The first objective was to examine the relationship between Technology Acceptance (TA) factors and BI System Use (SU). The results revealed that Facilitating Condition and Self Efficacy were significantly and positively related to BI System Use. This finding places in the foreground the importance of information systems usage skills for the users. On the other hand, the importance of technical support and training in the institutions. The findings are consistent with earlier studies such as Mujalli, Khan, et al. (2022), (Alzuabi, Abdulhadi, Alotaibi, and Shuweihdi (2022)), (Liao, Shaw, & Li, 2019), (Salloum & Shaalan, 2018).

The second objective was to investigate the relationship between Technology Acceptance factors and Behavioral Expectations. The results revealed that Self Efficacy is significantly and positively related to Behavioral Expectations. These results confirm that employees who have skills in using systems have better behavioral expectations when implementing new BI systems for them, and therefore their resistance to change will be less. Accordingly, employees must be empowered by increasing their skills in using technology.

The third objective was to test the mediating role of Behavioral Expectations (BE) on the relationship between Technology Acceptance (TA) factors and BI System Use (SI). Behavioral Expectations were found don't mediate the Technology Acceptance (TA) factors and BI System Use relationship. This result is significant as it sheds light on the previously untested technology Acceptance (TA) factors and BI System Use relationship. According to previous studies, Armitage et al. (2015), and Gordon (1989) showed that behavioral expectations are primarily connected to the past actual use of the system. And that there is a discrepancy between universities in the application of BIS, many respondents were unable to express their behavioral expectations about the system clearly, which may lead to the removal of behavioral expectations as a mediating variable for the connection between users' understanding and acceptance of technology and BI systems use. Furthermore, Behavioral Expectations have been used as a mediator with a limited number of variables (Schultheis, 2016; Venkatesh et al., 2008). So, this study attempted to identify whether Behavioral Expectations mediate the relationship between a greater number of variables related to technology acceptance and BI system use. Finally, this study was applied in a different cultural environment in a developing country, in which the information systems are still not sufficiently developed in the Palestine universities, which is an additional reason for the absence of a mediation effect of behavioral expectations among administrators.

The fourth objective was to examine the relationship between Research objective 4: to determine the relationship between Behavioral Expectations and BI System Use. Behavioral Expectations were found to be significantly and positively associated with BI System Use. These results indicate that the users who have better expectations of the systems can use them more. Therefore, the associations should improve the user's acceptance of the systems.

7. Implications

7.1 Theoretical Implications

The study contributed to the field of knowledge in terms of the technology acceptance criteria that need to be considered while adopting information systems for university administrators worldwide. Furthermore, the study can see the factors that the researcher investigates and check how much they affect the technology acceptance of administrators. Moreover, the present work is of value to the literature because it examines the mediating such as the Behavioral Expectations effect in explaining the influence of independent variables namely: Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Information Quality, System Quality, and Self-Efficacy on BIS use. Additionally, gap existing in the literature regarding studies with mediators. In addition, this study showed that Self Efficacy was the best indicator of BI System Use and it had a significant influence on the Behavioral Expectations. Finally, the study revealed that Facilitating Conditions and Behavioral Expectations had a significant influence on BI System Use.

7.2 Managerial implications

This study recommends the management of universities improve the administrators' capabilities to use BIS and improve the BIS interfaces to make it easier to use. Accordingly, BIS developers should always strive to develop BI applications that can achieve tasks effectively to sustain the positive intention of BIS users in universities. Moreover, the findings of this study suggest improvements to Facilitating Conditions such as the aspect of increasing the training, providing information about the technology and resources related to the BIS, technical support for users through implementing training courses on how to use the system and supporting programs, in addition to preparing a manual that provides introductory information about it, and spending additional efforts by launching programs for their administrators to increase the usage of BIS in their universities.

8. Conclusion

8.1 Limitations and suggestions for future

research

This study has some limitations that should be highlighted. Firstly, the survey could be a matter of the unfairness and biases of the administrator's answers. Therefore 100% precision couldn't be guaranteed. Secondly, this study has employed quantitative methodology to examine the relationship between technology acceptance factors the BI system use, which restricts our ability to understand the underlying logic. Qualitative research may be used by future researchers to provide more in-depth insight and to have a deeper understanding.

This study offers a few suggestions for future research. This study's findings could be used or repeated in future studies in other sectors, such as the Banking sector, private companies, and government institutions. This would help prove the model's external validity. In addition, it will be interesting for future research to test and explore the model developed for this research in another cultural setting.

The selection of a mediating variable might be an additional area for future research. For example, this research used Behavioral Expectations as mediating variable to measure the mediating effect of Behavioral Expectations to use BIS on the relationship between these constructs and system use in Palestine, although it was consistent with previous studies (Venkatesh et al., 2008); (Schultheis, 2016), future research is needed to the demographic factors, it may affect to the relationship between technology acceptance factors and BI system use. As the closing point, the variables relating to technology acceptance that were explored in this study were limited. At the same time, other important variables were not included in this study. Hence, additional research should be carried out with the inclusion of the variables that this study did not include such as Behavioral Intention, Ease of Use, Ability, Task-Technology Fit, Complexity and E-Service Quality.

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9.4 Data availability

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9.5 Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

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