Integrated Investment Appraisal of a 400 Bed Hospital Project in the Kurdistan Region of Iraq Using FAST Modeling Standards

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ABSTRACT

The provision of healthcare services is one of the top priorities of the Kurdistan Regional Government (KRG). People living in this region have insufficient access to advanced healthcare services. Nevertheless, the limited healthcare services with regard to population growth in the region have grown 2.4% per year creating a serious deficiency in accessing modern healthcare services.

In undertaking this investigation, the aim was to improve economic and social development in the region by providing a financial, economic and risk analysis of a 400 bed hospital project development in the KRG, with the expectation of alleviating healthcare service demands on existing facilities for many years ahead which will be another step to increase the quality of healthcare provided in this area. This study is based on cost-effectiveness analyses of the integrated investment appraisal technique. The strategy employed in this study is to move towards a more effective and better projection by carrying out the modeling of expected future healthcare service demands, a qualitative evaluation of various conversations with government officials, healthcare service providers and private sector healthcare service officers. This work focuses on a variety of internal and global policy areas such as financing, the fees charged by different earners and quality-adjusted life years.

The study was conducted from May 2017 through May 2018. The necessary data for this investigation was obtained from the Ministry of Health Kurdistan-Iraq, KRG Statistics Office and Galala Construction Contracting Holding Ltd. The conclusions should be of concern to those interested in hospital project development in the

Kurdistan Region of Iraq and specifically the Kurdistan Regional Government in guiding the Ministries of Planning and Health to develop targeted solutions to these critical issues faced by the KRG.

Keywords: Cost-effectiveness Analysis, Healthcare Services, Hospital Project, Economic Analysis, Financial Analysis, Risk Analysis, Kurdistan Region of Iraq.

ÖZ

Sağlık hizmetlerinin sağlanması, Kürdistan Bölgesel Yönetimi'nin en önemli önceliklerinden biridir. Bu bölgede yaşayan insanlara iyi bir sağlık hizmeti sunulamamaktadır. Bununla birlikte, yılda ortalama %2.4 oranında nüfus artışına ilişkin sınırlı yapıda sağlık hizmetlerinin sunulması gelişmiş sağlık hizmetlerine sunulmasında yetersizlik yaratmıştır.

Bu Araştırmayı yürütürken, bölgedeki sağlık hizmetlerini hafifletme beklentisi ile 400 yataklı hastane projesinin yapılması için finansal, ekonomik ve risk analizi yaparak bölgedeki ekonomik ve sosyal gelişmeyi iyileştirmeyi amaçlamıştır. Bu proje, mevcut hastanelerin üstündeki sağlık hizmeti taleplerini azaltması açısından bir başka adım olacaktır. Bu çalışma, entegre yatırım değerlendirme tekniğinin maliyet etkililik analizlerine dayanmaktadır, çalışmada kullanılan strateji ve gelecekteki sağlık hizmetleri taleplerinin modellenmesi gibi faktörler hükümet ve özel sektör sağlık hizmeti görevlileriyle yapılan çeşitli görüşmelerin nitel bir değerlendirmesi yapılarak ele alınmıştır.

Bu araştırmada hastaların ekonomik gelirleri göz önünde bulundurularak ödenen ücretler farklı bir şekilde hesaplanmıştır. Bunun yanısıra, proje finanse etmek ve kaliteli yaşam yılları gibi çeşitli faktörlere odaklanmaktadır. Bu çalışma, Mayis 2017'den Mayis 2018'e tarihleri arasında gerçekleştirilmiştir ve gerekli veriler Kürdistan bölgesel yönetimi sağlık bakanlığı, İstatistik Ofisi ve Galala İnşaat Taahhüt Holding Ltd.'den elde edinmiştir. Bu çalışmadaki sonuçlar, Kürdistan Bölgesinde hastane projesinin uygulunmasında yol gösterici bir çalışmadır. Ayrıca , Planlama

Bakanlığına ve Sağlık Bakanlığı'nın karşılaştığı problemlere yönelik çözümler geliştirmek için hazırlanmıştır.

Anahtar Kelimeler: Maliyet-etkililik Analizi, Sağlık Hizmetleri, Hastane Projesi, Finansal Analizi, Ekonomik Analizi, Risk Analizi, Irak Kürdistan Bölgesi.

To my lovely parents

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LIST OF ABBREVIATIONS

CE	Cost-effectiveness Ratio
CF	Conversion Factor
CSCF	Commodity Specific Conversion Factor
ECE	Economic Cost-effectiveness Ratio
FCE	Financial Cost-effectiveness Ratio
HYL	Healthy Years of Life
IDP	Internally Displaced Persons
KRG	Kurdistan Regional Government
KRI	Kurdistan Region of Iraq
KRSO	Kurdistan Regional Statistics Office
NPV	Net Present Value
PV	Present Value
QALY	Quality Adjusted Life Year

Chapter 1

INTRODUCTION

1.1 Background to the Study

"Health is wealth" is more than just a familiar aphorism. It is a statement that relates to the improvement of the health sector of a nation and its economic growth. An effective and efficient health sector stimulates economic growth and enables more people to be educated as well as enhancing labor productivity. Consequently, it increases the average income level in the economy. In other words, as the economy develops, the quality and length of life in such a nation will improve due to the increase in demand for better health care services with regard to income level. Several countries are facing challenges in modifying and modernizing their health care services with the hope of improving health care and developing best practices. Developed social welfare needs include statistics and welfare generated from the number of births, death rates, the power of the standard medical system and healthcare delivery in the creation of a nation. The importance given to the quality of new technologies in healthcare services has supported the modernization of medical applications and the provision of health services.

However, the Kurdistan Regional Government (KRG) has made significant progress in enhancing the region’s healthcare services through investment in health infrastructure between the periods 2008 to 2011. Nevertheless, the unexpected influx of Syrian refugees and Internally Displaced Persons (IDP) into the country, in response

to the ISIS crisis, brought about a protracted budget crisis[1]. This had a negative impact on the per capita level of health expenditure in the Kurdistan Region of Iraq (KRI).

According to data obtained from the Kurdistan Regional Statistics Office (KRSO), KRG in total has 110 hospitals (e.g. General, Pediatrics, Obstetrics and Pediatrics, Obstetrics and Gynecology, other specialties and also some tertiary healthcare centers) of which 69 were owned by the government. There are an aggregate 8999 governorate owned hospital beds. Table 1 shows the corresponding hospital bed rates (per 1,000 population) by governorates in 2017, whilst Table 2 and 3 present the aggregate current healthcare utilization and corresponding utilization rate in governmental hospitals (per 1000 population) of each governorate using 2017 data obtained from the KRSO for the latest year in which these data are available.

Table 1: Baseline Governorate-level Hospital Bed Rates (per 1,000 Population)

Governorate	Governmental hospital beds	hospitals Private	Total	Population	Rates
Erbil	2,657	643	3,300	2,113,391	1.56
Duhok	1,642	291	1,933	1,511,585	1.28
Sulaimani	3,333	433	3,766	2,129,794	1.77
Regional total	7,632	1,367	8,999	5,754,770	1.56

Source: Kurdistan Regional Statistics Office Annual Report for 2017

Table 2: KRG Baseline Health Service Utilization by Governorate in 2017

	Erbil	Duhok	Sulaimani	Kurdistan total
Population	2,113,391	1,511,585	2,129,794	5,754,770
Hospitalizations (Inpatient utilization)	206,423	181,022	275,043	662,488
Emergency (Visits)	12,283	186,202	18,922	217,407
Outpatient (Visits)	2,512,621	2,479,598	2,775,651	7,767870

Source: Kurdistan Regional Ministry of Health Annual Report for 2017

[1] World Bank. 2015. "The Kurdistan Region of Iraq: Assessing the Economic and Social Impact of the Syrian Conflict and ISIS"

Table 3: KRG Governorates Baseline Health Service Utilization Rates (per 1,000 Population) in 2017.

	Erbil	Duhok	Sulaimani	Kurdistan total
Hospitalizations Rate	98	120	129	115
Emergency utilization Rate	6	123	9	38
Outpatient utilization Rate	1,189	1,640	1,303	1,350

Table 1 shows that the average rate of 1.56 hospital beds per 1000 population compared to 2.9 average World rate[2] indicates that in 2017 KRG was behind international norms by approximately was 7,689 hospital beds. In addition, the high level of outpatient visits, with regard to the numbers of governmental hospitals implies that there is high pressure on existing governmental hospitals in the region. Hence, in order to compensate for the current inadequacy in the healthcare service, with respect to potential population growth, the government must invest more in the health sector in order to develop health care efficiency, quality, structure, administration, data systems and the workforce.

1.2 Objectives of the Study

Currently, the healthcare services available in public hospitals are free but of poor quality, while that of the private healthcare is not free but still of low quality," said Professor Dlawer Ala'Aldeen[3]. The Kurdistan region has inadequate healthcare services in terms of the number of hospitals, hospital beds and, most especially, requisite medical instruments (technology) to serve patients in accordance with world healthcare standards. A large number of patients travel abroad every year in order to obtain affordable and better healthcare services which has led to a considerable amount of cash outflow. Therefore, the health sector should be improved and adequately

[2] The World Factbook. Central Intelligence Agency, 2017. Web.

[3] Rudaw. Kurdistan's Health System in a Globalized World, Alexandra Di Stefano Pironti, 2014. Web.

managed in order to provide the necessary infrastructure to make healthcare available, efficient and reliable. This should be put in place for both high earning and low-income patients in the region and Iraq as a whole, with the aim of creating a healthier country. Consequently, the main objectives of this study are to evaluate the pre-feasibility study of the construction of a 400 bed teaching hospital project in the KRG. The intention is to equip the hospital with state-of-the-art technology and sterilization systems in order to meet global healthcare standards and internationally accepted criteria for patient safety and future enhancement in the world. In addition, with the objectives of enhancing economic and social advancement in the region, by assisting the KRG in developing medical services, training district health workers to maintain and improve their skills and knowledge, providing employment opportunities for the labor force and establishing a balanced healthcare supply system by renewing the KRG with the highest referral.

1.3 Research Methodology

The method used in this investigation is based on the Integrated Analysis of Investment Projects as proposed by Jenkins et al. (2011) based on cost-effectiveness analysis. Firstly, by conducting a financial and economic analysis of the projects, the study seeks to examine project viability and sustainability through its construction and operation phases. Lastly, the study will conduct a sensitivity and risk analysis associated with the project in order to highlight potential critical and risky variables for the purpose of mitigating potential risk exposure. The models in this study will be constructed by following some fundamental principles and rules in financial modelling. The study will employ FAST Modeling Standard (FAST Standard, 2016). The FAST acronym stands for Flexible, Appropriate, Structured and Transparent

which serves as a guide for a modeler designing financial spreadsheets with a fewer errors.

1.4 Organization of the Study

This study is organized as follows: Chapter 1 of this study introduces and discuss the study objectives and research methodology. Chapter 2 presents a literature review comparing the current state of the healthcare service with a projection of future demand and supply for healthcare services in the sampled region. Chapter 3 discusses the research methodology employed e.g., financial, economic, sensitivity and risk analyses. Chapter 4 provides an exclusive explanation of the importance of the FAST standard and also provides a detailed overview of the FAST Modeling Standard techniques. Chapter 5 presents a brief overview of the project background and inherent cost details with an examination of project services. Chapter 6 addresses the financial analysis of the project and an economic assessment of the project's viability. In this chapter, the financial and economic outcomes will be discussed in detail. Chapter 7 addresses sensitivity tests and risk analysis of the proposed hospital project. Chapter 8 provides an exclusive summary, conclusion and policy implications.

Chapter 2

LITERATURE REVIEW

2.1 Background

Kurdistan is a proto-state region located in the North of Iraq and constitutes the nation's only self-sufficient region. It is situated at 36.4103° N and 44.3872° E. In total, the land area is approximately 40,643 square kilometers which is four times larger than Lebanon and larger than The Netherlands. The area includes three provinces administered by the KRG; Erbil, Sulaimani and Duhok. However, it excludes the areas of Kurdistan outside of the KRG, for example, Kirkuk. Kurdistan is neighbored by Iran towards the east, Syria towards the west and Turkey to the North.

Figure 1: Map of Kurdistan Region Iraq.

The people living in the Kurdistan Region of Iraq (KRI) are mostly Kurds alongside Turkmens, Assyrians, Chaldeans, Armenians and Arabs. According to official data

obtained from the Kurdistan Regional Statistics Office (KRSO), in 2017 the population of KRI was around 5.75 million which is almost 15% of the population of Iraq[4]. It has an annual growth rate of 2.4%[5]. In addition, approximately 36% of the population are aged between 0 and 14 years old and only 4% are aged above 63 years. The median age in the region is just above 20 which indicates that more than 50% are below 20. This means that the KRI has an increasing young population who are fundamental users of future health care services. According to the World Bank Group in 2008 and 2011, KRG had insufficient healthcare services but followed a positive trend in healthcare investment projects which assumed that the increase in expenditure was above inflation and population growth when the recurrent per capita health expense was measured to be approximately $110. In 2012–2014 the region unexpectedly surprisingly has an encountered an influx of Syrian refugees and internally displaced Iraqis (IDI). This unanticipated population growth seriously constrained the delivery of healthcare services.

This upsurge inflicted stress on the public health sector in respond to rising healthcare needs. The cost to the KRI was approximately $46 million. This cash outflow impacted negatively on the overall performance of the health system (e.g. investment and system responsiveness) and also health expenditure at a per capita level. Hence, the Kurdistan Regional Government (KRG) could not provide an excellent care–oriented health system. Nevertheless, in order to meet 21st century healthcare demands, the KRG should modify and regenerate its healthcare service to serve both the citizens and the requirements of this swiftly expanding region. In the base case scenario

[4] The World Bank 2017, Iraqi Population (38,274,618), 2017
[5] Kurdistan Regional Statistics Office website, 2017

projections, population growth is the main indicator for the projection of future healthcare utilization.

2.2 The Past Condition

According to a comprehensive study undertaken in 2010 by the RAND Health Corporation, the total population of Kurdistan Region Iraq (KRI) was measured in 2009 as about 5,227,980 in the three governorates. This is based on statistics distributed by the RAND Corporation that approximately 1,887,518 people reside in Erbil, 1,139,012 in Duhok and 2,201,450 in Sulaimani. From their study they discovered that KRI has fewer hospital beds per 10,000 population compared with other nations including Turkey, Lebanon, Jordan and the average world rate. They demonstrated that by 2015, the Kurdistan region would need an additional 1,343 hospital beds in order to maintain a consistent hospital bed to population ratio, although this ratio is not comparable to Jordan. In order to achieve a comparable ratio in 2015, KRG would need an additional 250% or 4,753 more hospital beds.

As reported by KRSO in 2014, the total number of hospitals in KRI was approximately 117 and the value of beds per 1000 population was approximately 2.0 beds. Meanwhile, the value of hospital beds per 1000 population in Turkey was measured to be approximately 2.7. Therefore the value of beds in KRI is less than the international average of 2.9 for per 1000 population. This situation also deteriorated when the region suffered from exposure to ISIS warfare during the same period. Figure 2 shows the gap of hospital beds ratio per 1000 population between 2014 and 2017 in KRI.

Table 4: Gap of Beds Value per 1000 Population in Kurdistan Region of Iraq between 2014 and 2017.

Item line	2014	2017	Gap Between 2014 and 2017	% Changes
Number of Hospitals	117	110	-7	-5.98%
Bed Ratio per 1000 Population	2	1.56	-0.44	-22.00%
Population	5,332,600	5,754,770	422,170	7.92%

Table 4 demonstrates that from 2014 to 2017, a 7.92% population growth reduced the ratio of beds per 1000 population by 0.44. Contrary to expectations, the region did not record any notable improvement in the health sector while its population grew swiftly.

In the baseline health service utilization in KRI, this study compared the study of the RAND Health Corporation in2014 and data provided by the KRSO in 2017 with the purpose of evaluating the aggregate growth of health care utilization in the past few years.

Table 5: Baseline Health Service Utilization in Kurdistan Region of Iraq 2009 Compared to 2017.

Item line	2009	2017	Gap Between 2014 and 2017	% Changes
Population	5,227,980	5,754,770	526,790	10%
Hospitalization	581,363	662,488	81,125	14%
Outpatient visits	8,429,946	7,767,870	(662,076)	-8%
Emergency visits	717,879	217,407	(500,472)	-70%

Evidently, from 2009 to 2017, a 10% increase in the population brought about an increase in hospitalization by 14%, whilst outpatient and emergency visits decreased by 8% and 70% respectively.

2.3 Projecting Future Health Care Demands

For the purposes of this analysis, it is important to project for future healthcare utilization by predicting future demand and supply for healthcare services in KRI. Therefore, constructing a base model guides us in determining whether the forecasted supply is adequate to meet future demand or not to do so.

In constructing the base model, the current provision of hospital beds in KRG was assumed to remain unchanged through 2017 to 2033 but with a projected population growth. Population growth forecasts in this study are based on 2017 data obtained from KRSO, which forecasted growth to be approximately 2.4% (e.g., the projected birth rate minus death rate), while the total population in the three governorates were measured to be approximately 5,754,770 people in 2017.Figure 5 demonstrates the estimated population growth for the next 15 years.

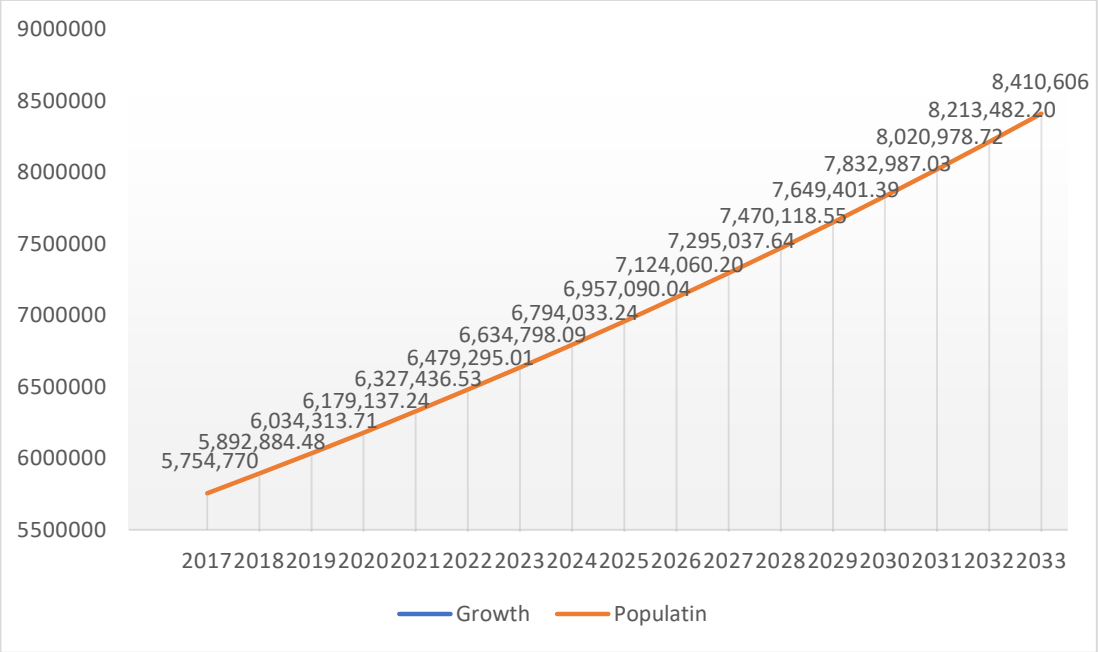

Figure 2: Population Projections for the Kurdistan Region of Iraq from 2018 to 2033. Source: Kurdistan Regional Statistics Office Annual Report for 2017.

Figure 2 compared current levels of the population with those for the next 15 years. As shown on the diagram, the total population at 5 years and 15 years from now is assumed to be around 6,479,295 and 8,213,482 respectively. Hence, it means that the growth would be close to 13 % in 2022 and 43% in 2032.

In assessing the demand model for the next 15 years, this study assumed that the current number of hospital beds provided remains unchanged through 2032 which is approximately 8,999 beds. Thus, demand would increase with regard to population growth. Consequently, 13% growth in 2022 and 43% in 2032 will increase the demand for hospital beds by 18,970 and 23,819. In addition, this will shrink the value of beds per 1000 population to 1.389 and 1.096 respectively as is illustrated in Table 6.

Table 6: Projected Demand and Supply for Hospital Beds in the Kurdistan Region of Iraq in 2017 Projected Forward to 2022 and 2032.

Years	2017	2022	2032
Projected Population	5,754,770	6,479,295	8,213,482
Existing Supply of Beds	8,999	8,999	8,999
The Ratio of Beds per 1000 Population	1.564	1.389	1.096
The Ratio of the World Standard for Beds per 1000 Population	2.90	2.90	2.90
The Required Number of Beds Demanded	16,689	18,790	23,819
Deficiency in Beds	(7,690)	(9791)	(14,820)

The table indicates that the current level of beds per 1000 population is considerably below the desired world average value of 2.9 beds per 1000 population. Therefore, in order to compensate for the current deficiency in the number of hospital beds with regard to future population growth, KRG must review its health infrastructure and make an extreme effort in order to reach the desired rate of hospital beds to meet the average world rate.

