CHAPTER I
INTRODUCTION

A. Background of the study

Medical errors and health care-related adverse events were the third leading cause of deaths by 2013 in the United States, which accounted for more than 400,000 deaths in total [1]. In Europe, medical errors accounts for around 8-12% of all hospitalization cases annually. This equals to around 850,000 cases per year [2].

To overcome the problem, a safer systems are needed to reduce medical errors. This can be accomplished through the implementation of Hospital Information Systems (HIS). Hospital Information Systems, such as Electronic Medical Records (EMR), Computerized Physician Order Entry systems (CPOE) and Clinical Decision Support (CDS) are a means of way that will be beneficial for hospitals in reducing medical errors, while also increasing efficiency and quality of care, and reducing overall healthcare cost [3–6].

Despite all the benefits of HIS, the building and implementation of such system can only be acquired with large investment [7]. The initial capitals are large because the hardware and software used for the system are a costly subject, also the management needs to invest in training for their personnel [8]. Therefore the management has to be certain whether

this investment is truly going to be cost-effective or not, since the return on investment is said not to be accomplished in a short time after the implementation [7]. Furthermore, there are also other barriers in adopting the system such as the reluctance of the physician to use the system because of the complexity that comes with it and organizational commitment to switch from paper-based to HIS [5].

Inside HIS, there are different types of system for different purposes. One important system is Electronic Medical Records (EMR). EMR has been defined as a system to collect and store clinical information of patients. This was made initially to overcome the problems that comes with the use of paper-based medical records, such as large storage needed and more time to find and access records. EMR will provide a quicker and more accessible way for physician to access their patient's data, therefore it will improve the efficiency and quality of care. Meanwhile, Clinical Decision Support (CDS) is usually integrated with .

Computerized Physician Order Entry systems (CPOE) in HIS. In CDS the system will help physicians to decide on the appropriate treatment for their patients. CDS will provide physicians the information of the patient, diagnostic support and clinical guideline. It will also reminds and warn physicians if there is any change or dosing adjustment needed for the patient. In conjunction to CDS, CPOE will provide

electronic prescription for the medications given to the patient. Along with prescription, CPOE also provides information about the specific drugs that will link directly to the patient's data (age, weight, risk factors). All of these systems are working simultaneously to improve the patient's overall care [9–11].

Since HIS is a promising way to improve quality, safety and efficiency of healthcare, some countries such as USA, UK, Australia, etc are slowly implementing this system into their healthcare. In the USA only, the country is continuously trying to accelerate the implementation of the system through certain acts and incentives given to their hospitals. One of the act is called Health Information Technology Economic and Clinical Health Act, or "HITECH Act" [12]. This act gives physicians and hospitals certain amounts of incentive payments. For hospitals, the government gives approximately $2,000,000 as a base payment, although the number varies depending on the criteria meets on the specific eligible hospitals [13]. However, hospitals need to prove that the implementation will give meaningful use or else they will get certain penalties in the future.

With large investment in the development and implementation process of HIS, organizations need to ensure that it will bring not only improvements of the quality but also a reduction in healthcare cost. Many

researches has said that the use of HIS is a cost-effective way, despite the huge initial investment. One research mentioned that the use of HIS resulted in a positive financial return on investment in health care organizations [14]. However, there is also another research that has said HIS can be implemented in a modest cost without mentioning the actual number of the investment [15].

With that being said, there were not enough information on how much it actually costs for one organization to implement HIS and what counts in the components on the costing itself. Therefore the purpose of this research is to systematically review reports concerning the cost components of a Hospital Information System and the overall cost of the development and implementation, so as to give the hospital management the bottom line components and possible problems in HIS adoption and to inform future research in this area.

B. Problem statement

1. There is little evidence of the HIS development that can be use by the hospital manager as a guideline.

2. There is little evidence on the cost components and how much the cost are needed to build and implement a HIS that can be use by manager to be used as a precaution and to calculate the investment and benefits.

C. Research Aims

1. To systematically review reports of Hospital Information System cost components in development and implementation.

2. Provide hospital management with the information regarding the investment and cost of building and implementing HIS.