The effect of business intelligence practices on job satisfaction in the Saudi Electricity Company in the Asir Region

Faiz Binzafrah
Department of Business Adminstration, King Khalid University, Abha, Saudi Arabia, and
Faisal Taleedi
King Khalid University, Abha, Saudi Arabia

Received 2 March 2022
Revised 21 March 2022
Accepted 21 March 2022

Abstract

Purpose – The purpose of this study is to determine the effect of business intelligence on job satisfaction in the Saudi Electricity Company in the Asir. It aims to evaluate employee job satisfaction after adopting a BI system for job practices.

Design/methodology/approach – A mixed-method including descriptive, questionnaire for data collection and analytical approach was used. The random sample population consists of 354 employees out of 3,000.

Findings – It is found that the implementation of a BI system and the associated practices have a statistically significant effect on employee job satisfaction. The study recommends the adoption of BI systems for organizational activities. Such organizations must consider the latest BI tools for solving business problems.

Originality/value – To the best of authors' knowledge, the current study is the first attempt to evaluate the performance of BI practices in the region and in context of employee job satisfaction. This will contribute to understanding the job satisfaction in similar organizational environment.

Keywords Business intelligence, Job satisfaction evaluation, Saudi electricity

Paper type Research paper

Introduction

In the modern era, business organizations of all types, public, private, manufacturing and service, face numerous challenges with rapid technological change. Traditional management of business operations has become incapable of handling the growing operational needs of business organizations. Therefore, raising the organization technological infrastructure is essential to enhance the business performance efficiency. Business applications based on emerging technologies and artificial intelligence (AI) are the most feasible replacement for traditional business management operations. Business applications based on AI have drastically changed the organizational work culture and facilitated employees with an easy-to-use operational infrastructure. For instance, Business Intelligence (BI) is one of such technologies that creates an intelligent work environment for both business operations and employees of an organization.

With the emergence of BI, business organizations find new pathways for managing their operations. BI systems can operate effectively in the face of the successive change via the

Journal of Money and Business
Vol. 2 No. 1, 2022
pp. 107-131
Emerald Publishing Limited
e-ISSN: 2634-260X
p-ISSN: 2634-2596
DOI 10.1108/JMB-03-2022-0011

programs, activities and procedures that rely on them to access large amounts of information. The study's approach investigates, analyzes and creates methods based on BI that accomplish business objectives and ensure efficient results following robust decision-making approaches.

BI systems are distinguished by the features that enhance business performance efficiency. These systems can analyze business data and effectively predict business performance. Further, these systems can perform complex operations considering business requirements and produce the most appropriate solutions. Furthermore, they facilitate employees easy to access platforms, provide necessary reports with data accuracy and enhance the job satisfaction environment.

Job satisfaction is a critical component of overall happiness because it gives employees the energy to perform, continue, grow and innovate in their jobs. Achieving job satisfaction has become a critical means for progressive organizations to develop relationships with their employees. They develop employees' creative behavior, motivating them to exert additional efforts. BI applications provide intelligence business operations environment, produce accurate information, and enhance work accuracy, proficiency and efficiency. These attributes contribute to employee job satisfaction and help organizations retain a competitive workforce. The current study determines how BI systems influence job practices and employees' satisfaction in such an environment.

Research statement

Job satisfaction is one of the most important factors affecting employees' lives, as it enhances job performance, improves psychological and social compatibility, and influences other life aspects. In contrast, job dissatisfaction leads to the failure of desired work outputs and is one factor hindering progress. The study's approach evaluates the impact of BI systems on work satisfaction among Saudi Electricity Company employees, located in the Asir Region. Such systems play a vital role in delivering quality services across business organizations. Organizations adopt these systems and BI-based applications to accommodate changing customer needs, service quality and efficient administrative support to achieve high performances. These systems offer novel management models, such as business information systems and equally reflect employee job satisfaction. Precisely, they are efficient in data collection and analysis, decision-making, management support and improving business performances. The current study determines the effect of such systems in organizational environment and designs the following *research questions*:

RQ1. To what extent does the Saudi Electricity Company utilize BI elements (data collection, data warehousing, data mining, reporting and information presentation)?

RQ2. How satisfied the company's employees are with their jobs and their characteristics (organizational environment, material and moral incentives, duties and responsibilities) at the Saudi Electricity Company?

RQ3. What are the implementing features of BI systems that impact the employee job satisfaction?

The following *hypothesis* is derived from the third question:

H1. There is a statistically significant effect at the level of significance (0.05) for practicing the dimensions of BI on the level of job satisfaction in the Saudi Electricity Company in the Asir Region.

The presented study seeks to achieve the following *research objectives*:

OBJ1. Determining the extent to which the Saudi Electricity Company uses BI systems dimensions.

OBJ2. Assessing work satisfaction and its dimensions (organizational environment, material and moral incentives, duties, and responsibilities) at the Saudi Electricity Company.

OBJ3. Assessing the influence of BI practices on employees' job satisfaction.

Research significance

The study's scope and findings will contribute the administration of the Saudi Electricity Company in understanding the job satisfaction of its employees. These findings will help to improve the service quality since electricity is core utility service for the consumers. The authors expect that the study's results will add scientific knowledge and the intended advantages will provide pathways for innovative research in such management areas. The authors hope that the study's findings will enlighten the importance of BI practices in achieving job satisfaction at the Saudi Electricity Company and also creates a model for similar organizations.

Research limitations

The study will be limited to the following limits:

Objective limit: The study is determined by its objectives limit in studying the impact of BI practice on job satisfaction in the Saudi Electricity Company.

Spatial boundary: The Saudi Electricity Company in the Asir Region.

Time limit: The study was implemented in the second semester of academic year 2021.

Theoretical framework

Business intelligence

"End user-oriented procedures that rely on the employment of technology and a set of mathematical models and analytical methodologies to obtain useful information and knowledge to improve and develop the quality of decisions" (Zamzam, 2018).

Job satisfaction

The psychological feeling of contentment and satisfaction with the fulfilling needs, desires and expectations, with the work itself and its environment, with trust, loyalty, and a sense of belonging to the work and related factors (Mohammed, 2018).

