



Assessing the effect of Business Intelligence and Innovation on business startups: A Case Study Approach

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Abstract

business intelligence and innovation are crucial in initiating and advancing company enterprises. This research examined the impact of business intelligence and innovation on business startups. A simple random sampling approach was used to gather data using questionnaires mailed to 173 workers and managers of enterprises in the Kurdistan Region of Iraq. The study used Pearson correlation and Regression analysis to ascertain the association between factors and the impact of business intelligence and innovation on company startups. The analysis was conducted using SPSS software version 26. The study findings demonstrate a direct and positive relationship between the variables of business intelligence and innovation for business startups. Additionally, business intelligence and innovation have a noteworthy impact on the success of business startups.

Keywords: Business Intelligence, Innovation, Business Startups.

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Introduction

Overview

A startup is a nascent enterprise that utilizes initial capital to cultivate an innovative product or service and introduce it to the market with a competitive drive, enabling consumers to acquire the product at a reduced cost and fostering more excellent employment prospects (Bohn & Kundisch, 2018). It is a corporation with a brief history of operations still developing or investigating potential markets (Shvets, 2018). Business startups require business intelligence and innovation for success. Firm Intelligence involves data visualization for better decision-making and action (Kasemsap, 2016). However, practical application is challenging for organizations, and understanding how to use business intelligence investment can be

challenging (Hribar Rajterič and Irena, 2010). Also, innovation is the development and implementation of new processes, products, services, and delivery systems that substantially improve results, efficiency, effectiveness, or quality (Taylor, 2017). Innovation presents itself in a variety of ways in emerging societies. More excellent knowledge of what innovation means and why it matters, as regarded by developing nations' fast-rising young population (Baskaran & Mehta, 2016).

Business intelligence and innovation are essential for company beginnings since they provide the monitoring of industry trends, rivals, and consumer behavior, hence delivering useful insights to organizations (Wanda & Stian, 2015). An essential task is to examine the influence of organizational Intelligence on enhancing the learning and innovation skills of persons in a startup organization (Huang et al., 2022). Business Intelligence has the potential to influence a company's success significantly and is thus a crucial focus for many firms (Hawking & Sellitto, 2010).

Innovation is crucial for organizations, especially startups, as it enhances survival rates and reduces production costs. Process improvements boost survival rates, while radical breakthroughs lower them. However, excessive newness and tininess can only improve longevity if the innovative business is burdened with excessive liabilities (Konga and Ramaiah, 2021). Business startups increasingly integrate technology to drive innovation and growth (Hendri Khuan et al. 2023). They seek solutions to eliminate issues and improve value during product/service development, increasing their chances of success without significant external investments. Innovation and business intelligence contribute to positive outcomes (Nazari et al., 2022). This study aims to analyze how business intelligence and innovation can be effectively employed in the growth of new enterprises in the Kurdistan Region's Halabja, Sulaimani, and Ranya regions. Startups rely on these concepts to adapt to market demands, better understand consumer needs, and make informed decisions. However, a greater understanding of using business intelligence effectively to drive innovation within the startup environment must be more significant. The study focuses on managers and employees from these regions. The significance of business intelligence and innovation in startup firms is evident in their ability to help them overcome obstacles and establish an advanced position in the labor market.

Literature Review

Business Intelligence:

Business intelligence, sometimes known as BI, encompasses a range of software applications used to analyze unprocessed data inside a firm. Data mining, online analytical processing, querying, and reporting are interconnected operations within business intelligence. Businesses use business intelligence to optimize

decision-making, save expenses, and discover novel opportunities. Business intelligence encompasses more than just corporate reporting or a collection of tools for pulling data from organizational systems. CIOs use business information to identify inefficient business processes that may be redesigned (Mulcahy, 2013). Business Intelligence (BI) is a systematic approach that transforms raw information into structured data, which is then analyzed to provide insights and enhance a company's fundamental decision-making process (Singh & Samalia, 2014).

