

Ecommerce's Important Role in the Medical Sector

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Abstract. We live in an evolving world where technology thrives. Regardless of age and gender, having the general knowledge of basic technology is vital for all. We see the need to keep up with fast-changing trends that influence the wants and needs of consumers. Technology has a huge influence in our daily lives and the upcoming generations including generation X and Y have it embedded in their DNA. The rapid advancement of technology plays a huge role in the growth of our economy. Many corporations depend on computer networks not only for conducting their business but also for basic survival (keeping up with competitors). The sector I would like to focus on is the medical sector and the role e-commerce plays.

Keywords: E-commerce strategies, B2B healthcare, benefits, RFID, medical sector

1. Introduction

Some of the earliest forms of medicine, and medical practices, were the use of natural resources like plants and animal parts. During the early 20th century, the development of medicine changed drastically. What was a possible cause for this major shift in thinking was the rejection of the traditional way of thinking and approach to science. In spite of strong resistance from some, many open-minded individuals led the way in improving or rejecting the old theories of the past.

Much has changed since then, due to the advancement in technology, doctors, clinics and hospitals are able to save and review a patient's full medical history. It gives doctors an early start on what to look for in a patient. Vaccines have played one of the most important roles in the prevention of diseases and technology has allowed the newest vaccines to prevent certain types of cancers.

E-commerce is the process of buying and selling, exchanging products, services and information via computer networks. Currently the use of e-commerce in healthcare is very general. The most common uses are keeping electronic medical records, the transmission of information and telemedicine. Making medicine accessible online not only benefits doctors and their patients, it could also improve relationships between hospitals, clinics, suppliers and customers. Collaborative commerce (c-commerce), which is an EC model in which individuals or groups communicate or collaborate online. An example is the use of Skype/streaming videos online, could be used between different groups of surgeon to share knowledge and expertise. It could also open new doors whereby doctors could monitor bed-ridden patients, even patients in comma. The possibilities are endless.

2. E-commerce Strategies

Because of the rapid advancement in technology, the expectations of consumers for quality healthcare are high. Hospitals, clinics and other healthcare providers have to deal with consumer expectation whilst doing it in the most cost-efficient way. Ellen.H.K, Suzanne.C.H and Gerene.S [1] explained the significant impact e-commerce could have on the cost, efficiency, and quality of the overall management and delivery

of healthcare services. 'Efficiency gains within the health-care arena have been attributed to the application of information technology and, most specifically, the Internet.' [1] With the appropriate e-commerce business models customized and implemented accordingly, it would reach the goal of efficient healthcare management at lower costs. Ellen.H.K, Suzanne.C.H, and Gerene.S [1] talk about the benefits e-commerce (otherwise known as e-health) has on healthcare. The implementation of e-commerce strategies will help healthcare providers work more efficiently especially those using back-dated paper-based systems. The benefits are that hospitals and doctors are able to view a patient's full medical history and give the correct diagnosis. This saves the patient a great deal of time. 'Briggs and Early [3] have reviewed how recent developments in the technology of the Internet affect the way healthcare is provided.' [2] The Australian National Electronic Health Records Taskforce [19] defines the electronic health record (EHR) as "[a]n electronic longitudinal collection of personal health information usually based on the individual, entered or accepted by health care providers, which can be distributed over a number of sites or aggregated at a particular source". The EHR is the mechanism that integrates patient information into the next generation of health information technologies, including Computerized Physician Order Entry (CPOE) and Clinical Decision Support Systems (CDSS), and generally improve the quality of point-of-care decision-making. With the use of proper IT infrastructure and information systems, traditional paper-based systems will be eliminated in the future. Terry, Nicolas Petal [20] listed the IT-led system reform is centered on several intersecting technologies that may be grouped as tracking, entry, decision-support and reporting:

- "Tracking" or identifying technologies such as barcodes and accompanying scanners positively identify drugs, dosages and patients. Radio Frequency Identification (RFID) "track and trace" technologies may displace barcode technologies for identifying tasks and allow further positive tracking of drugs and, potentially, patients.
- "Entry" technologies are represented by computerized physician order entry (CPOE) systems that avoid medication errors caused by illegibility and other recording mistakes.
- "Decision-support technologies" (CDSS) are evolved order entry systems that have lost their passivity and reference drug interaction information, EHR data, or treatment models (such as clinical practice guidelines), and which offer considerable advantages over simple CPOE systems. Related are interactive devices such as appliances used for telecare that collect and monitor data from remotely located patients and trigger further evaluation and treatment.
- "Reporting" systems provide for adverse event and medical error disclosure and reporting and facilitate outcomes research.

Suman Kapuretal [2] wrote about the growth rate in Internet access and all the improvements in performance resulting from new technologies, in particular in the areas of telemedicine and in communication between patient and healthcare professionals. Modern information technology not only affects the delivery of healthcare, but also can significantly influence the doctor-patient relationship.

3. B2B Healthcare & Supply Chain Management Systems

As e-commerce has not been fully taken advantage of/ maximized to its full potential due to people not being able to fully let go of tradition and embrace new technology. The key to the success lies primarily in the full participation of consumers and healthcare providers. Healthcare: B2B. B2B healthcare e-commerce involves transactions and the exchange of information among vendors, hospitals, insurance agencies, state and federal regulators, and doctors' offices where patients—the end consumers—are not directly involved. A good way to start is for hospitals, clinics, pharmacies and other healthcare institutions to merge e-commerce and supply chain management. From an Operations Management perspective, Jan de Vries and Robbert Huijsman [17] stated the focus in the health care sector concentrated on optimizing individual processes. Examples are the application of operations research techniques to optimize inventory levels of drugs and methods for optimizing the ordering process of care-related products and pharmaceuticals. Schnelleretal [16] explained that nowadays information and communication technologies can play a significant role in improving health supply chains and it will be of no surprise that many health care organizations have started up projects in the field of health supply chains. With the careful implementation of supply chain management, costs/expenses will decline. A supply chain management system would manage the healthcare provider's relationship with suppliers especially since most decision making revolve around the managing of medical

products and supplies. They would be able to share information about orders, production, inventory levels, delivery of products and services. The goal is to get the right amount of product to the destination with the least amount of time and lowest cost. Subsequently, a stock replenishment system could be developed where the system keeps a daily record of stock-levels and automatically orders new stock, shipped and delivered when required. The use of Skype and online video services is mostly for social purposes, communication between friends and family member or for business purposes (video-conferencing). Doctors can use this technology for patients' routine check-ups, to give the patient their diagnosis and an electronic prescription for minor cases like cough, influenza, food-poisoning etc. The technology would serve its purpose by saving time and transportation costs. This technology could also be used for follow-up treatment. 'E-health can help manage acute and chronic conditions', 'Web-based disease management programs are an important part of the e-health revolution, and are designed to alter the delivery of care through the use of technology to monitor patients daily to determine their health status, remind them to take their medications, and handle problems before they become more serious.' [1] While the world's population increases, resources are getting more scarce. E-commerce is a great solution for healthcare because it uses scarce resources in the most efficient way that can sustain the health of a nation. Suzanne C. Holmes and Renee H. Miller [6] explores the application of e-commerce to the healthcare industry from the consumers' and providers' points of view. They discussed the risks of e-commerce and review the public and private responses to address these concerns. E-health promises to improve efficiency, facilitate communication between doctor and patient, monitor compliance with medical regimens, and positively impact on the quality of health services provided and the overall health of the patient.

