Application of Decision Support System in E-commerce

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Abstract

Electronic commerce (EC) has the potential to improve efficiency and productivity in business activities. E-commerce today is no longer technological issue, but is also a business issue. A decision support system (DSS) is "an interactive information system that provides information, models and data manipulation tools to help make decisions in semi-structured and unstructured situations. E-commerce involves a number of forms, varying level of cost and complexity, depending on business need. This conceptual paper presents the e-commerce application by integrating with Decision support systems. It further highlights some critical issues in e-commerce, suggestion future strategies for e-commerce in years to come

Key Words: e commerce, decision support system, supply chain management, electronic funds transfer.

Introduction

Electronic Commerce is defined as an attempt to increase transactional efficiency and effectiveness in all aspects of the design, production, marketing and sales of products or services for existing and developing marketplaces through the utilization of current and emerging electronic technologies. In the globalization era, understanding the adoption of information communication technology, including e-commerce by developing countries is becoming important to improve its adoption success. This, in turn, enables developed countries to trade with developing countries more efficiently.

Decision Support System (DSS) is an umbrella term used to describe any computer application that enhances the user's ability to make decisions. More specifically, the term is usually used to describe a computer based system designed to help decision makers use data, knowledge and communications technology to identify problems and make decisions to solve those problems. DS systems can be separated into seven broad categories namely Communications Driven DSS, Data Driven DSS, Document Driven DSS, Knowledge Driven DSS, Model Driven DSS, Spreadsheet based DSS and Web-based DSS.

Communications Driven DSS is a type of DSS that enhances decision-making by enabling communication and sharing of information between groups of people. Data Driven DSS are a form of support system that focuses on the provision of internal (and sometimes external) data to aid decision making. Document Driven DSS are support systems designed to convert documents into valuable business data. Knowledge Driven DSS are systems designed to recommend actions to users. Model Driven DSS support systems incorporate the ability to manipulate data to generate statistical and financial reports, as well as simulation models, to aid decision-makers. Spreadsheet based DSS offer decision-makers easy to understand representations of large amounts of data. Web-based DSS system that is operated through the interface of a web browser, even if the data used for decision support remains confined to a legacy system such as a data warehouse.

Review of literature

According to Miles et al., 2000; Silverman et al., 2001, the importance of applying decision support systems (DSS) in e-commerce websites has been widely accepted. A decision support system (DSS) is "an interactive information system that provides

information, models and data manipulation tools to help make decisions in semi-structured and unstructured situations where no one knows exactly how the decision should be made". The traditional DSS method includes use of models, interactive problem-solving, user-controlled analyzing data and evaluating decision alternatives.

Silverman et al. (2001) identified three levels of DSS in e-commerce shopping websites: access focused, transaction focused, and relationship focused. The first level websites only offer simple user-pulled information access, such as basic search and browsing capabilities; the second level websites interactively offer more support for buyer's mental processes, e.g. provide default settings and templates, guided choices, and well-structured steps; the third level websites focus on maintaining long term relationship with the customers and are similar to Customer Relationship Management (CRM) systems.

Kurnia (2006) discover the adoption of e-commerce in Indonesia, as an example of a developing country, and its relevance by assessing the adoption level, benefits experienced, negative consequences and problems encountered due to electronic commerce adoption. Some factors affecting the adoption of e-commerce and the condition of Indonesia in relation to e-commerce adoption are discussed in this paper. The findings of the research conducted so far indicate a positive growth of e-commerce adoption in Indonesia. Based on the study, it appears that e-commerce is indeed relevant to Indonesia, despite the current limitations with the existing infrastructure and other issues related to the economical and socio-cultural conditions. E-commerce may offer excellent opportunities for growth in developing nations like Indonesia. Further research into the Indonesian situation is needed to better understand the adoption issue. In addition, other limitation of this article is that it does not show technical part of electronic commerce.