Business intelligence systems

BI is critical for generating current operational and strategic business decisions. Information methods help BI systems to reduce losses by providing information that allows them to deliver services that meet consumer demands. It also helps the company prepare for future events while accomplishing its strategic goals and adjusts to a range of internal and external events that affect the organization's operations (Al-Zanoun and Mazhar, 2020).

Business intelligence dimensions

The dimensions of BI have emerged as a significant driver of performance improvement in businesses and business organizations during the last decade (Al-Masab, 2018). The following is a discussion of the BI dimensions.

Data collection: Data sources are the first step in BI systems, in which it is necessary to collect and integrate all available data from primary and secondary sources, which differ in type and origin (Kopčeková *et al.*, 2013).

Data warehouse: The data warehouse is defined as "a database that provides reports and query tools, and stores current data, old and new historical data, and statistical data, which are extracted from different operational systems, unifying them to obtain reports, administrative analysis and decision-making" (Al-Atwi, 2018).

Data mining: Data mining consists of a variety of techniques for identifying nuggets of information or decision-making knowledge in datasets and extracting them in such a way that they can be used in areas such as decision support, forecasting and estimation. Data mining is the non-intuitive extraction of implicit, previously unknown information that may be useful for searching for relationships and global patterns that exist in large databases but are hidden among the vast amount of data (Khan and Quadri, 2012).

Reporting (data analysis): Data analysis techniques are of great importance in BI applications because of their role in reshaping information and presenting it in different ways and formats to the beneficiary. Data analysis techniques can be divided into two groups: immediate analytical processing and data mining (Shabeer, 2015).

Information display: The success of the BI system in achieving its goals depends mainly on the success of the information display process, through efficiently communicating system outputs, as these technologies are the visible part of the BI system, and their efficiency is measured by their ability to display information in a way that makes them relevant (Ali, 2020).

Job satisfaction

The importance of job satisfaction can be explained as follows (Mohammed, 2018):

(1) A high degree of job satisfaction leads to a high level of ambition among workers in various institutions.

(2) A high level of job satisfaction leads to a decrease in employee absenteeism.

(3) Workers who are more satisfied with their work are less prone to work accidents.

(4) There is a close relationship between job satisfaction and productivity, the higher the job satisfaction, the higher the production.

(5) A high level of job satisfaction among workers leads to satisfaction with their lives.

Dimensions of job satisfaction

Organizational environment: Job environment and climate significantly impact employee satisfaction and well-being. Employees are happier when their employers prioritize learning and development, which leads to higher productivity and profitability. Achieving good culture and environmental management requires employee engagement, efficacy and cultural fit (Stefanovska-Petkovska *et al.*, 2019).

Material and moral incentives: It is well known that wages and material incentives help employees meet basic as well as higher-level needs. They are essential to determining performance and job satisfaction because they help attract and retain experienced workers in organizations with high human capital (Funmilola *et al.*, 2013).

Tasks and responsibilities: Job satisfaction is influenced by a number of major work-related factors, including demonstrating valued skills and abilities, opportunities for new learning and development, the variety of tasks and responsibilities employees perform, and the degree of difficulty, workload, responsibility and performance pressure (Alkatheri, 2018).

The Saudi Electricity Company

Owing to its climate and dependence on several sectors that consume electricity, such as cement, petrochemicals, iron and steel, and oil, Saudi Arabia's electric power production relies heavily on oil derivatives and natural gas (Omran and Zaalan, 2012).

The Saudi Electricity Company, a public utility company linked with the Ministry of Energy, Industry and Mineral Resources, is responsible for delivering electricity in Saudi Arabia (Gazzedh and Abubakar, 2018). The Saudi Electricity Company is the Kingdom of Saudi Arabia's foremost supplier of electrical energy services. The corporation has a capacity of approximately 74.3 GW. Saudi Arabia's government wants to boost its capacity to around 120 GW by 2032 in response to the country's growing demand for electrical services (Amran *et al.*, 2020).

The Saudi Electricity Company's primary objective is to ensure an adequate supply of electricity to the public and industry in each region, and the procedure that the Saudi Electricity Company now follows is entirely dependent on the actual, immediate needs of each district in the city for the current year, taking budget constraints into account. On the one hand, this may result in the construction of a few substations as the budget permits (El-Quliti and Kabli, 2012).

The Saudi Electricity Company seeks to maximize the efficiency of its resource utilization in generating electricity to meet the growing demand for electric energy services in a variety of sectors, including residential, industrial and commercial, and seeks to minimize the cost of electricity production (Mahish, 2016).

Employing business intelligence practices

Al-Babli (2018) identified the role of BI systems through their essential impact on job satisfaction among company employees. Participation in the formulation of the strategic vision through simplicity, clarity and comprehensiveness; and with this vision, the highest degree of active participation and belonging to the organization, satisfaction and loyalty is achieved. Vision supports the formulation of the organization's message about core activity types and provides new information that motivates employee performance, formulating the organization's strategic objectives, and analyzing and addressing the elements of strength and weakness within the organizational environment. BI systems work to achieve competitive advantage in the organization and achieve incentives and rewards.

Their research concluded that using knowledge management systems in conjunction with BI applications will boost job satisfaction by enhancing staff productivity and efficiency due to newly learned and shared knowledge. This usage also revealed that using knowledge management systems with BI applications boosts employees' sense of appreciation and worth because it preserves their expertise.

Establishing a BI culture inside the Saudi Electricity Company improves job interaction and stimulates new ideas and creativity. It is sufficient to have a more interactive and collaborative culture within the organization, and people within this cultural connection can build capacities. Staff practices and knowledge self-regulation detect and resolve current concerns (Al-Hawajrah, 2018).

Literature review

Business intelligence in Arabic studies

Al-Omari and Aqili (2020): On the one hand, tried to define BI and administrative development as well as the function of BI in administrative development at King Abdulaziz University. They evaluated how much BI is used at a medium level in administrative development and the vital importance of training in BI practices in administrative

development. The sample also included 46 community members and technicians with administrative jobs in various university bodies.

Sweis and Abdeen (2019) tested BI systems for their ability to enhance organizational competency in Palestinian banks. A questionnaire was used to collect study data, which sampled 120 bank workers (Bank of Palestine, Cairo, Amman Bank, Arab Islamic Bank and Palestinian Islamic Bank). According to one of the study's most important results, there is a direct association between BI systems and the growth of organizational genius.