Lastly, the changes in health service utilization result from population growth. In order to forecast health service utilization, this study assumes that the baseline health service utilization rate does not change through 2032. Hence, in order to estimate the future health service utilization this research multiplies the Baseline Utilization Rate by Future Population in a given year. Table 7 presents the future healthcare utilization by using the 2017 health service utilization rates. This is the last year in which rates are available.

Table 7: Baseline Health Service Utilization by the Kurdistan Region of Iraq in 2017 Projected Forward to 2022 and 2032.

Years	2017	2022	2032
Population	5,754,770	6,479,295	8,213,482
Hospitalization Rate	115	115	115
Emergency Utilization Rate	38	38	38
Outpatient Utilization Rate	1,350	1350	1350
Hospitalization (Inpatient Utilization)	662,488	745,895	945,534
Emergency Utilization (Visits)	217,407	244,779	310,294
Outpatient Utilization (Visits)	7,767,870	8,745,844	11,086,675

In Table 7, it is clear that KRI faces a constantly increasing need for healthcare services. These escalating demands do not only require additional resources but also effective policy choices and enhanced financing systems and also better quality and increased effectiveness of incentives in the health service.

Chapter 3

METHODOLOGY

3.1 Introduction

Integrated investment appraisal technique of cost-effectiveness (CE) analysis is the methodology which is utilized in this study. The CE analysis is an integration of three major phases which are financial, economic and risk analysis. This method will be applied in such public health projects when outcomes can not be quantified in monetary terms because it is usually not easy to apply a full cost-benefit analysis. The cost-effectiveness model designed for this study aims to evaluate capital investment in the project on a non-incremental basis for the 400 bed hospital project with no other existing facility with which to compare. This opportunity will allow us to carry forward an investment appraisal analysis for the new hospital project and for those investments that are not obligated to be appraised on an incremental basis. Since the CE analysis does not quantify the benefits in monetary value, the project analyst should discount both the costs and units of effectiveness at the same discount rate if the CE analysis is to be carried out correctly. Additionally, the discounted costs should now be discounted by units of effectiveness see equation below.

$$CE_i = \frac{PV\ \ of\ \ Costs_i}{PV\ \ of\ \ Effectiveness_i}$$

This methodology of appraising integrated investment projects was proposed by Jenkins, Yan Kuo and Harberger (2011). According to them, this method is efficient

when considering the fact that project expense is spread over the lifetime of the project while project benefit cannot be quantified in monetary terms. In addition, due to technical difficulties and postponement of project operations, investment costs are frequently subject to escalation. Potential uncertainties increase the probability of unexpected events which a project may face. This method provides an exhaustive approach to assessing investment projects by integrating financial, economic and risk analysis through the anticipated life of the project. This is carried out in order to enhance the possibility of accepting successful projects and to minimize the chance of executing bad projects.

3.2 Financial Analysis

The main aim of conducting a financial analysis for the proposed hospital project is to determine its financial viability and project sustainability throughout its investment and operating phases. A predictive positive financial outcome or cost effectiveness of per patient day is a necessary condition to demonstrate that the project is worth undertaking which, by no means, would result in an appositive outcome. Conducting a financial analysis starts with estimating a base case scenario for financial data requirements with regard to the project's inputs and outputs. It then takes into consideration each account receivable, payable and cash balance in order to proceed with the modelling of the financial cash flow statement of the project. The final outcome will be to generate the project’s expected net financial cash flow year by year over the project’s lifetime.

The anticipated outcome of the project is usually influenced by movements in the real price of inputs due to changes in supply and demand. Also, the effect of inflation e.g. movements in general price levels during its anticipated life. Unpredicted changes in

real prices and inflation create a serious impact on a project's outcomes. Hence, a fundamental function of the financial modeler is to create an approximation of nominal prices that are designed to incorporate future changes in inflation and real prices in order to reduce negative outcomes. The financial model employed in this study calculated both cash inflow and outflow in domestic currency and also in nominal terms simply by multiplying real prices by the domestic price index of the same year throughout the project's life. Subsequently, it was converted in real terms, in order to estimate the Financial Cost Effectiveness (FCE) of per patient day, Net Present Value (NPV) and Internal Rate of Return (IRR) for both financial and economic analyses.

Furthermore, information about financing the investment expenditure is highly imperative to test the financial viability of a project. This is because its capital (debt/equity) ratio, type of loans (long-term, short-term, domestic or foreign), principal and interest repayments are the main indicators to demonstrate cash flow availability for principal and interest repayment. In the case of public projects both interest and principal repayment are implicitly guaranteed by the government.

For the development project' financial cash flow statement, the residual values of assets that have a longer economic life than the estimated project lifetime should be accounted for. The residual value of each asset should be obtained based on its economic depreciation and also should be adjusted with the domestic inflation index over the project's anticipated life. In the case of accounting for the residual value of land used for the project, it is important to know that the value of land does not depreciate or appreciate under most situations. Although its value would rather change when any depreciation or appreciation in the value of land is as a result of the project.

The above information is a fundamental point to bear in mind when constructing the financial cash flow of a project.

The investment cash flow statement during the project's lifetime is a buildup to calculate various performance indicators regarding project viability and sustainability based on the banker's and owner's aspects. The financial statements from the banker's aspect shows the potential strength of the project to serve its debt liabilities (e.g. principal plus interest repayment) during the debt's anticipated lifetime. In addition, this has been conducting by calculating net cash flows before financing and also the nominal term in order to estimate debt evaluation criteria and then converting it into the real term by using the domestic price index to conduct an economic analysis of a project.

On the other hand, cash flow statements from the owner's perspective consist of the net cash flow from the banker's perspective in the nominal term plus cash inflows generated through financing activities and also subtracting the cash outflow (principal and interest repayments). Then, after calculating the cash flow statement in the nominal term, the next step is to convert it to the real term by applying evaluation criteria such as the financial cost-effectiveness of per patient day, NPV and IRR.

Once cash flow statements are prepared, the next stage is to calculate different decision criteria from both perspectives. From equity (owners) point of view, there are many decision criteria available in order to appraise project viability, financially and economically. However, the cost-effectiveness ratio for per patient days (CE), NPV and also the IRR criteria are the criteria that are accepted significantly more than others and they are used to carry out project evaluations as they bring about genuinely useful

project outcomes in the vast majority of cases. Apart from this, bankers always use annual debt service ratio (ADSCR) and loan life coverage ratio (LLCR) when assessing a project's capacity to generate sufficient money to service the repayment of debt related to the project.

The ADSCR is proportion of the nominal annual net cash flow (ANCF), before financing and after-tax available for debt service over principal and interest repayment on a year to year basis. It assesses the project's viability in generating enough ANCF to service its debt repayments on an annual basis. The project's LLCR, on the other hand, is obtained by calculating the PV of net NCF before financing over the PV of loan repayments in the nominal term of the period in question (t) to the end of the period of the loan repayment obligation period. LLCR indicates if the project has enough cash in one or more specific years to service the debt repayment when ADSCR demonstrates there is inadequate cash in the same period to service the debt repayment.

$$\text{ADSCR} = \frac{\text{Annual Net Cash Flow Available for Debt Service}_{\text{T}}}{\text{Annual Total Debt Service}_{\text{T}}}$$

$$\text{LLCR} = \frac{\text{P Vof } (\text{ANCF}_{\text{T to the end year of debt}})}{\text{P V of } (\text{Annual Debt Repayment}_{\text{T to the end year of debt}})}$$

3.3 Economic Analysis

Economic research is another important part of the integrated investment assessment technique based on CE analysis. It intends to capture the optimal economic benefit from the limited resources allocated to a particular investment project for each single beneficiary. In other words, it is used to examine the project's total net economic

benefits to determine whether it increases the economic welfare of the country as a whole or not.

The economic benefits and costs might resemble financial benefits and costs in terms of the approaches they use. Nevertheless, the concepts of economic values of benefit have distinct differences from the financial values. The main difference for health projects arise when we try to determine the exact estimation of benefits. In view of the fact that the real purpose of health projects is to improve the quality and length of life of a particular nation, it is inappropriate to value these outcomes in monetary value. An appropriate health outcome of benefit ought to be designed to cover increased life expectancy, decreased morbidity, and improved quality of life. Hence, the economic benefit can be obtained by estimating the quality adjusted life years (QALYs) of each patient who receives treatment from the proposed hospital facility. Hence, this investigation of the economic analysis is based on cost-effectiveness analysis as a measure of the project's economic productivity. Nevertheless, the concepts of economic values of cost have distinct differences from the financial values. This difference can arise between economic and financial values when the market price of inputs and outputs is affected by the presence of distortions in the market. These distortions might be value added tax, personal income taxes, import tariffs, production subsidies and excise duties which have a considerable impact on the economic evaluation of capital, foreign and economic exchange rates. However, when there are no distortions in the market economic value of project cost would be clear because its demand and supply price have coincided.

3.4 Quality Adjusted Life Years

The quality-adjusted life years (QALY) is a model for understanding the results of therapeutic treatment. There is no broad measure of health status yet it is, much of the time, assessed by the quality and length of life. The calculation structure behind the QALY formula is straightforward. In this index a weight of 1 defines perfect health 1 QALY (1 year of life * 1 utility = 1QALY). [6] Whereas a year of life lived in a region where there is a lower quality of life than the QALY is worth less than 1. Nevertheless, a weight of 0 relates to a zero health state which is judged equal to death. This index is a measure of the relative utility preference one gets from one more year of healthy life lived in a specific nation. The greater the utility preference, the greater the QALYs associated with it. The QALY merges changes in quality and length of life in a single indicator. The likelihood of joining utility and quantity of life in a singular file depends on the possibility that personal satisfaction can be measured by applying the idea of "Utility". This well rooted theory in the school of welfare economics is acknowledged as utilitarianism.

3.5 Commodity Specific Conversation Factor for Project Costs

Economic appraisal project costs are evaluated differently in that they are usually classified either as internationally tradable or non-tradable. Internationally tradable project inputs are items in which the determination of economic price takes place in the world market. Distortions such as customs duties, import/export taxes or subsidies plus the foreign exchange premium (FEP). While the determination of the economic price of the non-tradable project inputs takes place in the local market, nonetheless, in order to determine economic prices and costs of an item, commodity-specific

[6] Health Outcome Research Unit., Problems and solutions in Calculating Quality Adjusted Life Years (QALYs) Luis and Jose 2003

conversion factors (CSCF) are calculated. Hence, immediately after the financial cash flow statements are constructed for the project's inputs and outputs, the next step is to replace the financial values of the project outflows to the economic cost. This is done by multiplying the financial cash outflow from the total banker's point of view in the real term by the corresponding CSCF. The CSCF is the ratio of the identical economic value to the financial value. Once the economic benefits and resources outflow statements are prepared, the next step is to discount both the QALYs and economic cost by the same economic discount rate and then the discounted cost and QALYs now should be discounted.

3.6 Risk Analysis

Sensitivity analysis is an important feature of the integrated investment appraisal technique. It identifies the project's key risk variables with regard to change in one variable. When the outcome of the financial and economic analyses (e.g. FCE, ECE, FNPV, ENPV, DSCR, and LLCR) are 100% based on deterministic values, the decisions to either accept or reject the project should not be taken only on the basis of these deterministic outcomes. Sensitivity analysis, most of the time, differentiates between risky and non-risky variables. This can be achieved by using "what if analysis" which is a function of Microsoft Excel ™, to test how the outcomes of the project are sensitive to change in the value of one variable at a time. After the risky variables have been identified a comprehensive risk analysis is applied in order to obtain an outcome which would be based on probabilities not deterministic outcomes. For that reason, a Monte Carlo Risk Simulation analysis is applied to carry out a risk analysis which leads to probability distribution and correlations between input variables as this will provide the most accurate outcome for the investment decision.

Chapter 4

FAST MODELING STANDARD

4.1 Introduction

Fast modeling standard (FAST) is a set of rules introduced by the FAST Modeling union. The FAST modelling union comprises staff from F1F9. The FAST Standards Organization (FSO) was established in 2011, and since then several thousand financial modelers and professionals have contributed to carrying out further developments in this standard.

The main aim of FAST modeling is to build reliable financial modules in the least time with the lowest number of errors. According to FAST modeling, the biggest issues financial modelers are facing when they are using Microsoft Excel in constructing their models is the complication of the transaction and the unstructured feature of the model they use which leads them to making a mistake in their spreadsheets.

According to Panko (2006), whether the developers of the financial modules are experienced or not, the spreadsheets have about 2% to 5% rate of errors in their formulas which have a considerable impact on final results. Most of the time these errors do occur due to the application of a large number of formulas in a chain. Therefore, modelers need to figure out the logic behind these errors. Interestingly, these errors come from the people who use the software and not from the programs they use. According to Panko (1998), many individuals propose that spreadsheet errors

occur due to mistyping or the omission of figures in the wrong cells when entering an equation, or confusing writing signs in a formula such as putting a plus sign instead of a minus sign. Although these errors do exist, however, there are numerous and different sorts of mistakes in spreadsheet construction.

These errors can either be quantitative or qualitative in which quantitative errors in a spreadsheet produce the wrong result. Qualitative errors, on the other hand, occur during maintenance, what-if analysis or other activities. Quantitative errors are divided into three types. First, the simple mistakes which are called mechanical errors. These occur when the modeler enters the wrong number and/or points to the incorrect cell. Secondly, there are logic errors, which occur by writing the wrong formula in the model because of an inaccuracy in reasoning. The rate of committing logic errors is above that of mechanical errors and it is not as easy as quantitative errors to detect and correct logic errors. The last type of error is the omission error which is the most dangerous type. It occurs when something is left out. According to Panko (2006), although such errors are widespread, however, few companies test for spreadsheet errors whether results are reasonable or not. Hence, how can we decrease the rate of spreadsheet errors since we cannot blame the software program?

In view of this typical reaction, working with Microsoft Excel does not justify one being a good modeler or not. Basically, this is due to the feature of the Microsoft Excel modeling environment in not providing formalized instruction on constructing well-designed models. Notwithstanding this, a model can be built with high adaptability yet much is unstructured and complex. At this point, following the FAST standard technique is highly recommended by the FAST standard union in order to create well-defined spreadsheets which are completed correctly to help us make sense of that

multiplex. Having a well-standardized model eliminates most of the difficulties in the model's readability and usability. Another reason to implement FAST standard techniques is to build up a simple and readable financial model in which most of the time the complexity of the financial model is from the modeler and not from the transactions themselves. Hence, we should realize that the complexity is varying between the financial model and the transactions. This next section provides a detailed explanation of FAST modeling techniques.

4.2 The FAST Acronym

The FAST acronym is;

4.2.1 Flexible

The fundamental purpose of FAST is to create a workbook whose design and procedures will be as adaptable as possible in the short time and flexible in the long time. A model must allow various users to make alterations as new data is obtained and the period can be extended as new data becomes available. Different users ought to be able to make adjustments easily and apply sensitivities and scenarios. According to FAST modeling (2016), a flexible model is not an all-singing, all-dancing template model which has everything the user wants. Flexibility means building a model which is easy to change, adapt and easy to update when it is required.

4.2.2 Appropriate

Models must demonstrate key business assumptions particularly and accurately without unnecessary detail and should exclude superfluous data. According to FAST modeling (2016), the modeler ought not to miss the fundamental point of the model they recommend, having a decent portrayal of reality, not simply the truth.

4.2.3 Structured

FAST Modeling considers that there is always a possibility that different modelers work on the same model over time so, it is vital in maintaining the model's logical integrity by having strict consistency in design and structure. Adhering to a consistent approach in organizing the model is critical to ensure time is not wasted. In contrast, learning, building or even support of the model would be tedious.

4.2.4 Transparent

Powerful models are organized in a straightforward and simple way in which the equations can easily be understood by both modelers and non-modelers alike. Confidence in a financial model's integrity comes from the logical structure, lucidity and layout. So, a logical structure will provide confidence in financial models and enhance transparency and also increase the flexibility of the model.

4.3. General Rules for Workbook Design

According to FAST modeling (2016) different worksheets should be classified according to their functions. The design rules in this section apply to the most part of workbook design and/or each worksheet in a model.

4.3.1 Foundation

The foundation sheet is the model's chassis or main infrastructure which also contains sheets for inputs, timing flags and indexation factors. Input sheets are separated from each other based on their classes. For instance, splitting up constant-inputs from series-inputs and actual amounts from forecasts as well. These categorizations can be further broken down by what the inputs are. For example, initial investment, financing, expenses and income. A time sheet should include critical dates and periods like start date, end date and time flags. A flag can be either one or zero in a particular period of time to answer the "when" question in the model. If the flag is one, it means something

is happening in that period and vice-versa. Flag is an essential part of calculations because using flags has been suggested to reduce overusing horribly long calculations like the nested IF function.

4.3.2 Presentation

Presentation sheets include commercial statements, financial inputs, charts and report results. Therefore, it can be defined in the form of definitive analysis, control, report or documentation sheets which is one of the basic requirements of any effective model.

4.3.3 General Principles on Design Layout

According to FAST standards, the financial worksheets are to follow the rule of common column structure. Each column in the model should have only one unique purpose. It means each column undertakes a specific role and function in all sheets, so it will make each line item easily visible and clear in a particular place. On the left side of the spreadsheet, there are three tiny columns provided for distinguishing between the title and sub-titles in the model. This guides model users to create and differentiate much more easily between the title and sub-titles. For instance, columns in each worksheet are divided into two parts. The first part is from column A to column I on the left and the second part is from columns J onwards on the right. Functions of each column are illustrated below. Columns A, B, C, and D are devoted to separate sub-section labels from sections. Column E is devoted to the name of the line-item, while columns F, G, and H represent constant numbers, units, and row totals respectively. Column J row onwards is devoted to calculating time dependent values. The calculation block is the main element of the FAST standard approach. It is widely used in modeling to increase model readability. The calculation block contains all the components (equations) of the formula used in model calculations.

The different color symbols are another important feature which is used for different line-item groups. For example, blue color implies the selected line is imported from another sheet, red font indicates the line is exported to another sheet and using black font means the line is neither exported nor imported.

Applying the FAST approach of financial modeling helps the modeler and model-users to be more productive and to work quickly with fewer errors. According to F1F9 ACADEMY, the keyboard will be used as a navigational instrument as it allows users to form a model faster and with fewer errors. By using keyboard shortcuts, users can verify formulas more easily than before as it provides an opportunity to the builder and user of the model to easily surf through the model backward and forward between various calculations and understand the logic behind the calculations easily without any distractions. Accordingly, it allows the user not to think about how to use Excel for building a model but to concentrate on the logic of the model.

4.3.4 Formula Clarity

According to FAST modeling (2016), formulas should be:

- Simple and short as possible. Using long formulas is not allowed where simpler formulas could achieve the same result. Flags are highly recommended to decrease the use of difficult formulas like the nested IF function
- Do not use brackets needlessly because it separates the logic in formulas
- Putting space in formulas as it helps increase readability and clarity of formulas.
- Proliferate links is one of the tools which increases the transparency of a financial model. Every value ought to be calculated in its assigned line in workbook sheet. For more usage, we should link it rather than recalculating the same value.

Chapter 5

PROJECT MODELING PARAMETERS AND ASSUMPTIONS

5.1 Background

This chapter will first provide a short project description followed by Project Modeling Parameters and Assumptions and financial analysis for the 400 bed hospital project which could affect the eventual fate of the region and the whole country. Financial cash flows are built based on the key assumptions specified in the table of parameters. Balanced desires of future operating outcomes of this investment are likewise presented. All the transactions in the assessments have been carried out in Iraqi Dinar (IQ) given that the projects income is in IQ.

5.2 The Proposed Hospital Project

The proposed hospital project would be multi-specialty primary care unit. The project has a total area of approximately 93,000 M2, which is approximately 50,508 M2 for the hospital area as specified in table 8. The hospital consists of 400 beds on 6 floors with 8 operating rooms, 10 elevators, 9 fire escape stairs and also 8500 M2 of green area. The proposed hospital project construction scope is based on the construction data of the Shar Hospital of Sulaimani which was constructed in 2011. The engineering data required for this study was obtained from the project contractor (Galala Construction Contracting Ltd) based on 2018 prices.