Davies (2001) discussed about what is e-commerce, the Impact of e-commerce on business functions in terms of communications, supply chain, sales, marketing, procurement, logistics and research and development. Also discussed in the study are way on how to develop an ecommerce strategy and its practical implementation such as selecting an ISP, making use of search engines, using email, marketing and promoting your website, e-catalogue considerations, implementation of an e-catalogue, credit card fraud and prevention, security and virus protection and providing online database access from a websites. By keeping the Web maintenance and marketing function within the company, Economic Packaging can ensure that the Website continues to be promoted effectively, enabling further customers and suppliers to be reached, at a minimal cost.

Goodwin, Keskinocak, Murthy, Wu, Akkiraju (1999) discussed the attention in artificial intelligence (AI) for e-Business that has been focused on business to consumer transactions. It is stated that AI can have a larger impact on the supply chain that delivers goods and services to the end consumer. Reductions in costs and the pervasiveness of the Internet have encouraged companies to move towards using ecommerce for transactions with their business partners. Companies are willing to invest resource because of the reduced product cycle times and the lower transaction costs that they expect. A result of this movement is that companies can afford to interact with a larger number of trading partners and form project and customer specific partnerships that would have been too costly in the past. To manage a larger and more dynamic set of partnerships and to be

able to take advantage of transient opportunities, business users will need decision-support systems to identify and analyze the opportunities in terms of their business objectives. In this paper, they described their agent-based decision support framework for creating systems to support trading partners in the e-supply chain. They focused on the issues that need to be addressed in order to create a viable and useful decision-support system. The limitation of this article is that it the authors did not explain all the e-commerce application and how decision support system really play a role.

McDonald (2002) instructed ways on how to build an e-commerce application. The slide does explain a lot in terms of application, blueprints e-commerce application design, designing and implementing the business model. The author also shows what features you might look for in an application server. He went over advantages of horizontal layers, advantages of vertical tiers, affect of layers and tiers on capabilities and the process of architecting the sample application. The study does shows the technical part of e-commerce and decision support system, however, this study does not clarify terms that is use clearly, making understanding hard.

Brown (2006) explained about how to improve customer experience in using e-commerce. The author also discuss that integrated customer experience research methods are a critical tool every business needs to win high-value customers and keep them coming back in order to ensure satisfaction with the customer experience. He mentioned that many Web businesses do not provide a compelling customer experience; some sites are simply unusable, while others fail to provide content, goods and services that match their customers' needs and expectations. The limitation of this article is that the

authors did not identify in a greater depth the relative importance of each methods and concepts.

Hurst and Gellady (2000) discussed the secrets to making website a welcome place that encourages customer to stay and buy. They describe the strategies and tactics to help build a great customer experience – the key to get a success e-commerce. They also said that providing a great customer experience on the web can result in strong word-of-mouth exposure, media accolades, and increased revenue. The good customer experience is likely to lead to future visits by the customer and long-term loyalty for the site, including great word-of-mouth referrals to friends and family. The limitation of this article is that the author's didn't elaborate more on the method to enhance customer experience.

According to Flight (2006), product suitability is very important for e-commerce development. Not everything is suited to online selling and website should understand what consumers are likely to buy directly from the website. There were three features that have been discussed which is product homogenous, shippable and inexpensive. Consumers prefer to buy things that they are understand exactly what they are buying, low delivery cost and buy a cheap product but valuable. The limitation of this article is the author didn't elaborate more on each features in greater depth. Grady and Chuang (2001) claims that increase in communications capabilities will substantially change the process of product development. They said that suppliers will be able to be linked together using E-Commerce technologies in a product development chain, with the potential of a substantial reduction in cost and lead-time with a simultaneous increase in product variety. They also describe the eighteen issues represent a comprehensive research program that is necessary to

begin to address E-Commerce and product development. The limitation of this study is the authors doesn't elaborate more on the issues arise in this article.

Marek J. Druzdzel and Roger R. Flynn (2002) discussed that Decision Support Systems (DSS) are interactive, computer based systems that aid users in judgment and choice activities. The author stated that typical application areas of DSS are management and planning in business, health care, the military, and any area in which management will encounter complex decision situations. Decision support systems are typically used for strategic and tactical decisions faced by upper level management decisions with a reasonably low frequency and high potential consequences in which the time taken for thinking through and modeling the problem pays off generously in the long run. The author identified that they are three fundamental components of DSS which are Database Management System (DBMS), Model Base Management System (MBMS) and Dialog Generation and Management System (DGMS). The limitation of this article is that the author does not mention any disadvantage of DSS.