Asmus (2019): This study investigated the impact of technological and organizational BI capabilities, as well as a moderate decision environment, on BI success. The sample size was 141 users, and the researcher employed a quantitative causal explanatory research approach based on a questionnaire. The investigation produced many significant conclusions, including that there is a statistically significant positive association between technological BI capabilities and BI success, while decision environments have no detectable influence on BI capabilities — numerous studies on job satisfaction.

Hafeez (2019): For this study, wealth and job satisfaction mediated the effects of affluence on employee turnover intentions. The research covered all workers of two Pakistani banks and two Pakistani educational institutions. A total of 106 workers were sampled. The researcher utilized a questionnaire-based descriptive-analytic technique. The research produced several significant conclusions, including the following: economic prosperity correlates with job satisfaction, but negatively with employee turnover intention. Job satisfaction mediates the relationship between wealth and turnover intention.

Benefits from previous studies

Previous studies aided the author in clarifying some of the study's fundamental concepts, which enriched the study's theoretical framework, identifying procedural concepts, developing tools, determining the most appropriate statistical methods to use here and in identifying findings from previous studies that aid in discussing and supporting the results.

Distinctive features of this study

Studies that deal with the impact of BI practices on job satisfaction are limited.

Research methodology

Study approach: This study relied on a descriptive-analytical approach to reach an accurate and detailed understanding of the research problem and reveal an accurate perception of the phenomenon being analyzed.

Study sample: The study sample is known to be part of the research community. A random sample of workers from the Saudi Electricity Company in the Asir Region was selected. Questionnaires were distributed electronically to 374 employees, the study sample and the 354 valid questionnaires were received.

Study tool: The questionnaire was distributed electronically to the sample members to collect the necessary data.

The questionnaire was divided into

The first axis is the practice of "BI" and contains five primary dimensions: data collection, data warehousing, data mining, reporting (data analysis) and information display.

The second axis represents "job satisfaction." The axis of job satisfaction contains three basic dimensions: organizational environment, material and moral incentives, tasks and responsibilities.

The answers were based on a five-point Likert scale, according to the following table (see Table 1):

Statistical methods used

(1) Relative frequency, mean, standard deviation and percentages.

(2) Correlation coefficients were calculated to study the relationship between the study variables.

(3) Simple and multiple regressions were used to measure the effect of the independent variable on the dependent variable.

(4) Cronbach's alpha.

(5) The analysis of variance test was used to study the differences in the answers of the study sample according to demographic variables.

Results and discussion

The researcher verified the validity of the study tool as follows:

Validity assessment: The research tool was derived from a group of experts, consisting of (3) specialized members in management, information systems and statistics. The experts expressed their opinions on the appropriateness of statements, clarity of formulation and suitability of each statement to the axis. Accordingly, the researcher made modifications agreed upon by the experts.

(1) Confirmatory factor analysis:

CFA indicates the questionnaire's stability in its results and does not change significantly if it was redistributed to the sample members several times under the same conditions. The study used the internal consistency method to measure the tool's stability using Cronbach's alpha test, as shown in the Table 2.

Field study analysis

RQ4. What is the degree to which the dimensions of BI are used by the Saudi Electricity Company in the Asir Region?

In addition, there were the following sub-questions:

The first sub-question: What is the degree of use for data collection in the Saudi Electricity Company in the Asir Region?

The arithmetic averages, standard deviations, the order of the items and the degree of response to the items of the first dimension (data collection) were obtained to answer this question. The results in Table 3 show the following.

Table 2 shows that the Cronbach alpha coefficients for the resolution axes were all highly acceptable, with a very high stability value indicating consistency and good interdependence between study axes.

In general, the mean of all the items for the dimension of data collection was 4.384, which is within the classification of a "very high response" according to the Likert five-point scale. The results show the responses to the items of the sample members, arranged in order of relative

Rating	Very high	Highly	Medium	Weakly	Very weak degree
Degree	5	4	3	2	1

Table 1.
Five-point Likert scale

Table 2.
Values of Cronbach's alpha coefficient for the scales used in the study

Axis	Axis dimensions	Number of phrases	Cronbach's alpha coefficients above 70% are acceptable
The first	The first dimension: data collection	4	0.912
	The second dimension: Data warehouse	4	0.922
	The third dimension: data mining	4	0.916
	Fourth dimension: Reporting (data analysis)	4	0.934
	The fifth dimension: The transmission (display) of information	4	0.920
Axis one: business intelligence		20	0.978
The second	The first dimension: The regulatory environment	5	0.940
	The second dimension: Material and moral incentives	5	0.935
	Dimension three: Duties and responsibilities	5	0.943
Theme two: job satisfaction		15	0.977
Overall survey		35	0.986

importance. Item 4 ranked first, followed by items 1 and 2 in second place, with the same relative importance, and item 3 in third place. We conclude that the degree of use after data collection in the Saudi Electricity Company in the Asir Region is high.

The results here are consistent with the study of Sweis and Abdeen (2019), who found that the actual application of BI systems was high in the dimension of data collection.

The second sub-question: What is the degree of use of the data warehouse dimension in the Saudi Electricity Company in the Asir Region?

The arithmetic averages, standard deviations, the order of the items and the degree of response to the items of the second dimension (data warehousing) were obtained to answer this question. The results in Table 4 show the following.

The arithmetical averages of the items ranged between (4.437–4.491); in general, the arithmetic mean of all items for the data warehouse dimension was 4.461, which falls within the classification of a "very high response" according to the Likert five-point scale. The results show the responses of the sample members to the items arranged in order of relative importance from highest to lowest according to their relative importance, similar to their order in Table 4.

The results are consistent with the results of the Al-Atwi study (2018), which reached a high rate for data warehousing in Saudi telecom technology companies.

The third sub-question: What is the degree of use for data mining in the Saudi Electricity Company in the Asir Region?

The arithmetical averages, standard deviations, the order of the items and the degree of response to the items in the third dimension (data mining) were obtained to answer this question. The results in Table 5 show the following.