Business intelligence encompasses computerized methods for detecting, collecting, and analyzing organizational data, including sales revenue categorized by product and department and associated expenses and income. Business intelligence tools comprehensively analyze past, current, and future trends in organizational operations. Business intelligence technologies are often used for reporting, online analytical processing, data mining, firm performance management, benchmarking, text mining, and predictive analytics (Cebotarean & Titu, 2011). Business intelligence (BI) assists administrators in analyzing information from various sources to enhance decision-making at both tactical and strategic levels. Existing data frameworks are suitable for regular use, but new tools are required for organizational and operational planning in business analysis (Rasoul & Mohammad, 2016).

The concept of business intelligence has been widely recognized in the corporate sector in recent years. The term "business intelligence" was invented by Hans Peter Luhn, a researcher at IBM. He proposed an automated approach to provide up-to-date information services to scientists and engineers who need support managing the increasing volume of scientific and technical literature. Nevertheless, the term gained widespread use in the 1990s after Dresner, an analyst at Gartner, popularized it. Dresner used business intelligence (BI) to convey that companies might use the information stored in their IT systems (Shollo & Kautz, 2010). Business intelligence is a collection of tools and technology that assist in business decision-making by evaluating data from different sources such as customers, rivals, partners, economic conditions, and internal processes. It provides a realistic framework for applying critical mathematical models (Vercellis, 2011). Corporate interest in business intelligence has increased due to its potential to reduce costs, improve service quality, and enhance decision-making processes (Foley & Guillemette, 2010).

Business intelligence is a framework that collects, transforms, and delivers organizational information from various sources, reducing data collection time and enabling management decision-making. It focuses on consumers, rivals, sectors, technology, and goods for competitive advantage (Heang, 2017). Business intelligence systems use operational and historical data and analytical tools to provide company planners and decision-makers with crucial information. They help assess market trends, consumer behavior, and market conditions. The emergence of data warehouses, data cleansing, hardware and software capabilities, and web architecture has enhanced the business intelligence environment. (Khan, & Quadri, 2012).

Business intelligence consists of three main components: data warehouses, business performance management, and big data analytics. Data warehouses are structured collections of structured and verified business data used to make informed decisions. They are subject-oriented databases coupled with an information system, providing historical data and thematic storage of aggregated information (Lloyd, 2011). Business performance management involves process-oriented systems, plan modeling, and management of organizational efficiency (Olszak & Ziemba, 2010). Big data analytics is a revolutionary technology that uses data analytics to gain insights and make better decisions, requiring database management solutions with capabilities beyond ordinary SQL-based systems (He, 2016).

Innovation:

Innovare means "into new" in Latin. Innovation is doing something unexpected. Innovation is a vital tool for entrepreneurs to create competitive potential for companies and wealth by leveraging current resources or establishing new ones, including development using new information (Distanont & Khongmalai, 2018). For firms, innovation is usually risky, costly, and time-consuming (Stenberg, 2017). Innovation is a social and dynamic phenomenon that involves active engagement and knowledge exchange (Hemphälä & Magnusson, 2012). Any company, business, or non-profit may innovate. It may affect the organization's performance (Vahs & Brem, 2015). Any business must prioritize innovation for market expansion and cooperation. Innovative methods may be used to create new goods, improve management, and optimize labor operations. All innovation definitions incorporate process or product improvements. In contrast to creativity, innovation begins with a concept and ends with a new function (Tohidi & Jabbari, 2012).

The phrase "innovation" is often used; however, several modern enterprises struggle to comprehend it. Many statements on innovation are prone to misinterpretation. In order to fully embrace and reap the rewards of innovation, it is crucial to recognize that innovation is both an outcome, a systematic procedure, and a way of thinking (Kahn, 2018). According to Fagerberg et al. (2010), employees who are highly educated and work at organizations that focus on research and development and have strong connections to prestigious scientific institutions are generally seen as individuals who come up with new and creative ideas. Innovation concepts include strategic actions to enhance profitability, such as acquiring state-of-the-art manufacturing equipment, implementing efficient organizational practices, and deploying advanced business process monitoring systems. Insufficient innovation may lead to financial or company collapse (Christensen et al. 2016).