4. Radio-Frequency Identification (RFID) in Health Care

In Wikipedia [13] the definition of Radio-frequency identification (RFID) is a technology that uses communication through the use of radio waves to exchange data between a reader and an electronic tag attached to an object, for the purpose of identification and tracking. RFID makes it possible to give each product in a grocery store its own unique identifying number, to provide assets, people, work in process, medical devices etc. all with individual unique identifiers - like the license plate on a car but for every item in the world. Furthermore, passive RFID tags (those without a battery) can be read if passed within close enough proximity to an RFID reader. It is not necessary to "show" them to it, as with a bar code. The most important benefits for the hospital spring from the time saved from non-value-added activities transferred to patient care activities (which takes up 80% of hospital expenses), and the significant reduction of on-hand inventory at distributed storage locations. Not only will healthcare institutions have tremendous savings, they will be able to efficiently manage staff, hospital supplies, equipment and facilities. According to Ygal Bendavid, Harold Boeck, and Richard Philippe [14] this new technology is emerging as the standard for healthcare institutions. Its purpose is to identify, track and locate patients and staff as well as identifying and tracking medical supplies (which will help in Supply chain management). The detailed list of benefits in healthcare environments are improving their asset utilization and maintenance by using RTLS to track mobile devices and assets, improve patient and staff workflow, improve patient safety by ensuring correct drug dispensation, and improve patient billing through the automatic capture of performed services and the automatic creation of itemized billing. They [14] believe that the implementation of an enterprise resource planning (ERP) system, e-commerce transactions, AIDC or business intelligence reporting systems can contribute to modernizing key elements of the hospital's supply chain and can generate substantial benefits, including improvement of patient care and service levels. Vikram Bhakoo and Caroline Chan [15] explained the RFID implementation within the trauma unit of the emergency department in a hospital based in Tennessee (USA). The RFID implementation proved to still have a few glitches like problems of misdirected data signals as some readers captured unexpected and unwanted data. Recognizing that certain issues need to be addressed and improved upon, they [15] also emphasized the largely neglected supply chain function in health care. They discuss the benefits that e-commerce has on the health care sector and that the success comes down to full participation of all/most stakeholders. A highly advanced technology like RFID used to be prohibitively expensive. [18] Fortunately, it is currently accessible and the benefits are long-term covering a large variety of sectors in healthcare.

5. Benefits of E-commerce in Developing Countries

Developing countries have less/limited access to medical information and services compared to developed, wealthier nations. The report written by Lucy Firth, Peter Francis, David Mellor [3] addresses one of the key factors to the success/failures of e-commerce that lies in the power of the people in the industry (Australia). It all starts with healthcare professionals, doctors and clinics' integration of online technology with their core operational strategy. If nurses and doctors promote and encourage patients to use their online services, a chain reaction would occur and their patients even traditional folks would gradually get comfortable with e-health. As healthcare costs continually rise, these developing countries even countries like Australia are looking for new, innovative and cost-effective ways of healthcare. 'Online solutions with transactions, which represent e-commerce in the health sector, are attracting attention.' [3] The report focuses on what is the core operational strategy currently used by general practitioners (GP) in Australia and the advantages if they used online services in the daily operations. There are a few possibilities of why GPs in Australia don't practice e-commerce. The first reason could be because they are used to their current operational strategy and find no need to change or add anything. Another reason could be the lack of funds to setup the IT infrastructure or equipment needed. Finally, other non-strategic and non-means (non-financial) factors prevent them from adopting online technologies. 'Andrews' richer concept of strategy may be relevant to GP practice where the clinicians have a preference for quality clinical outcomes in terms of their professional practice and commitment to society.' [4] The authors Lucy Firth, Peter Francis, David Mellor [3] talk about the relationship between business and the use of information technology. They write about the connection between business operations and online technologies using the Strategic Alignment Model which shows the business and IT components, characteristics and their highly interdependent relationships. One of the benefits of e-commerce is the competitive advantage a business will have over competitors. Lee and Bai's [5] model of the evolution of IS/IT planning is about the amount of e-commerce implemented with physical operations. They wrote that the [5] evolution of IT planning has four stages/modes. The first and most basic is technology mode, which focuses on computer efficiency and automation. The second is Align mode that involves business strategy, resource allocation, management support and user involvement. The third stage is Impact mode that involves competitive advantage, innovation and information technology. The final mode is Fit mode which is where IT infrastructure and strategy is fitted together with organizational perspective, group interaction, knowledge management, organizational learning and change management. Pure/partial e-commerce depends on the degree of digitization (the transformation from physical to digital). IT strategy and infrastructure can be implemented gradually into an organization. The most appropriate for GPs is the click-and-mortar (click-and-brick) organizations. The click-and-mortar organization conducts some e-commerce activities but do their primary business in the physical world. It was observed that GPs operate in a highly modified market where government regulation, legal-ethical issues and insurance are all influential. These factors may contribute to the impression that 'GPs do not perceive themselves to be in the drivers' seat [or free to position their practices as they would like]. Rather, they are responding to various stakeholders including patients, their professional associations, and state and federal government, in a market in which they perceive themselves as powerless.' According to Lucy Firth, Peter Francis, David Mellor [3] the influence of government is significant in the health sector. Government requirements for GPs to scan in patient records can be expected to lead to an increased use of information technology in even the simplest medical practice. These non-discretionary changes may take away attention of the GP from valuable, but less immediate, changes to their practices. When it comes to their IS/IT strategy, it appears that GPs have tended to base investment decisions on efficiency and cost cutting opportunities. They do not appear to be investing in IS/IT for the purpose of promoting their clinical goals, in fact, very few if any saw the potential to improve their current clinical practices by going online. Exceptions to this are that they could see better patient outcomes from online test results. It still comes down to the willingness of GPs and healthcare providers to embrace new technology and to do it for the right reasons. There will always be the existence of a certain type of health practitioner that believes strongly in their conventional methods/ways. The authors of this report [3] believe that GPs in Australia have not taken to e-commerce because they are poorly informed as to the realistic technology requirements for, and risks of, online medical applications. This over-estimation of the costs is compounded

