



**Pre-feasibility Study**

# **SETTING UP MEDICAL LABORATORIES**

**September 2021**

*“The figures and financial projections are approximate due to fluctuations in exchange rates, energy costs, and fuel prices etc. Users are advised to focus on understanding essential elements such as production processes and capacities, space, machinery, human resources, and raw material etc. requirements. Project investment, operating costs, and revenues can change daily. For accurate financial calculations, utilize financial calculators on SMEDA’s website and consult financial experts to stay current with market conditions.”*

**Small and Medium Enterprises Development Authority**  
Ministry of Industries and Production  
Government of Pakistan

## Table of Contents

<b>1</b>	<b>DISCLAIMER .....</b>	<b>6</b>
<b>2</b>	<b>EXECUTIVE SUMMARY .....</b>	<b>7</b>
<b>3</b>	<b>INTRODUCTION TO SMEDA .....</b>	<b>8</b>
<b>4</b>	<b>PURPOSE OF THE DOCUMENT .....</b>	<b>9</b>
<b>5</b>	<b>BRIEF DESCRIPTION OF PROJECT &amp; SERVICES .....</b>	<b>9</b>
5.1	Major Equipment Required for Medical Laboratory .....	13
5.2	Service Flow .....	22
5.3	Installed and Operational Capacities .....	24
<b>6</b>	<b>CRITICAL FACTORS .....</b>	<b>29</b>
<b>7</b>	<b>GEOGRAPHICAL POTENTIAL FOR INVESTMENT .....</b>	<b>29</b>
<b>8</b>	<b>POTENTIAL TARGET MARKETS .....</b>	<b>29</b>
<b>9</b>	<b>PROJECT COST SUMMARY .....</b>	<b>31</b>
9.1	Project Cost .....	31
9.1.1	Land .....	32
9.1.2	Building / Infrastructure .....	33
9.1.3	Machinery and Equipment .....	33
9.1.4	Furniture & Fixtures .....	35
9.1.5	Office Equipment .....	35
9.1.6	Office Vehicle .....	36
9.1.7	Medical Instruments .....	36
9.1.8	License Fee .....	37
9.1.9	Security against building .....	37
9.1.10	Pre-operating Cost .....	37
9.2	Financial Feasibility Analysis .....	38
9.3	Financial Feasibility with 50% Debt Financing .....	38
9.4	Breakeven Analysis .....	38
9.5	Revenue Generation .....	40
9.6	Variable Cost Estimate .....	41
9.7	Fixed Cost Estimate .....	42
9.8	Human Resource Requirement .....	44
<b>10</b>	<b>CONTACT DETAILS .....</b>	<b>45</b>
<b>11</b>	<b>USEFUL LINKS AND CONTACTS .....</b>	<b>46</b>
<b>12</b>	<b>ANNEXURES .....</b>	<b>48</b>

12.1	Income Statement .....	48
12.2	Balance Sheet .....	49
12.3	Cash Flow Statement .....	50
<b>13</b>	<b>KEY ASSUMPTIONS.....</b>	<b>51</b>
13.1	Operating Cost Assumptions.....	51
13.2	Revenue Assumptions .....	51
13.3	Financial Assumptions .....	51
13.4	Cash Flow Assumptions.....	52
13.5	Debt Related Assumptions .....	52

## Table of Tables

Table 1: Installed and Operational Capacity for Pathology Tests .....	26
Table 2: Installed and Operational Capacity for Radiology Tests .....	27
Table 3: Project Cost .....	31
Table 4: Breakup of Space Requirement .....	32
Table 5: Building Renovation Cost .....	33
Table 6 Machinery Equipment .....	33
Table 7: Furniture and Fixtures .....	35
Table 8: Office Equipment .....	35
Table 9: Office Vehicle .....	36
Table 10 Medical Instruments .....	36
Table 11: License Fee .....	37
Table 12: Security against Building .....	37
Table 13: Pre-operating cost .....	37
Table 14: Financial Feasibility Analysis .....	38
Table 15: Financial Feasibility Debt Financing .....	38
Table 16: Breakeven Analysis .....	38
Table 17: Total Revenue .....	40
Table 18: Revenue from Pathology Tests .....	40
Table 19: Revenue from Radiology Tests .....	41
Table 20: Variable Cost Estimate .....	41
Table 21 Direct Labor .....	42
Table 22: Variable Cost Assumptions .....	42
Table 23: Fixed Cost Estimate .....	42
Table 24 Management Staff .....	43
Table 25 Fixed Cost Assumptions .....	43
Table 26: Human Resource Requirement .....	44
Table 27: Suppliers of Machinery and Equipment .....	45
Table 28: Useful Links .....	46
Table 29 Healthcare Commissions .....	47
Table 30: Operating Cost Assumptions .....	51
Table 31: Revenue Assumptions .....	51
Table 32: Financial Assumptions .....	51
Table 33: Cash Flow Assumptions .....	52