The arithmetic averages of the items ranged between (4.409–4.502), and in general, the arithmetic mean of all items for the data mining dimension was 4.462, which falls within the "very high response" classification according to the Likert five-point scale. The results show the responses of the sample members to the items arranged in order of relative importance from highest to lowest as follows: Item 4 ranked first, followed by item 3, whereas item 1 was in third place and item 2 was in last place. We conclude that the degree of use of data mining in the Saudi Electricity Company in the Asir Region is high.

The study results in this field agree with the results of the Al-Atwi study (2018), which found that data mining revealed a high degree of use.

N	The item	Dimension one: data collection	Very weak degree	Weakly	Neutral	Highly	Very high	Average Relative importance	Standard deviation	degree of suitability	Order of importance
1	It is used to collect advanced technical data on an ongoing basis	Repetition	6	18	39	63	228	4.381	0.983	Very high	2
		The ratio	1.7	5.1	11.0	17.8	64.4	0.876			
2	It relies on collecting information on various internal and external sources	Repetition	7	15	27	92	213	4.381	0.939	Very high	2
		The ratio	2.0	4.2	7.6	26.0	60.2	0.876			
3	Data collection contributes to developing and improving the performance and quality of the service provided	Repetition	7	14	39	72	222	4.378	0.965	Very high	3
		The ratio	2.0	4.0	11.0	20.3	62.7	0.875			
4	Sophisticated technology when collecting data helps in obtaining accurate data	Repetition	6	20	28	74	226	4.395	0.970	Very high	1
		The ratio	1.7	5.6	7.9	20.9	63.8	0.879			

Table 3.
Analysis of the first dimension paragraphs: data collection

Table 4.
Second dimension: data warehouse

			Dimension two: data warehouse								
N	The item		Very weak degree	Weakly	Neutral	Highly	Very high	Average Relative importance	Standard deviation	degree of approval	Order of importance
1	Storage of data and information contributes to business development	Repetition	6	12	24	72	240	4.491	0.891	Very high	1
		The ratio	1.7	3.4	6.8	20.3	67.8	0.898			
2	Data storage helps foster creative ideas to improve the services provided	Repetition	4	12	27	83	228	4.466	0.861	Very high	2
		The ratio	1.1	3.4	7.6	23.4	64.4	0.893			
3	The vast stock of knowledge brings technological innovation	Repetition	6	9	39	65	235	4.451	0.909	Very high	3
		The ratio	1.7	2.5	11.0	18.4	66.4	0.890			
4	The data warehouse realizes the principle of technological innovation which is part of business intelligence	Repetition	9	12	27	73	233	4.437	0.953	Very high	4
		The ratio	2.5	3.4	7.6	20.6	65.8	0.887			

N	The item	The third dimension: data mining	Very weak degree	Weakly	Neutral	Highly	Very high	Average Relative importance	Standard deviation	degree of approval	Order of importance
1	Data mining is used to constantly add and develop new services	Repetition	7	11	28	80	228	4.443	0.911	Very high	3
		The ratio	2.0	3.1	7.9	22.6	64.4	0.888			
2	Using data mining helps in obtaining products and services with minimal time and effort	Repetition	4	14	35	81	220	4.409	0.902	Very high	4
		The ratio	1.1	4.0	9.9	22.9	62.1	0.881			
3	Data mining contributes to organizing and arranging data	Repetition	4	9	26	84	231	4.494	0.828	Very high	2
		The ratio	1.1	2.5	7.3	23.7	65.3	0.898			
4	Data mining contributes to providing highly accurate information	Repetition	4	11	28	71	240	4.502	0.855	Very high	1
		The ratio	1.1	3.1	7.9	20.1	67.8	0.900			

Table 5.
The third dimension: data mining

The fourth sub-question: What is the degree of use for preparing reports from the Saudi Electricity Company in the Asir Region?

The arithmetical averages, standard deviations, the order of the paragraphs and the degree of response to the paragraphs of the fourth dimension (reporting) were obtained to answer this question. The results in Table 6 show the following.

The arithmetic averages of the paragraphs ranged between (4.485–4.559). In general, the arithmetic mean of all the paragraphs for the reporting dimension was 4.513, which falls within the classification of a "very high response" according to the Likert five-point scale. The results show the responses of the sample members to the items arranged in order of relative importance from highest to lowest is as follows: Item 1 ranked first, followed by item 4 in second place, whereas item 2 was in third place and item 3 was in last place.

The results of the study in this field agree with the results of Shabeer (2015), which concluded that there is a high level of BI in all its dimensions in the banking sector.

The fifth sub-question: What is the degree of use for displaying information in the Saudi Electricity Company in the Asir Region?

To answer this question, the arithmetic averages, standard deviations, order of the paragraphs and degree of response to the paragraphs of the fifth dimension (presentation of information) were obtained. The results in Table 7 show the following.

The arithmetic averages of the paragraphs ranged between 4.454 and 4.56. In general, the arithmetic mean of all the paragraphs for the dimension of transmission (display) of information was 4.502, which is within the classification of a "very high response" according to the five-point Likert scale. We conclude that the degree of data collection of the Saudi Electricity Company in the Asir Region is very high. The results show the responses of the sample members to the items arranged in order of relative importance from highest to lowest as follows: Item 1 ranked first, followed by item 2 ranking second. Item 4 was in third place, and item 3 was in fourth place.

The results of the study agree with Sweis's results as well as Abdi's study (2019), who found that the reality of the application of BI systems (after analyzing the data) came to a high rate, and the results of Al-Atwi (2018), which also concluded, after data analysis, that it produced a high rate.

To answer the first main question:

The arithmetic averages of the dimensions of BI ranged between 4.384 and 4.513); in general, the arithmetic average of all dimensions of BI reached 4.464, which falls within the classification of a "very high response" according to the Likert five-point scale. We conclude that the degree of use of BI dimensions in the Saudi Electricity Company of the Asir Region is very high, and the results show the responses of the sample members to the dimensions of BI, arranged in order of relative importance from highest to lowest, as follows:

Preparation of reports: the relative importance of this phrase was 0.9026, and it ranked first.

Conveying information (presentation): The relative importance of this phrase was 0.9005. It ranked second.

Data warehousing: the relative importance of this phrase was 8,923; it ranked third.

Data Mining: the relative importance of this phrase was 8,925; it ranked third.

