

Practice of Business Intelligence System in Nepalese Small and Medium Enterprises

Shiva Prasad Nepal

Ph.D. scholar, Faculty of Management, T U

Email: spnepal98@gmail.com

Shiba Prasad Sapkota

Ph.D. scholar, Balkumari College

Email: shibasapkota986@gmail.com

ABSTRACT

Everywhere, competition has increased in the digital age. Modern technology makes small business management difficult as well. Customers are aware of the international market. The most recent advancement in management is business intelligence. A data-driven decision to address the challenge encountered by any corporate organization is the current dilemma in management, as opposed to an intuitive or constrained logical decision. Any corporate organization should be concerned with decoding the message from data via scientific analysis. The analysis in this study included 504 Nepalese SEMs. We questioned companies in the manufacturing, service, wholesale, and retail industries on how they used business intelligence in their operations. The survey found that Nepalese SMEs are only just beginning to use business intelligence. For Nepalese businessmen, technological literacy is of the utmost importance. The major worry of Nepalese SMEs is the fear of losing sensitive data.

Keywords: Business intelligence, Managerial aspects, Data security, Technological aspects, Data driven decision.

1. Introduction

Management identifies, develops, and chooses the optimum solution. Management has recently adopted data-driven decision-making or machine learning. Globalization has increased rivalry among businesses of all sizes. Data-driven decision-making to solve corporate problems is a current management topic. Business intelligence (BI) has many benefits for companies (Papachrisdoulou, E., Koutsaki, & Kirkos (2017). Data-driven machine learning completes tasks. Machine learning (ML) uses probability theory and linear algebra to learn and perform tasks automatically. Luhn coined business intelligence in 1958, according to Yeoh (2008). Technology advancement takes time. Technology advancement leads to new accomplishments. In the 1990s, data warehousing, on-line analytical processing, and business intelligence calmed the information era. During those years, data was collected, modified, integrated, stored, and accessed to assure its accuracy, relevance, and usability. From data warehousing to the early 2000s, the focus has been on the technologies and processes needed to make information accessible and valuable. This technology has mostly benefited highly competent computer users who can utilize their tools to navigate massive, often difficult databases. In 2006, Robert S. Kaplan and David P. Norton introduced the Balanced Scorecard, a new management method that uses key performance indicators (KPIs).

Technological advancement and its accessibility already merged different bodies of knowledge. Business, Mathematics, statistics, Technology, and behavioral science are coming together. Understanding those bodies of knowledge by the management of a firm allows developing appropriate strategies to govern employee towards goal achievement behavior.

The convergence of information technology with functional areas of business organization and their interactions with business strategies have become crucial to incorporate agenda over the past two decades (Del at.el.,2018). Business Intelligence(BI) is an integrated system of information technology to collect, analyze, and interpretation of actionable information. Assembly of different equipment (computer hardware and software), collection of data from both internal and external sources through a computer application, processing the data using different mathematical and statistical procedures and supply of necessary information on real-time to the different users as per their necessity builds business intelligence in an organization (Davenport,2014).

The four components of BI (Infrastructure, Data management, Data analyses, and Information Delivery) are integrated as sufficient infrastructure captured all necessary information from both internal and external sources,

data management technology supports data analysis and information delivery system (dashboard) supplies those analyzed data to the decision-makers (Troyansky et.al.,2015).

In terms of usability, data management, including data type, the sophistication of analytical techniques, and visualization/reporting capabilities, business intelligence (BI) is the development of decision support systems (DSS), executive information systems (EIS), and management information systems (MIS) (Chen et al., 2012). The essential goal, however, remains the same: to better managers' decision-making through data collection, processing, and analysis.

Business intelligence (BI) tools make it easier to gather data, analyze it, and communicate information. They are made to help with decision-making. In business, technology, data, and analytics are viewed as a transformative force. To enhance reporting and decision-making, many firms are thus implementing business intelligence (BI) technology. Quality data in well-designed data stores, along with software tools that give users fast access, efficient analysis, and intuitive presentation of their right information, enabling them to take the right actions or make the right decisions, are the components of a business intelligence system (Popovic et.al.2012). The architecture of BI depends on its applications.

The business intelligence system (BIS) generates, analyses, and supplies actionable information to assists decision-makers. BI system consists of :1) Infrastructure, 2) data management, 3) data analysis, and 4) supply of actionable information (Rikhardsson & Yigitbasioglu, (2018). The digitalization of the organization has changed the decision-making style from judgmental to a data-driven decision. As big data analytics search the truth, the insightful judgment of a manager is no longer required.

SMEs are characterized as having relatively modest industries. SMEs are heavily reliant on internal sources of capital to fund their expansion because they are: (a) actively managed by their owners; (b) highly personalized; (c) generally local in their region of operations; and (d) highly customized (Faitira et al., 2012). Countries define SMEs differently (ILO, 1997). Employees, turnover, fixed asset value, ownership, energy use, and other factors are used to classify businesses (Agyei-Mensah, 2011).