Table 8: Areas M2 per Department

Department		Total (M2)	Department		Total (M2)
1.01	Accident and Emergency	1,227	4.05	Drivers/Staff on Duty	-
1.02	Outpatient	1,760	5.01	Pharmacy	821
1.03	Functional Diagnostic	278	5.02	Sterilization	890
1.05	Laboratory	892	5.05	Kitchen	1,252
1.06	Morgue	353	5.06	Laundry	554
1.07	X-Ray Diagnostic & NMR	1,938	5.07	General store	591
1.08	Nuclear Medicine Diagnostic	652	5.08	Maintenance	443
1.09	Operating Theatre	3,171	5.09	Waste/disposal	89
1.10	Delivery/IVF	-	6.02	Teaching	352
1.13	Physiotherapy	1,041	6.03	Training Course	266
1.14	Ergotherapy/Occupational Therapy	139	7.02	Limited Care Dialysis	545
1.15	Doctors on Duty	140	8.02	Water Supply	-
1.16	Observation Department/Ward	648	8.03	Boiler House	734
2.01	General Wards	7,239	8.04	Central Gas Station	216
2.02	Maternity	2,548	8.05	Power Supply	989
2.03	Intensive Care Unit ICU, ICCU	1,529	8.06	Telecommunication	56
2.05	Children's Ward Incl. Neonatology	2,741	8.07	Air Conditioning	446
2.06	Infectious Disease Ward	1,011	8.08	Transport System	597
2.11	Ambulatory Care and Operation	1,148	8.09	Other Operational Installations	1,077
3.01	Administration	1,200	9.00	Small Equipment and Disposals	52
3.02	Archive	175	10.00	Central Cleaning	297
3.03	Library	81		Primary circulation areas	4,605
4.01	General Support Services	1,127		loading platforms	259
4.02	Spiritual Care/Social Security	32		Balconies	2,293
4.03	Staff Changing	414		Covered Porte Cochere (main & emergency)	888
4.04	Staff Dining Room	712			
TOTAL HOSOITAL AREA M2		50,508			

5.3 Hospital service

The proposed hospital project will provide the following services.

5.3.1 Inpatient Department Services

The Inpatient Department services (IPD) will serve those patients admitted into the hospital by a doctor's order. Typically, they are patients who have surgical and medical cases. Such as, General Surgery, Neurosurgery, Cardiothoracic Surgery, Organ Transplantation, Obstetrics & Gynecology and those who need to be kept in the Intensive Care Unit.

5.3.2 Outpatients Department Services

Outpatients will serve those patients who require observation services including Neurosurgery, Cardiology, Pulmonology, Gastroenterology, Ophthalmology, Orthopedics, General Medicine, Ent, Urology & Nephrology, Endocrinology, Dermatology, Radiology, Pharmacy, Pediatrics, Histopathology, Physiotherapy, Diabetes Clinic, Child Clinic, Fertility Clinic, Laboratory Services, Dentistry.

5.3.3 Emergency Department Services

The well-equipped emergency unit with qualified medical and paramedical staff will operate around the clock to attend to any emergency services and those people who are in need of emergency treatment and have serious injuries.

5.4 Project Modeling Parameters and Hypotheses

This part will introduce the main assumptions and hypotheses utilized in building the financial, economic and sensitivity analysis based on FAST standard modeling.

5.4.1 Project Timing

The hospital project covers 18 years of evaluation. The project's physical construction will take 2 years starting in year 0. It will be followed by 15 years of operation period

which starts and ends in year 2 and 16 respectively. Year 17 is the cessation of operations and all project assets are considered to be liquidated.

5.4.2 Price Index and Exchange Rates

The local coin, Iraqi Dinar (IQ) and USD are two currencies applied in this analysis. In 2017 the inflation rate in Iraq was about 2% while US inflation it was about 2.13%. From year 0 to 3, inflation in Iraq is expected to increase by 2% while from year 4 onward it is expected to increase by 4%. At the same time, the inflation rate in the US is expected to remain steady for the duration of the project. The IQD/USD exchange rate is about 1184 which was taken in the base year. This rate is adjusted by the distinction in inflation rates each according to purchasing power parity. The predicted Price index calculations and the exchange rate for each year have been calculated which is shown in the Table 9.

Table 9: Price Index and Exchange Rates

YEARS	Constant	Unit	Total	-	1	2	3	4	5	15	16	17
INFLATION RATES, INFLATION INDICES AND EXCHANGE RATES												
Domestic Inflation - Iraq	2.00%	%										
Forecast Period Flag - Domestic Inflation		Flag	1.00	1.00	-	-	-	-	-	-	-	-
Domestic Inflation		%		2.00%	2.00%	2.00%	2.00%	4.00%	4.00%	4.00%	4.00%	4.00%
Domestic Inflation Index		Index		1.00	1.02	1.04	1.06	1.10	1.15	1.70	1.77	1.84
Foreign Inflation - US	2.13%	%										
Forecast Period Flag - Foreign Inflation		Flag	1.00	1.00	-	-	-	-	-	-	-	-
Foreign Inflation		%		2.13%	2.13%	2.13%	2.13%	2.13%	2.13%	2.13%	2.13%	2.13%
Foreign Inflation Index		Index		1.00	1.02	1.04	1.07	1.09	1.11	1.37	1.40	1.43
Domestic Inflation Index		Index		1.00	1.02	1.04	1.06	1.10	1.15	1.70	1.77	1.84
Foreign Inflation Index		Index		1.00	1.02	1.04	1.07	1.09	1.11	1.37	1.40	1.43
Relative Inflation Index		Index		1.00	1.00	1.00	1.00	1.01	1.03	1.24	1.26	1.28
Relative Inflation Index		Index		1.00	1.00	1.00	1.00	1.01	1.03	1.24	1.26	1.28
Exchange Rate	1,184.00	IQD / USD										
Exchange Rate factor (for sensitivity and risk)	-	%		-	-	-	-	-	-	-	-	-
Exchange Rate Real		IQD / USD		1,184	1,184	1,184	1,184	1,184	1,184	1,184	1,184	1,184
Exchange Rate Nominal		IQD / USD		1,184	1,182	1,181	1,179	1,201	1,223	1,466	1,493	1,521
Real Interest Rate	9.00%	%										
Domestic Inflation		%		2.00%	2.00%	2.00%	2.00%	4.00%	4.00%	4.00%	4.00%	4.00%
Domestic Nominal Interest Rate		%		11.18%	11.18%	11.18%	11.18%	13.36%	13.36%	13.36%	13.36%	13.36%

5.4.3 Capital Cost

The proposed 400 bed hospital project investment cost in real terms is assumed to be around 131 million USD in year 0 which is equivalent to around 154,601 million IQD

(see Table 10). The investment cost is separated into six different sections (e.g. Land which is accounts for 8.72% of the total investment cost while the cost of the Site Development, Building and Civil Works, Equipment, Technical Fees and interest during construction and loan commitment fees constitute for 7%, 42.4%, 32.4%, 5.7%, 2.1%, 1.6% respectively. The 400-bed hospital project's sources and use of funds statement is shown below.

Table 10: Sources and Uses of Funds Statement

Line Item	Year 0 M' IQD	Year 1 M' IQD	Year 0 in M' USD	Year 1 in M' USD
Sources of Funds				
Principal Loan	29,260	67,551	24.71	57.13
Equity Contrbution	18,209	39,581	15.38	33.47
Total Sources of Funds	**47,470**	**107,132**	**40.09**	**90.60**
Uses of Proceeds				
Cost of Land	13,500	-	11.40	-
Cost of Site Development	7,404	3,418	6.25	2.89
Total Cost of Building and Sivil Works	7,376	58,212	6.23	49.23
Total Cost of Equipment	14,961	35,191	12.64	29.76
Total Cost of Technical Fee	1,774	7,104	1.50	6.01
Interest During Construction	-	3,207	-	2.71
Upfront Fees incl. advisors,bank cost,etc	2,454	-	2.07	-
Total Projects Costs	**47,470**	**107,132**	**40.09**	**90.60**
Check	**-**	**-**	**-**	**-**

In 2018 the nominal exchange rate is about 1184 IQD/USD which is equal to the real exchange rate. The total investment cost for the 400 bed hospital project in nominal terms is presented in Table 11.

Table 11: Investment Schedule (Nominal, M'IQDs)

YEARS	Constant	Unit	Total	-	1	2
INVESTMENT COSTS - NOMINAL						
Domestic Inflation Index		Index		1.00	1.02	1.04
Investment Cost overun	-	%				
Land & Site Development						
Cost of Land		M' IQD		13,500	-	-
Cost of Site Development		M' IQD		7,404	3,486	-
Total Land & Site Development		M' IQD		20,904	3,486	-
Building and Civil Works						
Cost of Unskiled Labour		M' IQD		776	135	-
Cost of Materials and Supplies (incl. tax)		M' IQD		6,600	59,242	-
Total Cost of Building and Sivil Works		M' IQD		7,376	59,376	-
Equipment						
Basic Cost (incl. tax)		M' IQD		14,373	34,484	-
Cost of Installation		M' IQD		327	784	-
Cost of Transportation		M' IQD		261	627	-
Total Cost of Equipment		M' IQD		14,961	35,895	-
Technical Fees						
Total Cost of Technical Fee		M' IQD		1,774	7,246	-
Summary of Investment Costs						
Total Land & Site Development		M' IQD		20,904	3,486	-
Total Cost of Building and Sivil Works		M' IQD		7,376	59,376	-
Total Cost of Equipment		M' IQD		14,961	35,895	-
Total Cost of Technical Fee		M' IQD		1,774	7,246	-
Total Investment Cost		**M' IQD**		**45,015**	**106,003**	**-**

5.4.4 Project Financing

The overall investment expense of the 400 bed hospital project is funded by equity participation and debt commitment. 35% of the investment expense is funded through equity contribution in the meantime the remaining portion which equates to 65% of this cost is financed by the loan as shown in table 12. The entire loan amount disbursement is scheduled to be withdrawn 65% of investment cost in each construction period.

Table 12: Financing Parameters

YEARS				-	1	2
	Constant	Unit	Total			
FINANCING - NOMINAL						
Financing Parameters						
Equity (% of Investment Costs)	35.00%	%				
Senior Debt (% of Investment Costs)	65.00%	%				
Total Investment Costs(Land, Site Development, Building and Civil Works, Equipment and Technical Fees)		M' IQD		45,015	106,003	-
Loan Draw Down Period		Flag	2.00	1	1	-
Equity Contribution Towards Total Investment Costs		M' IQD		15,755	37,101	-
Senior Debt Contribution Towards Total Investment Costs		M' IQD		29,260	68,902	-

The loan is provided by Erbil Bank for Investment and Finance at a nominal interest rate of 11.18% in year 0 with a loan tenure of 9 years. The bank requires a minimum DSCR and LLCR on the loan to be above 1.5. The hospital begins operation in year 2. The loan repayment will be made in 9 equal installments starting from 2 to 10. The Bank grants a grace period to repay the principal for two years of construction of the project (see table 13) for the loan repayment schedule. The interest expense during the construction period besides any commitment fees and loan appraisal fees are capitalized into investment cost. The non-refundable appraisal fee is equal to 1% of the amount of the loan. It will be paid at the beginning of year 0. The loan commitment fee is equal to 1.5% of the total loan amount.

Table 13: Loan Repayment Schedule-nominal

YEARS	Constant	Unit	Total	-	1	2	3	4	5	6	7	8	9	10
LOAN REPAYMENT SCHEDULE - NOMINAL														
Debt Repayment Period		Flag	9	-	-	1	1	1	1	1	1	1	1	1
Commitment and Upfront Fees Period		Flag	1	1	-	-	-	-	-	-	-	-	-	-
Construction Period		Flag	2	1	1	-	-	-	-	-	-	-	-	-
Loan Repayment Period	9	Years												
domestic Nominal Interest rate		%		11.18%	11.18%	11.18%	11.2%	13.36%	13.36%	13.36%	13.36%	13.36%	13.36%	13.36%
Commitment Fees (% of loan)	1.00%	%												
Appraisal fee incl. advisors,bank cost,etc (% of loan)	1.50%	%												
Loan Repayment Schedule														
Senior Debt Contribution towards Total Investment Costs		M' IQD		29,260	68,902	-	-	-	-	-	-	-	-	-
Loan Disbursment		M' IQD		29,260	68,902	-	-	-	-	-	-	-	-	-
Beginning Debt		M' IQD		-	29,260	98,162	87,255	76,348	65,441	54,534	43,628	32,721	21,814	10,907
Interest Accrued		M' IQD		-	-	10,975	9,755	8,536	8,743	7,286	5,829	4,371	2,914	1,457
Principal Repayment		M' IQD		-	-	10,907	10,907	10,907	10,907	10,907	10,907	10,907	10,907	10,907
Interest Paid		M' IQD		-	-	10,975	9,755	8,536	8,743	7,286	5,829	4,371	2,914	1,457
Total Debt Repayment Scheduled		**M' IQD**		**-**	**-**	**21,881**	**20,662**	**19,443**	**19,650**	**18,193**	**16,736**	**15,278**	**13,821**	**12,364**
Ending Debt		M' IQD		29,260	98,162	87,255	76,348	65,441	54,534	43,628	32,721	21,814	10,907	(0)
Interest During Construction		**M' IQD**		**-**	**3,271**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Commitment Fees		M' IQD		982	-	-	-	-	-	-	-	-	-	-
Appraisal fee incl. advisors,bank cost,etc		M' IQD		1,472	-	-	-	-	-	-	-	-	-	-
Loan Commitment and Appraisal Fee		**M' IQD**		**2,454**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

5.4.5 Residual Value

The estimated Residual Value of the project comprises four different sections. E.g. Residual Values of Land, an un-depreciable portion and a depreciable portion of site development, building and equipment. At the end of the operation period, the salvage value of the equipment and 55% of the site development are forecasted to be zero. The building is considered to have a life of 50 years and was deteriorated linearly to determine its salvage value. Table 14 shows the residual value of hospital assets.

Table 14: Residual Value-nominal

YEARS	Constant	Unit	Total	-	1	2	3	4	5	15	16	17
LIQUIDATION VALUE - NOMINAL												
Domestic Inflation Index	-	Index		1.00	1.02	1.04	1.06	1.10	1.15	1.70	1.77	1.84
Cost of Land	13,500.00	M' IQD										
Residual Period		Flag	1	-	-	-	-	-	-	-	-	1
Residual Value of Land		**M' IQD**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**24,809**
Cost of Site Development	10,821.60	M' IQD										
Operation Duration	15	Years										
Depreciable Portion of Site Development Economic Life	15	Years										
Depreciable Portion	55%	%										
Residual Period		Flag	1	-	-	-	-	-	-	-	-	1
Residual Value of Undepreciable Portion		**M' IQD**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**8,949**
Residual Value of Depreciable Portion		**M' IQD**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Total Cost of Building and Sivil Works	65,588.40	M' IQD										
Operation Duration	15	Years										
Building Economic Life	50	Years										
Residual Period	-	Flag	1	-	-	-	-	-	-	-	-	1
Residual Value of Building and Civil Works		**M' IQD**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**84,371**
Total Cost of Equipment	50,152.37	M' IQD										
Equipment Economic Life	15	Years										
Operation Duration	15	Years										
Residual Period		Flag	1	-	-	-	-	-	-	-	-	1
Residual Value of Equipments		**M' IQD**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Total Residual Values		**M' IQD**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**118,128**

5.4.6 Patient-days

The yearly patient-days in the hospital are differentiated based on the type of treatment each patient receives and the doctors' time they consume during treatment in both inpatients and outpatients. The yearly inpatient-days refers to the amount of time that each inpatient spends at the hospital during their treatment. These days basically depend on the total number of patients who are admitted to the hospital and the type of treatment they receive in each of the following categories e.g. General Illness, Infect. & TB, Surgery, Maternity, Pediatrics. Each of these variables has a different number of beds authorized and the average length of stay. From historical records the yearly inpatient-days of the hospital are determined in each of these categories based on year zero estimation. This day is expected to increase by 2% each year from year 1 to 16 as presented in table 15.

Table 15: Inpatient Parameters Based on Year 0 Projection

Inpatients	General Illness	Infect. & TB	Surgery	Maternity	Pediatrics	total/avrage
Useable Beds	80	100	102	30	88	400
Bed Utilisation Rate	70%	70%	70%	70%	70%	70%
Average Length of Stay (ALOS) Days	12	15	6	5	10	10
Admission	1,703	1,703	4,344	1,594	2,248	11,593
Days/Year	20,440	25,550	26,061	7,972	22,484	102,507
Inpatient Discharged	1,550	1,618	3,996	1,546	2,158	10,869
Percentage Increase in inpatient days	**2.00%**	**%**				

The hospital distinguishes patients by income/wealth into full-paying and discounted in-patients. It is assumed that 60% of inpatients would pay a full cost per patient day, while the remaining 40% would pay at the discounted rate. The yearly patient-days of full-paying and discounted inpatients is presented in Appendix.[7]

[7], Table 43: Annual Number of Patient Days.

Nonetheless, patient-days for outpatients are determined based on the times they visit the hospital for treatment. The expected outpatient visits to the hospital in the base year are presented in table 16 in which this number is expected to increase by 2.5% each year through the project's life.

Table 16: Outpatient Parameters Based on Year 0 Projection

Outpatients		
General OPD Clinic Visit	161,510	Visit/year
Specialist OPD Clinic Visit	232,079	Visit/year
CAS Visit	138,661	Visit/year
Total Number of Outpatients / visit	532,250	Visit/year
Percentage Increase in out-patients/visi	**2.50%**	**%**

It is essential to determine average outpatient visits in order to convert outpatient visits into equivalent inpatient-days. It is expected that teen outpatient visits are equivalent to one inpatient-day which gives us an equivalent inpatient-day. The detailed projection of yearly outpatient visits to the hospital and equivalent out-patients visits to inpatient days is presented in Appendix.[8]

5.4.7 Revenue

The hospital's forecasted revenue is calculated based on the fee paid by the patient for each inpatient-day for an inpatient and by visit for outpatients. The revenue generated from inpatient-days is also different in each of these treatment categories e.g. General Illness, Infect. & TB, Surgery, Maternity, Pediatrics and fees charged by high and low earning patients. It is assumed that 60% of inpatients would pay 100% of treatment costs, while the remaining 40% would pay at the discounted rate 60% treatment cost. Nonetheless, fees charged for outpatients are determined based on the treatment they receive per visit to the hospital. As in table 17, the real fee scheduled for each service

[8], Table 43: Annual Number of Patient Days.

in the hospital is shown based on the year 0 price. The detailed projection of the forecasted yearly fee is charged in nominal terms and the aggregate yearly revenue is presented in Appendix.[9]

Table 17: Revenue Details

Revenue Details		
FEE SCHEDULE (2017 prices)		
In-patients		
General Illness Per Patient- Per Day	250	000' IQD
Infectious & TB Per Patient- Per Day	350	000' IQD
Surgery Per Patient- Per Day	1,000	000' IQD
Maternity Per Patient- Per Day		
First day	1,000	000' IQD
Subsequent day(s) Per Patient- Per Day	250	000' IQD
Paediatrics Per Patient- Per Day	450	000' IQD
Breakdown of in-Patients (according to fee paid)		
Full Paying Inpatients		
Income from Full-paying In-patients-100% of Average Inpatient Fees	100.00%	%
Discounted In-patients		
Income from Discounted In-patients-60% of Average Inpatient Fees	60.00%	%
Percentage Change in Fee of Discounted In-patients	-	%
Outpatients		
Outpatient per Visit	50	000' IQD
Percentage Change in All Fees		
Percentage Change in All Fees	-	%

5.4.8 Operating Cost

The project's operating expenses are classified into eight different categories (e.g. Utilities, Chemicals & medical supplies expenses, operating maintenance costs, Miscellaneous, Hospital Cleaning, Food and Beverages, Labor costs and Working Capital). The operating costs for this analysis are basically measured in nominal terms by multiplying the domestic price index by the real operating cost for each year throughout the hospital's life path.

[9], Table 44: Fees and Revenues.

5.4.8.1 Utilities

Utilities include the costs of electricity, water and fuel. The hospital is assumed to consume 1,680,000 KWH of electricity per year at a cost of 130 IQD, while the hospital is projected to consume 85,000 M3 of water in which 50% is used for drinking and the remaining 50% is used for flushing toilets at a cost of 300 IQD and 100 IQD respectively. The electricity and water for toilets have been subsidized by the government. Hence, the project is not obligated to pay for these consumptions. The fuel utilization is assumed to be 33,600 liters per year at a cost of 700 IQD. These consumptions are determined at year zero prices and at a full utilization rate. The utilization in the first two years of operating were 80% and 90% respectively of the full capacity utilization. The projected cost of utilities through the hospital operation period is calculated in the nominal term. For details please check Appendix.[10]

5.4.8.2 Chemicals and Medical Supplies

The real operating expense of Chemicals & medical supplies is estimated to be 14,087 M'IQD which includes Pharmaceutical, Laboratory Supplies, Medical Supplies and Dental Supplies based on year 0 prices. The real cost is assumed to increase by 1% per annum starting from year 1 to 16. During the first two years of operating, the Chemicals & medical supplies utilization were taken as 80% and 90% respectively of the maximum capacity utilizations. This is fixed at 100% utilization from the third year of the operations period onwards when the project reached its maximum running capacity. The projected cost of Chemicals & medical supplies utilization through the hospital operation period are calculated in the nominal term. Check Appendix.[11]

[10], Table 46: Utilities.
[11], Table 47: Chemicals & Medical Supplies.