Table 34: Debt Related Assumptions .....	52
------------------------------------------	----

## Table of Figures

Figure 1: Digital Water Bath .....	14
Figure 2: Microscope .....	14
Figure 3: Chemistry analyzer .....	15
Figure 4: Centrifuge Machine .....	15
Figure 5: Ultrasound Color Doppler .....	16
Figure 6: Digital X-Ray Machine .....	17
Figure 7: Dry Bath Incubator .....	17
Figure 8: CO <sub>2</sub> incubators.....	18
Figure 9: Pipettes .....	18
Figure 10: Balance Scale.....	18
Figure 11: PH Meter.....	19
Figure 12: Laboratory Vials .....	20
Figure 13: Test Tubes .....	20
Figure 14: Cover Slips.....	21
Figure 15: Electrolyte Analyzer .....	21
Figure 16: Compound Digital Microscope .....	22
Figure 17: Process Flow for Pathology Tests.....	22
Figure 18: Process Flow for Radiology Tests.....	23
Figure 19: Health Expenditure - Pakistan .....	30
Figure 20: Public Expenditure on Health.....	30

## 1 DISCLAIMER

This information memorandum is to introduce the subject matter and provide a general idea and information on the said matter. Although, the material included in this document is based on data / information gathered from various reliable sources; however, it is based upon certain assumptions, which may differ from case to case. The information has been provided on, as is where is basis without any warranties or assertions as to the correctness or soundness thereof. Although, due care and diligence has been taken to compile this document, the contained information may vary due to any change in any of the concerned factors, and the actual results may differ substantially from the presented information. SMEDA, its employees or agents do not assume any liability for any financial or other loss resulting from this memorandum in consequence of undertaking this activity. The contained information does not preclude any further professional advice to be obtained by the user. The prospective user of this memorandum is encouraged to carry out additional diligence and gather any information which is necessary for making an informed decision, including taking professional advice from a qualified consultant / technical expert before taking any decision to act upon the information.

For more information on services offered by SMEDA, please contact our website:

[www.smeda.org.pk](http://www.smeda.org.pk)

### **Document Control**

Document No.	218
Prepared by	SMEDA-Punjab (OS)
Revision Date	September 2021
For information	<a href="mailto:helpdesk.punjab@smeda.org.pk">helpdesk.punjab@smeda.org.pk</a>

## 2 EXECUTIVE SUMMARY

A Medical Laboratory is an entity which provides services to conduct diagnostic tests on clinical specimens to obtain information about the health of a patient. The results of these tests are used by physicians/doctors to diagnose medical problems of the patients, suggest treatments for the identified problems, and/or suggest preventive measures to the patients to keep them healthy.

With the population of the country growing at a high rate, the health-related issues are also increasing correspondingly. Medical laboratories constitute a very important link of the health value chain to provide proper treatment and prevention of diseases by the doctors/ physicians. The local population suffers from an increasing number of Liver, Kidney, Heart, Dehydration, Infectious and Inflammation diseases. Lack of timely diagnosis and delayed action for prevention and treatment of such diseases leads to increasing the disease intensity and creates complications in the treatment. In order to provide better and timely healthcare solutions to the local population, setting up more healthcare facilities, including medical labs, is essential.