Nepal has micro, small, medium, and large businesses:

- a) Micro industry: A micro-enterprise has a fixed capital of less than two million rupees, excluding house and land; the entrepreneur runs and manages the industry; a maximum of nine workers, including the entrepreneur; and an annual transaction of less than ten million rupees.
- b) Cottage industry: A cottage industry is based on traditional skills and technology, labor-oriented, uses local raw materials, technology, arts, and culture, and can use up to 50 KW of electricity to power engines, equipment, and machines.
- b) Small industry: Any industry with a fixed capital under 150 million rupees, excludes micro companies and cottage industries.
- d) A medium industry has fixed capital of 150–500 million rupees.
- e) Large industries have fixed capital beyond 500 million rupees (Industrial Enterprise Act 2020).

The Nepali government's Department of industrial compiles and publishes industrial statistics.

Table No.1: Types and numbers of industries in Nepal

Size	Number
Micro enterprises	41,099
Cottage industries	23,374
Small industries	4,88,239
Medium scale industries	1,846
Large scale industries	1,162
Total	5,55,720

Source: Statistics of SMEs, Nepal, Department of Industry 2022

Table No.1 showed that most Nepalese industries are small ($488,239 / 555,720 * 100 = 87.85\%$), whereas only 1,162 are huge (0.209%).

Sector-wise distribution of Nepalese SMEs

Table No. 2: Sector wise distribution on Nepalese SMEs

Areas of industrial activities	Number of industries
Manufacturing industries	114,484
Energy based industries	589
Agriculture -forest product-based industries	178,931
Tourism industries	54,795
Mining industries	486
Service industries	192,888
Infrastructure sector	10,021
Information technology-based industries	518
Total	5,52,712

Source: Statistics of SMEs, Nepal, Department of Industry 2022.

Table 2 groups Nepalese industries into eight categories. Services, agriculture-forest product, and manufacturing are the largest industrial sectors. Nepal has few IT industries.

SMEs are essential for creating independent jobs, leveraging local resources, and raising rural inhabitants' incomes. In 2001, SMEs made up 96% of industrial firms, created 83% of the sector's jobs, and contributed 80% to the country's GDP (Dahal & Sharma., 2004). SMEs rely on family savings for equity financing, but their creditworthiness inhibits expansion. The company's leader depends on entrepreneurial skills and ignores managerial qualifications. Recruiting without job descriptions is common. Staff are rarely allowed to make decisions on their own, even if they are capable. Locally developed, inefficient, and prone to breakdowns, the technology wastes a lot. Few SMEs export; most produce for local markets. Export-oriented enterprises cannot grow due to inherent limits. Private entrepreneurs cannot provide equity capital or collateral security; hence SMEs cannot obtain institutional credit (Dahal et al., 2004).

Technology (BI) boosts staff efficiency by providing accurate, timely information for good decisions (Burgess, 1997). SME has limited human resources, cannot hire IT expertise, and uses manual decision-making with sluggish data processing and human errors. SMEs struggle with data volume, information, and understanding. Thus, SME managers rely on their experience to make timely judgments, which increases the risk of failure. Nepalese SMEs gain from business intelligence (BI). Nepalese SMEs use outdated industrial methods and technology, have limited financial resources, and lack marketing and commercial experience (Dahal et al., 2004). This study examines whether Nepalese SMEs have sufficient infrastructure to adopt Business Intelligence. SMEs need accurate, reliable, and timely information to make the right decisions and grow and expand. Manual information systems cannot provide this information. Lack of accurate and reliable information affects the planning function of Nepalese SMEs, contributing to their misery. Nepalese SMEs suffer with data overload, lack of information, and illiteracy. Thus, SME managers rely on their experience to make timely judgments, which increases the risk of failure. This study aimed to examine whether Nepalese SMEs have sufficient business intelligence infrastructure to adopt business intelligence, functional areas where business intelligence systems are used and to disclose the reasons behind the non-adoption of business intelligence.

Business intelligence as a decision-support system in businesses emerged in the late 1990s as a result of developments in information technology. It takes a lot of time, effort, and organizational resources for the management to manually gather the information that is required. Management, statistics, and technology are all combined in a business intelligence system. The management's attempts to gather, store, and analyse the massive amount of data, information required to unlock the secret message concealed in raw data, are supported by BI.

The advantages of BI to an organization include systematic management of structured and unstructured data, massive data gathering and analysis, knowledge discovery from the data, and providing the analytical answer to decision makers (Wieder & Ossimitz, 2015; Yoon et al., 2014). The business intelligent system (BIS), which enables organizations to recognize and sensibly use data to stabilize or strengthen their position on the market, is

one of the greatest tools for combining the many internal and external data sources into a solution with significant business value.

The problems of the traditional file environment of data management are:

- The same data may be saved in multiple files and may take on different meanings for various users.
- Possibilities of losing the original data if just one person has to make changes to the data
- It could be challenging to search the data.
- Inadequate data security.
- Difficulty in assessing the complete data.