5.4.8.3 Maintenance Costs

The real maintenance costs of Buildings, Vehicles, Equipment, Sewage and Electrical Installation maintenance were assumed to be independent of operating costs. They are shown in table 18 in full capacity utilization. Real maintenance costs based on year 0 prices and t real prices were assumed to increase by 1% per annum. Hospital maintenance expense starts in the second year of operation and was assumed to be 80% and 90% in year 3 and 4 respectively of the full capacity utilization. The projected expense of maintenance costs through the hospital operation period are calculated in the nominal term. For details please check Appendix.[12]

Table 18: project Maintenance Parameters Based on Year 0 Projection

	Constant	Unit
Maintenance cost		
Equipment Maintenance		
Equipment Maintenance @ 100% Utilization	27.62	M' IQD
Real Increase in Equipment Maintenance	1.00%	%
Building Maintenance		
Area	50,506	Sq. M
Cost / Sq. M/year (year 0)	190	IQD
Real increase in Building Maintenance	1.00%	%
Vehicle Maintenance		
Cost of Vehicle (year 0) @ 100% Utilization	1,725,000	IQD
Number of Vehicles	7	#
Real Increase in Vehicle Maintenance	1.00%	%
Sewage Maintenance		
Cost of Sewage (year 0) @ 100% Utilization	1,112,000	IQD
Real Increase in Vehicle Maintenance	1.00%	%
Electrical installations Maintenance		
Cost of Electrical Installations (year 0) @ 100% Utilization	11,277,500	IQD
Real Increase in Vehicle Maintenance	1.00%	%

5.4.8.4 Miscellaneous

Miscellaneous includes the costs of Advertising, Transportation, Official entertainment, Communication, Office Supplies, Stationery and Ink, Staff Clothing, Protective materials and Furniture. The real Miscellaneous cost was assumed to be

[12], Table 48: Maintenance cost

46.72 M'IQD based on year 0 prices, at a full utilization rate and the real prices were assumed to increase by 1% per annum starting from year 1 to 16. The utilization in the first two years of operating were 80% and 90% respectively of the full capacity utilization. The projected cost of Miscellaneous through the hospital operation period are calculated in the nominal term. See Appendix.[13]

5.4.8.5 Hospital Cleaning

The cleaning cost is an indirect labor cost of 110 in the hospital because this duty was given to a private company with a yearly contract size of 625.8 M'IQD. This price is based on the base year price and the real cost is assumed to increase by 1% per year. The private company is responsible for cleaning and pressing all the hospital linen and the employees' uniforms as well as patients' laundry and cleaning patient rooms and public places (see appendix).[14]

5.4.8.6 Food and Beverage

An average 500 people per day will eat from the hospital's catering department and this number is considered to remain steady during the project's operation period. The average person costs to the hospital are considered to be 10,000 IQD per day at year 0 prices and the cost is considered to increase by 1% in real terms per year starting from year 1 to 16 for the duration of the operation period. The projected costs of Food and Beverage through the hospital operation period are calculated in the nominal term. For detail please check Appendix.[15]

[13], Table 50: Miscellaneous.
[14], Table 51: Hospital Cleaning.
[15], Table 52: Food and Beverage

5.4.8.7 Labor

Throughout the construction period of the hospital, all labor costs are covered by contract packages awarded to successful bidders. Nevertheless, during the hospital operational period, the project will hire 714 employees. The average real wage in the base year is expected to be around 2,936,680 per month and it is expected to grow by 1% each year through 1 to 16. The projected cost of labor through the hospital operation period is calculated in the nominal term. For detail please check Appendix[16].

5.5 Working Capital

The account payable and the cash balance of the investment are assessed to be 11% of the aggregate consumptions. The investment would not have an account receivable on the grounds that all installments to the task would be in the cash.

Table 19: Working Capital Parameters Based on Year 0 Projection

YEARS				-	1	2	3	4	5	16	17
	Constant	Unit	Total								
WORKING CAPITAL DETAILS - NOMINAL											
Accounts Payables % of Maintenance and Operating Expenses	11.00%	%									
Total Recurrent Costs Nominal		M' USD		-	-	41,520	44,398	48,291	50,729	87,063	-
Accounts Payables		**M' USD**		**-**	**-**	**4,567**	**4,884**	**5,312**	**5,580**	**9,577**	**-**
Cash Balance % of Maintenance and Operating Expenses	11.00%	%									
Total Recurrent Costs Nominal		M' USD		-	-	41,520	44,398	48,291	50,729	87,063	-
Cash Balance		**M' USD**		**-**	**-**	**4,567**	**4,884**	**5,312**	**5,580**	**9,577**	**-**
Change in Accounts Payable		M' USD		-	-	(4,567)	(317)	(428)	(268)	(459)	9,577
Change in Cash Balance		M' USD		-	-	4,567	317	428	268	459	(9,577)

5.6 Macro-input Variables

Macroeconomic parameters are generally necessary for the calculation of the economic evaluation of any investment project although usually these variables are similar between projects. Hence, these variables are used to calculate the economic conversion factors with the purpose of transforming the financial value of the project's costs into its economic value (see table 20). This step is essential in order to work with

[16], Table 53: Labor cost

real resource costs for this hospital project in the economy. In an integrated investment appraisal, the selection of the discount rate to calculate the NPV for the financial and economic cash flows is a critical issue especially for kind of a project when you have little idea what the private sector is going to require as a return on their capital. If the cash flow is discounting after deducting the loan repayments then what is remaining is the return to equity that rate will be close to the economic discount rate. In such a situation the most neutral kind of assumption is to assume the two discount rates are the same.

Table 20: Macro-input Variables

Inflation, Exchange Rates, Discount Rate, and Taxes		
Domestic Inflation - Iraq	2.00%	%
Foreign Inflation - US	2.13%	%
Exchange Rate	1,184	IQD / USD
Exchange Rate factor (for Sensitivity and Risk)	-	%
Return on Equity	13.00%	%
Foreign Exchange Premium	5.00%	%
Taxes on 'Materials and Supplies'	10.00%	%
Taxes on 'Basic cost'	10.00%	%
Value Added Tax	-	%
Income Tax Paid by Skilled Labor	15.00%	%
Income Tax Paid by Unskilled Labor	10.00%	%

Chapter 6

FINANCIAL AND ECONOMIC ANALYSIS

6.1 Financial Analysis

After detailed identification of the objectives and scope of the project, such as demand, technical, inputs and financing parameters, it is now time to identify financial cash flow statements for the project with the purpose of evaluating the financial viability of the hospital project to be built. For that reason the financial cash flow statements are conducted from both total investment (bankers') and equity owners' perspectives.

Initially, the nominal cash flow statements from the bankers view of point is calculated so as to obtain annual net cash flows (ANCF) before financing in order to determine the project's capability in serving its debt repayment on a year to year basis (see table 21). And then the ADSCR and LLCR have been computed for evaluating the hospital's capability in serving its obligation for the duration of the loan repayment period. These are presented in Tables 22 and 23 respectively.

Table 21: Cash Flow Statement, Bankers' Point of View (Nominal)

YEARS	Constant	Unit	Total	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
FINANCIAL ANALYSIS TOTAL INVESTMENT PERSPECTIVE (in millions) NOMINAL																					
Cash inflows																					
Fees																					
Total Revenues from Full-paying In-patients		M' IQD		-	-	24,139.6	24,632.4	25,628.4	26,664.8	27,743.4	28,865.8	30,033.9	31,249.6	32,514.8	33,831.5	35,201.8	36,628.0	38,112.3	39,657.2	41,265.1	-
Total Revenues from Discounted In-patients		M' IQD		-	-	21,725.6	22,169.2	23,065.5	23,998.3	24,969.0	25,979.2	27,030.6	28,124.6	29,263.3	30,448.3	31,681.6	32,965.2	34,301.1	35,691.5	37,138.6	-
Revenues from Out-patients		M' IQD		-	-	28,414.9	29,001.7	30,181.6	31,409.9	32,688.8	34,020.2	35,406.6	36,850.1	38,353.1	39,918.1	41,547.8	43,244.9	45,012.1	46,852.5	48,769.2	-
Government Subsidies																					
Total Cost of Electricity		M' IQD		-	-	181.8	208.6	241.0	250.7	260.7	271.1	282.0	293.3	305.0	317.2	329.9	343.1	356.8	371.1	385.9	-
Total Cost of Water for Flushing Toilets		M' IQD		-	-	3.4	3.8	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	-
Residual Values																					
Residual Value of Land		M' IQD		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24,808.5
Residual Value of Undepreciable Portion		M' IQD		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,948.9
Residual Value of Depreciable Portion		M' IQD		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual Value of Building and Civil Works		M' IQD		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	84,370.8
Residual Value of Equipments		M' IQD		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total inflows		**M' IQD**		**-**	**-**	**74,465**	**76,016**	**79,121**	**82,328**	**85,666**	**89,141**	**92,757**	**96,522**	**100,440**	**104,519**	**108,765**	**113,185**	**117,787**	**122,576**	**127,563**	**118,128**
Cash outflows																					
Investment Costs																					
Cost of Land		M' IQD		13,500.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cost of Site Development		M' IQD		7,404.00	3,485.95	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Cost of Building and Sivil Works		M' IQD		7,376.40	59,376.24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Cost of Equipment		M' IQD		14,961.49	35,894.71	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Cost of Technical Fee		M' IQD		1,773.60	7,246.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Interest During Construction		M' IQD		-	3,271.28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Loan Commitment and Appraisal Fee		M' IQD		2,454.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maintenance and Operations																					
Total Cost of Electricity		M' IQD		-	-	181.8	208.6	241.0	250.7	260.7	271.1	282.0	293.3	305.0	317.2	329.9	343.1	356.8	371.1	385.9	-
Total Cost of Drinking Water Cost		M' IQD		-	-	10.6	12.2	14.1	14.6	15.2	15.8	16.5	17.1	17.8	18.5	19.3	20.0	20.8	21.7	22.5	-
Total Cost of Water for Flushing Toilets		M' IQD		-	-	3.4	3.8	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	-
Total Cost of Fuel		M' IQD		-	-	19.6	22.5	26.0	27.0	28.1	29.2	30.4	31.6	32.8	34.2	35.5	36.9	38.4	40.0	41.6	-
Total Cost of Chemicals & Medical Supplies		M' IQD		-	-	11,960.5	13,861.9	16,178.4	16,993.8	17,850.3	18,749.9	19,694.9	20,687.5	21,730.2	22,825.4	23,975.8	25,184.2	26,453.5	27,786.7	29,187.2	-
Total Cost of Equipment Maintenance		M' IQD		-	-	-	24.2	28.5	33.3	35.0	36.8	38.6	40.6	42.6	44.8	47.0	49.4	51.9	54.5	57.2	-
Total Cost of Building Maintenance		M' IQD		-	-	-	8.4	9.9	11.6	12.2	12.8	13.4	14.1	14.8	15.5	16.3	17.2	18.0	18.9	19.9	-
Total Cost of Sewage Maintenance		M' IQD		-	-	-	1.0	1.1	1.3	1.4	1.5	1.6	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	-
Total Cost of Electrical installations Maintenance		M' IQD		-	-	-	9.9	11.7	13.6	14.3	15.0	15.8	16.6	17.4	18.3	19.2	20.2	21.2	22.2	23.4	-
Total Cost of Vehicle Maintenance		M' IQD		-	-	-	10.6	12.5	14.6	15.3	16.1	16.9	17.7	18.6	19.6	20.6	21.6	22.7	23.8	25.0	-
Total Cost of Miscellaneous		M' IQD		-	-	38.9	44.6	51.6	53.6	55.8	58.0	60.3	62.7	65.2	67.9	70.6	73.4	76.3	79.4	82.6	-
Total Hospital Cleaning cost		M' IQD		-	-	664.2	684.2	718.7	754.9	793.0	833.0	874.9	919.0	965.3	1,014.0	1,065.1	1,118.8	1,175.2	1,234.4	1,296.6	-
Total Food and Beverage		M' IQD		-	-	1,936.9	1,995.4	2,096.0	2,201.6	2,312.6	2,429.1	2,551.5	2,680.1	2,815.2	2,957.1	3,106.1	3,262.7	3,427.1	3,599.8	3,781.3	-
Total Cost of Employees		M' IQD		-	-	26,704.2	27,510.6	28,897.2	30,353.6	31,883.4	33,490.3	35,178.3	36,951.2	38,813.6	40,769.8	42,824.6	44,983.0	47,250.1	49,631.5	52,132.9	-
Change in Accounts Payable		M' USD		-	-	(4,567.2)	(316.6)	(428.2)	(268.1)	(280.8)	(295.0)	(309.8)	(325.4)	(341.8)	(359.0)	(377.1)	(396.1)	(416.0)	(436.9)	(458.9)	9,576.9
Change in Cash Balance		M' USD		-	-	4,567.2	316.6	428.2	268.1	280.8	295.0	309.8	325.4	341.8	359.0	377.1	396.1	416.0	436.9	458.9	(9,576.9)
Total Expenditures		**M' IQD**		**47,470**	**109,274**	**41,520**	**44,398**	**48,291**	**50,729**	**53,281**	**55,963**	**58,779**	**61,737**	**64,845**	**68,108**	**71,536**	**75,137**	**78,918**	**82,890**	**87,063**	**-**
Net Cash-flow		**M' IQD**		**(47,470)**	**(109,274)**	**32,945**	**31,618**	**30,830**	**31,599**	**32,385**	**33,178**	**33,978**	**34,784**	**35,596**	**36,411**	**37,229**	**38,049**	**38,868**	**39,686**	**40,500**	**118,128**

Table 22: ADSCR for Bank Debt (M'IQD), Nominal

YEARS	Constant	Unit	Total	2	3	4	5	6	7	8	9	10
DEBT SERVICE COVERAGE RATIOS												
Debt Repayment Period		Flag	9.00	1	1	1	1	1	1	1	1	1
Annual Debt Service Coverage Ratio												
Net Cash-flow		M' IQD		32,945	31,618	30,830	31,599	32,385	33,178	33,978	34,784	35,596
Total Debt Repayment Scheduled		M' IQD		21,881	20,662	19,443	19,650	18,193	16,736	15,278	13,821	12,364
Annual Debt Service Coverage Ratio - ADSCR		#		1.5	1.5	1.6	1.6	1.8	2.0	2.2	2.5	2.9
Summary of ADSCR												
Minimum ADSCR	1.51	#										
Maximum ADSCR	2.88	#										
Average ADSCR	1.96	#										

From years 2 to 10 of the debt repayments obligation period the minimum ADSCR is 1.51 while the maximum and average ADSCR are 2.88 and 1.96 respectively. Since the bank required the minimum ratio of DSCR 1.50 the project's ADSCR shows that the project is viable to repay its debt obligation. Nevertheless, although ADSCR ratios were satisfactory in the debt service period, nonetheless the LLCR calculation was held in order to assign the overall project's viability in meeting its debt service obligations as presented in the table below.

Table 23: LLCR for Bank Debt (M'IQD), Nominal

YEARS	Constant	Unit	Total	2	3	4	5	6	7	8	9	10
LOAN LIFE COVERAGE RATIOS												
Nominal Interest Rate	11.18%											
Net Cash Flow Available for Debt Service [NCFADS], Nominal		M' IQD		32,945	31,618	30,830	31,599	32,385	33,178	33,978	34,784	35,596
Total Debt Repayment Scheduled	-	M' IQD	-	21,881	20,662	19,443	19,650	18,193	16,736	15,278	13,821	12,364
PV of NCF Available for Debt Service [NCFADS], Nominal		M' IQD		199,846	185,561	171,153	156,012	138,322	117,781	94,061	66,801	35,596
Present Value of Loan Repayment		M' IQD		112,219	100,437	88,694	76,993	63,754	50,656	37,712	24,942	12,364
Loan Life Coverage Ratio - LLCR		#		1.8	1.8	1.9	2.0	2.2	2.3	2.5	2.7	2.9
Summary of LLCR												
Minimum LLCR	1.78	#										
Maximum LLCR	2.88	#										
Average LLCR	2.24	#										

As it shown above, from years 2 to 10 of the debt repayments obligation period the project's average LLCRs is 2.24,while the minimum and maximum LLCR for debt is 1.78 and 2.88 respectively. The above table indicates that the LLCR is higher than the ADSCR but meanwhile it meets the required LLCR by the bank of 1.5. Hence, the

LLCR criteria confirm that the project is not anticipated to face any predictable difficulty concerning the payment of its debt to the bank. At the same time, this project is a public project and its debt obligation has been guaranteed by the government. As a result, the bank is expected to be engaged in paying the credit to the proposed hospital project.

After the cash flow statement is created from the bank's point of view, it is now time to evaluate the equity holder's perspective. For this reason, a more comprehensive cash flow statement is designed in view of the fact that the equity holder is interested in all the existing inflows and outflows related to the project. Hence, net cash flow after financing is constructed by adding the loan disbursements as a cash-inflow while the loan proceeds are added as an outflow to the project's nominal cash flow statement from the banker’s perspective. Now, in order to apply the financial evaluating criteria such as cost of per patient day, FNPV and FIRR of the project, the cash flow statements is converted into real terms as shown in table 24.

Table 24: Cash Flow Statement, Equity Owners' Point of View M'IQD

YEARS	Constant	Unit	Total	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
FINANCIAL ANALYSIS EQUITY HOLDER'S PERSPECTIVE (in Million) NOMINAL																					
Total Inflows		M' IQD		-	-	74,465	76,016	79,121	82,328	85,666	89,141	92,757	96,522	100,440	104,519	108,765	113,185	117,787	122,576	127,563	118,128
Total Outflows		M' IQD		47,470	109,274	41,520	44,398	48,291	50,729	53,281	55,963	58,779	61,737	64,845	68,108	71,536	75,137	78,918	82,890	87,063	-
Net Cash-flow Befor Financing		M' IQD		(47,470)	(109,274)	32,945	31,618	30,830	31,599	32,385	33,178	33,978	34,784	35,596	36,411	37,229	38,049	38,868	39,686	40,500	118,128
Add Inflow of loan																					
Senior Debt Contribution Towards Total Investment Costs		M' IQD		29,260	68,902	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Cashflow Available for Debt Repayment		M' IQD		(18,209)	(40,372)	32,945	31,618	30,830	31,599	32,385	33,178	33,978	34,784	35,596	36,411	37,229	38,049	38,868	39,686	40,500	118,128
Total Loan Repayments		M' IQD		-	-	21,881	20,662	19,443	19,650	18,193	16,736	15,278	13,821	12,364	-	-	-	-	-	-	-
Net Cashflow After Financing		**M' IQD**		**(18,209)**	**(40,372)**	**11,064**	**10,956**	**11,387**	**11,950**	**14,192**	**16,442**	**18,700**	**20,963**	**23,232**	**36,411**	**37,229**	**38,049**	**38,868**	**39,686**	**40,500**	**118,128**
FINANCIAL ANALYSIS EQUITY HOLDER'S PERSPECTIVE (in Millions) REAL																					
Domestic Inflation Index		Index		1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
Total Inflows		M' IQD		-	-	71,574	71,631	71,690	71,727	71,764	71,803	71,842	71,883	71,924	71,966	72,010	72,054	72,099	72,145	72,192	64,282
Total Outflows		M' IQD		47,470	107,132	39,908	41,837	43,755	44,196	44,635	45,078	45,526	45,978	46,434	46,896	47,361	47,832	48,307	48,787	49,272	-
Net Cash-flow Befor Financing		M' IQD		(47,470)	(107,132)	31,666	29,794	27,934	27,530	27,129	26,725	26,317	25,905	25,490	25,071	24,648	24,222	23,792	23,358	22,921	64,282
Add Inflow of Loan																					
Senior Debt Contribution Towards Total Investment Costs		M' IQD		29,260	67,551	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Cashflow Available for Debt Repayment		M' IQD		(18,209)	(39,581)	31,666	29,794	27,934	27,530	27,129	26,725	26,317	25,905	25,490	25,071	24,648	24,222	23,792	23,358	22,921	64,282
Total loan Repayments		M' IQD		-	-	21,032	19,470	17,617	17,120	15,240	13,480	11,833	10,293	8,854	-	-	-	-	-	-	-
Net Cashflow After Financing		**M' IQD**		**(18,209)**	**(39,581)**	**10,634**	**10,324**	**10,318**	**10,411**	**11,889**	**13,244**	**14,483**	**15,612**	**16,636**	**25,071**	**24,648**	**24,222**	**23,792**	**23,358**	**22,921**	**64,282**
Total Financial Cost		**M' IQD**		**18,209**	**39,581**	**60,761**	**61,107**	**61,150**	**61,094**	**59,653**	**58,337**	**57,137**	**56,049**	**55,067**	**46,674**	**47,140**	**47,611**	**48,086**	**48,566**	**49,051**	**-**
Total Patient days		**Days/Year**		**-**	**-**	**159,263**	**159,340**	**159,419**	**159,501**	**159,583**	**159,668**	**159,755**	**159,843**	**159,934**	**160,027**	**160,121**	**160,218**	**160,317**	**160,418**	**160,521**	**-**

Return on Equity	13.00%	%
NPV After Financing	37,604.48	M' IQD
IRR	21.32%	%
PV of Cost	379,815	M' IQD
PV of Patient Days	913,138	#
PV of Financial Cost per Patient Days	415,945	IQD

The Return on Equity was assumed to be 13.00%. Hence, we found out the PV of the project cost to be about 379,815 M'IQD while the PV of patient days is about 913,138. Consequently, the PV of financial cost per patient day is about 415,945 IQD.