Choong Y. Lee (2003) in the article explores e-commerce issues, such as marketing and logistics problems, and creates viable recommendations. The author stated that the issues that e-commerce faces will be examined through the marketing mix. Exploring the ideas of product, place, price and promotion, and applying them to e-commerce problems is the main focal point of the article. The author believed that the four concepts of the marketing mix equally play a critical part in the success of e-commerce. Therefore, concentrating on these concepts will prove to be of the utmost importance as an e-commerce provider. The author

also stated that with many barriers involved in e-commerce, companies must be able to effectively and efficiently manage each phase of the marketing mix. The limitation of this article is that the author does not give much example about any company that has successfully used this marketing strategy for e-commerce.

Erik Wilde and Andreas Steiner (2004) in their article try to demonstrate that e-commerce technologies are in many ways comparable to computer networking, and show that convincing businesses to adopt e-commerce technologies could be made easier by showing them that e-commerce is basically computer networking taken to another level. The authors also believe that using these metaphors will make it easier to talk about e-commerce technologies, to reuse existing knowledge about networking architectures on this new level, and to identify the areas where additional work needs to be done. The authors also discussed about the metaphors that they are using in their comparison of e-commerce infrastructures and traditional computer networking. They then continue in by applying these metaphors to e-commerce infrastructures and investigate the overall picture as well as some case studies. The limitation of this article is that the authors of this article discussed more about networking rather than the relationship between networking and e-commerce.

Lawrence J. Radecki and John Wenninger (1999) describe in their article how electronic billing and payment systems work and discuss the factors that will determine whether high volume billers and their customers are likely to benefit sufficiently to join in large numbers. The authors begin by estimating the size of the market for processing recurring bills. They then examine how information exchanges and money flows under the current system of bill presentment

and payment will change with the move to electronic systems, and consider who stands to gain if this payment innovation becomes popular. Finally, they look at some of the obstacles that may delay the adoption of e-billing.

Sison and Fontrodona (2006) discuss on the main ethical issues in e-commerce such as security, privacy, identity and nonrefutability of transactions. The author also proposes the measures that both government and private sector may adopt in order to address the ethical issues.

Faja (2005) concern on the privacy of personal information is one of the ethical and legal issues that associated with e-commerce. The author focuses on the privacy concerns in the context of online environment, provide understanding the nature of online environment and also the trade off that internet users willing to deal when they disclose their personal information in the web sites. The limitation of this paper is that, the item used to measure the hypotheses were adopted from the previous research, these may lead to outdated information due to inaccurate measurement of collecting data.

Anil and Tan (2003) discussed on the Legal Regulatory and Policy Issues of E-commerce in Asia. The author reviews the current status and development of ICT law and regulation as it impacts on e-commerce and economic development in the Asia Pacific Region. The author also discusses how the regional countries have developed their local laws to address the various legal issues of e-commerce law and regulation. The paper also surveys the immediate regulatory issues that need to be addressed for the growth of e-commerce. The limitation on this study is, the author only review the development status of ICT law and regulation impacts on e-commerce and economic development in Asia Pacific region. The

author should also do reviews on East Asia countries such as Japan and Korea. These countries are known as advanced country in the ICT arena. Therefore, the author may also study on the key success factor of these develop country.

Nasir (2004) write on the Legal issues involved in E-commerce. The author provides and overview of some of the legal issues and related problem in e-commerce. The legal issues that the author discussed are electronic transaction, privacy and security, and copyright and trademark issues. The author also discussed on the law and legislation regarding these issues.