[9]He believes that after an official industry name is given to describe e-commerce's integration into the healthcare industry, many new sectors will be created thereafter.

7. Key Ethical & Legal Issues In E-health

Ethical/legal issues in e-health. Most people are very sensitive about personal medical information. A big fear for many individuals are the privacy laws and security that protect personal information and the type of legal consequences that will occur if their private medical records are leaked. Trust is a fundamental concern in Ehealth. Indeed, it is fundamental to health care. To receive the care they need, patients must share private information and be willing to take medications, use medical devices, or often accept interventions that intrude on their bodies. They rely on health care providers to keep their personal information confidential, to provide accurate and appropriate information about their conditions and possible treatments, and to recommend the therapy they believe to be in the patient's interest. It is vital that healthcare providers and institutions abide by a code of ethics and behave in a moral manner. Bette-Jane Criggeretal [11] lists the Ehealth Code of Ethics in her report. This Ehealth Code of Ethics is an important part of the effort to make it possible for the Internet to realize its potential to enhance people's health and well-being worldwide. The goal of the code is to help create a trustworthy environment for all users, whether they are patients, health care professionals, website sponsors, people who develop health applications and content for the Web, or individuals who turn to the Internet to help them stay well. First and foremost, taken together the principles of the Ehealth Code identify the fundamental values at stake in creating conditions for trust in the health Internet: candor and honesty; quality of information, products, and services; respect for individuals' right to give informed consent; and respect for privacy and protection of confidential information. The principles identify as well the essential features of good professional and business practices that instantiate those values. 'The Ehealth Code extends the ethical guidance that frames health care offline to meet the special challenges raised by the technical possibilities of the online world, in which information flows much more rapidly, to potentially many more people than has ever been possible before.' [11] It is also important for these healthcare providers (hospitals, clinics, specialists' centers etc.) to have the proper software installed that protects the system from system failures, software bugs/viruses, hackers etc. A solution is to outsource and work with other organizations that specialize in protecting privacy and confidentiality of individuals, to use proper network and standards. Roberto J Rodriguesetal [10] described the many inadequacies concerning national and international controls and legislation, especially regarding the issue of jurisdiction; and urgent need for an internationally accepted policy framework that addresses basic rights and responsibilities of users and providers. Freedom of access to information and expression and the protection of users' data security and privacy are especially critical topics that have to be addressed more indepthly. 'Decisions and initiatives related to cyberspace law and ethics issues in health and healthcare must necessarily involve experts from a variety of knowledge domains involving civil and criminal law, medical ethics (bioethics), computing ethics, medical computing, and legal medicine.' [10] Electronic transactions involve important regulatory and legal issues not yet fully addressed. There must be a set of standards in place when it comes to the safekeep of medical records and other transactions involving medical products and services. 'The health sector has not addressed information security in a comprehensive manner. Healthcare organizations face a great variety of security, privacy, and confidentiality risks and must be made fully responsible for maintaining all aspects of security and confidentiality of data and information. Eventual conflicts between data sharing, data security, and confidentiality must be addressed early in the process of systems procurement and development and after implementation.' [10]