The FNPV of the project is about 37,604.48 M'IQD which is positive while FIRR is about 21.132% which is higher than the discount rate. This indicates that the owner will have the ability to recoup the initial investment, in addition, procuring an extra amount of wealth about 37,604.48 M'IQD.

This outcome demonstrates that the project is financially worth undertaking as it can serve its debt obligation during the debt repayment period and can yield a positive return to the government. So, in order to carry out a more comprehensive analysis, the economic analysis will proceed

6.2 Economic Analysis

The financial analysis of the proposed hospital project focuses on its financial effectiveness. However, the economic analysis deal with the definitive effect of the project on the welfare of the whole of society. To start with, the project's benefits ought to be estimated in a way that catches some measurements of the effect of the health service. For instance, the yearly number of patient days or services provided does not catch the effect of the extra number of years of life that will be gained or the number of years of pain and suffering eliminated. Thus, in an economic analysis, the concern is with economic benefits and costs and not simply money receipts and expenditures. Consequently, the QALYs demonstrate a first strategy for estimating the real benefit or utility for people created by achieving better access to health care services and protection toward the costs of disease. The number of QALYs estimate

the utility of both the extra years of life gained and the quality of life adjusted through these years as a consequence, Table 25 illustrates the aggregated years balanced for quality for all discharged patients in the hospital during the project operating phases. This examination has employed only an illustrative set of information on the basis of each discharged patient in the hospital.

Table 25: Quality Adjusted Life Years (QALY's)

YEARS	Constant	Unit	Total	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Summary of patients discharged																					
General Illness Patients Discharged		#		-	-	1,582	1,583	1,584	1,584	1,585	1,586	1,586	1,587	1,588	1,589	1,589	1,590	1,591	1,592	1,593	-
Infect. & TB Patients Discharged		#		-	-	1,652	1,653	1,653	1,654	1,655	1,655	1,656	1,657	1,658	1,658	1,659	1,660	1,661	1,662	1,663	-
Surgery Patients Discharged		#		-	-	4,079	4,081	4,083	4,084	4,086	4,088	4,090	4,092	4,093	4,095	4,097	4,099	4,101	4,104	4,106	-
Maternity Patients Discharged		#		-	-	6,072	6,074	6,077	6,079	6,082	6,085	6,087	6,090	6,093	6,096	6,099	6,102	6,105	6,108	6,111	-
Pediatrics Patients Discharged		#		-	-	2,203	2,204	2,205	2,206	2,207	2,208	2,209	2,210	2,211	2,212	2,213	2,214	2,215	2,217	2,218	-
Outpatients Discharged		#		-	-	5,298	5,302	5,305	5,309	5,313	5,316	5,320	5,324	5,328	5,332	5,336	5,341	5,345	5,350	5,354	-
Total Patients Discharged		**#**		**-**	**-**	**20,887**	**20,897**	**20,907**	**20,917**	**20,927**	**20,938**	**20,949**	**20,960**	**20,971**	**20,983**	**20,994**	**21,007**	**21,019**	**21,032**	**21,044**	**-**
Quality Adjusted Life Years																					
Average Healthy Life Expectancy	70	Years																			
General Illness	50	Age/Admission																			
Infect. & TB	40	Age/Admission																			
Surgery	46	Age/Admission																			
Maternity	35	Age/Admission																			
Pediatrics	9	Age/Admission																			
Outpatients	35	Age/Admission																			
Years of Life Saved Per Patient by Treatment																					
Operation Period		Flag	15	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
General Illness		Years of Life		-	-	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	-
Infect. & TB		Years of Life		-	-	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	-
Surgery		Years of Life		-	-	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	-
Maternity		Years of Life		-	-	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	-
Pediatrics		Years of Life		-	-	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	-
Outpatients		Years of Life		-	-	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	-
Utility																					
Time (Year)	**1.00**	**#**																			
Percentage Change in Utility Preference	-	%																			
Utility (Preference)	**0.78**	%		0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Utility		**#**		0	0	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0
QALYs Saved Per Patient by Treatment																					
General Illness		QALY's per Patient		-	-	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	-
Infect. & TB		QALY's per Patient		-	-	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	-
Surgery		QALY's per Patient		-	-	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	-
Maternity		QALY's per Patient		-	-	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	-
Pediatrics		QALY's per Patient		-	-	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	-
Outpatients		QALY's per Patient		-	-	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	-
Quality Adjusted Life Years (QALYs)																					
General Illness		QALY's		-	-	24,684	24,694	24,704	24,714	24,725	24,736	24,747	24,758	24,770	24,782	24,794	24,806	24,819	24,831	24,844	-
Infect. & TB		QALY's		-	-	38,653	38,669	38,685	38,701	38,718	38,735	38,752	38,770	38,788	38,807	38,826	38,845	38,864	38,884	38,905	-
Surgery		QALY's		-	-	76,362	76,393	76,425	76,457	76,490	76,524	76,558	76,593	76,629	76,666	76,703	76,741	76,780	76,819	76,859	-
Maternity		QALY's		-	-	165,760	165,828	165,897	165,967	166,039	166,112	166,187	166,263	166,340	166,420	166,500	166,583	166,667	166,752	166,840	-
Pediatrics		QALY's		-	-	104,837	104,879	104,923	104,967	105,013	105,059	105,106	105,154	105,204	105,254	105,305	105,357	105,410	105,464	105,519	-
Outpatients		QALY's		-	-	144,647	144,740	144,835	144,932	145,031	145,134	145,238	145,346	145,456	145,568	145,684	145,802	145,924	146,048	146,176	-
Total QALY's		QALY's		**-**	**-**	**554,943**	**555,203**	**555,468**	**555,739**	**556,017**	**556,300**	**556,589**	**556,885**	**557,187**	**557,496**	**557,811**	**558,134**	**558,463**	**558,800**	**559,144**	**-**
Return on Equity	**13.00%**	**%**																			
PV oF Economic Benefits QALY's	**3,181,453**	**#**																			

Throughout years 2 to 10, the hospital project is expected to serve the community by saving the life of patients admitted to the hospital. In the first year of operation about 20,887 patients are anticipated to be discharged in the hospital which is equivalent to 554,943 QALY, a PV of about 3,181,453 QALYs indicates that the project will serve large number of patients admitted to the proposed hospital during its anticipated life span.

Secondly, project expenses ought to be estimated based on their economic values which may differ from their financial values. For that reason, in order to calculate the economic values for economic cost of the hospital project, conversion factors are calculated for each of the outflow items on the financial cash flow statement. See Table 26 for the list of all conversion factors used to convert the financial cost of the project into its economic cost.

Table 26: List of All Conversion Factors

Summary of Conversion Factors

	Conversion Factors
Land	1.00
Site Development	0.97
Depreciable Portion of Site Development	0.97
Building Construction	1.05
Equipment	1.04
Technical Fees	0.99
Electricity	1.00
Drinking Water	1.00
Water for Toilets	0.45
Fuel	1.04
Chemicals and Medical supplies	1.04
Maintenance	0.97
Miscellaneous	1.00
Labor	0.85
Change in Accounts Payable	0.92
Change in Cash Balances	0.92

After calculating commodity specific conversation factors for each of the cash outflow items this ratio has been multiplied with each corresponding item in the cash outflow

statement from the bankers perspective in real terms hence, the economic cost of each item of project cost is obtained as presented in the table below.

Table 27: Economic Value of Project Cost

YEARS	Constant	Unit	Total	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
PROJECTED ECONOMIC RESOURCE OUTFLOW, ECONOMY'S POINT OF VIEW REAL																					
	CF																				
Economic Costs																					
Investment Costs																					
Land	1.00	M' IQD		13,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Site Development	0.97	M' IQD		7,168	3,309	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Building Construction	1.05	M' IQD		7,721	60,933	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Equipment	1.04	M' IQD		15,632	36,767	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Technical Fees	0.99	M' IQD		1,750	7,008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maintenance and Operations																					
Electricity	1.00	M' IQD		-	-	175	197	218	218	218	218	218	218	218	218	218	218	218	218	218	-
Drinking Water	1.00	M' IQD		-	-	10	11	13	13	13	13	13	13	13	13	13	13	13	13	13	-
Water for Flushing Toilet	0.45	M' IQD		-	-	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6	-
Fuel	1.04	M' IQD		-	-	20	22	25	25	25	25	25	25	25	25	25	25	25	25	25	-
Chemicals & Medical Supplies	1.04	M' IQD		-	-	12,011	13,648	15,316	15,469	15,623	15,780	15,938	16,097	16,258	16,420	16,585	16,750	16,918	17,087	17,258	-
Equipment Maintenance	0.97	M' IQD		-	-	-	22	25	28	28	29	29	29	29	30	30	30	31	31	31	-
Building Maintenance	0.97	M' IQD		-	-	-	8	9	10	10	10	10	10	10	10	10	11	11	11	11	-
Sewage Maintenance	0.97	M' IQD		-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
electrical Installations Maintenance	0.97	M' IQD		-	-	-	9	10	11	12	12	12	12	12	12	12	12	13	13	13	-
Vehicle Maintenance	0.97	M' IQD		-	-	-	10	11	12	12	13	13	13	13	13	13	13	13	14	14	-
Miscellaneous	1.00	M' IQD		-	-	37	42	47	47	47	47	47	47	47	47	47	47	47	47	47	-
Total Hospital Cleaning Cost	1.00	M' IQD		-	-	638	645	651	658	664	671	678	684	691	698	705	712	719	727	734	-
Total Food and Beverage	1.00	M' IQD		-	-	1,862	1,880	1,899	1,918	1,937	1,957	1,976	1,996	2,016	2,036	2,056	2,077	2,098	2,119	2,140	-
Labor	0.85	M' IQD		-	-	21,817	22,035	22,256	22,478	22,703	22,930	23,159	23,391	23,625	23,861	24,100	24,341	24,584	24,830	25,078	-
Change in Accounts Payable	0.92	M' IQD		-	-	(4,041)	(275)	(357)	(215)	(217)	(219)	(221)	(223)	(225)	(228)	(230)	(232)	(234)	(237)	(239)	4,798
Change in Cash Balance	0.92	M' IQD		-	-	4,041	275	357	215	217	219	221	223	225	228	230	232	234	237	239	(4,798)
Net Resource outflow		**M' IQD**		**45,771**	**108,017**	**36,575**	**38,534**	**40,486**	**40,894**	**41,299**	**41,709**	**42,123**	**42,542**	**42,964**	**43,390**	**43,821**	**44,256**	**44,696**	**45,140**	**45,588**	**-**
Total QALY's		**#**		**-**	**-**	**554,943**	**555,203**	**555,468**	**555,739**	**556,017**	**556,300**	**556,589**	**556,885**	**557,187**	**557,496**	**557,811**	**558,134**	**558,463**	**558,800**	**559,144**	**-**
Total Patient days		**Days/Year**		**-**	**-**	**159,263**	**159,340**	**159,419**	**159,501**	**159,583**	**159,668**	**159,755**	**159,843**	**159,934**	**160,027**	**160,121**	**160,218**	**160,317**	**160,418**	**160,521**	**-**

Return on Equity	**13.00%**	**%**
PV of Economic costs	**376,167**	**M' IQD**
PV of Economic Benefits QALY's	**3,181,453**	**#**
PV of Patient Days	**913,138**	**Days**
PV of Cost Effectivness per QALY'S	**118,238**	**IQD**
PV of Economic cost per Patient Days	**411,950**	**IQD**

After calculating the economic benefit and cost of the project (total quality adjusted life years and project economic cost) then the PV of economic cost, benefits and patient days are calculated. The PV of economic cost is obtained to be about 376,167 M'IQD, PV of QALYs estimated to be around 3.181 M'QALYs as presented earlier and PV of patient days is calculated to be about 913,138 days. Consequently, the cost effectiveness per QALYs is estimated to be about 118,238 IQD, meanwhile the economic cost of per patient days is approximately 411,950 IQD.

To sum up, we discovered that the project is viable from the banker's perspective as it can generate a positive cash flow during its operating period to serve its debt service obligations. Meanwhile, the ratios of ADSCR and LLCR demonstrated that the project is bankable from the banker's point of view. At the same time, the FINP and FIRR supported that the project is a viable undertaking. These numbers indicate that the project is financially worth undertaking.. At the same time, the economic cost of per patient days is lower than the financial cost of per patient days. This is a positive signal for the project to be accepted.

Despite all the above being carried out, we still need to undertake an comprehensive risk analysis in order to obtain an outcome which would be based on probabilities not deterministic outcomes, since the input variables and the projected outcome in our productive model 100% based on our best estimates in that we assumed the single value in that model will actually arise in the future which is not realistic. For that reason, we need to do a risk analysis which leads to probability distribution and correlations between input variables and can provide the most accurate outcome for our investment. For that reason, firstly, the sensitivity analysis will be applied and then a Monte Carlo Risk Simulation analysis will be carried out.

Chapter 7

RISK ANALYSIS

7.1 Introduction

In this chapter, sensitivity and the Monte Carlo Risk Simulation analyses have been carried out in order to determine the consequences of the project's outcome with respect to changes in the project's key variables on each the DSCR, LLCR, financial, and, economic cost effectiveness of per patient days, CE ratios per QALY's, FNPV, and, FIRR of the proposed investment.

7.2 Results of the Sensitivity Analysis

Table 30 shows the sensitivity results to the investment cost overrun. Based on the table below, as investment cost increases ADSCR will fall below the required rate by the bank. Meanwhile, the LLCR is still above 1.5. There is a rise of 12.5% in investment cost while the CE ratios increase, but it does not have any significant effect on the FNPV and FIRR results as NPV is still positive and FIRR above discount rate.

Table 28: Sensitivity Analysis to Investment Cost Overrun

Investment Cost Overun				-	%						
	ADSCR			LLCR			PATINET DAYS		QALY's	OWNER VIEWS	
	Year 2	Year 3	Year 4	Year 2	Year 3	Year 4	FCE	ECE	ECE	FNPV	FIRR
	1.51	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
-12.50%	1.72	1.75	1.81	2.04	2.11	2.21	398,583	392,599	112,683	53,459	26.62%
-10.00%	1.67	1.70	1.76	1.98	2.05	2.14	402,055	396,469	113,794	50,288	25.43%
-7.50%	1.63	1.65	1.71	1.93	2.00	2.09	405,528	400,340	114,905	47,117	24.32%
-5.00%	1.58	1.61	1.67	1.87	1.94	2.03	409,000	404,210	116,016	43,946	23.26%
-2.50%	1.54	1.57	1.63	1.83	1.89	1.98	412,473	408,080	117,127	40,775	22.26%
-	**1.51**	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
2.50%	1.47	1.49	1.55	1.74	1.80	1.88	419,418	415,820	119,348	34,434	20.42%
5.00%	1.43	1.46	1.51	1.70	1.76	1.84	422,890	419,691	120,459	31,263	19.57%
7.50%	1.40	1.42	1.48	1.66	1.72	1.80	426,363	423,561	121,570	28,092	18.76%
10.00%	1.37	1.39	1.44	1.62	1.68	1.75	429,835	427,431	122,681	24,921	17.99%
12.50%	1.34	1.36	1.41	1.58	1.64	1.72	433,308	431,301	123,792	21,750	17.25%

The domestic inflation rate is one of the main indicators which usually has an impact on all of the project's non-tradable items and also has a notable effect on real exchange rates. Thus it has been tested for any deviation from the base case expectation. As we can see when this index increases by 9.5%, ADSCRs will decrease while LLCR will improve so, we can conclude that there is no serious problem associated with debt. This variable does not have any impact on ECE ratios. The FCE decreases when FNPV rises and FIRR is still higher than the discount rate.

Table 29: Sensitivity Analysis of Domestic Inflation

Domestic Inflation -	2.00%	%									
	ADSCR			LLCR			PATINET DAYS		QALY's	OWNER VIEWS	
	Year 2	Year 3	Year 4	Year 2	Year 3	Year 4	FCE	ECE	ECE	FNPV	FIRR
	1.51	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
-2.50%	1.82	1.74	1.62	1.69	1.67	1.65	416,523	411,950	118,238	37,077	22.00%
-1.00%	1.70	1.66	1.60	1.72	1.72	1.73	416,301	411,950	118,238	37,280	21.73%
0.50%	1.59	1.59	1.59	1.74	1.78	1.83	416,108	411,950	118,238	37,456	21.51%
2.00%	**1.51**	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
3.50%	1.43	1.48	1.59	1.82	1.92	2.04	415,811	411,950	118,238	37,727	21.15%
5.00%	1.36	1.44	1.59	1.87	2.01	2.16	415,705	411,950	118,238	37,824	21.00%
6.50%	1.30	1.40	1.60	1.92	2.09	2.30	415,625	411,950	118,238	37,897	20.86%
8.00%	1.25	1.37	1.60	1.98	2.19	2.44	415,569	411,950	118,238	37,948	20.74%
9.50%	1.21	1.34	1.62	2.04	2.29	2.59	415,534	411,950	118,238	37,980	20.63%

Table 32 and 33 shows the sensitivity results to the percentage changes in all fees charged in the hospital and the percentage change of fees charged on discounted inpatients. According to the tables below, even 4% and 5% decreases in fees charged respectively, the selling price will not affect CE ratios and at the same time it will almost keep the NPV positive. Regarding the possible impact on ADSCRs, the ratio falls below the required rate by the bank but LLCR still meets the required ratio by the bank. Hence, we can conclude that there is no serious problem since the ratio LLCR still covers the requested ratio of 1.5 by the bank.

Table 30: Sensitivity Analysis to Percentage Change in All Fees

Percentage Change in All Fees	-	%									
	ADSCR			LLCR			PATINET DAYS		QALY's	OWNER VIEWS	
	Year 2	Year 3	Year 4	Year 2	Year 3	Year 4	FCE	ECE	ECE	FNPV	FIRR
	1.51	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
-4.00%	1.37	1.38	1.42	1.60	1.65	1.72	415,945	411,950	118,238	21,230	17.66%
-3.00%	1.40	1.42	1.46	1.64	1.70	1.78	415,945	411,950	118,238	25,323	18.57%
-2.00%	1.44	1.46	1.50	1.69	1.75	1.83	415,945	411,950	118,238	29,417	19.48%
-1.00%	1.47	1.49	1.55	1.74	1.80	1.88	415,945	411,950	118,238	33,511	20.40%
-	**1.51**	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
1.00%	1.54	1.57	1.63	1.83	1.90	1.98	415,945	411,950	118,238	41,698	22.24%
2.00%	1.57	1.60	1.67	1.87	1.94	2.03	415,945	411,950	118,238	45,792	23.16%
3.00%	1.61	1.64	1.71	1.92	1.99	2.08	415,945	411,950	118,238	49,886	24.09%
4.00%	1.64	1.68	1.75	1.96	2.04	2.14	415,945	411,950	118,238	53,979	25.01%

Table 31: Sensitivity Analysis to Change in Discounted In-patients Fees

Percentage Change in Fee of Discounted In-patients							-	%			
	ADSCR			LLCR			PATINET DAYS		QALY's	OWNER VIEWS	
	Year 2	Year 3	Year 4	Year 2	Year 3	Year 4	FCE	ECE	ECE	FNPV	FIRR
	1.51	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
-5.00%	1.46	1.48	1.53	1.71	1.78	1.85	415,945	411,950	118,238	31,621	19.97%
-4.00%	1.47	1.49	1.54	1.73	1.79	1.87	415,945	411,950	118,238	32,817	20.24%
-3.00%	1.48	1.50	1.55	1.74	1.81	1.88	415,945	411,950	118,238	34,014	20.51%
-2.00%	1.49	1.51	1.56	1.75	1.82	1.90	415,945	411,950	118,238	35,211	20.78%
-1.00%	1.50	1.52	1.57	1.77	1.83	1.91	415,945	411,950	118,238	36,408	21.05%
-	**1.51**	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
1.00%	1.52	1.54	1.60	1.79	1.86	1.94	415,945	411,950	118,238	38,801	21.58%
2.00%	1.53	1.55	1.61	1.81	1.88	1.96	415,945	411,950	118,238	39,998	21.85%
3.00%	1.54	1.56	1.62	1.82	1.89	1.97	415,945	411,950	118,238	41,195	22.12%
4.00%	1.55	1.57	1.63	1.83	1.90	1.99	415,945	411,950	118,238	42,392	22.39%

The projected increase of inpatient days and outpatient visits in the hospital is assumed to be approximately 2% and 2.5% respectively. After this expectation has been tested by sensitivity analysis (see table 34 and 35) we discovered the increase in this ratio will be celling up all the debt ratios while the CE ratios are decreasing. At the same time the decline in inpatient days by 4% and outpatient visits by 3.5% will increase the CE ratios while the NPV remains positive and LLCR meets the required rate of LLCR by the bank.