Problem Statement

Electronic commerce over the Internet is a new way of conducting business. It has the potential to radically alter economic activities and the social environment. Already, it affects such large sectors as communications, finance and retail trade. It holds promise in areas such as education, health and government. The largest effects may be associated not with many of the impacts that command the most attention which is customized products and the elimination of middlemen, but also with less visible, but potentially more pervasive, effects on routine business activities (e.g. ordering office supplies, paying bills, and estimating demand), that is, on the way businesses interact and operate. This paper focuses on the Electronic Commerce framework and its relationship with decision support system. Therefore, the problem statement for this study is;

1. Lack of understanding on how Electronic Commerce business operation works.

2. Lack of understanding of Electronic Commerce association with Decision Support System.

3. Lack of knowledge regarding the Electronic Commerce framework and the technical part; the usage of decision support system in the framework.

Objectives

Based on the review of literature, the authors have formulated the following objectives:

1. To learn about Electronic Commerce and how its business operation works.

2. To study relationship of Electronic Commerce and Decision Support System.

3. To understand about the Electronic Commerce framework and the technical part; the usage of decision support system in the framework.

Scope of Study

The new electronic communications technologies allow us to find useful information and to communicate quickly and easily has evolved into a necessary part of our everyday lives. Electronic commerce makes it possible to do almost any kind of business in a very simple way. Thus, this study is discussing about what is e-commerce in a greater view. This study focus on the definition on e-commerce, theory and application, and the element of e-commerce such as, customer behavior, marketing and networking, internet payment and billing. This paper also provides information regarding the legal and ethical issues in ecommerce.

 The study is conducted in three modules or stages:

Module 1: Collection of data from various sources, using the search engine; www.Google.com to find journal and articles about Electronic Commerce, Decision Support System and how both the system perform and execute. Journal includes information on E-commerce Application, E-commerce activities and E-commerce issues.

Module 2: Analysis of data and drafting of reports.

Data to be analyzed is based on whatever information gathered and according to the framework of the research. The validity of the information, articles and journal gathered is determined.

Module   3:   Final   analysis/Policy Recommendations/Conclusion.

The research framework has 3 key dimensions:

1) E-Commerce's Definition
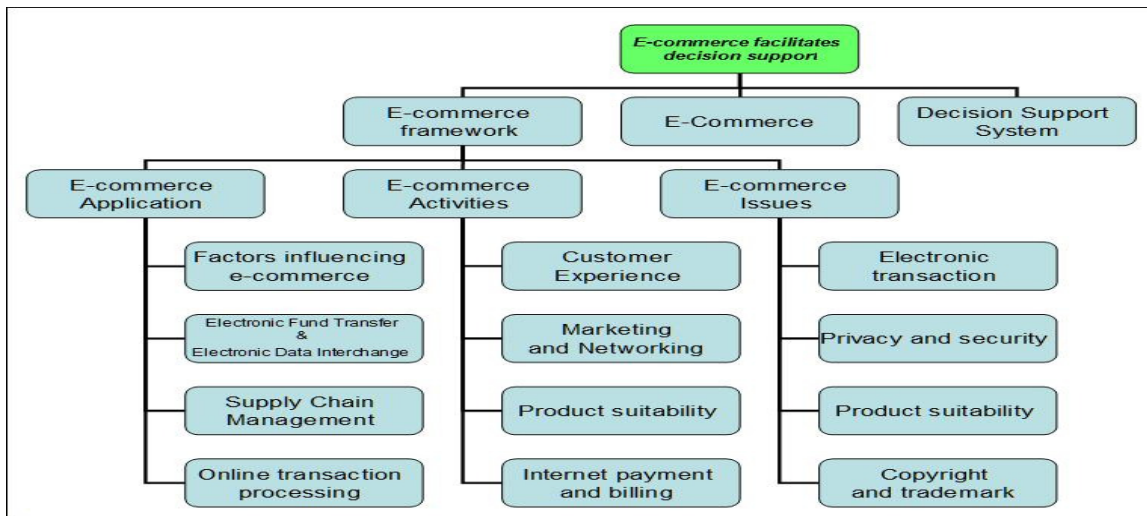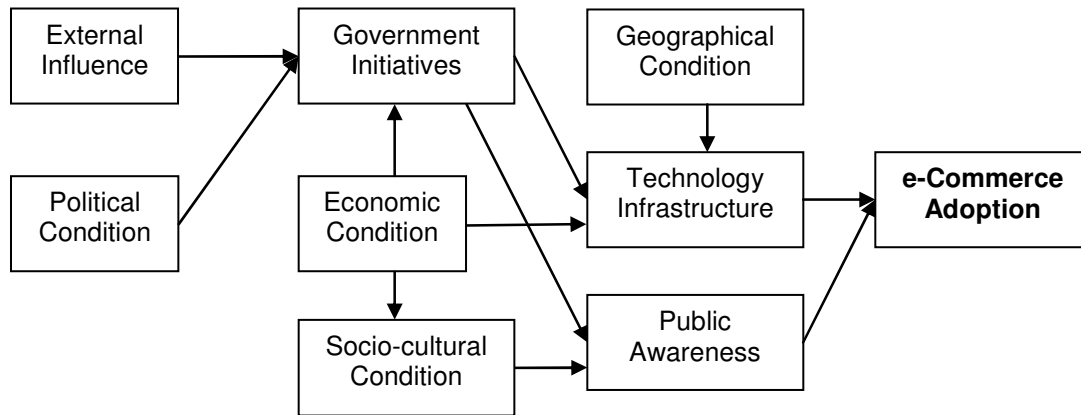2) Decision Support System Definition
3) E-commerce framework:

Figure 1: Research Framework

Discussion, Analysis and Findings

1. Electronic Commerce Application

There are 8 factors affecting e-commerce adoption:

The use of eCommerce within enterprise will vary and any implementation should be driven by business needs rather than technology. Technologies only act as an enabler. For a company, an online link to their bank in order to check the latest financial position may be the ideal use of such developments and the extent to which they want to venture into e-commerce. Email is a very powerful business tool, often underestimated and undervalued. The fast expansion of low cost Internet access and related services has certainly been the main driver of this new business revolution and offers many SMEs the opportunity to venture into e-commerce at a price they can afford and at a level they can relate to. Effective use of a Website can provide increased levels of customer service and by simply using the Internet; it can act as a valuable information source. Products do not always have to be sold online although in certain cases this might be the most effective way of providing the service.

1. a. Electronic funds transfer.

Electronic funds transfer or EFT refers to the computer-based systems used to perform financial transactions electronically. The term is used for a number of different concepts. There are cardholder-initiated transactions, where a cardholder makes use of a payment card, electronic payments by businesses, including salary payments and also electronic check clearing.

EFT may be initiated by a cardholder when a payment card such as a credit card or debit card is used. This may take place at an automated teller machine (ATM) or point of sale (EFTPOS), or when the card is not present, which covers cards used for mail order, telephone order and internet purchases. Card-based EFT transactions are often covered by the ISO 8583 standard. A number of transaction types may be performed, including sale; there the cardholder pays or return or service, refund; where a merchant refunds an earlier payment made by a cardholder, withdrawal; the cardholder withdraws funds from their account, e.g. from an ATM, deposit; where a cardholder deposits funds to their own account typically at an ATM, cashback; where a cardholder withdraws funds from their own account at the same time as making a purchase, inter-account transfer; transferring funds between linked accounts belonging to the same cardholder, payment; transferring funds to a third party account, Inquiry; a transaction without financial impact, for instance

balance inquiry, available funds inquiry, linked accounts inquiry, or request for a statement of recent transactions on the account and lastly, administrative; this covers a variety of non-financial transactions including PIN change.

EFT transactions require communication between a numbers of parties. When a card is used at a merchant or ATM, the transaction is first routed to an acquirer, then through a number of networks to the issuer where the cardholder's account is held. A transaction may be authorized offline by any of these entities through a stand-in agreement. Stand-in authorization may be used when a communication link is not available, or simply to save communication cost or time. Stand-in is subject to the transaction amount being below agreed limits. These limits are calculated based on the risk of authorizing a transaction offline, and thus vary between merchants and card types. Offline transactions may be subject to other security checks such as checking the card number against a 'hotcard' (stolen card) list, velocity checks (limiting the number of offline transactions allowed by a cardholder) and random online authorization.