The foundation of business intelligence is a solid data warehouse. A data warehouse houses the organization’s history and present data from internal and external sources.

The components of a data warehouse are presented in figure No 1.

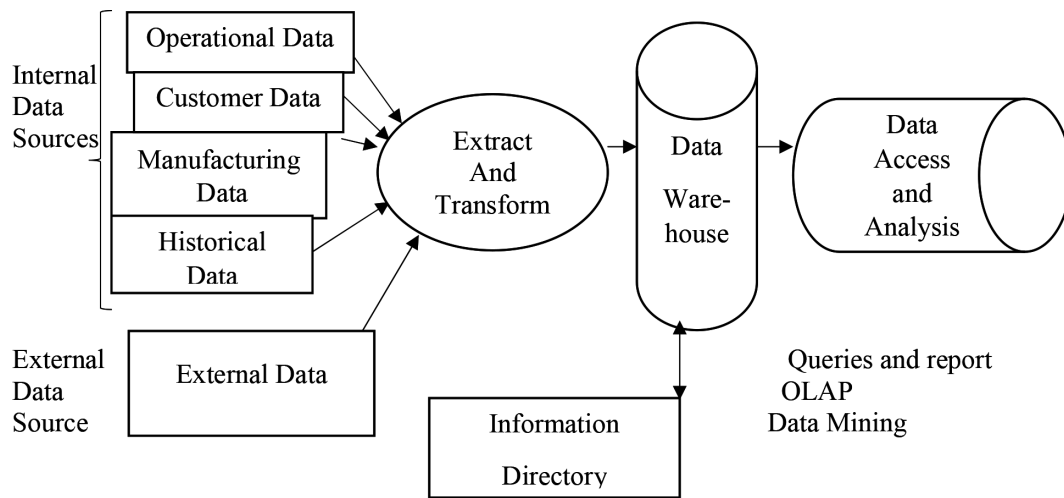


Figure No. 1: Data warehouse

Source; Laudon et.al. Management Information System, 11th Edition.

To design information systems, analyze structured and unstructured data, handle big data, and give management useful information for better decision-making, business intelligence makes use of advanced methods and technologies(Grover et al.2018).

Business Intelligence combines management, technology, statistics, and arithmetic.Graphically, it is presented in figure No. 2.

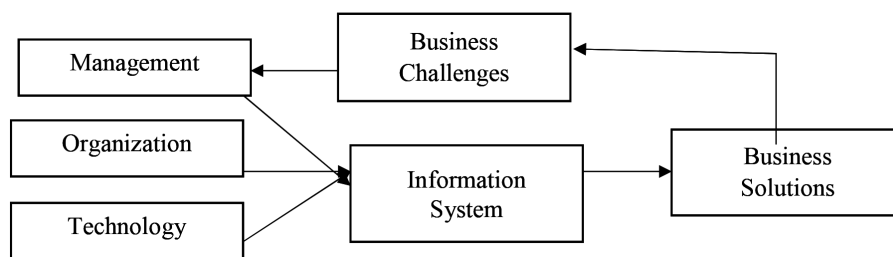


Figure No.2: Business Intelligence System

Figure No.2 depicts the basic components of business intelligence. An organization is a group of individuals working together to achieve common objectives inside a purposefully created framework. An organization is divided into three levels by a hierarchy of power and responsibility: the top level, the intermediate level, and the operation level. Top-level management develops long-term strategies for the entire company, whereas middle-level management executes top-level management’s plans and policies, and operational-level management is in charge of managing the firm’s daily operations.

For supporting the various levels and types of decisions, there are four systems. Middle and operational level managers receive routine reports and summaries of transactional-level data from management information systems (MIS) to help them solve structured and semi-structured decision problems. For middle level managers who are faced with semi-structured decision scenarios, decision support systems (DSS) give analytical models or tools for processing vast amounts of data. Executive support systems (ESS) are organizations that offer external data and high-level summaries of company performance to senior management, which makes mostly unstructured decisions (Laudon et.al.2010).

Resource Based View

The acquisition of resources is one of the main areas of competitiveness in the corporate world. In addition to being purchased, an organization's resources are also created through its experiences, which are distinctive and impossible for rivals to replicate. The Resource-Based View (RBV) examines and evaluates an organization's resources to determine how it develops a sustained competitive advantage. Because resources differ, there are variations in organizational performance. Human, financial, physical, structural, and informational resources are all types of organizational resources (Barney 1991). Employees that are capable, committed, motivated, and loyal are an organization's greatest asset and what sets it apart from its rivals. Competitive advantages come from advanced technology, a suitable organizational structure, and ample financial resources. Information collecting, analysis, and data-driven decisions made by the company all contribute to strengthening its position in a cutthroat market. According to RBV, it's important to identify the organization's resources, the firm's capabilities, the areas in which the company can outperform its rivals, the strategy to use the resources to their fullest potential, and the resource gaps that need to be filled.