Data collection: the relative importance of this phrase was 8,768; it ranked fourth.

This result is consistent with the study by Sweis and Abdeen (2019), Al-Atwi (2018) and Shabeer (2015), all of which concluded that there is a high level of BI in all dimensions.

RQ5. What is the degree of job satisfaction and its dimensions (organizational environment, material and moral incentives, tasks and responsibilities) in the Saudi Electricity Company in the Asir Region?

N	The items	Fourth dimension: reporting (data analysis)	Very weak degree	Weakly	Neutral	Highly	Very high	Average Relative importance	Standard deviation	degree of approval	Order of importance
1	The speed of data analysis helps save time and effort in providing a new service	Repetition	7	6	23	64	254	4.559	0.847	Very high	1
		The ratio	2.0	1.7	6.5	18.1	71.8	0.911			
2	Accuracy and clarity of data analysis contribute to increasing future profits	Repetition	4	12	24	77	237	4.500	0.852	Very high	3
		The ratio	1.1	3.4	6.8	21.8	66.9	0.900			
3	Data intelligence helps accelerate the implementation of future insights	Repetition	7	11	27	67	242	4.485	0.910	Very high	4
		The ratio	2.0	3.1	7.6	18.9	68.4	0.897			
4	Keen on quality process in data analysis	Repetition	6	9	25	73	241	4.508	0.865	Very high	2
		The ratio	1.7	2.5	7.1	20.6	68.1	0.901			

Table 6.
Fourth dimension: reporting (data analysis)

Table 7.
The fifth dimension: information transmission (presentation)

The fifth dimension: The transmission (display) of information											
N	The items		Very weak degree	Weakly	Neutral	Highly	Very high	Average Relative importance	Standard deviation	degree of approval	Order of importance
1	Presenting information appropriately contributes to the ability to discover strengths in order to seek their development	Repetition The ratio	5 1.4	8 2.3	19 5.4	72 20.3	250 70.6	4.564 0.912	0.812	Very high	1
2	Displaying information increases the ability to detect vulnerabilities, so that they can be addressed	Repetition The ratio	3 0.8	8 2.3	22 6.2	93 26.3	228 64.4	4.511 0.902	0.783	Very high	2
3	Presenting information leads to the discovery of opportunities, and an attempt to exploit them	Repetition The ratio	3 0.8	6 1.7	41 11.6	81 22.9	223 63.0	4.454 0.890	0.827	Very high	4
4	Presentation of information develops the ability to detect threats and risks in order to avoid them	Repetition The ratio	5 1.4	8 2.3	33 9.3	74 20.9	234 66.1	4.480 0.896	0.862	Very high	3

Research proceeded using the following sub-questions:

The first sub-question: To what degree was the regulatory environment in the Saudi Electricity Company in the Asir Region achieved?

The arithmetical averages, standard deviations, the order of the items and the degree of response to the items of the first dimension (the organizational environment) were found to answer this question. The results are shown in Table 8.

The results show the responses of the sample members to the items arranged in order of relative importance from highest to lowest as follows: the arithmetic averages of the items ranged between 4.420 and 4.511, and in general, the arithmetic mean of all items for the dimension of the regulatory environment was 4.463, which is within the classification of "very high response" according to the Likert five-point scale. We conclude that the response regarding achieving a regulatory environment in the Saudi Electricity Company in the Asir Region is very high.

Item 1 ranked first, followed by item 5; item number 4 and fourth rank ranked item number 2 whereas in the last rank item number 3 ranked third.

This result is consistent with the results of Cheap (2017), which found that the degree of job satisfaction dimensions was high.

The second sub-question is to what degree material and moral incentives are achieved by the Saudi Electricity Company in the Asir Region?

To answer this question, the arithmetical averages, standard deviations, the order of the items and the degree of response to the items of the second dimension (material and moral incentives). The results in Table 9 show the following:

The arithmetic averages of the paragraphs ranged between 4.327 and 4.533. In general, the arithmetic mean of all paragraphs was 4.421, which falls within the classification of "very high response" according to the Likert five-point scale. We conclude that achieving material and moral incentives, tasks and responsibilities in the Saudi Electricity Company in the Asir Region is high. The results show the responses of the sample members to the items, arranged in order of relative importance from highest to lowest, as follows:

Item 3 ranked first, followed by item 2; item 1 was in third place and item 4 in fourth place; in the fourth rank was item number 4, whereas item number 5 ranked second.

The results of a study in this field agree with those of the Shdeifat's study (2015). There is a statistically significant effect at the level of (0.05) for human resources planning, selection and appointment on employee satisfaction.

The third sub-question: What is the degree of fulfilling tasks and responsibilities in the Saudi Electricity Company in the Asir Region?

The arithmetical averages, standard deviations, the order of the items and the degree of response to the items of the third dimension (tasks and responsibilities) were obtained to answer this question. The results in Table 10 show the following.

The results show the responses of the sample members to the items, arranged in order of relative importance from highest to lowest, as follows: the arithmetic averages of the items ranged between 4.409 and 4.584, and in general, the arithmetic mean of all items for the dimension of tasks and responsibilities was 4.463, which falls within the classification of "very high response" according to the Likert five-point scale. We conclude that the degree of fulfillment of tasks and responsibilities in the Saudi Electricity Company in the Asir Region is very high. Item 1 ranked first, followed by item 2; item 3 was in third place whereas item 5 was in fourth place; item 4 was in last place.

The current study results in this field are consistent with the results of the study by Muhammad and Bhash (2017), who found that the level of job satisfaction was moderate among teachers of education.