Table 32: Sensitivity Analysis of % increase in In-patient days

Percentage Increase in Inpatient Days						2.00%	%				
	ADSCR			LLCR			PATINET DAYS		QALY's	OWNER VIEWS	
	Year 2	Year 3	Year 4	Year 2	Year 3	Year 4	FCE	ECE	ECE	FNPV	FIRR
	1.51	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
-4.00%	1.39	1.40	1.45	1.63	1.69	1.76	430,774	426,636	123,003	24,362	18.32%
-2.50%	1.41	1.43	1.48	1.66	1.72	1.79	428,066	423,954	122,129	26,712	18.87%
-1.00%	1.44	1.46	1.51	1.69	1.75	1.83	424,758	420,678	121,064	29,623	19.54%
0.50%	1.47	1.49	1.55	1.73	1.80	1.87	420,753	416,712	119,778	33,209	20.35%
2.00%	**1.51**	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
3.50%	1.54	1.57	1.63	1.84	1.91	2.00	410,220	406,280	116,409	42,973	22.45%
5.00%	1.58	1.61	1.68	1.90	1.98	2.08	403,458	399,583	114,258	49,511	23.78%
6.50%	1.61	1.66	1.74	1.98	2.06	2.17	395,538	391,739	111,749	57,453	25.30%
8.00%	1.65	1.71	1.80	2.06	2.16	2.28	386,345	382,634	108,852	67,079	27.03%

Table 33: Sensitivity Analysis of % Increase in Out-patient Visits

Percentage Increase in Out-patients/Visit						2.50%	%				
	ADSCR			LLCR			PATINET DAYS		QALY's	OWNER VIEWS	
	Year 2	Year 3	Year 4	Year 2	Year 3	Year 4	FCE	ECE	ECE	FNPV	FIRR
	1.51	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
-3.50%	1.43	1.45	1.50	1.68	1.74	1.82	424,066	419,993	119,984	28,861	19.35%
-2.00%	1.45	1.47	1.52	1.70	1.76	1.84	422,597	418,538	119,669	30,418	19.72%
-0.50%	1.47	1.49	1.54	1.72	1.79	1.86	420,795	416,754	119,283	32,342	20.16%
1.00%	1.49	1.51	1.56	1.75	1.81	1.89	418,601	414,580	118,810	34,708	20.69%
2.50%	**1.51**	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
4.00%	1.53	1.55	1.61	1.82	1.89	1.97	412,750	408,786	117,546	41,139	22.06%
5.50%	1.55	1.58	1.65	1.86	1.93	2.02	408,929	405,001	116,715	45,439	22.93%
7.00%	1.57	1.61	1.68	1.91	1.99	2.09	404,384	400,500	115,723	50,658	23.93%
8.50%	1.60	1.64	1.72	1.96	2.05	2.16	399,013	395,181	114,543	56,979	25.08%

The expected annual real increase in salary was assumed to be about 1% while this expectation is based on a deterministic assumption hence the sensitivity analysis being carried out (see table 36). After testing this expectation, we discovered that if the annual real increase in salaries reaches 5%, it may possibly impact on ADSCRs and LLCR which lowers the ratio below the required 1.5 by the bank. At the same time, all the ratios of the cost per patient days and QALYs will rise, the NPV will turn to negative and FIRR would be lower than the discount rate. Hence the real increase in salaries is a risky variable which could affect the projected outcome.

Table 34: Sensitivity Analysis to Real Increase in Salaries

Real Increase in Salary				1.00%	%						
	ADSCR			LLCR			PATINET DAYS		QALY's	OWNER VIEWS	
	Year 2	Year 3	Year 4	Year 2	Year 3	Year 4	FCE	ECE	ECE	FNPV	FIRR
	1.51	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
-3.00%	1.60	1.68	1.81	2.12	2.24	2.39	376,012	378,007	108,495	74,069	27.73%
-2.00%	1.58	1.65	1.75	2.04	2.15	2.28	384,824	385,497	110,645	66,023	26.37%
-1.00%	1.55	1.61	1.70	1.96	2.06	2.17	394,369	393,610	112,974	57,307	24.87%
-	1.53	1.57	1.64	1.87	1.96	2.06	404,717	402,406	115,498	47,857	23.20%
1.00%	**1.51**	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
2.00%	1.48	1.49	1.53	1.68	1.73	1.80	428,138	422,314	121,212	26,471	19.13%
3.00%	1.46	1.45	1.46	1.58	1.61	1.65	441,389	433,577	124,445	14,371	16.54%
4.00%	1.43	1.41	1.40	1.47	1.48	1.50	455,799	445,826	127,961	1,212	13.32%
5.00%	1.41	1.37	1.34	1.36	1.34	1.34	471,482	459,157	131,787	(13,108)	9.06%

The escalation factor of recurrent cost contains the recurrent costs of Utilities, Chemicals & Medical Supplies expenses, Operating maintenance cost, Miscellaneous, Hospital cleaning, Food and Beverages, Labor cost and Working Capital. Since these costs are based on the base year projection, any delay in project operation or change in variables will affect the eventual project outcome so for that reason sensitivity testing is carried out. As shown in table 37, even if the recurrent cost increases by 6% the DSCR declines, however, LLCR can still meet the bank's required debt ratio. All the cost effectiveness ratios will rise but FNPV remains positive and FIRR is above the discount rate.

Table 35: Sensitivity Analysis of Escalation Factor of Recurrent Cost

Escalation Factor of Recurrent Cost				-	%						
	ADSCR			LLCR			PATINET DAYS		QALY's	OWNER VIEWS	
	Year 2	Year 3	Year 4	Year 2	Year 3	Year 4	FCE	ECE	ECE	FNPV	FIRR
	1.51	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
-6.00%	1.62	1.66	1.73	1.95	2.03	2.12	399,323	396,522	113,809	52,783	24.68%
-4.50%	1.59	1.63	1.70	1.91	1.98	2.07	403,478	400,379	114,916	48,989	23.84%
-3.00%	1.56	1.59	1.66	1.86	1.94	2.03	407,634	404,236	116,023	45,194	23.00%
-1.50%	1.53	1.56	1.62	1.82	1.89	1.98	411,790	408,093	117,130	41,399	22.16%
-	**1.51**	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
1.50%	1.48	1.50	1.55	1.74	1.80	1.88	420,101	415,807	119,345	33,810	20.47%
3.00%	1.45	1.47	1.51	1.70	1.76	1.83	424,257	419,665	120,452	30,015	19.63%
4.50%	1.42	1.43	1.47	1.66	1.71	1.78	428,412	423,522	121,559	26,220	18.79%
6.00%	1.39	1.40	1.44	1.61	1.67	1.74	432,568	427,379	122,666	22,426	17.95%

Chemicals and Medical supplies is one of the critical variables which could have a notable impact on the projected outcome as the large amount of project outflow spends on that variable. The expected annual real increase for Chemicals and Medical supplies is expected to be 1%. This deterministic variable has been tested as shown in table 35. If the real increase is raised by 7% the ADSCR and LLCR will fall below the required rate by the bank and all cost effectiveness ratios will increase meanwhile FNPV will turn to negative and FIRR will be lower than the discount rate.

Table 36: Sensitivity Analysis of Real Increase in Chemicals and Medical Supplies

Real Increase in Chemicals & Medical Supplies						1.00%	%				
	ADSCR			LLCR			PATINET DAYS		QALY's	OWNER VIEWS	
	Year 2	Year 3	Year 4	Year 2	Year 3	Year 4	FCE	ECE	ECE	FNPV	FIRR
	1.51	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
-5.00%	1.57	1.64	1.77	2.04	2.16	2.29	385,282	379,914	109,042	65,604	26.35%
-3.50%	1.55	1.62	1.72	1.99	2.09	2.21	391,620	386,535	110,943	59,817	25.33%
-2.00%	1.54	1.59	1.68	1.92	2.02	2.13	398,761	393,996	113,084	53,296	24.17%
-0.50%	1.52	1.56	1.63	1.86	1.94	2.03	406,824	402,421	115,502	45,933	22.85%
1.00%	**1.51**	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
2.50%	1.49	1.50	1.54	1.70	1.75	1.82	426,280	422,748	121,337	28,168	19.49%
4.00%	1.47	1.47	1.48	1.61	1.64	1.69	438,008	435,002	124,854	17,458	17.26%
5.50%	1.46	1.44	1.43	1.51	1.53	1.55	451,338	448,929	128,851	5,286	14.40%
7.00%	1.44	1.40	1.37	1.41	1.40	1.40	466,509	464,779	133,401	-8,567	10.44%

The expected number of people who use the Food and Beverage service in the hospital is assumed to be approximately 500 people per day. The sensitivity analysis is applied to see what the impact will be on the project outcome if this number is raised (see table 39). As we can see, when the number of people reaches 700 the ADSCR will decrease but LLCR will still meet the requirement by the bank. The financial cost of per patient day ratio will increase but the FNPV will remain positive and FIRR is above the discount rate.

Table 37: Sensitivity Analysis of Food and Beverage Number of People per Day

Food and Berevarge Average Number				500.00	#						
	ADSCR			LLCR			PATINET DAYS		QALY's	OWNER VIEWS	
	Year 2	Year 3	Year 4	Year 2	Year 3	Year 4	FCE	ECE	ECE	FNPV	FIRR
	1.51	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
300	1.54	1.57	1.63	1.83	1.90	1.99	411,048	407,053	116,832	42,077	22.31%
350	1.53	1.56	1.62	1.82	1.89	1.97	412,272	408,277	117,183	40,959	22.06%
400	1.52	1.55	1.61	1.81	1.87	1.96	413,496	409,501	117,535	39,841	21.81%
450	1.51	1.54	1.60	1.79	1.86	1.94	414,721	410,726	117,886	38,723	21.56%
500	**1.51**	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
550	1.50	1.52	1.57	1.77	1.83	1.92	417,170	413,175	118,589	36,486	21.07%
600	1.49	1.51	1.56	1.76	1.82	1.90	418,394	414,399	118,940	35,368	20.82%
650	1.48	1.50	1.55	1.74	1.81	1.89	419,619	415,624	119,292	34,250	20.57%
700	1.47	1.49	1.54	1.73	1.79	1.87	420,843	416,848	119,643	33,132	20.32%

The utility preference is tested to figure out the impact of QALYs on the project outcome as shown in table 40. The utility preference will only have impact on economic cost effectiveness per QALYs. It does not have any impact on financial outcomes or on economic cost of per patient days. As it is clear, a 12.5% decrease in utility preference will increase the cost per QALYs.

Table 38: Sensitivity Analysis of Percentage Change in Utility Preference

Percentage Change in Utility Preference						-	%				
	ADSCR			LLCR			PATINET DAYS		QALY's	OWNER VIEWS	
	Year 2	Year 3	Year 4	Year 2	Year 3	Year 4	FCE	ECE	ECE	FNPV	FIRR
	1.51	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
-12.50%	1.51	1.53	1.59	1.78	1.85	1.93	415,945	411,950	135,129	37,604	21.32%
-10.00%	1.51	1.53	1.59	1.78	1.85	1.93	415,945	411,950	131,375	37,604	21.32%
-7.50%	1.51	1.53	1.59	1.78	1.85	1.93	415,945	411,950	127,824	37,604	21.32%
-5.00%	1.51	1.53	1.59	1.78	1.85	1.93	415,945	411,950	124,461	37,604	21.32%
-2.50%	1.51	1.53	1.59	1.78	1.85	1.93	415,945	411,950	121,269	37,604	21.32%
-	**1.51**	**1.53**	**1.59**	**1.78**	**1.85**	**1.93**	**415,945**	**411,950**	**118,238**	**37,604**	**21.32%**
2.50%	1.51	1.53	1.59	1.78	1.85	1.93	415,945	411,950	115,354	37,604	21.32%
5.00%	1.51	1.53	1.59	1.78	1.85	1.93	415,945	411,950	112,607	37,604	21.32%
7.50%	1.51	1.53	1.59	1.78	1.85	1.93	415,945	411,950	109,988	37,604	21.32%
10.00%	1.51	1.53	1.59	1.78	1.85	1.93	415,945	411,950	107,489	37,604	21.32%
12.50%	1.51	1.53	1.59	1.78	1.85	1.93	415,945	411,950	105,100	37,604	21.32%

7.3 Results of Risk Analysis

A risk analysis is carried out by applying the Monte Carlo simulation method. The critical variables of the project (Domestic Inflation, Investment Cost Overrun, real increase in Salaries, real increase in Chemicals and Medical supplies and Utility

Preference) have been tested to see how the project responds to potential variations in these values. The results are shown below.

7.3.1 Forecast Results from the Banker's Perspective for ADSCR and LLCR

Table 39: Statistic Results for ADSCR in Years 2, 3 and 4

Statistics: ADSCR Year 2	Forecast values
Trials	10,000
Base Case	1.5
Mean	1.7
Median	1.6
Mode	—
Standard Deviation	0.4
Variance	0.1
Skewness	2.02
Kurtosis	7.17
Coeff. of Variation	0.2089
Minimum	1.2
Maximum	3.6
Range Width	2.4
Mean Std. Error	0.0

Statistics: ADSCR Year 3	Forecast values
Trials	10,000
Base Case	1.5
Mean	1.7
Median	1.7
Mode	—
Standard Deviation	0.3
Variance	0.1
Skewness	1.75
Kurtosis	6.40
Coeff. of Variation	0.1490
Minimum	1.3
Maximum	3.1
Range Width	1.9
Mean Std. Error	0.0

Statistics: ADSCR Year 4	Forecast values
Trials	10,000
Base Case	1.6
Mean	1.8
Median	1.8
Mode	—
Standard Deviation	0.1
Variance	0.0
Skewness	0.7313
Kurtosis	4.00
Coeff. of Variation	0.0816
Minimum	1.4
Maximum	2.5
Range Width	1.2
Mean Std. Error	0.0

The above tables of ADSCR demonstrate the capacity of the project of serving its liability. Since the ratio of mean values is higher than the base case values, meanwhile, the low standard deviations in those years from the mean values imply that there is a low risk associated with the loan burden. Therefore, it can be concluded that the hospital project is viable.

Table 40: Statistic Results for LLCR in Years 2, 3 and 4

Statistics: ALLCR Year 2	Forecast values
Trials	10,000
Base Case	1.8
Mean	2.0
Median	2.0
Mode	—
Standard Deviation	0.2
Variance	0.0
Skewness	0.5771
Kurtosis	3.60
Coeff. of Variation	0.0937
Minimum	1.5
Maximum	2.9
Range Width	1.4
Mean Std. Error	0.0

Statistics: LLCR Year 3	Forecast values
Trials	10,000
Base Case	1.8
Mean	2.1
Median	2.1
Mode	—
Standard Deviation	0.2
Variance	0.1
Skewness	0.5029
Kurtosis	3.43
Coeff. of Variation	0.1186
Minimum	1.4
Maximum	3.2
Range Width	1.8
Mean Std. Error	0.0

Statistics: LLCR Year 4	Forecast values
Trials	10,000
Base Case	1.9
Mean	2.2
Median	2.2
Mode	—
Standard Deviation	0.3
Variance	0.1
Skewness	0.3525
Kurtosis	3.28
Coeff. of Variation	0.1496
Minimum	1.3
Maximum	3.6
Range Width	2.3
Mean Std. Error	0.0

The LLCR results confirm the DSCR outcomes in the hospital project's capability in servicing its liabilities as the mean values are higher than the base case and the standard deviation from the mean values are low. In view of the fact that the proposed hospital

project can cover its debt obligation in these years, cash flows will be in excess in the following years.

7.3.2 Forecast Result from the Owner's Perspective

Table 41: Statistic Results for FNPV, FIRR, and Financial Cost of Per Patient Days

Statistics: Financial NPV	Forecast values
Trials	10,000
Base Case	37,604.48
Mean	67,607.99
Median	66,526.40
Mode	—
Standard Deviation	17,754.91
Variance	315,236,656.23
Skewness	0.3527
Kurtosis	3.20
Coeff. of Variation	0.2626
Minimum	10,721.10
Maximum	131,138.86
Range Width	120,417.77
Mean Std. Error	177.55

Statistics: Financial IRR	Forecast values
Trials	10,000
Base Case	21.32%
Mean	26.74%
Median	26.52%
Mode	—
Standard Deviation	3.53%
Variance	0.12%
Skewness	0.4828
Kurtosis	3.68
Coeff. of Variation	0.1320
Minimum	15.23%
Maximum	44.53%
Range Width	29.30%
Mean Std. Error	0.04%

Statistics: Financial Cost Per Patient days	Forecast values
Trials	10,000
Base Case	415,945
Mean	383,088
Median	384,272
Mode	—
Standard Deviation	19,444
Variance	378,063,103
Skewness	-0.3527
Kurtosis	3.20
Coeff. of Variation	0.0508
Minimum	313,513
Maximum	445,386
Range Width	131,873
Mean Std. Error	194

The NPV mean value obtained is greater than the value of the base case. This indicates that the probability of the outcome improving the hospital project is significantly greater than the likelihood of it worsening the outcome. Moreover, the minimum value is positive which indicates that the project from the financial perspective is not risky at all. Meanwhile, the table of FIRR shows that the mean value of FIRR is performing higher than the base case and the discount rate of this hospital project. The standard deviation of this variable is 3.53% from the mean at 26.74% which is particularly low and bears no risk whatsoever. This hospital project's minimum value is 15.23%. This percentage is greater than the discount rate. The mean value of financial cost per patient days obtained is lower than the base case projection. It implies that the financial cost would be lower than the deterministic value.

7.3.3 Forecast Result for Economic Analysis

Table 42: Statistic Results for Economic Analysis

Statistics: PV of Economic Benefits QALY's	Forecast values
Trials	10,000
Base Case	3,181,453
Mean	3,222,277
Median	3,226,545
Mode	—
Standard Deviation	84,854
Variance	7,200,244,703
Skewness	-0.8384
Kurtosis	4.37
Coeff. of Variation	0.0263
Minimum	2,958,808
Maximum	3,404,105
Range Width	445,297
Mean Std. Error	849

Statistics: Cost Effectivness Per QALY's	Forecast values
Trials	10,000
Base Case	118,238
Mean	108,432
Median	108,425
Mode	—
Standard Deviation	5,793
Variance	33,564,446
Skewness	0.0013
Kurtosis	3.32
Coeff. of Variation	0.0534
Minimum	86,738
Maximum	133,431
Range Width	46,693
Mean Std. Error	58

Statistics: PV of Economic Cost	Forecast values
Trials	10,000
Base Case	376,167
Mean	349,153
Median	349,948
Mode	—
Standard Deviation	16,134
Variance	260,298,127
Skewness	-0.2963
Kurtosis	3.19
Coeff. of Variation	0.0462
Minimum	290,441
Maximum	403,698
Range Width	113,257
Mean Std. Error	161

Statistics: Economic Cost Per Patient Days	Forecast values
Trials	10,000
Base Case	411,950
Mean	382,366
Median	383,237
Mode	—
Standard Deviation	17,668
Variance	312,175,364
Skewness	-0.2963
Kurtosis	3.19
Coeff. of Variation	0.0462
Minimum	318,069
Maximum	442,100
Range Width	124,030
Mean Std. Error	177

The Monte Carlo simulation demonstrates that economically the project is not risky at all, as the mean value of PV of QALYs is higher than the base case scenario and the minimum value is positive. At the same time, the mean values of cost effectiveness per QALYs is lower than the base case projection. These outcomes indicate that the economic benefit to the project will be higher than the deterministic outcome while the cost will be lower.

Meanwhile, the mean value of PV of economic cost and the economic cost of per patient days are lower than the base case outcome. Overall, from the Monte Carlo

simulated forecasted results, the project probabilistic ratios are not risky. It can be concluded that the project has approximately zero level of riskiness.

Chapter 8

CONCLUSION

Kurdistan region has inadequate health care services in terms of the number of hospitals and hospital beds compared with world healthcare standards with respect to population growth. Meanwhile, the inadequacy of government funding and low quality of private healthcare provision has created a huge shortcoming in healthcare delivery in the region. Hence, the government should pay attention to the delivery of healthcare for both high and low income earning patients in order to serve the community and create a healthier country.

The results for this per feasibility study show that the 400 bed hospital project is worth undertaking as its financial and economic analyses indicate that the project is viable as it can serve its debt obligation and financially has a positive NPV. On the other hand, the economic cost of per patient days obtained is lower than the financial cost of per patient days. Lastly, the risk analysis supported that outcomes are efficient.

One of the difficulties encountered by this research was the unavailability of online data sets regarding the health system in Iraq. All the data which was used in this study was obtained by official requirements from Ministry of Health and KRG's statistics office. This made it difficult to obtain the necessary data on time and it was challenging to take any data from previous researchers. Therefore, this study relied essentially on the data set provided by the Kurdistan Ministry of Health and Statistics Office. More

research is required in the sampled country so that future project evaluations can be more reliable and appropriate to the Kurdistan Region of Iraq.