Enterprise Resource Planning (ERP)

Organizations generally have a wide variety of information systems that were each developed to support unique tasks, hierarchies, and lines of business but are incapable of exchanging data automatically. Organizational efficiency and commercial effectiveness suffer when data is spread across hundreds of different platforms. Enterprise Resource Planning (ERP) solutions address this issue by aggregating and storing information from multiple critical corporate operations, including production and manufacturing, finance and accounting, sales and marketing, and human resources. One process's data is immediately available to another process after being updated.

The components of ERP are presented in figure No.3.

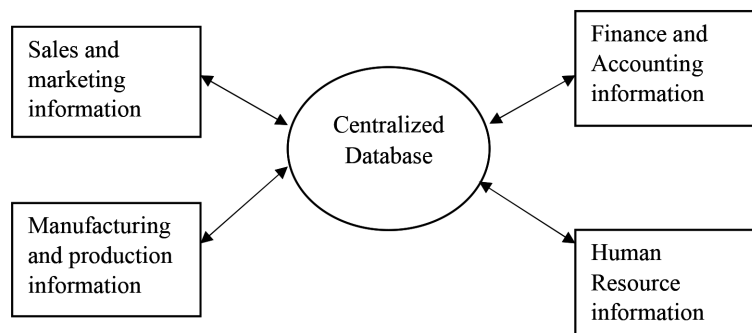


Figure No.3: Enterprise Resource Planning

Technological Aspect

BI is considered as a set of tools for gathering, analyzing, and accessing data for use in decision-making. The internal network, data bank, and storage of data gathered from various data sources are all aspects of BI technology. Whether or not Nepalese business owners are prepared to implement BI in their operations depends on the organization's access to appropriate hardware, user-friendly software, and internal networking systems. The technological infrastructure that Nepalese SMEs have at their disposal will determine how well they can adapt BI (Chau & Tam, 1997).

The internet and web are used in electronic commerce, also known as digital marketing, to conduct business transactions. It is the contemporary model for retail. The technology components of the virtual market include wireless internet connections, potent handheld mobile devices, and web-based computing. The eight distinguish-

ing characteristics of e-commerce technology that Laudon et al. listed are:

- I. Ubiquity: Internet and Web technology are accessible anytime, anywhere, on mobile devices, including at work, at home, and anywhere.
- II. Global reach: The technology is applicable everywhere on earth, regardless of country boundaries.
- III. Universal standards: There is just one set of technological standards, called the internet standards.
- IV. Richness: Text, audio, and video messages are all feasible.
- V. Interactivity: The technology functions through user engagement.
- VI. Information Density: The technology improves information quality while lowering information costs.
- VII. Customization: The technology enables the delivery of customized messages to both individuals and groups.
- VIII. Social Technology: User content generation and distribution are made possible by new internet social and business models, which also support social networks.

The degree to which an idea is deemed to be superior to the notion it replaces is known as its relative benefits. The degree of complexity at which an invention is deemed to be beyond human comprehension and use. It has to do with how new technology, like BI, is seen as being rather difficult to understand and use. The degree to which an idea is thought to be in line with values, previous perceptions, and requirements for future execution is referred to as its compatibility. Therefore, it is the degree to which an IT system is in line with the practices and beliefs already present in a particular firm. The ability to monitor innovation and its effects is known as observability. It indicates the degree to which people may perceive the impact of technology adoption before the adoption. The extent to which potential users have the opportunity to test an innovation is its trialability. It is the capacity of an organization or an individual to test, utilize, and practice new technologies or services before acquiring or making use of them.

2. Materials and Methods

To gather the information required for the study, semi-structured interviews were held. The units of information were the owners and managers of Nepalese SMEs, and the units of analysis were the SMEs themselves. 504 SMEs from Nepal were specifically chosen as a sample for the study. Each responder had 30 minutes of time to complete the survey. In order to do a descriptive analysis and come to conclusions regarding the study, the collected data were entered into the SPSS program. The respondents were given a standardized questionnaire that covered the various facets of business intelligence.

Gender wise distribution of the respondent is presented in Table No.3.

Table No.3: Gender

Gender	Frequency	Percent	Cumulative percent
Male	226	44.8	44.8
Female	278	55.2	100
Total	504	100	

Table No. 3 disclosed that the ratio of male and female participants is 44.8:55.2, which implies that more females are involved in Nepalese SMEs than males.

The education level of the respondents is presented in Table No. 4.

Table No.4: Education Level

Education	Frequency	Percent	Cumulative percent
Graduate	320	63.5	63.5
Graduate & above	184	36.5	100
Total	504	100	

Table No. 4 revealed that the ratio of undergrad and graduate and above respondents in the study is 63.5:36.5. The ratio of education levels among respondents indicates that the majority of undergrad Nepalese are involved in SMEs.