Table 8.
First dimension: regulatory environment

N	The items		The first dimension: The regulatory environment Very weak degree	Weakly	Neutral	Highly	Very high	Average Relative importance	Standard deviation	degree of approval	Order of importance
1	The environment within the work attracts employees to work in it with the presence of modern technologies	Repetition The ratio	8 2.3	16 4.5	19 5.4	55 15.5	256 72.3	4.511 0.902	0.949	Very high	1
2	Modern technologies have contributed to doing the work that the employee is proficient in and wants to work in	Repetition The ratio	5 1.4	19 5.4	20 5.6	75 21.2	235 66.4	4.457 0.891	0.924	Very high	4
3	Human cadres are constantly trained to use modern technologies	Repetition The ratio	6 1.7	19 5.4	25 7.1	74 20.9	230 65.0	4.420 0.884	0.955	Very high	5
4	Effective internal communication is available with modern technology between business departments and employees	Repetition The ratio	5 1.4	13 3.7	32 9.0	68 19.2	236 66.7	4.460 0.892	0.906	Very high	3
5	A technical support section is available to assist in the event of a sudden technical failure	Repetition The ratio	4 1.1	17 4.8	30 8.5	61 17.2	242 68.4	4.468 0.893	0.919	Very high	2

N	The items	The second dimension: material and moral incentives	Very weak degree	Weakly	Neutral	Highly	Very high	Average Relative importance	Standard deviation	degree of approval	Order of importance
1	Modern technology has contributed to achieving the moral and material requirements of the employees	Repetition	5	15	34	62	238	4.449	0.930	Very high	3
		The ratio	1.4	4.2	9.6	17.5	67.2	0.889			
2	Modern technology has helped employees reduce work pressures	Repetition	4	17	32	62	239	4.454	0.924	Very high	2
		The ratio	1.1	4.8	9.0	17.5	67.5	0.890			
3	Employees can benefit from modern technology services at any time and with minimal effort	Repetition	5	11	30	52	256	4.533	0.881	Very high	1
		The ratio	1.4	3.1	8.5	14.7	72.3	0.906			
4	Employees who excel in using modern technology are rewarded with financial incentives	Repetition	7	25	36	58	228	4.341	1.045	Very high	4
		The ratio	2.0	7.1	10.2	16.4	64.4	0.868			
5	Modern technology contributes to the chances of getting promotions and obtaining a higher job rank	Repetition	8	21	43	57	225	4.327	1.045	Very high	5
		The ratio	2.3	5.9	12.1	16.1	63.3	0.865			

Table 9.
The second dimension: material and moral incentives

Table 10.
The third dimension: tasks and responsibilities

N	The items	The third dimension: duties and responsibilities	Very weak degree	Weakly	Neutral	Highly	Very high	Average Relative importance	Standard deviation	degree of approval	Order of importance
1	Modern technology has eased tasks and responsibilities	Repetition	6	8	16	67	257	4.584	0.821	Very high	1
		The ratio	1.7	2.3	4.5	18.9	72.6	0.916			
2	Employees are keen to bear the difficulties of using modern technology in order to accomplish the tasks required of them	Repetition	5	12	24	88	255	4.457	0.871	Very high	2
		The ratio	1.4	3.4	6.8	24.9	63.6	0.891			
3	Employees seek to gain experience through modern training courses in the field of information technology that the management provides them constantly	Repetition	9	12	32	62	239	4.440	0.968	Very high	3
		The ratio	2.5	3.4	9.0	17.5	67.5	0.888			
4	The employees seriously strive to achieve the desired administrative goals through the use of modern technology	Repetition	11	12	30	69	232	4.409	0.995	Very high	5
		The ratio	3.1	3.4	8.5	19.5	65.5	0.881			
5	Employees are obligated to implement the internal regulations and laws related to modern technology at work	Repetition	8	17	23	75	231	4.423	0.967	Very high	4
		The ratio	2.3	4.8	6.5	21.2	65.3	0.884			

RQ5. What is the degree of job satisfaction and its dimensions (organizational environment, material and moral incentives, tasks and responsibilities) in the Saudi Electricity Company in the Asir Region?

To answer this question, the arithmetical averages, standard deviations, the order of the paragraphs and the degree of response to all job satisfaction and its dimensions (organizational environment, material and moral incentives, tasks and responsibilities), the results are shown in Table 11.

This result is consistent with the studies of Al-Rakhees (2019), Al-Anzi (2011), and Al-Bayt (2014), which confirmed the existence of a level between high and medium job satisfaction.

RQ6. What is the impact of BI practices on job satisfaction in the Saudi Electricity Company in the Asir Region?

To answer the third main question, we formulated the following main hypothesis:

From the previous table, the correlation coefficients between the axes and dimensions of the study, the value of the Pearson correlation coefficient between the second axis (job satisfaction) and the dimensions of BI was as follows: first, data collection, followed by data warehouse in second place; data mining was in the third place, followed by reporting in fourth place, and finally presenting information in fifth place. This indicates a strong direct correlation between the axis of job satisfaction and the dimensions of BI (see Table 12).

First main hypothesis test. There is a statistically significant effect at a significance level (0.05) for the axis of BI practice on the axis of satisfaction level for the employees of the Saudi Electricity Company in the Asir Region. Simple linear regression analysis was used to measure the impact of the independent variable (BI practice) on the dependent variable (the second axis: job satisfaction).

Simple linear regression analysis. The research hypotheses are tested using the simple regression method, which is used to study the relationship between a dependent variable and

Axis/dimension	Average Relative importance	Standard deviation	Degree of approval	Order of importance
The first axis: practicing business intelligence	4.4649 0.8929	0.7476	Very high	
Dimension one: data collection	4.3841 0.8768	0.8588	Very high	5
Dimension two: data warehouse	4.4618 0.8923	0.8143	Very high	4
The third dimension: data mining	4.4625 0.8925	0.7825	Very high	3
Fourth dimension: reporting (data analysis)	4.5134 0.9026	0.7941	Very high	1
The fifth dimension: the transmission (display) of information	4.5028 0.9005	0.7382	Very high	2
Theme two: job satisfaction	4.449 0.8899	0.818	Very high	
The first dimension: the regulatory environment	4.4638 0.8927	0.8359	Very high	1
The second dimension: material and moral incentives	4.421 0.8842	0.8620	Very high	3
Dimension three: duties and responsibilities	4.4632 0.8899	0.8365	Very high	2

Table 11. Descriptive analysis of the axes and dimensions of the questionnaire as a whole

Table 12.
Calculation of the correlation coefficients between the axes and dimensions of the study

Study variables		1st: data collection (whether from internal or external sources)	The second dimension: The data warehouse	The third dimension: data mining	Fourth dimension: Reporting (data analysis)	The fifth dimension: Information transmission	Theme one: Practicing business intelligence
Theme two: job satisfaction	Pearson's link	0.737	0.852	0.820	0.817	0.854	0.869
	Indication level	0.000	0.000	0.000	0.000	0.000	0.000
	N	354	354	354	354	354	354

an independent variable. The independent variable is BI practice. The dependent variable is the second axis: job satisfaction.

