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An Enterprise Computer-Based Information System (CBIS) in the Context of Its Utilization and Customer Satisfaction

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Abstract

Information systems is the study of technology, organizations, and people. An enterprise computer-based information system (CBIS) is type of technology where people can buy and sell their items online, therefore, it is a part of the online business process. This relationship has resulted in the reengineering of the information systems' model, the formulation of new requirements for training and education, and opening new investment windows for the development of new technologies at both the computer hardware and software application level to meet the needs of newly emerging business models. The aim of this chapter is to provide a comprehensive survey on enterprise CBISs in the context of its utilization and customer satisfaction.

Keywords: enterprise CBISs, information systems, customer satisfaction, online systems

1. Introduction

An enterprise computer-based information system (CBISs) have an important role to play in the digital economy as well as being a vibrant research area. It is considered to be a unique online platform that offers tools and capabilities for marketing, communication and retention of consumers [1]. Unlike supply chains, an enterprise CBIS can be defined as an inter-organizational technological and online information system that permits the contributing purchasers and vendors in a number of markets to exchange information about cost and goods assistance and carry out business transactions. It assists possible trading partners to find each other and transact. In addition to being significant from a practical perspective, enterprise CBISs have

made a key impact on the electronic business (eBusiness) area from both the company and the customer's perspectives, as both have benefited from the emergence of enterprise CBISs with its main goal being to facilitate business transactions using an efficient and effective approach. It is clear that enterprise CBISs offer a more practical and well-defined business model for organizations to compete in the contemporary digital economy [2, 3]. Despite the rapid development of enterprise CBISs, it is noted that in many cases, they are under-utilized and face early closure due to various technical or cultural obstacles [4, 5].

In general, enterprise CBISs can be categorized from various perspectives relating to their utilization: the independent enterprise CBIS, the buyer-oriented enterprise CBIS, the supplier-oriented enterprise CBIS, the vertical enterprise CBIS, the horizontal enterprise CBIS and the hybrid enterprise CBIS.

This chapter aim is to provide a comprehensive survey on enterprise CBISs in the context of its utilization and customer satisfaction. It covers the concept of the enterprise CBIS, including its background, definitions, challenges, motivations, importance, types and enterprise CBISs research trends. The rest of the chapter is structured as follows: 1) Section 2 provides the background of enterprise CBISs, Section 3 reviews definitions of enterprise CBISs, Section 4 presents the importance enterprise CBISs, Section 5 identifies the strengths and limitations of enterprise CBISs and Section 6 discusses the categories of enterprise CBISs.

2. Background of enterprise CBIS

The utilization of the digital economy in the late '90s caused the disappearance of intermediaries between customers and vendors. A vendor could sell company goods and services directly to a customer without the need for a middle man [6, 7]. Beside the advance in the growth of the digital economy technologies, novel types of enterprise CBISs were established which contributed new value-added services, attracting many new customers and vendors with extra services that facilitate the required business transactions [4, 8, 9]. The development of enterprise CBISs has changed the way traditional business is performed, resulting in new business models, which were developed in the late 1990s. The enterprise CBIS is the result of employing innovative technology in business processes. Overall, the deployment of enterprise CBISs is associated with the eBusiness process of reengineering, linking IT/IS technologies with traditional businesses [10, 11]. It requires a change of management principles and practical alignment between IT/IS technologies and business processes, all of which should be considered for the successful implementation of enterprise CBISs.

While there are many advantages and opportunities for enterprise CBISs [4, 12], cases of the ineffective employment of enterprise CBISs, from both the customers' and vendors' side are reported [6]. If the services of an enterprise CBIS contractor do not add any value to the customer/vendor, in the long term, they will decide that the enterprise CBIS is not the best way for them to conduct business. Lacking an adequate critical mass of customers will lead to the eventual shutdown of that particular enterprise CBIS. Similarly, an insufficient number of buyers in the enterprise CBIS will reduce the incentive for vendors to join the enterprise CBIS, as there will not be enough customers to whom they could advertise their goods or services.

The contemporary literature on enterprise CBISs describes many different eBusiness models of enterprise CBISs [12]. Today's enterprise CBIS practices support many different processes between a customer and a vendor. A number of enterprise CBISs support only the aggregation of supply and demand, and the searching and matching of customers or vendors [13]. In addition, different enterprise CBISs support different types of auctions and negotiations. On the other hand, not many enterprise CBISs support the entire trade process such as contracting, logistics, insurance, finances, legal and payments [6].