Types of SMEs is presented in Table No.5.:

Table No.5: Types of Business

Types	Frequency	Percent	Cumulative percent
Manufacturing	63	12.5	12.5
Service	69	13.7	26.2
Wholesale	79	15.7	41.9
Retail	293	58.1	100
Total	504	100	

Table 5 depicts the types of Nepalese SEMs selected as the sample for the study. Among the types of SMEs selected for the study, the majority are retail businesses.

3. Results

a. Business Intelligence Infrastructure

The study's objective was to look at the business intelligence infrastructures that are available to SMEs in Nepal. The study's respondents were questioned about their access to business intelligence software, cell phones, internet, and computer hardware. In table No. 6, the participants' responses are compiled.

Table No. 6: Business Intelligence Infrastructure

Types	Number	Desktop		Laptop		Cello phone		Internet		software	
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Manufacturing	63	63	0	63	0	63	0	63	0	63	0
Service	69	69	0	69	0	69	0	69	0	69	0
Wholesale	79	79	0	36	43	79	0	79	0	79	0
Retail	293	56	237	0	293	293	0	293	0	56	237
Total	504	267	237	168	336	504	0	504	0	267	237

According to Table 6, 52.97% of SMEs have desktop computers, while 33.33% of SMEs have laptop computers. There are computer software facilities in 52.97 percent of SMEs. Only 23.62 percent of retail establishments have access to computer hardware. The technology that SMEs have access to will determine the technological context of BI adoption.

b. Information System in Functional Areas

The study's goal was to identify the commercial activities where Nepalese SMEs employ information systems. Whether respondents used business intelligence systems in operations, marketing, finance & accounting, social networking, and top-level management was a question that was posed to them. In table No. 7, the respondents' responses are compiled.

Table 7: Adaptation of Business Intelligence

Types	Manufacturing		Service		Wholesale		Retail	
	Yes	No	Yes	No	Yes	No	Yes	No
Operation	61	2	28	41	0	79	0	293
Marketing	61	2	28	41	0	79	0	293
Finance & Accounting	63	0	30	39	34	45	0	293
Social net working	0	63	0	69	0	79	0	293
Management	0	63	0	69	0	79	0	293

According to Table 7, 96.28 percent of SMEs engaged in manufacturing in Nepal are using business intelligence systems for operations and marketing. Business intelligence systems are being used in finance and accounting processes by all SMEs engaged in manufacturing in Nepal. Business intelligence systems are not being used in social networking and top-level management by Nepalese manufacturing SMEs.

Business intelligence is used by 59.42 percent of Nepalese SMEs operating in the service sector for operations and marketing, and by 76.92 percent of these companies for finance and accounting. Social networking and top-level management do not employ any business intelligence systems. Only the finance and accounting sectors of Nepalese wholesale SMEs use business intelligence systems (75.55%). Nepalese retail enterprises do not employ any business intelligence solutions. More Nepalese SMEs use business intelligence systems in the finance and accounting departments than in other departments.

c. Perception on Business Intelligence System

The purpose of the study was to reveal how Nepalese SEMs felt about the business intelligence system. The statement "Business Intelligence system helps to achieve efficiency and effectiveness" was put to the test with the respondents. In table No. 8, the respondents' responses are compiled.

Table 8: Respondents opinion on Business Intelligence

Yes		Business Intelligence system helps to achieve efficiency and effectiveness.			Total
		No	Undecided		
Type of Business	Manufacturing	63	0	0	63
	Service	57	0	12	69
	Wholesale	22	0	57	79
	Retail	21	6	266	293
Total		163	6	335	504

Table 8 showed that 32.34 percent of respondents agreed that business intelligence plays a crucial role in maximizing productivity and effectiveness. The majority (66.46 percent) of Nepalese SEMs are unaware of the use of business intelligence for the efficient running of their enterprises. SMEs working in the service and manufacturing sectors are aware of the value of information system.

d. Opinion on Problems to adopt Business Intelligence System

- Lack of Skilled Manpower

With the owners and managers of Nepalese SMEs, business intelligence-related issues for these businesses were explored. We questioned respondents if they agreed that there is a shortage of competent personnel to operate business intelligence systems. The responses' thoughts on this topic are summarized in Table 9.

Table 9: Opinion on Lack of skilled manpower

Yes		Lack of skilled manpower		Total
		No		
Type of Business	Manufacturing	0	63	63
	Service	6	63	69
	Wholesale	49	30	79
	Retail	293	0	293
Total		348	156	504

According to Table 9, 69.04 percent of owner/ managers of Nepalese SMEs concur that there is a shortage of competent labor that can operate business intelligence systems. The skilled labor, according to Nepalese SMEs in the manufacturing (100%) and service (91.3%) sectors, is not a barrier to the adoption of business intelligence. 37.97 percent of SMEs in the wholesale sector believe that manpower is not a problem for them.

We questioned respondents if they agreed that there is a shortage of competent personnel to operate business intelligence systems. The responses' thoughts on this topic are summarized in Table 9.