Innovation was crucial for effectively promoting products and services via social media platforms, enhancing customer support, and maintaining a competitive edge. According to Luamba et al. (2021), participants emphasized that innovation is crucial for survival and profitability. Process innovation involves

modifying industrial processes, equipment, and software to reduce costs, improve quality, enhance efficiency, and address environmental issues. Sales and manufacturing techniques are employed to enhance both efficiency and effectiveness (Maier, 2018). Technological innovation tackles market and agent-centric problems. The exchange of implicit and explicit information facilitates knowledge acquisition via various methods. Technological innovation explores integrating technology into goods, services, and processes (Jason, 2013).

Business Startups:

Startups first emerged in the 1970s. Small, nimble, and highly inventive enterprises emerged in industrialized nations, disrupting established markets for goods and services and organizational management (Skawińska & Zalewski, 2020). Startups are new firms that are struggling to survive. These companies are typically founded on unique ideas and rise to success. These occurrences are mentioned in the literature of management, organization, and entrepreneurial theory (Salamzadeh & Kawamorita Kesim, 2015); the company startup process is extremely inertial: it not only takes time. Entrepreneurs must identify viable business opportunities and develop those ventures into new startup enterprises. Indeed, an entrepreneurial search for viable projects and a time-to-build limitation mean that business startup rates are largely inelastic across the cycle. However, understanding why this inertia is crucial in determining business cycle outcomes is crucial (Coles & Kelishomi, 2011). Recent writers emphasize the need for further research on how startups establish new ties, particularly in developing early customer connections and resource bases through direct engagement with customers, as creating new business partnerships is particularly challenging for startups (Aaboen et al. 2016). Startups face high risk and uncertainty in the market but can survive or collapse depending on internal and external conditions. Successful development requires internal drive and firm resolve, while bureaucracy and financial concerns are significant barriers. According to research findings, effective human resource management is crucial for successful startup development (Venckuviene, 2014).

Business Startups refers to the first stage of a company. This kind of organization exhibits certain features, which may be classified into four dimensions based on the starting characteristics described in the literature. Organizational character refers to the distinctive qualities and characteristics of a new organization. Ownership refers to the attributes of an owner, including their decision-making abilities and oversight role. Strategic and innovative approaches and financial considerations (Nurcahyo et al. 2018) are the primary considerations of most startup organizations, which are organic organizations with high centralization (Gurianova et al. 2014). As a result, decision-making becomes more flexible and adaptable. Most startups have a straightforward organizational structure. A simple organizational structure with low departmentalization, broad control, centralized power, and low formalization is standard in startups.

Owners often serve as management, making decisions intuitively. Startups prefer specialty marketing and are innovative, often backed by personal resources or bootstrap finance (Nurcahyo et al., 2018). Startup success variables vary by stage; for example, certain aspects are more significant in the research and planning stages and have less influence in the execution or capital-raising phases. Economic considerations, innovation, entrepreneurship, and technological variables are among the success determinants (Asgari et al., 2022). Considerations influencing the success of startup firms include: Every startup in the global market relies heavily on innovation to succeed. Startups must spend on research and development to pursue new business prospects (Richter, Jackson, & Schildhauer, 2017).