A transaction may be authorized via a pre-authorization step, where the merchant requests the issuer to reserve an amount on the cardholder's account for a specific time, followed by completion, where the merchant requests an amount blocked earlier with a pre-authorization. This transaction flow in two steps is often used in businesses such as hotels and car rental where the final amount is not known, and the pre-authorization is made based on an estimated amount. Completion may form part of a settlement process, typically performed at the end of the day when the day's completed transactions are submitted.

EFT transactions may be accompanied by methods to authenticate the card and the cardholder. The merchant may manually verify the cardholder's signature, or the cardholder's Personal identification number (PIN) may be sent online in an encrypted form for validation by the card issuer. Other information may be included in the transaction, some of which is not visible to the cardholder (for instance magnetic stripe data), and some of which may be requested from the cardholder.

1. b. Electronic Data Interchange

EDI is one of the most effective, time-proven ways to conduct electronic business transactions worldwide. Companies that utilize EDI benefit from lower order processing costs, shorter order cycle times, fewer errors and an electronic audit trail.

EDI uses standardized file formats to transfer data or transactions electronically such as purchase orders and invoices between two trading partners. The file can be passed through a Value Added Network (VAN) or over the Internet. The VAN receives stores and moves the EDI files, acting as an electronic post office. When files are sent and received by a company or trading partner, the files are read and translated. The transactions from the files are then loaded into the trading partner's core applications.

1. c. Supply Chain Management

Supply chain management (SCM) is the process of planning, implementing, and controlling the operations of the supply chain as efficiently as possible. Supply Chain Management spans all movement and storage of raw materials, work-in-process inventory, and finished goods from point-of-origin to point-of-consumption.

Supply chain management is a cross-functional approach to managing the movement of raw materials into an organization and the movement of finished

goods out of the organization toward the end-consumer. As corporations strive to focus on core competencies and become more flexible, they have reduced their ownership of raw materials sources and distribution channels. These functions are increasingly being outsourced to other corporations that can perform the activities better or more cost effectively. The effect has been to increase the number of companies involved in satisfying consumer demand, while reducing management control of daily logistics operations. Less control and more supply chain partners led to the creation of supply chain management concepts. The purpose of supply chain management is to improve trust and collaboration among supply chain partners, thus improving inventory visibility and improving inventory velocity.

1. d. Online Transaction Processing

Online transaction processing (OLTP), refers to a class of systems that facilitate and manage transaction-oriented applications, typically for data entry and retrieval transaction processing. The term is somewhat ambiguous; some understand a "transaction" in the context of computer or database transactions, while others define it in terms of business or commercial transactions. OLTP has also been used to refer to processing in which the system responds immediately to user requests. An automatic teller machine (ATM) for a bank is an example of a commercial transaction processing application. The technology is used in a number of industries, including banking, airlines, mailorder, supermarkets, and manufacturing. Applications include electronic banking, order processing, employee time clock systems, e-commerce, and e-trading.

Online Transaction Processing has two key benefits; simplicity and efficiency. It reduced paper trails and gives faster and more accurate forecasts for revenues and expenses. It also provides a solid foundation for a stable organization because of the timely updating. Another simplicity factor is that of allowing consumers the choice of how they want to pay, making it that much more appealing to make transactions. OLTP is proven efficient because it vastly broadens the consumer base for an organization, the individual processes are faster, and it's available 24 hours, 7 days per week.

1. e. Point Of Sale

Point of sale or point of service (POS) can mean a retail shop, a checkout counter in a shop, or the location where a transaction occurs. More specifically, point of sale often refers to the hardware and software used for checkouts it is equivalent of an electronic cash register. Point of sale systems are used in restaurants, hotels, stadiums, and casinos, as well as almost any type of retail establishment.

Most retail POS systems do much more than just "point of sale" tasks. Even for smaller tier 4 & 5 retailers, many POS systems can include fully integrated accounting, inventory management, open to buy forecasting, customer relation management (CRM), service management, rental, and payroll modules. Due to this wide range of functionality, vendors sometimes refer to POS solutions as retail management software or business management software.