- Unavailability of Easy Software

We questioned respondents if they agreed that there is unavailability of easy software to operate business intelligence systems. The responses' thoughts on this topic are summarized in Table 10.

Table 10: Unavailability of easy software

Yes		Unavailability easy software		Total
		No		
Type of Business	Manufacturing	0	63	63
	Service	6	63	69
	Wholesale	55	24	79
	Retail	291	2	293
Total		352	152	504

Table 10, revealed that 69.84 percent of owner / managers of Nepalese SMEs are agreed that the reason of non-practice of Business Intelligence is unavailability of easy software. Unavailability easy software, according to Nepalese SMEs in the manufacturing (100%) and service (91.3%) sectors, is not a barrier to the adoption of business intelligence. 30.37 percent of SMEs in the wholesale sector believe that unavailability of easy software is not a problem for them.

- Limited Information

We questioned respondents if they agreed that there is Limited Information to operate business intelligence systems. The responses' thoughts on this topic are summarized in Table 11.

Table11: Limited Information

Yes		limited information		Total
		No		
Type of Business	Manufacturing	0	63	63
	Service	6	63	69
	Wholesale	40	39	79
	Retail	291	2	293
Total		337	167	504

Table 11, revealed that 66.86 percent of owner / managers of Nepalese SMEs are agreed that the reason of non-practice of Business Intelligence is limited information are there with them. Limited information with Nepalese SMEs, according to Nepalese SMEs in the manufacturing (100%) and service (91.3%) sectors, is not a barrier to the adoption of business intelligence. 49.36 percent of SMEs in the wholesale sector believe that Limited information with Nepalese SMEs is not a problem for them to adopt Business Intelligence.

- Small Turnover

We questioned respondents if they agreed that there is small amount of turnover to operate business intelligence systems. The responses' thoughts on this topic are summarized in Table 12.

Table 12: Small Turnover

Yes		Small turnover		Total
		No		
Type of Business	Manufacturing	0	63	63
	Service	6	63	69
	Wholesale	40	39	79
	Retail	291	2	293
Total		337	167	504

According to Table 12, 66.86 percent of the owners and managers of Nepalese SMEs concur that their low turnover is the reason they don't use business intelligence. According to Nepalese SMEs in the manufacturing (100%) and service (91.3%) sectors, a little quantity of turnover in SMEs is not a barrier to the adoption of business intelligence. The little quantity of turnover in Nepalese SMEs, according to 49.36 percent of SMEs in the wholesale sector, is not a barrier to their adoption of business intelligence.

- Concern for data security

We asked respondents if they agreed that using business intelligence solutions raises concerns about data security. Table 13 presents an overview of the participants' opinions on this subject.

Table 13: Concern for data security

Yes		Concern for data security		Total
		No		
Type of Business	Manufacturing	13	50	63
	Service	24	45	69
	Wholesale	65	14	79
	Retail	293	0	293
Total		395	109	504

According to Table 13, 78.37 percent of the owners and managers of Nepalese SMEs concur that a concern over data security prevents them from using business intelligence. According to Nepalese SMEs in the manufacturing (79.63%) and service (65.21%) sectors, worry over data security is not a barrier to the adoption of business intelligence. Concern for data security in Nepalese SMEs, according to 17.72 percent of SMEs in the wholesale sector, is not a barrier to their adoption of business intelligence.

4. Discussion and conclusions

The competition from a local to a global level is becoming more intense due to economic globalization. Regardless of the size and type of corporate organization, data-driven decision making is currently of utmost importance. Because of the accessibility of computer hardware and software, the conventional methods of data collecting, storage, and analysis are becoming obsolete. This study aimed to reveal how Nepalese SMEs saw the incorporation of business intelligence into their operations. The study's main objective was to determine whether or not different types of industries have different perceptions of business intelligence. Out of 504 SMEs, 12.5% were manufacturing companies, 13.69% were service companies, 15.67% were wholesale companies, and 58.13%

were retail companies. Business intelligence in Nepalese SMEs is at the development stage, based on the infrastructure that is now available for it. The manufacturing, service, and wholesale business sectors in Nepal have access to computer hardware and software facilities. All SMEs in Nepal have access to mobile phones and the internet. According to the study's findings, Nepalese retail enterprises lack a strong business intelligence infrastructure. The primary issue of the SME in implementing BI is whether the technology is supported (Chau & Tam, 1997). When making adaptation decisions, the comparison of benefits, additional benefits of new technology, desire, and relevance of BI to the organization are taken into account. Does BI give the business a competitive edge? Does BI satisfy the firm's requirements? Are the quarries of decision-maker's (Prem Kumar & Roberts, 1999).

The qualities of external and internal technologies that could have an impact on companies or people are defined by the technological element of adoption (Khayer, Talukder et al., 2020). The technological background, according to Tornatzky and Fleischer (1990), includes both internal and external technologies that are relevant to businesses. The organizations' external technologies are those that are easily accessible on the market but are not currently adopted by a specific firm; these technologies can have an impact on innovation "by defining the boundaries of what is possible as well as by demonstrating to firms how technology can enable them to evolve and adapt" (Baker, 2012). The decision to adopt innovation must take into account the organization's internal technologies, which include its current tools and procedures. These technologies set a firm's tolerance for the extent and speed of technological change (Baker, 2012).