This Pre-feasibility document provides details for setting up a Medical Laboratory. The proposed laboratory will provide services to conduct common pathological tests; including Complete Blood Count (CBC), Liver Function Tests (LFTs), Renal Function Tests (RFTs), Thyroid Function Tests (TFTs), Erythrocyte Sedimentation Rate (ESR), ABO Typing Test (Blood Group), HBA1C (Glycosylated Hemoglobin) Test, Insulin level Test, HBsAg (Hepatitis B), Anti-HCV test (Hepatitis C), Anti-HIV (Aids), Serum Electrolyte Test, Serum Calcium Test, Lipid Profile (cholesterol), RA Factor, Stool Examination, Urine Examination and Uric Acid (Fluid). In addition to these, the laboratory will also provide services to conduct radiological tests; including X-Ray and Ultrasound.

The proposed unit has an annual capacity of performing 99,600 (80,400 pathological and 19,200 radiological) tests by operating at 300 days per year. Initially, during the first year of operation, capacity utilization is assumed to be 50% which translates into 49,800 (40,200 pathological and 9,600 radiological) tests while maximum capacity utilization has been assumed to be 90%.

The Medical Laboratory may be established in metropolitan cities like Karachi, Lahore, Islamabad, Peshawar, Quetta and medium cities such as Hyderabad, Faisalabad, Multan, Rawalpindi, Bahawalpur, Sargodha, Sukkur, Gujranwala, Sialkot or other cities. Such medical laboratories may also be established in smaller cities of Pakistan.

Establishing the proposed medical laboratory requires a total investment of PKR 20.88 million. This includes capital investment of PKR 17.61 million and working capital of PKR 3.27 million. This project is proposed to be financed through 100% equity. The Net Present Value (NPV) of project is PKR 57.94 million with an Internal Rate of Return (IRR) of 47% and a Payback period of 3.01 years. Further, this project is expected to generate Gross Profit (GP) ratio ranging from 46% to 67% and Net Profit (NP) ratio ranging from 3% to 30% during the projection period of ten years. The proposed

project will achieve its estimated breakeven point at capacity of 44% (44,207 tests) with breakeven revenue amounting to PKR 29.45 million.

The proposed medical laboratory may also be established using leveraged financing. At 50% financing, at a cost of KIBOR+3%, the proposed business provides Net Present Value (NPV) of PKR 69.69 million, Internal Rate of Return (IRR) of 48% and Payback period of 2.96 years. The proposed project is expected to generate Net Profit (NP) ratio ranging from 1% to 30% during the projection period of ten years. The proposed project will achieve its estimated breakeven point at capacity of 48% (48,065 tests) with breakeven revenue of PKR 32.02 million.

The proposed project will provide employment opportunities to 24 people. High return on investment and steady growth of business is expected with the professionals having some prior experience and expertise in the related field of business. The legal business status of this project is proposed as "Sole Proprietorship".

### 3 INTRODUCTION TO SMEDA

The Small and Medium Enterprises Development Authority (SMEDA) was established in October 1998 with an objective to provide fresh impetus to the economy through development of Small and Medium Enterprises (SMEs).

With a mission "to assist in employment generation and value addition to the national income, through development of the SME sector, by helping increase the number, scale and competitiveness of SMEs", SMEDA has carried out 'sectoral research' to identify policy, access to finance, business development services, strategic initiatives and institutional collaboration and networking initiatives. Preparation and dissemination of prefeasibility studies in key areas of investment has been a successful hallmark of SME facilitation by SMEDA.

Concurrent to the prefeasibility studies, a broad spectrum of business development services is also offered to the SMEs by SMEDA. These services include identification of experts and consultants and delivery of need-based capacity building programs of different types in addition to business guidance through help desk services.

National Business Development Program for SMEs (NBDP) is a project of SMEDA, funded through Public Sector Development Program of Government of Pakistan.

The NBDP envisages provision of handholding support / business development services to SMEs to promote business startup, improvement of efficiencies in existing SME value chains to make them globally competitive and provide conducive business environment through evidence-based policy-assistance to the Government of Pakistan. The Project is objectively designed to support SMEDA's capacity of providing an effective handholding to SMEs. The proposed program is aimed at facilitating around 314,000 SME beneficiaries over a period of five years.



## 4 PURPOSE OF THE DOCUMENT

The objective of the pre-feasibility study is primarily to facilitate potential entrepreneurs in project identification for investment. The project pre-feasibility may form the basis of an important investment decision and in order to serve this objective, the document/study covers various aspects of project concept development, start-up, and production, marketing, finance and business management.