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APPENDIX

Table 43: Annual Number of Patients Days

YEARS	Constant	Unit	Total	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
TABLE 7: ANNUAL NUMBER OF PATIENTS DAYS																					
Days of Full-Paying in-Patients																					
General Illness	20,440.00	Days\Year																			
Infect. & TB	25,550.00	Days\Year																			
Surgery	26,061.00	Days\Year																			
Maternity																					
First Day	6,132.00	Days\Year																			
Subsquent Day	1,839.60	Days\Year																			
Pediatrics	22,484.00	Days\Year																			
Percentage Increase in Inpatient Days	2.00%	%																			
Operation Period		Flag	15.00	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
The ratio of full paying in-patients	40.00%	%																			
Increase in inpatient days		%		-	-	2.08%	2.12%	2.16%	2.21%	2.25%	2.30%	2.34%	2.39%	2.44%	2.49%	2.54%	2.59%	2.64%	2.69%	2.75%	-
General Illness		Days\Year		-	-	8,346	8,350	8,353	8,357	8,360	8,364	8,368	8,371	8,375	8,379	8,383	8,388	8,392	8,396	8,400	-
Infect. & TB		Days\Year		-	-	10,433	10,437	10,441	10,446	10,450	10,455	10,459	10,464	10,469	10,474	10,479	10,484	10,490	10,495	10,501	-
Surgery		Days\Year		-	-	10,641	10,646	10,650	10,655	10,659	10,664	10,669	10,674	10,679	10,684	10,689	10,694	10,699	10,705	10,711	-
Maternity																					
First Day		Days\Year		-	-	2,504	2,505	2,506	2,507	2,508	2,509	2,510	2,511	2,513	2,514	2,515	2,516	2,518	2,519	2,520	-
Subsquent Day		Days\Year		-	-	751	751	752	752	752	753	753	753	754	754	755	755	755	756	756	-
Pediatrics		Days\Year		-	-	9,181	9,184	9,188	9,192	9,196	9,200	9,204	9,209	9,213	9,217	9,222	9,226	9,231	9,236	9,241	-
Total Annual Days of full-paying in-patients		**Days\Year**		-	-	**41,856**	**41,873**	**41,890**	**41,908**	**41,926**	**41,945**	**41,963**	**41,983**	**42,002**	**42,022**	**42,043**	**42,063**	**42,085**	**42,106**	**42,128**	-
Days of Discounted In-Patients																					
Operation Period		Flag	15.00	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
The ratio of Discounted in-patients	60.00%	%																			
Increase in inpatient days		%		-	-	2.08%	2.12%	2.16%	2.21%	2.25%	2.30%	2.34%	2.39%	2.44%	2.49%	2.54%	2.59%	2.64%	2.69%	2.75%	-
General Illness		Days\Year		-	-	12,519	12,524	12,529	12,535	12,540	12,546	12,551	12,557	12,563	12,569	12,575	12,581	12,588	12,594	12,601	-
Infect. & TB		Days\Year		-	-	15,649	15,655	15,662	15,669	15,675	15,682	15,689	15,696	15,704	15,711	15,719	15,727	15,735	15,743	15,751	-
Surgery		Days\Year		-	-	15,962	15,968	15,975	15,982	15,989	15,996	16,003	16,010	16,018	16,025	16,033	16,041	16,049	16,057	16,066	-
Maternity																					
First Day		Days\Year		-	-	3,756	3,757	3,759	3,760	3,762	3,764	3,765	3,767	3,769	3,771	3,773	3,774	3,776	3,778	3,780	-
Subsquent Day		Days\Year		-	-	1,127	1,127	1,128	1,128	1,129	1,129	1,130	1,130	1,131	1,131	1,132	1,132	1,133	1,133	1,134	-
Pediatrics		Days\Year		-	-	13,771	13,777	13,782	13,788	13,794	13,800	13,807	13,813	13,819	13,826	13,833	13,839	13,846	13,854	13,861	-
Total Annual Days of Discounted in-patients		**Days\Year**		-	-	**62,784**	**62,809**	**62,835**	**62,862**	**62,889**	**62,917**	**62,945**	**62,974**	**63,003**	**63,033**	**63,064**	**63,095**	**63,127**	**63,159**	**63,193**	-
Days of Out-Patients																					
General OPD clinic visit	161,510	Visit\year																			
Specialist OPD clinic visit	232,079	Visit\year																			
CAS visit	138,661	Visit\year																			
Percentage Increase in Out-patients\Visit	2.50%	%																			
Operation Period		Flag	15	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
Real Increse in out-patients		%		-	-	2.63%	2.69%	2.76%	2.83%	2.90%	2.97%	3.05%	3.12%	3.20%	3.28%	3.36%	3.45%	3.53%	3.62%	3.71%	-
General OPD clinic visit		Visit\year		-	-	165,752	165,858	165,967	166,078	166,193	166,310	166,430	166,553	166,679	166,808	166,940	167,076	167,215	167,358	167,504	-
Specialist OPD clinic visit		Visit\year		-	-	238,175	238,327	238,483	238,643	238,808	238,976	239,148	239,325	239,506	239,692	239,882	240,077	240,277	240,482	240,692	-
CAS visit		Visit\year		-	-	142,303	142,394	142,487	142,583	142,681	142,782	142,885	142,990	143,098	143,209	143,323	143,440	143,559	143,682	143,807	-
Total Annual days of out-patient		**Visit\year**		-	-	**546,230**	**546,579**	**546,938**	**547,305**	**547,681**	**548,067**	**548,462**	**548,868**	**549,283**	**549,709**	**550,145**	**550,593**	**551,051**	**551,521**	**552,003**	-
Oputpatient Visit / Equivalent Patient-day	10	Visit\year																			
Outpatient-days Equivalent		**Days\Year**		-	-	**54,623**	**54,658**	**54,694**	**54,730**	**54,768**	**54,807**	**54,846**	**54,887**	**54,928**	**54,971**	**55,015**	**55,059**	**55,105**	**55,152**	**55,200**	-
Summary of Patients days																					
Total Annual Days of full-paying in-patients		**Days\Year**		-	-	**41,856**	**41,873**	**41,890**	**41,908**	**41,926**	**41,945**	**41,963**	**41,983**	**42,002**	**42,022**	**42,043**	**42,063**	**42,085**	**42,106**	**42,128**	-
Total Annual Days of Discounted in-patients		**Days\Year**		-	-	**62,784**	**62,809**	**62,835**	**62,862**	**62,889**	**62,917**	**62,945**	**62,974**	**63,003**	**63,033**	**63,064**	**63,095**	**63,127**	**63,159**	**63,193**	-
Outpatient-days Equivalent		**Days\Year**		-	-	**54,623**	**54,658**	**54,694**	**54,730**	**54,768**	**54,807**	**54,846**	**54,887**	**54,928**	**54,971**	**55,015**	**55,059**	**55,105**	**55,152**	**55,200**	-
Total Patient days		**Days\Year**		-	-	**159,263**	**159,340**	**159,419**	**159,501**	**159,583**	**159,668**	**159,755**	**159,843**	**159,934**	**160,027**	**160,121**	**160,218**	**160,317**	**160,418**	**160,521**	-

Table 44: Fees and Revenues

YEARS	Constant	Unit	Total	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
TABLE 8: FEES AND REVENUES																					
Fees from In-Patients Real																					
General Illness Per Patient- Per Day	250	000' IQD																			
Infectious & TB Per Patient- Per Day	350	000' IQD																			
Surgery Per Patient- Per Day	1,000	000' IQD																			
Maternity Per Patient- Per Day																					
First Day	1,000	000' IQD																			
Subsequent Day(s) Per Patient- Per Day	250	000' IQD																			
Paediatrics Per Patient- Per Day	450	000' IQD																			
Fees from Out-Patients Real																					
Outpatient Per Visit	50	000' IQD																			
Fees from In-Patients Nominal																					
Domestic Inflation Index		Index		1.00	1.02	1.04	1.06	1.10	1.15	1.19	1.24	1.29	1.34	1.40	1.45	1.51	1.57	1.63	1.70	1.77	1.84
Percentage Change in All Fees	-	%																			
Fees from Full-paying In-patients																					
Income from Full-paying In-patients-100% of Average Inpatient Fees	100%	%																			
Operation Period		Flag	15.00	-	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
General Illness Per Patient- Per Day		000' IQD		-	-	260.10	265.30	275.91	286.95	298.43	310.37	322.78	335.69	349.12	363.08	377.61	392.71	408.42	424.76	441.75	-
Infectious & TB Per Patient- Per Day		000' IQD		-	-	364.14	371.42	386.28	401.73	417.80	434.51	451.89	469.97	488.77	508.32	528.65	549.80	571.79	594.66	618.45	-
Surgery Per Patient- Per Day		000' IQD		-	-	1,040.40	1,061.21	1,103.66	1,147.80	1,193.71	1,241.46	1,291.12	1,342.77	1,396.48	1,452.34	1,510.43	1,570.85	1,633.68	1,699.03	1,766.99	-
Maternity Per Patient- Per Day																					
First day		000' IQD		-	-	1,040.40	1,061.21	1,103.66	1,147.80	1,193.71	1,241.46	1,291.12	1,342.77	1,396.48	1,452.34	1,510.43	1,570.85	1,633.68	1,699.03	1,766.99	-
Subsequent Day(s) Per Patient- Per Day		000' IQD		-	-	260.10	265.30	275.91	286.95	298.43	310.37	322.78	335.69	349.12	363.08	377.61	392.71	408.42	424.76	441.75	-
Paediatrics Per Patient- Per Day		000' IQD		-	-	468.18	477.54	496.65	516.51	537.17	558.66	581.00	604.24	628.41	653.55	679.69	706.88	735.16	764.56	795.15	-
Fees from Discounted In-patients																					
Income from Discounted In-patients-60% of Average Inpatient Fees	60%	%																			
Operation Period		Flag	15.00	-	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
Percentage Change in Fee of Discounted In-patients	-	%																			
General Illness Per Patient- Per Day		000' IQD		-	-	156.06	159.18	165.55	172.17	179.06	186.22	193.67	201.41	209.47	217.85	226.56	235.63	245.05	254.85	265.05	-
Infectious & TB Per Patient- Per Day		000' IQD		-	-	218.48	222.85	231.77	241.04	250.68	260.71	271.14	281.98	293.26	304.99	317.19	329.88	343.07	356.80	371.07	-
Surgery Per Patient- Per Day		000' IQD		-	-	624.24	636.72	662.19	688.68	716.23	744.88	774.67	805.66	837.89	871.40	906.26	942.51	980.21	1,019.42	1,060.19	-
Maternity Per Patient- Per Day																					
First Day		000' IQD		-	-	624.24	636.72	662.19	688.68	716.23	744.88	774.67	805.66	837.89	871.40	906.26	942.51	980.21	1,019.42	1,060.19	-
Subsequent day(s) Per Patient- Per Day		000' IQD		-	-	156.06	159.18	165.55	172.17	179.06	186.22	193.67	201.41	209.47	217.85	226.56	235.63	245.05	254.85	265.05	-
Paediatrics Per Patient- Per Day		000' IQD		-	-	280.91	286.53	297.99	309.91	322.30	335.20	348.60	362.55	377.05	392.13	407.82	424.13	441.09	458.74	477.09	-
Fees from Out-Patients Nominal																					
Operation Period		Flag	15.00	-	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
Outpatient Fee/Per Visit		000' IQD		-	-	52.02	53.06	55.18	57.39	59.69	62.07	64.56	67.14	69.82	72.62	75.52	78.54	81.68	84.95	88.35	-

Table 45: Fees and Revenues (cont.)

YEARS	Constant	Unit	Total	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Revenues Scheduled Yearly-Nominal																					
Revenues from Full-paying In-patients																					
General Illness		Days/Year		-	-	8,346.13	8,349.53	8,353.00	8,356.54	8,360.15	8,363.83	8,367.59	8,371.42	8,375.33	8,379.32	8,383.38	8,387.53	8,391.76	8,396.08	8,400.48	-
General Illness Per Patient- Per Day		000' IQD		-	-	260.10	265.30	275.91	286.95	298.43	310.37	322.78	335.69	349.12	363.08	377.61	392.71	408.42	424.76	441.75	-
1,000 Conversion	1,000	#																			
Revenues from Medicine		**M' IQD**		-	-	**2,171**	**2,215**	**2,305**	**2,398**	**2,495**	**2,596**	**2,701**	**2,810**	**2,924**	**3,042**	**3,166**	**3,294**	**3,427**	**3,566**	**3,711**	-
Infect. & TB		Days/Year		-	-	10,432.66	10,436.91	10,441.25	10,445.67	10,450.19	10,454.79	10,459.49	10,464.28	10,469.16	10,474.15	10,479.23	10,484.41	10,489.70	10,495.10	10,500.60	-
Infectious & TB Per Patient- Per Day		000' IQD		-	-	364.14	371.42	386.28	401.73	417.80	434.51	451.89	469.97	488.77	508.32	528.65	549.80	571.79	594.66	618.45	-
1,000 Conversion	1,000	#																			
Revenues from Infect. & TB		**M' IQD**		-	-	**3,799**	**3,877**	**4,033**	**4,196**	**4,366**	**4,543**	**4,727**	**4,918**	**5,117**	**5,324**	**5,540**	**5,764**	**5,998**	**6,241**	**6,494**	-
Surgery		Days/Year		-	-	10,641.31	10,645.65	10,650.07	10,654.59	10,659.19	10,663.89	10,668.68	10,673.56	10,678.55	10,683.63	10,688.81	10,694.10	10,699.50	10,705.00	10,710.61	-
Surgery Per Patient- Per Day		000' IQD		-	-	1,040.40	1,061.21	1,103.66	1,147.80	1,193.71	1,241.46	1,291.12	1,342.77	1,396.48	1,452.34	1,510.43	1,570.85	1,633.68	1,699.03	1,766.99	-
1,000 Conversion	1,000	#																			
Revenues from Surgery		**M' IQD**		-	-	**11,071**	**11,297**	**11,754**	**12,229**	**12,724**	**13,239**	**13,775**	**14,332**	**14,912**	**15,516**	**16,145**	**16,799**	**17,480**	**18,188**	**18,926**	-
Maternity																					
First Day		Days/Year		-	-	2,503.84	2,504.86	2,505.90	2,506.96	2,508.05	2,509.15	2,510.28	2,511.43	2,512.60	2,513.79	2,515.01	2,516.26	2,517.53	2,518.82	2,520.14	-
Subsquent Day		Days/Year		-	-	751.15	751.46	751.77	752.09	752.41	752.74	753.08	753.43	753.78	754.14	754.50	754.88	755.26	755.65	756.04	-
First day		000' IQD		-	-	1,040.40	1,061.21	1,103.66	1,147.80	1,193.71	1,241.46	1,291.12	1,342.77	1,396.48	1,452.34	1,510.43	1,570.85	1,633.68	1,699.03	1,766.99	-
Subsequent Day(s) Per Patient- Per Day		000' IQD		-	-	260.10	265.30	275.91	286.95	298.43	310.37	322.78	335.69	349.12	363.08	377.61	392.71	408.42	424.76	441.75	-
1,000 Conversion	1,000	#																			
Revenues from Maternity		**M' IQD**		-	-	**2,800**	**2,858**	**2,973**	**3,093**	**3,218**	**3,349**	**3,484**	**3,625**	**3,772**	**3,925**	**4,084**	**4,249**	**4,421**	**4,601**	**4,787**	-
Pediatrics		Days/Year		-	-	9,180.74	9,184.48	9,188.30	9,192.19	9,196.17	9,200.22	9,204.35	9,208.56	9,212.86	9,217.25	9,221.72	9,226.28	9,230.94	9,235.68	9,240.53	-
Paediatrics Per Patient- Per Day		000' IQD		-	-	468.18	477.54	496.65	516.51	537.17	558.66	581.00	604.24	628.41	653.55	679.69	706.88	735.16	764.56	795.15	-
1,000 Conversion	1000	#																			
Revenues from Pediatrics		**M' IQD**		-	-	**4,298**	**4,386**	**4,563**	**4,748**	**4,940**	**5,140**	**5,348**	**5,564**	**5,789**	**6,024**	**6,268**	**6,522**	**6,786**	**7,061**	**7,348**	-
Total Revenues from Full-paying In-patients		**M' IQD**		-	-	**24,140**	**24,632**	**25,628**	**26,665**	**27,743**	**28,866**	**30,034**	**31,250**	**32,515**	**33,831**	**35,202**	**36,628**	**38,112**	**39,657**	**41,265**	-
Revenues from Discounted In-patients																					
General Illness		Days/Year		-	-	12,519.19	12,524.29	12,529.50	12,534.81	12,540.23	12,545.75	12,551.38	12,557.13	12,562.99	12,568.97	12,575.07	12,581.30	12,587.64	12,594.11	12,600.72	-
General Illness Per Patient- Per Day		000' IQD		-	-	156.06	159.18	165.55	172.17	179.06	186.22	193.67	201.41	209.47	217.85	226.56	235.63	245.05	254.85	265.05	-
1,000 Conversion	1000	#																			
Revenues from Medicine		**M' IQD**		-	-	**1,954**	**1,994**	**2,074**	**2,158**	**2,245**	**2,336**	**2,431**	**2,529**	**2,632**	**2,738**	**2,849**	**2,964**	**3,085**	**3,210**	**3,340**	-
Infect. & TB		Days/Year		-	-	15,648.99	15,655.37	15,661.87	15,668.51	15,675.28	15,682.19	15,689.23	15,696.42	15,703.74	15,711.22	15,718.84	15,726.62	15,734.55	15,742.64	15,750.90	-
Infectious & TB Per Patient- Per Day		000' IQD		-	-	218.48	222.85	231.77	241.04	250.68	260.71	271.14	281.98	293.26	304.99	317.19	329.88	343.07	356.80	371.07	-
1,000 Conversion	1000	#																			
Revenues from Infect. & TB		**M' IQD**		-	-	**3,419**	**3,489**	**3,630**	**3,777**	**3,929**	**4,088**	**4,254**	**4,426**	**4,605**	**4,792**	**4,986**	**5,188**	**5,398**	**5,617**	**5,845**	-
Surgery		Days/Year		-	-	15,961.97	15,968.47	15,975.11	15,981.88	15,988.79	15,995.83	16,003.02	16,010.34	16,017.82	16,025.44	16,033.22	16,041.15	16,049.24	16,057.50	16,065.91	-
Surgery Per Patient- Per Day		000' IQD		-	-	624.24	636.72	662.19	688.68	716.23	744.88	774.67	805.66	837.89	871.40	906.26	942.51	980.21	1,019.42	1,060.19	-
1,000 Conversion	1000	#																			
Revenues from Surgery		**M' IQD**		-	-	**9,964**	**10,168**	**10,579**	**11,006**	**11,452**	**11,915**	**12,397**	**12,899**	**13,421**	**13,965**	**14,530**	**15,119**	**15,732**	**16,369**	**17,033**	-
Maternity																					
First Day		Days/Year		-	-	3,755.76	3,757.29	3,758.85	3,760.44	3,762.07	3,763.72	3,765.42	3,767.14	3,768.90	3,770.69	3,772.52	3,774.39	3,776.29	3,778.23	3,780.22	-
Subsquent Day		Days/Year		-	-	1,126.73	1,127.19	1,127.65	1,128.13	1,128.62	1,129.12	1,129.62	1,130.14	1,130.67	1,131.21	1,131.76	1,132.32	1,132.89	1,133.47	1,134.06	-
First Day		000' IQD		-	-	624.24	636.72	662.19	688.68	716.23	744.88	774.67	805.66	837.89	871.40	906.26	942.51	980.21	1,019.42	1,060.19	-
Subsequent day(s) Per Patient- Per Day		000' IQD		-	-	156.06	159.18	165.55	172.17	179.06	186.22	193.67	201.41	209.47	217.85	226.56	235.63	245.05	254.85	265.05	-
1,000 Conversion	1000	#																			
Revenues from Maternity		**M' IQD**		-	-	**2,520**	**2,572**	**2,676**	**2,784**	**2,897**	**3,014**	**3,136**	**3,263**	**3,395**	**3,532**	**3,675**	**3,824**	**3,979**	**4,140**	**4,308**	-
Pediatrics		Days/Year		-	-	13,771.11	13,776.72	13,782.45	13,788.29	13,794.25	13,800.32	13,806.52	13,812.85	13,819.29	13,825.87	13,832.58	13,839.43	13,846.41	13,853.53	13,860.79	-
Paediatrics Per Patient- Per Day		000' IQD		-	-	280.91	286.53	297.99	309.91	322.30	335.20	348.60	362.55	377.05	392.13	407.82	424.13	441.09	458.74	477.09	-
1,000 Conversion	1000	#																			
Revenues from Pediatrics		**M' IQD**		-	-	**3,868**	**3,947**	**4,107**	**4,273**	**4,446**	**4,626**	**4,813**	**5,008**	**5,211**	**5,422**	**5,641**	**5,870**	**6,108**	**6,355**	**6,613**	-
Total Revenues from Discounted In-patients		**M' IQD**		-	-	**21,726**	**22,169**	**23,066**	**23,998**	**24,969**	**25,979**	**27,031**	**28,125**	**29,263**	**30,448**	**31,682**	**32,965**	**34,301**	**35,691**	**37,139**	-
Revenues from Out-patients																					
General OPD clinic visit		Visit/year		-	-	165,752	165,858	165,967	166,078	166,193	166,310	166,430	166,553	166,679	166,808	166,940	167,076	167,215	167,358	167,504	-
Specialist OPD clinic visit		Visit/year		-	-	238,175	238,327	238,483	238,643	238,808	238,976	239,148	239,325	239,506	239,692	239,882	240,077	240,277	240,482	240,692	-
CAS visit		Visit/year		-	-	142,303	142,394	142,487	142,583	142,681	142,782	142,885	142,990	143,098	143,209	143,323	143,440	143,559	143,682	143,807	-
Outpatient Fee/Per Visit		000' IQD		-	-	52.02	53.06	55.18	57.39	59.69	62.07	64.56	67.14	69.82	72.62	75.52	78.54	81.68	84.95	88.35	-
1,000 Conversion	1000	#																			
Revenues from Out-patients		**M' IQD**		-	-	**28,415**	**29,002**	**30,182**	**31,410**	**32,689**	**34,020**	**35,407**	**36,850**	**38,353**	**39,918**	**41,548**	**43,245**	**45,012**	**46,853**	**48,769**	-