In the area of technology adoption, Roger (1995) recognized the five technological variables as relative benefit, complexity, compatibility, trialability, and observability. The components in Rogers theory of diffusion of innovation (DOI) are the most frequently researched factors used to study the impact of technological factors on technology adoption by SMEs, according to Banapour et al. (2020) and Pipitwanichakarn and Wongtada (2019). These technological traits have been the subject of numerous studies that evaluated the degree of company IT adoption using these criteria (Khayer, Talukder et al., 2020). As a result, S. Z. Ahmad et al. (2019) used these characteristics to investigate how SMEs in the UAE are using social media. Additionally, Hiran and Henten (2020) studied the adoption of cloud computing in the Ethiopian higher education industry using these factors. According to Teixeira et al (2018). 's theoretical analysis of 41 papers, which focused on 45 characteristics connected to organizational digital marketing adoption, adoption of innovations is likely to be influenced by relative advantage, compatibility and complexity, observability, and trialability. Additionally, the findings of Hameed and Counsell's (2012) meta-analysis support the notion that these components play a significant role in the adoption of IT innovations.

Information technology adaptation is popular in Nepalese SMEs' finance and accounting departments. 96.28 percent of manufacturing companies and 59.42 percent of service companies use information technology in their operational and promotional activities. In the retail industry of Nepal, there is no business intelligence system. Top management in Nepalese SMEs uses a traditional approach of decision-making. It implies that the business intelligence system in SMEs in Nepal is still developing. Lack of skilled labor, a lack of simple software, a lack of information, a little turnover, and concerns about data security are reasons why Nepalese SMEs do not use business intelligence, however manufacturing and service enterprises disagree with these explanations.

5. Implications of Study

The digitalization of commercial organizations makes it easier to manage large volumes of data. Data protection is a top priority because they are an organization's most valuable assets. Gaining competitive advantages is essential in a highly competitive corporate climate, and real-time information can help. More Nepalese SMEs are interested in implementing BI in their operations. The software developer can adapt the BI for Nepalese SMEs with the help of this study. The idea of business intelligence will be enhanced by additional study using different moderators and mediating variables, as well as research in different contexts. Technological literacy is the main issue in Nepalese business sector. Nepal government announced information and communication technology policy in 2015 with aim achieve the goal of "Digital Nepal". This policy is meant to lay the foundations for a larger "Digital Nepal" goal. This vision calls on Nepal to increase its pursuit of equality and sustainable progress through the use of information and communication technology, which will help change Nepali society into a knowledge and information-based society.

REFERENCES

- Agyei-Mensah, B. (2011), "Financial management practices of small firms in Ghana: an empirical study", *African Journal of Business Management*, 5 (10).
- Ahmad, S. Z., Abu Bakar, A. R., & Ahmad, N. (2019). Social media adoption and its impact on firm performance: The case of the UAE. *International Journal of Entrepreneurial Behavior & Research*, 25(1), 84–111. <https://doi.org/10.1108/IJEER-08-2017-0299> [Crossref], [Web of Science ®], [Google Scholar]
- Baker, J. (2012). The technology–organization–environment framework. Y. K. Dwivedi, M. R. Wade, & S. L. Schneberger (Eds.), *Information systems theory: Explaining and predicting our digital society* (Vol. 1, pp. 231–245). New York, NY: Springer. <https://doi.org/10.1007/978-1-4419-6108-2> [Crossref], [Google Scholar]
- Banapour, P., Yuh, B., Chenam, A., Shen, J. K., Ruel, N., Han, E. S., Kim, J. Y., Maghami, E. G., Pigazzi, A., Raz, D. J., Singh, G. P., Wakabayashi, M., Woo, Y., Fong, Y., & Lau, C. S. (2020). Readmission and complications after robotic surgery: Experience of 10,000 operations at a comprehensive cancer center. *Journal of Robotic Surgery*, 15(1), 0123456789. <https://doi.org/10.1007/s11701-020-01077-4> [Web of Science ®], [Google Scholar]
- Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17, 99–120
- Burgess, (1997), 'A categorized study of the use of IT in small business', Detailed Survey Report, *small Business Victoria*, Melbourne, Australia.
- Chau, P.Y.K. & Tam, K.Y. (1997). Factors affecting the adoption of open systems: An exploratory study. *MIS Quarterly*, 1-24.
- Chen, H., Chiang, R.H., Stoery, V.C., (2012). Business intelligence and analytics: from big data to big impact. *MS Quarterly*, (36) 4.
- Dahal, Navin and Bhaskar Sharma (eds) (2004), "WTO Membership: Opportunities and Challenges for SMEs in Nepal", xiv+103, SMEDP and SAWTEE, Kathmandu, Nepal.
- Davenport, T., (2014). Big data at work: Dispelling the Myths, Uncovering the Opportunities. *Harvard Business Review Press*, Harvard.
- Del Vecchio, P., Di Minin, A., Petruzzelli, A. M., Panniello, U., & Pirri, S. (2018). Big data for open innovation in SMEs and large corporations: Trends, opportunities, and challenges. *Creativity and Innovation Management*, 27.
- EkaviPapachristodoulou et.al., (2017). Business intelligence and SMEs: Bridging the gap. *Journal of Intelligence Studies in Business* 7(1):70-78.
- DOI:10.37380/jisib.v7i1.216
- Faitira et al., (2012). Barriers to The Adoption of ICT By SMEs In Zimbabwe: An Exploratory Study in Chinhoyi District. *Institute of Interdisciplinary Business Research*. 4, pp 1142-1156.
- Grover, V., Chiang, R. H., Liang, T. P., and Zhang, D. (2018), Creating strategic business value from big data analytics: A research framework. *Journal of Management Information Systems*, 35(2).
- Hameed, M.A., & Counsell, S. (2012). Assessing the influence of environmental and CEO characteristics for the adoption of information technology in organizations. *Journal of Technology Management & Innovation*, 7(1).