The purpose of this document is to provide information to the potential investors about setting up a Medical Laboratory. The document provides a general understanding of the business to facilitate potential investors in crucial and effective investment decisions.

The need to come up with pre-feasibility reports for undocumented or minimally documented sectors attains greater imminence as the research that precedes such reports reveal certain thumb rules; best practices developed by existing enterprises by trial and error, and certain industrial norms that become a guiding source regarding various aspects of business set-up and its successful management.

Apart from carefully studying the whole document one must consider critical aspects provided later on, which form the basis of any investment decision.

## 5 BRIEF DESCRIPTION OF PROJECT & SERVICES

A medical laboratory is an entity which provides services to conduct diagnostic tests on clinical specimens to obtain information about the health of a patient. Different types of qualitative, quantitative or screening tests procedures or examinations are performed on materials (e.g. blood, urine, stool, saliva, etc.) obtained from the human body. The results of these tests are used by physicians/doctors to diagnose medical problems of the patients, suggest treatments for the identified problems and/or suggest preventive measures to the patients to keep themselves healthy.

There are two main types of medical laboratories i.e. Pathological laboratory and Radiological laboratory. Pathological laboratory performs pathology tests which cover blood tests, urine tests, stool tests (test on feces) and tests on bodily tissues. A pathologist interprets the results of tests and identifies abnormalities that may indicate diseases and their possible causes, or potential health risks, such as diabetes, pre-diabetes, hypertension, etc. Radiological laboratory performs radiological tests. Radiology, also known as diagnostic imaging, is a series of tests that take pictures or images of parts of the body. Radiological tests include X-rays, Ultrasound, CT scan, DEXA, MRI scan, Magnetic Resonance Angiography (MRA), Angiography and CT scan. In the proposed medical laboratory pathology tests and two radiology tests, X-Rays and Ultrasound, have been covered.

For proposed tests a pathologist, radiologist, phlebotomist, lab technicians and lab assistants are required. A pathologist is responsible for overseeing the pathology department. He examine the tests reports performed by lab technician. Radiologists is

specialized in diagnosing injuries and diseases using medical imaging (radiology) procedures (exams/tests) such as X-rays. Whereas phlebotomist is a trained medical professional specializing in safely taking blood samples from patients. Lab Technicians are qualified and professional persons who analyze the samples using lab equipment and monitor the tests and procedures. Lab Assistants help in perform these tests and procedures. Lab Assistants are also responsible for cleaning and restocking the lab facility, keeping inventory, and ordering lab supplies.

Medical laboratory test constitutes an important link in the healthcare value chain to identify diseases and or their causes in the patients. The laboratory performs complex tests on patient samples using sophisticated equipment.

Medical laboratories vary in size and complexity and so offer a variety of testing services. In the proposed business model of a medical laboratory, following tests will be performed.

## **Pathological Tests**

### **Complete Blood Count (CBC)**

Complete Blood Count (CBC) is a group of tests used to evaluate the composition of the blood. The cell calculates the shares of different constituents of the blood (such as red blood cells (RBCs), white blood cells (WBCs), platelets (PLTs), etc.) with reference to the standard blood composition. CBC test provides information about the overall health of a person and indicates towards different kinds of diseases and conditions; associated with the changes in relative shares of different blood constituents.

### **Liver Function Tests (LFTs)**

Liver Function tests look at how well the liver is functioning and can indicate whether there is any damage or inflammation in the liver.

### **Renal or Kidney Function Test (RFTs / KFT)**

Renal or Kidney function test is significant for the people with diabetes, high blood pressure or heart disease. The doctor may recommend kidney function test if they suspect that kidneys are not functioning properly. These tests are also recommended to monitor the treatment of the people with kidney diseases.

### **Thyroid Function Test (TFTs)**

TFTs include measuring the amount of the thyroid hormones in a person's blood. These thyroid hormones include Thyroxine (T4) or Tri-iodothyronine (T3) and/or the pituitary hormone, Thyroid Stimulating Hormone (TSH).

**Erythrocyte Sedimentation Rate (ESR)**

This test is performed to measure how long does it take for red blood cells to fall to the bottom of a test tube that contain the blood sample. This test is performed to indicate inflammation in the body.