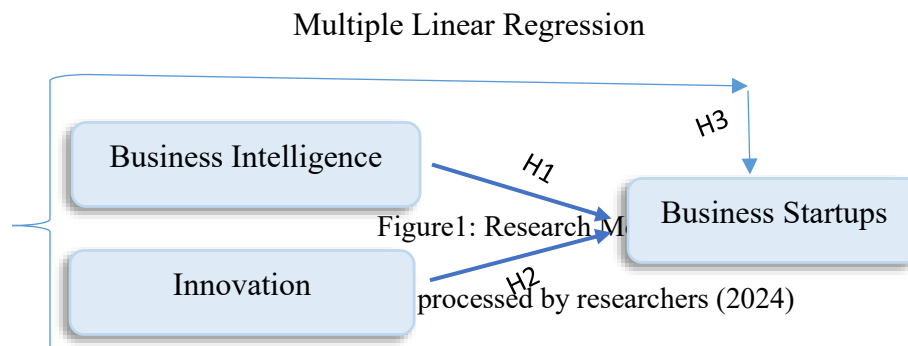
Startup failures often stem from managerial issues like lack of experience, corporate focus, and market demand. Lack of market understanding and industry experience impacts both startup survival and business establishment (Gustav, Sanjaya, & Nugroho, 2022). Geographical factors like population growth, economic diversity, small company share, industry density, and entrepreneurial culture contribute to startup survival (Adjei, 2021).

In sum, Business startups are closely linked to business intelligence and innovation. Business intelligence provides crucial insights for informed decision-making, improved productivity, and data analysis. Innovation allows startups to create unique products and services, grow through new processes and technology, and contribute to market development and expansion. Both business intelligence and innovation are essential for business startups' success.

Research Methodology

The information collected was from a questionnaire form that was distributed and filled out with 173 respondents using a Google form design using a probability sampling-simple random sampling method to examine variables. The methodology of this study includes design research by identifying independent variables (business intelligence and innovation) and dependent variables (business startups). This study highlights the impact of business startups in the private sector from Kurdistan/Iraq. The questionnaire of this study included two parts; the first part was about demographic questions, which contained (Gender, Age, Education Levels, and Organizational status). The second part of the questionnaire includes some questions as a Likert-scale type (Strongly Disagree=1, Disagree=2, Neutral=3, Agree=4 and Strongly Agree=5), which represented the independent and dependent variables of our study research using a Statistical program (SPSS)-V26 for analyzing the data.

Research models: This research uses Business Intelligence, Innovation, and Business Startups. To reveal the affected and unaffected, the hypothesis and model of this research are as follows:



Research Hypothesis:

H1: Business Intelligence Has a Significant Positive Effect on Business Startups.

H2: Innovation has a Significant Positive Effect on Business Startups.

H3: Business Intelligence and Innovation Have a Significant Positive Effect on Business Startups.

Statistical Analysis

Statistical analysis involves systematically gathering and examining large data sets to detect patterns and derive meaningful conclusions. It applies in scenarios like collecting research interpretations, doing statistical modeling, or creating surveys and studies. Statistical analysis encompasses essential methods that enable analysts to comprehend intricate data and derive significant findings that guide actions and plans. It utilizes mathematical concepts and statistical software to execute diverse data-related activities. Our research study utilizes two forms of statistical analysis: descriptive and inferential statistics (Blbas et al., 2024).

Descriptive and Inferential Statistics

Descriptive statistics provides a concise summary of the data set without making any inferences or interpretations about its contents. Inferential statistics builds upon descriptive statistics by extrapolating findings from the data and then providing recommendations.

Statistical instruments

It is used to collect, analyze, interpret, and present data systematically and meaningfully. Descriptive statistics were used to summarize and present data, including frequency and percentages for demographic

questions (Blbas & Faraj, 2022). Also, researchers used correlation and regression methods to show the relationship between variables. Data were analyzed using SPSS V.26.

Correlation and Regression Analysis

Correlation analysis is a statistical method used to quantify the pattern or association between independent variables and three dependent variables. The correlation is positive if the variables move in the same direction and negative if they move in opposing ways. Correlation coefficients range from -1 (perfect negative correlation) to +1 (perfect positive correlation), with 0 indicating no association.

Regression analysis is a statistical technique used to model and analyze the connection between a response variable and a group of explanatory factors. Multiple linear regression was used to determine the predictor factors, namely Business Intelligence and Innovation, that impact the response variable, which is Business Startups (Aziz et al., 2022).

Result and discussion

Descriptive Statistics for Demographic Questions

Researchers used descriptive statistics, which can help summarize data in simple quantitative measures such as percentages or means (Blbas & Faraj, 2022). Table 1 shows descriptive statistics for demographic questions used in this study, including gender, age, Education level, and Organization status).