- Hiran, K. K., & Henten, A. (2020). An integrated TOE-DoI framework for cloud computing adoption in higher education: The case of Sub-Saharan Africa, Ethiopia. In M. Pant, T. K. Sharma, O. P. Verma, R. Singla, & A. Sikander (Eds.), *Advances in intelligent systems and computing 1053 soft computing: Theories and applications* (pp. 1281–1290). Springer Nature Singapore Pte Ltd. [Crossref], [Google Scholar]
- Khayer, A., Talukder, M. S., Bao, Y., & Hossain, M. N. (2020). Cloud computing adoption and its impact on SMEs' performance for cloud supported operations: A dual-stage analytical approach. *Technology in Society*, 60, 101225. <https://doi.org/10.1016/j.techsoc.2019.101225> [Crossref], [Web of Science ®], [Google Scholar]
- Laudon, K., Laudon J.P. and Dass, R. (2010). Management Information System. *Dorling Kindersely Pvt. Ltd, Eleventh edition.*
- Premkumar, G. & Roberts, M. (1999). Adoption of new information technologies in rural small businesses. *Omega. The International Journal of Management Science*, 27.
- Pipitwanichakarn, T., & Wongtada, N. (2019). Leveraging the technology acceptance model for mobile commerce adoption under distinct stages of adoption: A case of micro businesses. *Asia Pacific Journal of Marketing and Logistics*, ahead-of-print (ahead-ofprint).
<https://doi.org/10.1108/APJML-10-2018-0448> [Crossref], [Web of Science ®], [Google Scholar]
- Popovic, A., R. Hackney, P.S. Coelho, J. Jaklič (2012). Towards business intelligence systems success: Effects of maturity and culture on analytical decision making, *Decision Support Systems*, 54(1) 729-739.
- Rikhardsson, P., & Yigitbasioglu, (2018). Business intelligence & analytic in Management accounting research: status and future focus. *International Journal of Accounting information system*, 29.
- Roger, E.M. (1995). *Diffusion of Innovations* (4th ed.). The Free Press, New York, NY.
- Teixeira, S., Martins, J., Branco, F., Gonçalves, R., Au-Yong-Oliveira, M., & Moreira, F. (2018). A theoretical analysis of digital marketing adoption by startups. J. Mejia, M. Muñoz, Á. Rocha, Y. Quiñonez, & J. Calvo-Manzano (Eds.), *Advances in intelligent systems and computing, Springer; Cham* (Vol. 688, pp. 94–105). https://doi.org/10.1007/978-3-319-69341-5_9 [Crossref], [Google Scholar]
- Tornatzky, L.G. & Fleischer, M. (1990). *The process of technology innovation*. Lexington Books, Lexington, MA.
- Troyansky, O., Gibson, T., Leichtwies C., Bjork, L., (2015). *Qlickview of Your Business: An Expert Guide to Business Discovery with Qlik view and Qlik*. Wiley, London.
- Wieder, B., & M.-L. Ossimitz (2015). The impact of Business Intelligence on the quality of decision making—a mediation model, *Procedia Computer Science*, (64) 1163-1171.
- Yeoh, W. (2008). *Critical success factors for the implementation of business intelligence systems in engineering asset management organizations*. The University of South Australia.
- Yoon, T.E., B. Ghosh, B.-K. Jeong (2014). User acceptance of business intelligence (BI) application: Technology, individual difference, social influence, and situational constraints, in: *System Sciences. (HICSS), 47th Hawaii International Conference on, (IEEE, 2014)*, pp. 3758-3766.
- Industrial Enterprises Act 2020, Nepal Government.
- Information and communication technology policy 2015, Nepal Government.