3. Definitions of enterprise CBIS

In today's advanced technological world, the problem of eBusiness implementation and utilization remains one of the top concerns of business and IT executives in an organization. There are various definitions of enterprise CBIS in the existing literature, the most prominent ones from the following authors [11, 14–29].

In this chapter, we use the definition of the enterprise CBIS provided by Reynolds et al., who defined it as “a single set of hardware, software, databases, networks, people, and procedures that are configured to collect, manipulate, store, and process data into information” [30]. This definition of the enterprise CBIS is apt for a number of reasons. Firstly, it highlights all the factors involved in the enterprise CBIS research area, representing both ‘what’ and ‘why’. Secondly, it refers to the purpose of these enterprise CBIS factors, including their aims and objectives. Lastly, the definition involves different important players participating in the utilization of enterprise CBISs together with the consideration of its different transactions.

4. Importance of enterprise CBIS

It is anticipated that no business today will remain untouched by the emergence of the digital economy. The main role of enterprise CBISs in today's rapidly changing business environment is to bring market players together to execute real-time exchange transactions, for example cost and product stipulations, and facilitating teamwork and network synchronization. The key idea is that a group of customers and vendors transact in a single online platform, allowing member organizations to take advantage of greater economies of scale and liquidity; and to purchase or sell anything easily, quickly and cost effectively. In addition, enterprise CBISs can help companies transcend geographical barriers, and grow globally to attain profits in emerging markets that were once unattainable [18–20].

Furthermore, the promising roles of enterprise CBISs include aggregating and matching customers and vendors and providing inter-business organizational market information [31]. It performs similar business transactions to conventional marketplaces, such as matching buyers and vendors, facilitating transactions, providing institutional infrastructure and offering capability, but with increased effectiveness and reduced transaction expenditure.

The main function of B2B enterprise CBISs is to enable information about the market and transactions to flow more efficiently. Usually, a buyer has to set up connections and associations with

many suppliers, who frequently use different IS and technologies, and vice versa. By utilizing an enterprise CBIS, the customer needs to create only one link with the enterprise CBIS, which provides a link to all the vendors on a system that shares similar standards. The enterprise CBIS offers a virtual space where customers and vendors can come together to discover new business opportunities. The objective of the enterprise CBIS is to draw together as many buyers and vendors as possible. Buyers bring purchase requirements while vendors offer products or services. The enterprise CBIS will then match purchase requirements against selling offers, enabling the participants to undertake new exchanges [27, 32–35] Strengths and limitations of enterprise CBIS.

The development of IT/IS technologies and telecommunication allow the digital economy to flourish, allowing its customers to transact with a minimized cost. The ongoing improvement of IT/IS technologies and telecommunication increases the efficiency of enterprise CBISs. For instance, many recent developments in ICT have focused on improving the security of enterprise CBIS payments, which increase customers' confidence carry out business transactions on enterprise CBISs all over the globe [19, 20].

There is no doubt that the Internet has had an unprecedented impact on the digital business world. This is because of the noticeable advantages for both vendors and customers in comparison with conventional means of engaging in commercial activities. Despite these advantages, there are also disadvantages of conducting digital business on the Internet, such as security breaches to communication or confidentiality [36, 37].

4.1. Strengths of enterprise CBIS

Through the utilization of enterprise CBISs, SMEs stand a better chance of competing with larger organizations. Simply being connected to the Internet 'highway' provides the exposure that SMEs are otherwise unable to achieve [38]. In addition, unlike a physical organization which employs 'bricks and mortar' employees who need salaries, a work schedule, holidays, etc., an enterprise CBIS can offer their goods 24 hours a day, 7 days a week with lower costs [6, 32, 33]. Consumers are not restricted to particular business house and are thus able to attain information and place orders anytime, anywhere [12, 32].

Another advantage of enterprise CBISs is the facilitation of International transactions. The networked enterprise CBISs are not restricted by borders, nor do they belong to anybody and access and publication material costs are extremely low. Communication between a customer/vendor located at the opposite ends of the world is as simple as one click. Any vendor now can trade goods globally with less effort via the utilization of enterprise CBISs [12, 39].

In addition, the reduction of execution costs is also considered an advantage of enterprise CBISs. With reduced personnel required in enterprise CBISs, the costs of running an enterprise CBIS will also be lowered. This can provide an opportunity for businesses utilizing the enterprise CBIS to better optimize their assets [36, 37]. Furthermore, enterprise CBISs can offer comparison shopping. Customers are able to utilize online search engines and compare prices to select a product at the best price possible.