Table 13 shows the results of the simple regression model for the impact of the BI practice variable on the job satisfaction variable.

The study results agree with Al-Azzawi (2013), who concluded that there is a significant correlation and effect between BI systems and human capital development in this field.

The five independent variables are the dimensions of the first axis: the practice of BI (data collection, data warehouse, data mining, reporting "data analysis," information presentation), and the dependent variable is job satisfaction.

Table 14 reports the major model factors in the last row of the table in addition to the regression coefficients, standard error, standard regression coefficients, *t*-value and indication level. Finally, the table interprets the values reporting two out of three dimensions to be significant, which are the second and fifth dimensions.

Variable	Regression coefficients	Standard error	Standard regression coefficients	*t*-value	Indication level	Interpretation
Constant	0.206	0.131		1.573	0.117	
Practice business intelligence	0.950	0.029	0.869	32.879	0.000	Significant
F value = 1081.037; degrees of freedom = (352, 1); total significant level = 0.000 R^2 adjusted coefficient of determination = 0.754 R^2 adjusted coefficient of determination = 0.752						The model is significant

Table 13. Results of the simple regression model for the impact of the business intelligence practice variable on the job satisfaction variable

Variable	Regression coefficients	Standard error	Standard regression coefficients	*t*-value	Indication level	Interpretation
Constant	0.081	0.128		0.632	0.528	
Dimension one: data collection	0.000	0.047	0.000	−0.003	0.998	Insignificant
Dimension two: data warehouse	0.368	0.070	0.367	5.301	0.000	Significant
The third dimension: data mining	0.070	0.071	0.067	0.981	0.328	Insignificant
Fourth dimension: reporting "data analysis"	0.077	0.065	0.075	1.198	0.232	Insignificant
The fifth dimension: Information display	0.459	0.064	0.414	7.190	0.000	Significant
F value = 249.171 degrees of freedom = (5,348) overall significant level = 0.000 Correlation coefficient R = 0.884 coefficient of determination R^2 = 0.782 R^2 adjusted coefficient of determination = 0.779						The model is significant

Table 14. Shows that the results of the multiple regression model to study the significance of the effect of the independent variables on the dependent variable

A multiple regression model was conducted after excluding the variables with insignificant effects (data collection, data mining, reporting "data analysis") and keeping the independent variables with a significant effect (data warehouse and information display).

Table 15 reports the major model factors in the last row of the table, in addition to the regression coefficients, standard error, standard regression coefficients, *t*-value and indication level. Finally, the table interprets the values showing that the two dimensions found to be significant are the second and fifth dimensions.

Results summary

(1) The first axis: BI practice received the maximum degree of approval. It is a statistical indicator limited to the fifth category of approval level. Thus, it is considered "to a very high degree" of what is stated in the axis. The fourth dimension, "Preparation of reports (data analysis)" came in second place; the fifth dimension, "Transmission (presentation) of information," came in third place; the third dimension, "data mining," came in fourth place; the second dimension, "data warehousing," came in fifth place, the first dimension: "data collection."

(2) The first dimension is the organizational environment, the third dimension is tasks and responsibilities, and the third dimension is the second dimension: material and moral incentives.

(3) The second axis: Job satisfaction has the maximum degree of approval. It is statistically shown to be at the fifth category of approval level, which "strongly agrees" with the statement.

(4) There is a statistically significant effect for the axis of practicing BI on the axis of employee satisfaction level for the Saudi Electricity Company in the Asir Region.

(5) Recommendations:

(6) The results indicate the following recommendations for management at the Saudi Electricity Company:

(7) There is a need to address and resolve the complexities involved in implementing BI environments, particularly with contemporary BI tools that employ highly complex modern technologies.

Table 15.
Results of the multiple regression model after excluding the dimensions of the business intelligence variable that have a non-significant effect on the job satisfaction variable

Variable	Regression coefficients	Standard error	Standard regression coefficients	*t*-value	Indication level	Interpretation
Constant	0.116	0.127		0.915	0.361	
Dimension two: data warehouse	0.450	0.050	0.448	8.922	0.000	Significant
The fifth dimension: Information display	0.517	0.056	0.446	9.291	0.000	Significant
F value = 620.387 degrees of freedom = (2,351) overall significant level = 0.000						The model is significant
Correlation coefficient R = 0.883 coefficient of determination R^2 = 0.779						
R^2 adjusted coefficient of determination = 0.778						

(8) A need exists to expand the scope of the BI systems in the Saudi Electricity Company to contribute to employee development.

(9) The company needs to manage human capital as a significant and strategic resource among the various resources owned by the company, maintaining and developing it continuously.

(10) A necessity exists to address the current gaps in the complexity of BI tools in the Saudi Electricity Company.

Future research

(1) The impact of the integrated application of AI with BI on the success of Saudi company operations.

(2) Success factors of human resource management strategies on strategic flexibility in the Saudi Electricity Company.

References

From Arabic studies

Al-Anzi, A.M. (2011), "Job satisfaction and work turnover: the case of the engineers of the saudi electricity company in the eastern sector", Unpublished Master's Thesis, Faculty of Economics and Administrative Sciences, Yarmouk University.

Al-Atwi, M.D.A.S. (2018), "The impact of business intelligence systems on the effectiveness of information and communication technology companies in Saudi Arabia", Unpublished Master's Thesis, College of Business, Amman Arab University.

Al-Azzawi, G.R. (2013), "The use of business intelligence systems in human capital development: an exploratory study of a sample of employees in the Ministry of Health", *Al-Ghari Journal of Economic and Administrative Sciences*, No. 28, pp. 49-74.

Al-Babli, M.A.A. (2018), "Self-service for business intelligence systems: exploring and representing data for intelligent decisions", Unpublished Master's Thesis, College of Business, Amman Arab University.

Al-Bayt, A.A.-S.F.D. (2014), "Job satisfaction and its role in improving the productivity of organizations: an applied study on saudi private sector organizations in Riyadh from 2010 to 2013 AD", Unpublished PhD Thesis, College of Graduate Studies, Al-Nelain University.