Architecture for Buyer DSS

The architecture of our decision support system for e-commerce buyer support is shown in Figure 3. The model is sourced from Teng et all [18]
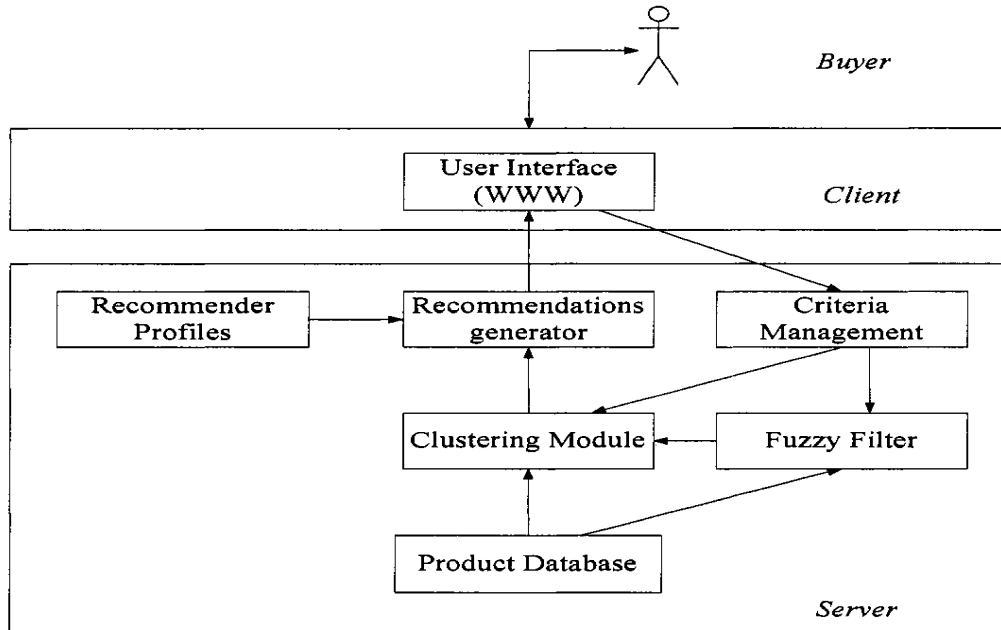
Figure 3: Architecture of buyer DSS

The criteria management module manages and records user preferences on preset criteria. The users specify their perceived relative importance on certain product features in fuzzy terms; they can also rule out certain which they consider being insignificant. In our approach, the purpose of gathering this information is not to recommend the optimal choice to the customer. The traditional optimal recommendation approach would not be efficient with ill-defined preferences; rather, it would limit the user's opportunity to explore more interesting alternative solutions. We will expose the customers to all possible solutions in such a way that the customers can easily find their own optimal choice. The preference information we gathered in this module is used to calculate the distance metric between the products, so that we can offer the most diverse alternative solutions to the customer. For example, if the price were of prime importance to the

customer, the presented alternatives would differ most in the price dimension.

Taking the user preference information from criteria management module and the product attributes from product database, the *fuzzy filter module* calculate the fuzzy "grades" for all product alternatives. Based on these grades (i.e. fuzzy triangles), the alpha-cut (the certainty level) is used to determine the number of alternatives in the "A" set and other grade sets. The certainty level is initially set to be 0.5 and can be modified to change the number of alternatives in the "A" set and the alike. This single parameter can be used to control the minimum quality of the A set. It implies the level of certainty that customer has in various aspects of the product. The more certain they are (i.e the less fuzzy their preference expressions are), the fewer alternatives they will need to examine. In other words, when the customer is not certain about the preferences, their investigation would cover wider range of products in order to explore more

opportunities that are available and make the best and informed choices. This parameter can also be attuned to the individual decision-making style of the customers. The fuzzy filter module generates the partitions with different grades of desirability, and passes this information to the clustering module for generating clusters inside these partitions.

The *clustering module* executes cluster analysis to discover the dissimilar product classes in order to present the most different suggestions. The "A" set is divided into dissimilar clusters using hierarchical clustering method or nearest-neighbor method. The representative product of each cluster is presented to be customer. The maximum number of alternatives presented to the customer can be determined in advance or automatically. Moreover, to avoid cognitive overload to the customer, this number should be reasonably small. In our system, we set this number to be three.