Another advantage of enterprise CBISs is their ability to provide detailed product information. There are limits to the amount of information that can be displayed in physical stores.

Customers may need detailed information about certain products that is difficult to provide. Providing such detailed information has been made easy with enterprise CBISs [40]. Moreover, enterprise CBISs can also create more efficient and targeted advertising to attract consumers. Compared to physical marketplaces, enterprise CBISs are able to keep detailed data on consumers as well as information on their shopping preferences to direct future communication and provide relevant offerings based on the customer's data. Customer information can be obtained by using all available data for example, customer location, the type of browser and operating system, the website they use to access the enterprise CBIS and their online behaviors/activities. This can help enterprise CBIS vendors maintain efficient communication with customers [25–27].

The facilitation of transactions is also considered an important advantage of enterprise CBISs [2, 10, 41]. This involves the process of matching the customers and vendors, for example, a customer with specific interests could easily establish a relationship with a vendor who supplies the desired products. This relationship can be long-term and the customer of the enterprise CBIS will have the opportunity to receive updates on the desired product. For example, a customer interested in a specific mobile make and model can register on the enterprise CBIS of the vendor who supplies that specific model to establish a relationship and initiate a transaction. The customer in this scenario will have the advantage of reviewing the product information prior to purchasing, before finalizing the transaction. On the other hand, the vendor will be able to record the customer's interests, provide the required services and send future updates. Thus, the ability of enterprise CBISs to facilitate transactions in this way could have the potential to build stronger relationships between customers and vendors, thereby resulting in the better utilization of enterprise CBISs [3, 8, 15].

4.2. Limitations of enterprise CBIS

Fraud is a rising concern when utilizing enterprise CBISs. It is widely accepted that the use of the Internet and enterprise CBIS systems has created new fraudulent possibilities [16, 17]. This is due to a lack of a direct contact, and in some cases, a customer may deliberately provide an incorrect identity and details to the vendor. Identity theft incidents in 2006, as a result of providing false information on the Internet, cost an estimated \$50 billion US dollars to businesses in the USA. It was also found that with the increased number of online users, it has become difficult to report every incident in a timely manner.

The utilization of enterprise CBISs' also raises issues related to security, especially the security of the user's data. Unlike physical markets, enterprise CBISs are required to keep customer data safe from being exposed. Similar concerns are raised in relation to connecting to a community network where other users can possibly access private data. It is difficult for new companies which are utilizing enterprise CBISs to handle such threats unless they are supported by experienced employees or partners in this field. In addition, the costs involved in employing skilled IT staff and purchasing the hardware/software required to maintain a safer enterprise CBIS may be prohibitive for some vendors [2, 10, 12]. According to Al-Otaibi and Al-Zahrani [42], 70% of consumers in the Kingdom of SA are of the view that security is their major concern when it comes to buying or selling online [42]. This is especially so given the fact that to buy from the enterprise CBIS, personal details such as name and account details

are needed. Of major concern is the disclosing of credit card details. Another study found that the majority of online customers believed that current advancements in security features, including encryption and other techniques, are not sufficient to lower their security concerns [3, 9]. Furthermore, potential enterprise CBIS customers might be worried that vendors can gather sensitive information without their knowledge that could be used in the future to cause discomfort and frustration.

Uncertainty regarding the reliability of enterprise CBISs was also found to be a disadvantage for customers. With a lack of human contact (such as feeling and touching the products being offered), reliability in this sense means the dependability of enterprise CBISs, where customers believe that information about the product being offered is accurate and precise. Gommans et al. [43] added that such uncertainties could prevent prospective enterprise CBIS customers from engaging in and transacting with the enterprise CBIS. Therefore, it is important to consider such concerns in order to gain customers' confidence and meet their expectations.

5. Categories of enterprise CBIS

The literature discusses several different categories of enterprise CBISs. An independent enterprise CBIS is typically a B2B online platform purposed by a third party, which is open to sellers in a specific industry. The B2B enterprise CBIS involves a wide range of communications between businesses, including sales as well as the purchase of services, business resources, IT, manufactured parts and mechanisms and capital equipment. In order to set up an efficient purchasing environment, an association of buyers may choose to run a buyer-oriented enterprise CBIS. If buyers are looking to purchase or participate in enterprise CBISs' activities, this type of enterprise CBIS can help lower administrative costs and assist them to obtain the best price from suppliers. A supplier-oriented enterprise CBIS is set up and operated by a number of suppliers who are seeking to create an efficient sales waterway via the Internet to a large number of buyers. A vertical enterprise CBIS provides online access/contact to businesses vertically up and down each segment of an industry sector, for example, automotive, chemical, textiles or construction. A horizontal enterprise CBIS is a set of assorted business and government entities assembled according to a universal need for selected goods and services. **Table 1** presents a summary of these categories of enterprise CBISs [10, 41, 44–62].