8. Discussion

As inpersonal as online business (online sales, online marketing, online advertising) is, I feel that it is the perfect marriage with medicine (health sector). The purpose and main goal of medicine and the health sector is to find the most innovative and cost-efficient way to cure diseases while maintaining high-quality standards in service. The school of medicine involves specific knowledge, skills, expertise. E-commerce is the perfect medical instrument to achieve that goal of medicine. I found that it takes the full participation of all stakeholders in the industry. Even though it may take some adapting especially those healthcare providers

that are used to traditional methods (using paper-based systems), like any new skill, it takes a small amount of time and effort but the payoff is far greater. As the future lies in the hands of the upcoming generation who have grown up technologically dependent and extremely tech-savvy, I believe that technology will be a big part of the health industry in the future. The definition of e-commerce is not only the process of buying and selling but it also involves exchanging products, services and information. Part of sharing information and knowledge can be done online between surgeons using video conferencing (which is more commonly used for corporate board meetings). Patients that are chronically ill or patients that have just gone through surgery can be monitored online using specific software that gives the doctor/surgeon 24/7 access to monitor the patient's condition. For chronic cases or for bed-ridden patients, they can get treatment from home, where they are hooked up to a medicine dispensing machine which is controlled electronically by the doctor. These in-patient treatments that are done in-person normally can be customized according to the individual's preferences. For these patients, they still have the quality in-patient service that they would receive at the hospital but in the comfort of their own home.

Even though e-health has its pros and cons (the reliance of highly sensitive and personal information saved and controlled electronically online), if e-commerce is deployed in the right manner with strategic IT planning and IT infrastructure, it will not only save time and costs but also increase efficiency and productivity between patients, doctors and medical suppliers. With the large number of companies that specialize in processing systems and computer software platforms, e-commerce can be performed in a safe and highly effective manner. In the future, no market player wishing to remain competitive will be able to avoid implementing modern web-based procurement, distribution and logistics processes in order to survive in an increasingly competitive world.

9. Conclusion

Traditional business and purchasing rules are changing, this is partially due to the increasing integration of internet-based transactions in all kinds of markets, including healthcare. The main challenge for market players is to set aside the required resources and expertise in order to choose the most suitable system, according to the individual organization's needs as well as their customer expectations. Key opportunities include reducing costs and administration efforts as well as speeding up procurement procedures. As we look to the future, with a increase in population and growing problems like environmental problems (Eg; pollution, wastes, nuclear power plants increases etc.) the need for better more efficient ways to improve healthcare will become more apparent. As health care costs continue to rise globally, e-commerce will be incredibly important in improving quality, efficiency, productivity and access of healthcare services in the most cost-efficient manner. The long-term benefits are the development of close relationships with suppliers (the ability to control medical supplies) and consumers (technology allows healthcare professionals to keep detailed patient history and preferences, this makes patients feel well-taken care of and special) Many would soon realize that e-health is transforming healthcare.

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