Table 46: Utilities

YEARS	Constant	Unit	Total	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Utilities																					
Electricity Cost																					
Consumption @ 100% utilization	1,680,000	KwH																			
Cost/KwH (year 0)	130.00	IQD																			
Escalation Factor of Recurrent Cost	-	%																			
1,000,000 Conversion	1,000,000	#																			
Operation Period		Flag	15	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
Capacity Utilizations		%		-	-	80%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-
Electricity Utilization		KwH		-	-	1,344,000	1,512,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	-
Total Cost of Electricity		**M' IQD**		**-**	**-**	**182**	**209**	**241**	**251**	**261**	**271**	**282**	**293**	**305**	**317**	**330**	**343**	**357**	**371**	**386**	**-**
Water Cost																					
Drinking Water Cost																					
Consumption @ 100% utilization	42,500.00	m3																			
Cost/Cu. M (year 0)	300.00	IQD																			
Escalation Factor of Recurrent Cost	-	%																			
1,000,000 Conversion	1,000,000	#																			
Operation Period		Flag	15	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
Capacity Utilizations		%		-	-	80%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-
Utilization of Drinking Water		m3		-	-	34,000	38,250	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	-
Total Cost of Drinking Water Cost		**M' IQD**		**-**	**-**	**11**	**12**	**14**	**15**	**15**	**16**	**16**	**17**	**18**	**19**	**19**	**20**	**21**	**22**	**23**	**-**
Water for Flushing toilets																					
Consumption @ 100% utilization	42,500.00	m3																			
Cost/Cu. M (year 0)	100.00	IQD																			
Escalation Factor of Recurrent Cost	-	%																			
1,000,000 Conversion	1,000,000	#																			
Operation Period		Flag	15	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
Capacity Utilizations		%		-	-	80%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-
Utilization of Water for flushing Toilets		m3		-	-	34,000	38,250	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	-
Total Cost of Water for Flushing Toilets		**M' IQD**		**-**	**-**	**3.400**	**3.825**	**4.250**	**4.250**	**4.250**	**4.250**	**4.250**	**4.250**	**4.250**	**4.250**	**4.250**	**4.250**	**4.250**	**4.250**	**4.250**	**-**
Fuel Cost																					
Consumption	33,600.00	litres																			
Cost/litre (year 0)	700.00	IQD																			
Escalation Factor of Recurrent Cost	-	%																			
1,000,000 Conversion	1,000,000	#																			
Operation Period		Flag	15	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
Capacity Utilizations		%		-	-	80%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-
Fuel Consumptions		litres		-	-	26,880	30,240	33,600	33,600	33,600	33,600	33,600	33,600	33,600	33,600	33,600	33,600	33,600	33,600	33,600	-
Total Cost of Fuel		**M' IQD**		**-**	**-**	**20**	**22**	**26**	**27**	**28**	**29**	**30**	**32**	**33**	**34**	**36**	**37**	**38**	**40**	**42**	**-**

Table 47: Chemicals & Medical Supplies

YEARS	Constant	Unit	Total	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Chemicals & medical supplies																					
Pharmaceutical	10,871	M' IQD																			
Laboratory Supplies	1,290	M' IQD																			
Medical Supplies	1,873	M' IQD																			
Dental Supplies	52	M' IQD																			
Total Chemicals & Medical Supplies @ 100% Utilization	14,087	M' IQD																			
Real Increase in Chemicals & Medical Supplies	1.00%	%																			
Escalation Factor of Recurrent Cost	-	%																			
Operation Period		Flag	15	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
Capacity Utilizations		%		-	-	80%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-
Real increase in Chemicals & Medical Supplies		%		-	-	1.020	1.030	1.041	1.051	1.062	1.072	1.083	1.094	1.105	1.116	1.127	1.138	1.149	1.161	1.173	-
Total Cost of Chemicals & Medical Supplies		**M' IQD**		**-**	**-**	**11,960**	**13,862**	**16,178**	**16,994**	**17,850**	**18,750**	**19,695**	**20,688**	**21,730**	**22,825**	**23,976**	**25,184**	**26,453**	**27,787**	**29,187**	**-**

Table 48: Maintenance Costs

YEARS	Constant	Unit	Total	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Maintenance Cost																					
Equipment maintenance																					
Equipment Maintenance @ 100% Utilization	28	M' IQD																			
Real Increase in Equipment Maintenance	1%	%																			
Escalation Factor of Recurrent Cost	-	%																			
Operation Period		Flag	15	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
Maintenance Capacity Utilizations	-	%	-	-	-	-	80%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Real Increase		%		-	-	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10	1.12	1.13	1.14	1.15	1.16	1.17	-
Real increase in Equipment Maintenance		M' IQD		-	-	-	22.76	25.87	29.03	29.32	29.61	29.91	30.21	30.51	30.81	31.12	31.43	31.75	32.07	32.39	-
Total Cost of Equipment Maintenance		**M' IQD**		**-**	**-**	**-**	**24.16**	**28.55**	**33.32**	**35.00**	**36.76**	**38.61**	**40.56**	**42.60**	**44.75**	**47.01**	**49.38**	**51.87**	**54.48**	**57.23**	**-**
Building Maintenance																					
Area	50,506	Sq. M																			
Cost / Sq. M/year (year 0)	190	IQD																			
Real increase in Building Maintenance	1.00%	%																			
Escalation Factor of Recurrent Cost	-	%																			
1,000,000 Conversion	1,000,000	#																			
Operation Period		Flag	15	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
Maintenance Capacity Utilizations		%		-	-	-	80%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Real Increase		%		-	-	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10	1.12	1.13	1.14	1.15	1.16	1.17	-
Real Increase in Building Maintenance		M' IQD		-	-	-	7.91	8.99	10.09	10.19	10.29	10.39	10.50	10.60	10.71	10.81	10.92	11.03	11.14	11.25	-
Total Cost of Building Maintenance		**M' IQD**		**-**	**-**	**-**	**8.39**	**9.92**	**11.58**	**12.16**	**12.77**	**13.42**	**14.09**	**14.80**	**15.55**	**16.33**	**17.16**	**18.02**	**18.93**	**19.88**	**-**

Table 49: Maintenance Costs (cont.)

YEARS	Constant	Unit	Total	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Sewage Maintenance																					
Cost of Sewage (year 0) @ 100% Utilization	1,112,000	IQD																			
Real Increase in Vehicle Maintenance	1.00%	%																			
Escalation Factor of Recurrent Cost	-	%																			
1,000,000 Conversion	1,000,000	#																			
Operation Period		Flag	15	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
Maintenance Capacity Utilizations		%		-	-	-	80%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Real Increase		%		-	-	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10	1.12	1.13	1.14	1.15	1.16	1.17	-
Real Increase in Sewage Maintenance		M' IQD		-	-	-	0.92	1.04	1.17	1.18	1.19	1.20	1.22	1.23	1.24	1.25	1.27	1.28	1.29	1.30	-
Total Cost of Sewage Maintenance		**M' IQD**		**-**	**-**	**-**	**0.97**	**1.15**	**1.34**	**1.41**	**1.48**	**1.55**	**1.63**	**1.72**	**1.80**	**1.89**	**1.99**	**2.09**	**2.19**	**2.30**	**-**
Electrical installations Maintenance																					
Cost of Electrical Installations (year 0) @ 100% Utilization	11,277,500	IQD																			
Real Increase in Vehicle Maintenance	1.00%	%																			
Escalation Factor of Recurrent Cost	-	%																			
1,000,000 Conversion	1,000,000	#																			
Operation Period		Flag	15	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
Maintenance Capacity Utilizations	-	%	-	-	-	-	80%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Real Increase		%		-	-	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10	1.12	1.13	1.14	1.15	1.16	1.17	-
Real increase in Electrical Installations Maintenance		M' IQD		-	-	-	9.30	10.56	11.85	11.97	12.09	12.21	12.33	12.46	12.58	12.71	12.83	12.96	13.09	13.22	-
Total Cost of Electrical installations Maintenance		**M' IQD**		**-**	**-**	**-**	**9.86**	**11.66**	**13.60**	**14.29**	**15.01**	**15.77**	**16.56**	**17.40**	**18.27**	**19.19**	**20.16**	**21.18**	**22.25**	**23.37**	**-**
Vehicle Maintenance																					
Cost of Vehicle (year 0) @ 100% Utilization	1,725,000	IQD																			
Number of Vehicles	7.00	#																			
Real Increase in Vehicle Maintenance	1.00%	%																			
Escalation Factor of Recurrent Cost	-	%																			
1,000,000 Conversion	1,000,000	#																			
Operation Period		Flag	15	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
Maintenance Capacity Utilizations	-	%	-	-	-	-	80%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Real Increase		%		-	-	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10	1.12	1.13	1.14	1.15	1.16	1.17	-
Real Increase in Vehicle Maintenance		M' IQD		-	-	-	9.95	11.31	12.69	12.82	12.95	13.08	13.21	13.34	13.47	13.61	13.74	13.88	14.02	14.16	-
Total Cost of Vehicle Maintenance		**M' IQD**		**-**	**-**	**-**	**11**	**12**	**15**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**-**

Table 50: Miscellaneous

YEARS	Constant	Unit	Total	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Miscellaneous																					
Advertising	1.52	M' IQD																			
Transportation	9.66	M' IQD																			
Official Entertainment	1.88	M' IQD																			
Communication	5.45	M' IQD																			
Office Supplies, Stationery & Ink	21.41	M' IQD																			
Staff Clothing	4.78	M' IQD																			
Protective Materials	0.76	M' IQD																			
Furniture	1.26	M' IQD																			
Total Miscellaneous at 100% Utilization	46.72	M' IQD																			
Escalation Factor of Recurrent Cost	-	%																			
Operation Period		Flag	15	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
Capacity Utilizations		%		-	-	80%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-
Total Cost of Miscellaneous		**M' IQD**		**-**	**-**	**39**	**45**	**52**	**54**	**56**	**58**	**60**	**63**	**65**	**68**	**71**	**73**	**76**	**79**	**83**	**-**

Table 51: Hospital Cleaning

YEARS	Constant	Unit	Total	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Cleanliness																					
Hospital-Cleaning	625.80	M' IQD																			
Real Increase in Hospital-Cleaning	1.00%	%																			
Escalation Factor of Recurrent Cost	-	%																			
Operation Period		Flag	15	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
Real Increase		%		-	-	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10	1.12	1.13	1.14	1.15	1.16	1.17	-
Real Increase in Hospital Cleaning		M' IQD		-	-	638	645	651	658	664	671	678	684	691	698	705	712	719	727	734	-
Total Hospital Cleaning Cost		**M' IQD**		**-**	**-**	**664**	**684**	**719**	**755**	**793**	**833**	**875**	**919**	**965**	**1,014**	**1,065**	**1,119**	**1,175**	**1,234**	**1,297**	**-**

Table 52: Food and Beverage

YEARS	Constant	Unit	Total	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Food and Beverage																					
Food and Beverage Per Person Per Day	10,000.00	IQD																			
Real increase in Food and Beverage	1.00%	%																			
Escalation Factor of Recurrent Cost	-	%																			
Food and Berevarge Average Number of People Per Day	500	Person																			
Days in The Year	365	Days/Year																			
1,000,000 Conversion	1,000,000	#																			
Operation Period		Flag	15	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
Real Increase		%		-	-	1.020	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10	1.12	1.13	1.14	1.15	1.16	1.17	-
Real Increase in Food and Beverage		M' IQD		-	-	1,862	1,880	1,899	1,918	1,937	1,957	1,976	1,996	2,016	2,036	2,056	2,077	2,098	2,119	2,140	-
Total Food and Beverage		**M' IQD**		**-**	**-**	**1,937**	**1,995**	**2,096**	**2,202**	**2,313**	**2,429**	**2,552**	**2,680**	**2,815**	**2,957**	**3,106**	**3,263**	**3,427**	**3,600**	**3,781**	**-**

Table 53: Labor Cost

YEARS	Constant	Unit	Total	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Manpower Expenses																					
Real Increase in Salary	1.00%	%																			
Monthe in a Year	12	#																			
Escalation Factor of Recurrent Cost	-	%																			
Operation Period		Flag	15	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
Domestic Inflation Index		Index		1.00	1.02	1.04	1.06	1.10	1.15	1.19	1.24	1.29	1.34	1.40	1.45	1.51	1.57	1.63	1.70	1.77	1.84
1,000,000 Conversion	1,000,000	#																			
Real Increase in Salaries		%		-	-	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10	1.12	1.13	1.14	1.15	1.16	1.17	-
Doctors	305	#																			
Average Salary	5,100,000	IQD																			
Total Doctors' Salaries		**M' IQD**		**-**	**-**	**19,810**	**20,409**	**21,437**	**22,518**	**23,653**	**24,845**	**26,097**	**27,412**	**28,794**	**30,245**	**31,769**	**33,371**	**35,052**	**36,819**	**38,675**	**-**
Technician	22	#																			
Average Salary	2,500,000	IQD																			
Total Technicians' Salaries		**M' IQD**		**-**	**-**	**700**	**722**	**758**	**796**	**836**	**878**	**923**	**969**	**1,018**	**1,069**	**1,123**	**1,180**	**1,239**	**1,302**	**1,367**	**-**
Therapist	15	#																			
Average Salary	3,000,000	IQD																			
Total Therapist' Salaries		**M' IQD**		**-**	**-**	**573**	**590**	**620**	**651**	**684**	**719**	**755**	**793**	**833**	**875**	**919**	**965**	**1,014**	**1,065**	**1,119**	**-**
Nurses	251	#																			
Average Salary	1,200,000	IQD																			
Total Nurses' Salaries		**M' IQD**		**-**	**-**	**3,836**	**3,952**	**4,151**	**4,360**	**4,580**	**4,811**	**5,053**	**5,308**	**5,576**	**5,857**	**6,152**	**6,462**	**6,787**	**7,129**	**7,489**	**-**
Assistants	29	#																			
Average Salary	1,100,000	IQD																			
Total Assistants' Salaries		**M' IQD**		**-**	**-**	**406**	**419**	**440**	**462**	**485**	**510**	**535**	**562**	**590**	**620**	**652**	**684**	**719**	**755**	**793**	**-**
Chief executive officer	1	#																			
Average Salary	2,500,000	IQD																			
Total CEO' Salaries		**M' IQD**		**-**	**-**	**31.84**	**32.80**	**34.45**	**36.19**	**38.01**	**39.93**	**41.94**	**44.06**	**46.28**	**48.61**	**51.06**	**53.63**	**56.34**	**59.18**	**62.16**	**-**
Chief financial officer	1	#																			
Average Salary	2,500,000	IQD																			
Total CFO' Salaries		**M' IQD**		**-**	**-**	**31.84**	**32.80**	**34.45**	**36.19**	**38.01**	**39.93**	**41.94**	**44.06**	**46.28**	**48.61**	**51.06**	**53.63**	**56.34**	**59.18**	**62.16**	**-**
Chief Information Officer	1	#																			
Average Salary	2,500,000	IQD																			
Total CIO' Salaries		**M' IQD**		**-**	**-**	**31.84**	**32.80**	**34.45**	**36.19**	**38.01**	**39.93**	**41.94**	**44.06**	**46.28**	**48.61**	**51.06**	**53.63**	**56.34**	**59.18**	**62.16**	**-**
Executives	6	#																			
Average Salary	1,900,000	IQD																			
Total Executives' Salaries		**M' IQD**		**-**	**-**	**145**	**150**	**157**	**165**	**173**	**182**	**191**	**201**	**211**	**222**	**233**	**245**	**257**	**270**	**283**	**-**
Human Resources & Recruiting	10	#																			
Average Salary	1,200,000	IQD																			
Total Human Resoutces&Recruiting' Salaries		**M' IQD**		**-**	**-**	**152.83**	**157.44**	**165.38**	**173.71**	**182.47**	**191.67**	**201.33**	**211.47**	**222.13**	**233.33**	**245.09**	**257.44**	**270.41**	**284.04**	**298.36**	**-**

Table 54: Labor Cost (cont.)

YEARS				-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Constant	Unit	Total																		
Security Department	15	#																			
Average Salary	1,500,000	IQD																			
Total Security Department' Salaries		**M' IQD**		**-**	**-**	**286.55**	**295.21**	**310.09**	**325.72**	**342.13**	**359.37**	**377.49**	**396.51**	**416.50**	**437.49**	**459.54**	**482.70**	**507.03**	**532.58**	**559.42**	**-**
Accounting Department	5	#																			
Average Salary	1,350,000	IQD																			
Total Accounting' Salaries		**M' IQD**		**-**	**-**	**85.97**	**88.56**	**93.03**	**97.71**	**102.64**	**107.81**	**113.25**	**118.95**	**124.95**	**131.25**	**137.86**	**144.81**	**152.11**	**159.77**	**167.83**	**-**
Administrating Department	10	#																			
Average Salary	1,200,000	IQD																			
Total Administrating' Salaries		**M' IQD**		**-**	**-**	**152.83**	**157.44**	**165.38**	**173.71**	**182.47**	**191.67**	**201.33**	**211.47**	**222.13**	**233.33**	**245.09**	**257.44**	**270.41**	**284.04**	**298.36**	**-**
Clerk	5	#																			
Average Salary	750,000	IQD																			
Total clerk' Salaries		**M' IQD**		**-**	**-**	**47.76**	**49.20**	**51.68**	**54.29**	**57.02**	**59.90**	**62.91**	**66.09**	**69.42**	**72.91**	**76.59**	**80.45**	**84.50**	**88.76**	**93.24**	**-**
Secretary	15	#																			
Average Salary	900,000	IQD																			
Total Clerk' Salaries		**M' IQD**		**-**	**-**	**171.93**	**177.12**	**186.05**	**195.43**	**205.28**	**215.62**	**226.49**	**237.91**	**249.90**	**262.49**	**275.72**	**289.62**	**304.22**	**319.55**	**335.65**	**-**
Counselor	6	#																			
Average Salary	850,000	IQD																			
Total Counselor' Salaries		**M' IQD**		**-**	**-**	**64.95**	**66.91**	**70.29**	**73.83**	**77.55**	**81.46**	**85.56**	**89.88**	**94.41**	**99.16**	**104.16**	**109.41**	**114.93**	**120.72**	**126.80**	**-**
Computer Programmer	2	#																			
Average Salary	120,000	IQD																			
Total Computer Programmer' Salaries		**M' IQD**		**-**	**-**	**3.06**	**3.15**	**3.31**	**3.47**	**3.65**	**3.83**	**4.03**	**4.23**	**4.44**	**4.67**	**4.90**	**5.15**	**5.41**	**5.68**	**5.97**	**-**
Receptionist	6	#																			
Average Salary	850,000	IQD																			
Total Receptioist' Salaries		**M' IQD**		**-**	**-**	**64.95**	**66.91**	**70.29**	**73.83**	**77.55**	**81.46**	**85.56**	**89.88**	**94.41**	**99.16**	**104.16**	**109.41**	**114.93**	**120.72**	**126.80**	**-**
Technicians	2	#																			
Average Salary	1,200,000	IQD																			
Total Technicians' Salaries		**M' IQD**		**-**	**-**	**30.57**	**31.49**	**33.08**	**34.74**	**36.49**	**38.33**	**40.27**	**42.29**	**44.43**	**46.67**	**49.02**	**51.49**	**54.08**	**56.81**	**59.67**	**-**
Drivers	7	#																			
Average Salary	850,000	IQD																			
Total Drivers' Salaries		**M' IQD**		**-**	**-**	**75.78**	**78.07**	**82.00**	**86.13**	**90.47**	**95.03**	**99.82**	**104.86**	**110.14**	**115.69**	**121.52**	**127.65**	**134.08**	**140.84**	**147.94**	**-**
Total Cost of Employees		**M' IQD**		**-**	**-**	**26,704**	**27,511**	**28,897**	**30,354**	**31,883**	**33,490**	**35,178**	**36,951**	**38,814**	**40,770**	**42,825**	**44,983**	**47,250**	**49,631**	**52,133**	**-**