Authors	Category of enterprise CBIS	Focus
Laudon and Traver (2007), Lucking-Reiley and Spulber (2001)	Independent	B2B transactions eliminate those involving homes, such as trade sales, inter customer exchange, and service.
Nepal et al. (2011)	Independent	By registering on an independent enterprise CBIS, companies can access top-secret requests for quotes or bids in the business industry.
Popovic (2002), Bakos and Bailey (1997), Yoo et al. (2013)	Independent	The authors categorized B2B enterprise CBISs according to their ownership arrangement and their industry focus.

Authors	Category of enterprise CBIS	Focus
Kaplan & Sawhney (2000), Campbell et al. (2013)	Independent	In disparity, independent enterprise CBISs are built by a small number of business industry agents (purchasers or sellers), typically leaders that dictate their particular industries.
Evans (2003)	Independent	The idea of two-sided enterprise CBISs refers to circumstances where one or many competing platforms give services that are employed by two types of trading business partners to interrelate and facilitate an exchange.
Bakos and Bailey (1997), Mancini et al. (2006)	Independent	Classifies web intermediary services into four categories: aggregation of purchasers and sellers, trust improvement between participants, market facilitation, and matching of purchasers and sellers.
Turban et al. (2002), L. Xiao et al. (2014).	Buyer oriented	A buyer-oriented enterprise CBIS is usually run by an association of buyers in order to set up an efficient purchasing environment.
Kösling (2001), Sila (2013), Mesáros (2010)	Buyer oriented	Procurement cycles can be abbreviated and also be supported by auctions and buy volume can be packaged up from interior business departments and from partner business organizations.
Smart and Harrison (2003)	Buyer oriented	Minimizing process costs is the maximum potential of eProcurement.
Singh et al. (2005), Turban et al. (2002)	Supplier oriented	A supplier-oriented enterprise CBIS is set up and operated by a number of suppliers who are seeking to create an efficient sales waterway via the Internet to a great number of buyers.
Turban et al. (2002)	Supplier oriented	Products can be sold directly to the consumer without any need for intermediaries.
Bierregaard (2002), McCuiston et al.(2001)	Supplier oriented	Companies sell extra products and business consumers can therefore realize huge discounts.
Bakos and Bailey (1997)	Vertical	Vertical enterprise CBISs provide online access/contact to businesses vertically up and down each segment of an industry sector, for example automotive, chemical, textiles or construction.
Bygdeson and Gunnarsson (2000)	Vertical	A vertical enterprise CBIS spans up and down each segment of one specific industry sector.
Kaplan and Sawhney (2000)	Horizontal	A horizontal enterprise CBIS is a set of assorted business and government entities assembled according to a universal need for selected goods and services.
Reinking (2000), Andoh-Baidoo et al. (2012)	Hybrid	In this category of enterprise CBISs, researchers combine both the vertical enterprise CBIS and the horizontal enterprise CBIS to add further value to businesses.
Lee et al. (2014)	Horizontal	In a horizontal enterprise CBIS, industries can be used for functions for example distribution, management, material, purchasing services etc.
Lee et al. (2014)	Vertical	In a vertical enterprise CBIS, professional information should support industry work process.

Table 1. Categories of enterprise CBISs.

Due to the dynamic business environments, enterprise CBISs are not strictly categorized according to **Table 1**. For instance, hybrid enterprise CBISs that combines both the vertical enterprise CBISs and horizontal enterprise CBISs can add further value to businesses.

6. Discussion and implication of CBIS

Despite all the possible advantages of IS in the context of online businesses today, the research in CBIS has narrowly focused on the cost related aspects. For instance, lack of customer satisfaction and unmet customer expectations are important inhibitors for online business growth. Trust is also another important aspect of CBIS utilization. Possible risks related to the opportunistic behavior of traders are a traditional reason of higher transaction costs in the CBIS environment, and demonstrates the need for CBIS techniques that build trust.