To *recommender profiles module* represents the rationale behind the recommendations generated by the system. It relates the key "values" of the customers with the features of the recommended products. This is inline with the means-end theory on web browsing activities which suggests that customer's choice on certain product attributes is essentially a means to attain certain personal values. We incorporate different values in the system in order to help with customer's decision making process, such as "budget", "value" and "luxury" consuming categories. These three profiles are partially based upon price frames. This is in accordance with Smith and Wortzel (1997) finding that novice customers are affected by the price frames of reference where price is used as a "heuristic cue" to indicate product quality.

E-billing has the potential to generate cost savings and other important benefits for both businesses and households. Even though billers will realize a large portion of the initial cost savings, consumers should capture all of the savings in the longer run. Competition in the marketplace will ensure that billers' cost reductions translate into lower prices for the goods and services provided to customers. E-billing supports the industry's ongoing efforts to provide improved payment services. Wholesale payment services are already largely electronic, so it stands to reason that banks would want to be closely involved in the development of an electronic format for retail payments. Some customers, billers, and banks are already expressing interest in e-billing systems, but it is still too early to know how rapidly and widely the technology will be adopted. Households have shown considerable inertia in adopting new payment methods, especially when the existing ones still work. Nonetheless, the number of computers in homes is rapidly increasing, and consumers may respond more favorably than expected to a technology that makes bill payment very easy.

Recommendations

It is obvious there is a huge market in e-commerce, and there is a definite need for effective management. The only way for a company online to be successful in the long run is dealing with problems and making corrections. With many barriers involved in e-commerce, companies must be able to effectively and efficiently manage each phase of the marketing mix. Companies can't afford to just focus on two or three areas. This is not enough. Focusing on just product and place will not accomplish goals in the long run. Each component must be evaluated occasionally and managed effectively. The reason why evaluating each

phase occasionally, is that with such a diverse and technology driven area, elements are constantly changing. Scanning the environment is a must to stay competitive and efficient. The company can only be as good as its weakest link, each area is as important as the other is integration among the four areas is very important.

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Developing highly trained and well equipped law enforcement officers in order to handle the increasing sophistication and international reach of cybercrime and fraud on the internet. Conducting Specific and appropriate training in the investigation, collection of electronic evidence and prosecution of electronic crime to the officers are essentials. The training will be on regular basis in order to counter the rapidly evolving nature of computer technologies.

Consumer education is more effective than any law enforcement action in order to prevent cyber crime or fraud being committed through the internet. This is essential so that consumers may enjoy a rewarding experience when transacting on the internet. The effort may be increased through the combination efforts by the government, business and consumer groups. The education programme should also include how each person is to report known cyber crimes, whether to the employers or directly to the respective law enforcement agency.

Basic criminal laws against activities that attack the confidentiality, integrity or availability of computer data, computer systems and electronic networks should be introduce as a part of the efforts to promote E-commerce trust and confidence. Laws must be enacted to criminalize hacking, illegal interception, interference of availability of computers and networks and unlawful access to systems.

Businesses and consumers must feel confident that internet is safe from cyber crime in order to ensure the growth of e-commerce. Using internet, the criminal may be able to appear suddenly. Commit the crime quickly and disappear without revealing their true identity or location. In order to stop them, law enforcement officers are required to move just as quickly and often require co-operation from a spectrum of organizations representing government, businesses and consumer groups in the various locations.

Conclusion

Decision support system plays an important role in application of E-commerce. Benefits of e-commerce adoption include improved customer service, better

inventory control, and lower marketing and distribution costs, reduced cycle time, increased market reach, and reduced operation costs. Other benefits include global connectivity, high accessibility, scalability, interoperability, and interactivity.

The fast expansion of low cost Internet access and related services has certainly been the main driver of this new business revolution and offers many SMEs the opportunity to venture into e-commerce at a price they can afford and at a level they can relate to. Effective use of a Website can provide increased levels of customer service and by simply using the Internet; it can act as a valuable information source. Thus we can conclude that DSS will have major impact on all types of business decisions.

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