Table1: Descriptive Statistics for the Personal Information

	Personal Information	Frequency	Percentage %
Gender	Male	98	56.6%
	Female	75	43.4%
Age	18-24	74	42.8%
	25-35	63	36.4%
	36-45	23	13.3%
	Above 45	13	7.5%
	Other	0	0%
Educational level	Diploma certificate	51	29.5%
	Bachelor degree	97	56.1%
	Master degree	19	11.0%
	PhD degree	6	3.5%
Organizational status	Employee	99	57.2%
	Manager	44	25.4%
	Executive manager	18	10.4%
	lecturer	12	6.9%
	Other	0	0%

Source: Data processed by researchers (2024)

Table (1) illustrates the descriptive statistics of the respondents in this research, which are divided into various levels for each level of demographic questions. The contributors' gender, age, educational level, and organizational standing are frequencies and percentages. According to the gender, this table reveals that most participants are male (56.6%) and female (43.4%). Furthermore, according to the results in the above table (36.4%), (13.3%) percent of the participants ages between (25-35) and (36-45) years. Correspondingly, Participants over 45 account for 7.5% of the total. Most responders are between 18 and 24, accounting for 42.8%. It is also evident that 3.5% of the participants had PHD credentials. There are a significant number of individuals with bachelor's degrees (56.1%), master's degrees (11.0%), and diplomas (29.5%). In addition, a high majority of respondents (57.2%) are workers, including directors (25.4%) participating, assistant directors (10.4%), and teachers (6.9%).

Inferential Statistics

In this part of the research, researchers tried to demonstrate Correlation analysis to show the relationship between variables. To analyze the hypothesis, they employed simple linear regression and multiple linear regression analysis at 95% confidence intervals.

Table2: Correlation matrix between independent variables and dependent variable

	Business Intelligence	Innovation
Business Startups	0. 509**	0. 503**

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

Table (2) showed a moderate positive significant relationship between the independent variables of both business intelligence (0.509), innovation (0.503), and the dependent variables of business startups.

Table3: Simple Linear Regression Analysis between the independent variable (Business Intelligence) and Dependent Variable (Business Startups)

	Coefficients			Model Summary		ANOVA	
	B	t-value	P-value	R	R Square	F	P-value
(Constant)	2.527	10.382	.000	0.509	0.259	59.842	.000
Business Intelligence	.432	7.736	.000				

Table (3) demonstrated a significant positive correlation (0.509) between the independent components and the dependent variable, as determined by Pearson's correlation analysis. It is essential to comprehend business intelligence's predictive power and impact on company launches. Furthermore, the table also presents the ANOVA table, which is used to assess the suitability of the explanatory variable (business

intelligence) in predicting the response variable (business startups). The results indicate that the model is indeed suitable, with an F-value of 59.842 and a P-value of 0.00.

The table presents the results for variables such as constant, slope, t-value, and coefficient of determination (R Square). Regression The coefficient (B) for business intelligence is 0.432, indicating that increasing business intelligence by one-unit results in a 0.432 increase in the number of new launches. The coefficient of determination, often known as R Square, quantifies the proportion of the dependent variable's variance that can be accounted for by the independent variable. The Coefficient (R Square) calculation indicates that 25.9% of the variation in business starts may be attributed to business intelligence. At the same time, the remaining variability is influenced by other factors that impact companies' initiation.

Table 4: Simple Linear Regression Analysis between the independent variable (Innovation) and Dependent Variable (Business Startups)

	Coefficients			Model Summary		ANOVA	
	B	t-value	P-value	R	R Square	F	P-value
(Constant)	.943	10.506	.000				
Innovation	.390	7.619	.000	0.503	0.253	58.044	.000

Table (4) demonstrated a significant positive correlation (0.503) between the independent elements and the dependent variable, as determined by Pearson's correlation analysis. It is essential to comprehend the forecast and impact of innovation on business launches. Furthermore, the table also presents the ANOVA table used to assess the suitability of the explanatory variable (innovation) in predicting the response variable (business starts). The results indicate that the model is suitable, with an F-value of 58.044 and a P-value of 0.00.