Two major contributions can be derived from this chapter. Firstly, for CBIS researchers, this chapter presents a detailed survey and useful background information on CBIS. Secondly, for CBIS stakeholders, this chapter suggests that for CBIS utilization and customer satisfaction, the three main pillars, i.e. customers, companies and CBIS regulators are needed. This study also categorized CBIS into several categories namely, independent CBIS, buyer oriented CBIS, supplier oriented CBIS, vertical CBIS, horizontal CBIS and the hybrid CBIS. Depending on the specific needs of the companies, they can employ any type of these CBIS. For example, large organizations that have sufficient resources would own say, a vertical CBIS with a multi-tiered system comprising many suppliers. On the other hand, a group of buyers may choose a buyer-oriented CBIS as a platform for finding the best procurement options. However shorter product life cycles and the demand for a larger number of derivatives have driven companies to be adaptive as well as responsive to the volatile environment. This suggests that they may need to consider a hybrid type of CBIS, which provides the benefits of both say the vertical and horizontal CBIS. Research on CBIS categories also ignores important aspects of customer needs and activities that may neutralize many of the hypothesized competitive benefits of fundamental firms. For instance, consumers who need instantaneous satisfaction may be unenthusiastic to rely on CBIS vendors who ship products by courier. Therefore, in this context the hybrid CBIS category involving the use of both virtual and physical presence to attain the needs of purchasers may be a better option.

Without any of the three pillars of CBIS as mentioned earlier, it is unlikely that the CBIS will be sustainable. A CBIS regulator plays a major role in the CBIS industry as they set the rules and regulations in order to control the CBIS applications. In some countries such as Saudi Arabia where there are many regulations relating to culture and religion, CBIS regulators have a huge effect on the sustainability of CBIS. Hence CBIS owners (or operators) need to consider the influence of this pillar. Obviously, the customer as a second pillar of CBIS also plays a very important role for its sustainability, without these pillars the CBIS will not function. Earlier customer focused CBIS research were mainly on the operational, implementation and adoption aspects of CBIS. However, with the introduction of Service Science Management and Engineering (SSME) by IBM, there is a now a focus on value (customer perspective) and value co-creation between stakeholders. Similarly, the company as the third pillar is also equally important. Together these three pillars should work together to co-create value for the stakeholders.

7. Conclusion and future trend

The existing literature in the field of the enterprise CBIS has indeed left doors open to identify the benefits and opportunities that may be gained in the future [2, 10, 12–14, 31, 38].

The current literature presents numerous cases of both the successful and unsuccessful employment and utilization of the enterprise CBIS, for both end purchasers and vendors. Unsuccessful employment of the enterprise CBIS might be caused by unsuitable service and/or support from suppliers. If the services provided by enterprise CBIS systems do not add value for both the purchaser and vendor, in the long term, the enterprise CBIS may not be the desired platform for a successful business operation, and the organization may be forced to face early closure if it does not have the desired volume of business. This also applies to purchasers. If there are only a small number of buyers, vendors are likely to lose interest in joining the enterprise CBIS, as they will not be compensated for their business investment.

Practically, future research directions should consider the intelligent agents in CBIS. The association between the IT and intelligent agents can assure new ways for customers to search and participate in CBIS. These technological applications can improve the ability of customers to search, select, negotiate, and transact for goods that align their preferences. Certainly, software-based intelligent agents present both organizations and customers with the possibility of “artificial life”-based demonstration in dealing with online transaction complexity, crowded, increasing demand of online business markets. They also have the ability to change market structure and CBIS performance. Thus, further research on these intelligent agents is needed in order to better understand their effectiveness on obtaining the satisfaction of CBIS’ users. Moreover, there should two distinct practical aspects that need to be further examined. These practical perspectives are functional and technical. The functional perspective is basically focuses in the functionality of CBIS systems and specifically required experts with business background to develop and improve the business processes. The technical perspective focuses in the programming and improvements of CBIS as software and require experts with IT background to assist in maintaining proper running of CBIS in the long terms. Therefore, both practical perspectives require independent research to avoid any confusion and assist CBIS to flourish with respects to the desired utilization.

This chapter has presented a detailed review of enterprise CBIS research. In the review, different types of enterprise CBISs were identified. Categorizing enterprise CBISs into different types can assist business owners to make informed decisions as to which is the most appropriate type for their business needs. The hybrid enterprise CBIS is probably the most flexible type of enterprise CBIS which utilizes interrelated online marketing multi-dimensional channels. It maintains transactions between enterprise CBIS platforms in different ways where every channel communicates with each other.

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