Al-Hawajra, K.M.Y. (2018), "The mediating role of business intelligence capabilities between organizational leadership and strategic success at the Jordanian Public University", *The Jordanian Journal of Business Administration*, Vol. 14 No. 3, pp. 413-444.

Al Kathiri, F.A. (2018), "Job satisfaction as an indicator of the effectiveness of the human resource management governance system in the parliamentary institutions in the United Arab Emirates", Unpublished Master's Thesis, College of Humanities and Social Sciences, United Arab Emirates University.

Al-Masab, A. (2018), "The effect of management knowledge on the business development", *Journal of Business Research*, Vol. 14 No. 1 (In this issue).

Al-Omari, M.B.A. and Aqili, O.B.M. (2020), "The role of business intelligence in administrative development at King Abdulaziz University", *King Abdulaziz University Journal: Arts and Humanities*, Vol. 28 No. 13, pp. 77-110.

Al-Rakhees, M. (2019), "Dimensions of the omponents of job satisfaction among workers in the public authority for applied education", *The Arab Journal of Science and Research Publishing*, Vol. 1 No. 1, pp. 97-108.

Al-Zanoun, M.M.R. and Mezher, R.A.M. (2020), "The impact of using business intelligence systems on the entrepreneurial trends of the palestinian banking sector: bank of palestine as a model", *A Research Paper Presented to the International Conference on Information Technology and Business*, pp. 1-29.

Ali, H.A.R.H. (2020), "The role of the business intelligence system in promoting high performance: an exploratory study of a sample of private banks in Erbil Governorate", *The Arab Journal of Management*, Vol. 40 No. 4, pp. 269-286.

Cheap, M. (2017), "Dimensions and components of job satisfaction among workers in the Public Authority for Applied Education", *The Arab Journal of Science and Research Publishing*, Vol. 1 No. 1, pp. 97-108.

Mohamed, S.E.-T. (2018), "Job satisfaction: a case study of a selected sample of workers in the national pension and social security fund", *Journal of Graduate Studies*, El-Neelain University, Vol. 12 No. 45, pp. 59-82.

Omran, K.M. and Zaalan, R.A.-I. (2012), "Using some statistical methods to predict electricity consumption in the Kingdom of Saudi Arabia", *College of Administration and Economics, University of Basra*, Vol. 8 No. 29, pp. 261-279.

Shabeer, M.M.O. (2015), "The role of business intelligence systems in developing human capital in the palestinian banking sector: a case study: Bank of Palestine", Unpublished Master's Thesis, College of Commerce, Islamic University, Palestine.

Shdeifat, F. (2015), "The Impact of human resource management practices on job satisfaction", (Unpublished Master's Thesis), Al al-Bayt University.

Sweis, M.I.K. and Abdeen, I.A.S. (2019), "The role of business intelligence systems in building organizational prowess: by application to banks operating in Palestine", *Journal of the Islamic University of Economic and Administrative Studies*, Vol. 27 No. 1, pp. 176-201.

Zamzam, H.A. (2018), "The impact of management information systems on business intelligence", Unpublished Master's Thesis, College of Business, Amman Arab University.

From English studies

Amran, Y.A., Amran, Y.M., Alyousef, R. and Alabduljabbar, H. (2020), "Renewable and sustainable energy production in Saudi Arabia according to Saudi Vision 2030; Current status and future prospects", *Journal of Cleaner Production*, Vol. 247, pp. 1-60.

Asmus, S.D. (2019), "Decision environments moderating effects on business intelligence capabilities and business intelligence success", (Unpublished Doctoral Dissertation), Capella University.

El-Quliti, S.A. and Kabli, M.R. (2012), "Economic scheduling of the electric transmission/distribution substations in Jeddah city with parametric results", *Journal of King Abdulaziz University*, Vol. 23 No. 2, pp. 115-136.

Funmilola, O.F., Sola, K.T. and Olusola, A.G. (2013), "Impact of job satisfaction dimensions on job performance in A small and medium enterprise in Ibadan, South Western, Nigeria", *Interdisciplinary Journal Oof Contemporary Research in Business*, Vol. 4 No. 11, pp. 509-521.

Gazzedh, K. and Abubakar, I.R. (2018), "Regional disparity in access to basic public services in Saudi Arabia: a sustainability challenge", *Utilities Policy*, Vol. 52, pp. 70-80.

Hafeez, M.M.I. (2019), "Influence of thriving and job satisfaction on turn over intention: mediating role of job satisfaction", *International Journal of Information, Business and Management*, Vol. 11 No. 3, pp. 1-8.

Khan, R.A. and Quadri, S.M.K. (2012), "Business intelligence: an integrated approach", *Business Intelligence Journal*, Vol. 5 No. 1, pp. 64-70.

Kopčeková, A., Kopček, M. and Tanuška, P. (2013), "Business intelligence in process control", *The Journal of Slovak University of Technology*, Vol. 21 No. 33, pp. 43-53.

Mahish, M. (2016), "Essays on GCC energy economics and Saudi Arabia's economic growth", [Unpublished Doctoral dissertation], Auburn University, Auburn.

Stefanovska-Petkovska, M., Petrovska, I., Bojadziev, M., Schaffer, I. and Tomovska-Misoska, A. (2019), "The effects of organizational culture and dimensions on job satisfaction and work-life Balance", *Montenegrin Journal of Economics*, Vol. 15 No. 1, pp. 99-112.

Further reading

Emhamed, Z. and Bahah, A. (2017), "Job satisfaction and its relationship to achievement motivation among physical education teachers in the intermediate education stage", *Journal of the History of Science*, No. 7, pp. 194-212.

Hussin, N. and Mokhtar, S.H.M. (2018), "The impacts of knowledge management practices on employees' job satisfaction", *International Journal of Academic Research in Progressive Education and Development*, Vol. 7 No. 3, pp. 338-351.

Wnuk, M. (2017), "Organizational conditioning of job satisfaction. A model of job satisfaction", *Contemporary Economics*, Vol. 11 No. 1, pp. 31-44.

Corresponding author

Faiz Binzafrah can be contacted at: fzafrah@kku.edu.sa