The table presents the results of the constant, slope, t-value, and coefficient of determination (R Square). Regression The innovation coefficient (B) is 0.390, indicating that a one-unit increase in innovation would lead to a 0.390 rise in company launches. The coefficient of determination (R Square) quantifies the proportion of the dependent variable's volatility that can be accounted for by the independent variable. The R Square coefficient reveals that innovation explains 25% of the variability in company beginnings, whereas other factors influence the remaining variability.

Table 5: Multiple Linear Regression Analysis between the independent variable (Business Intelligence and Innovation) and Dependent Variable (Business Startups)

	Coefficients			Model R	Summary R Square	ANOVA	
	B	t-value	p-value			F	p-value
(Constant)	2.317	9.522	.000	0.563	0.317	39.417	0.000
Business intelligence	.356	6.100	.000				
Innovation	.295	5.412	.000				

Table (5) demonstrated a significant positive correlation (0.563) between the independent and dependent variables, as determined by Pearson's correlation analysis. It is essential to comprehend the predictive power and impact of business intelligence and innovation on companies' initiation. The table also presents the ANOVA table, which assesses the suitability of the variables (business intelligence and innovation) in predicting the response variable (business startups). The results indicate that the model is suitable, with an F-value of 39.417 and a P-value of 0.000.

The above table performs all the calculations for the constant, slope, t-value, and coefficient of determination (R Square). Regression analysis the coefficient (B) for business intelligence is 0.356, indicating that a one-unit increase in business intelligence leads to a 0.356 rise in the number of new launches. Regression analysis the innovation coefficient (B) is 0.295, indicating that a one-unit increase in innovation would lead to a 0.295 rise in firm beginnings. The Coefficient of Determination (R Square) indicates that firm startups can explain 31.7% of business intelligence and innovation variability. At the same time, the remaining variance is caused by other variables that also impact business intelligence and innovation.

Hypothesis Result

This study hypothesized that Business Intelligence and Innovation would positively have a significant impact on Business Startups.

Table6: The Summary Result of the Hypothesis Test

	Hypotheses	Beta coefficient	t-value	Results
H1	Business Intelligence on Business Startups	0.356	6.100	Accept
H2	Innovation in Business Startups	0.295	5.412	Accept

Table 6 summarizes the hypotheses test result regarding the beta coefficient and t-value at a significance level 0.05. As it is clear from the table above, the t-value of all our study hypotheses is greater than 0.05 (significant level), which are (6.100 and 5.412) for H_1 and H_2 , respectively, so that we can accept all three hypotheses.

Discussion

The influence of business intelligence and innovation on the survival and development of business startups is a significant concern that warrants firms' attention. Our study sought to illustrate the effect of business intelligence and innovation on business startups. The survey data was disseminated to 173 workers and supervisors in the Kurdistan Region of Iraq. The findings indicate that business intelligence and innovation substantially influence the establishment of new businesses. Furthermore, this research revealed a significant and positive association between the independent variables, namely business intelligence and innovation, and the dependent variable, company starts. This implies that Intelligence and innovation are crucial for enhancing the company and increasing the likelihood of achieving long-term success.

Conclusion

The first findings of the research indicate that the male participants constituted the majority (56.6%) of the study population. Subsequently, 42.8% of the individuals exhibited an age range from 18 to 24 years. Furthermore, the data reveals that most survey participants own a bachelor's degree, with a percentage of 56.1%. Most of the research participants are employed, comprising 57.2% of the total.

The second phase of this research specifically examined the impact of business intelligence and innovation on establishing new businesses. A study has shown a favorable link between the independent variables, business intelligence and innovation, and the dependent variable, company startups. Furthermore, both business intelligence and innovation have a substantial impact on the establishment of new businesses.

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