**ABO Typing Test (Blood Group)**

Blood typing is a method to tell what type of blood a person has. Blood typing is often done so a person can safely donate blood or receive a blood transfusion. A person's blood type is based on whether or not certain proteins are present on red blood cells. These proteins are called antigens. The blood type (or blood group) depends on what types the parents passed down.

Blood is often grouped according to the ABO blood typing system. The four major blood types are Type A, Type B, Type AB and Type O.

**HBA1C (Glycosylated Hemoglobin) Test**

The Hemoglobin HBA1C test tells about the average level of blood sugar over the past 2 to 3 months. People who have diabetes need this test regularly to see if their levels are staying within range. The result is used to make adjustments in diabetes medicines. The HBA1C test is also used to diagnose diabetes.

**Insulin Level Test**

Insulin blood test, also referred to as fasting insulin test, is used to measure the amount of insulin in the body. The Insulin hormone is responsible for maintaining the blood sugar levels to a normal range. Insulin also helps the body in the absorption of sugar from carbohydrates, for use as energy or to store it as glucose for future use. Too low and too high levels of insulin are equally harmful for the body.

Too high levels of insulin can cause the blood sugar levels to fall leading to hypoglycemia and too low levels of insulin can lead to the increase of blood sugar levels in the body resulting in a condition known as hyperglycemia.

**HBsAg (Hepatitis B)**

A "positive" HBsAg test result means that the person is infected with Hepatitis B. This test can detect the actual presence of the Hepatitis B virus in the blood. A positive HBsAg test result means that the person is infected and can spread the Hepatitis B virus to others through his blood.

**Anti-HCV test (Hepatitis C)**

The HCV antibody test looks for antibodies to the hepatitis C virus in blood. Antibodies are chemicals released into the bloodstream when someone gets infected. A positive antibody test means that the person had been infected with the Hepatitis C virus at some point in time.

**Anti-HIV (Aids)**

HIV (Human Immunodeficiency Virus) is a virus that attacks and destroys cells in the immune system. These cells protect the body against disease-causing germs, such as bacteria and viruses. If a person loses too many immune cells, the body will have trouble fighting off infections and other diseases. This test looks for HIV antibodies in the blood or saliva. A person's immune system makes antibodies when exposed to bacteria or viruses, like HIV. An HIV antibody test can determine if a person has HIV from 3–12 weeks after infection. That is because it can take a few weeks or longer for the immune system to make antibodies to HIV.

**Serum Electrolyte Test**

Electrolytes are electrically charged minerals that help control the number of fluids and the balance of acids and bases in the body. They also help control muscle and nerve activity, heart rhythm, and other important functions. A serum electrolyte test measures levels of the body's main electrolytes such as Sodium, Bicarbonate, Potassium and Chloride. Abnormal levels of any of these electrolytes can be a sign of a serious health problem, including kidney disease, high blood pressure, and a life-threatening irregularity in heart rhythm. A serum electrolyte test is often part of a routine blood screening. The test may also be used to find out if the body has a fluid imbalance or an imbalance in acid and base levels.

**Serum Calcium Test**

It is a blood test to measure the amount of calcium in the blood. Serum calcium is usually measured to monitor bone diseases or calcium-regulation disorders (diseases of the parathyroid gland or kidneys). All cells require calcium to function. Calcium is especially important in the structure of bones and in neuromuscular (nerves and muscles) activity. A deficiency of calcium in the body fluids causes hyper excitable nerves and muscles. Excess calcium has the opposite effect.

**Lipid Profile (Cholesterol)**

A complete cholesterol test, also called a lipid panel or lipid profile, is a blood test that can measure the amount of cholesterol and triglycerides in the blood. A cholesterol test can help determine risk of the buildup of fatty deposits (plaques) in the arteries that can lead to narrowed or blocked arteries throughout the body (atherosclerosis). A cholesterol test is very important as High cholesterol levels often are a significant risk factor for coronary artery diseases.

**RA Factor**

A rheumatoid factor test measures the amount of rheumatoid factor in the blood. Rheumatoid factors are proteins produced by the immune system that can attack healthy tissue in the body. It is most often used to help diagnose rheumatoid arthritis. Rheumatoid arthritis is a type of autoimmune disorder that causes pain, swelling, and stiffness of the joints.

**Stool Examination**

A stool examination is a series of tests done on a stool (feces) sample to help diagnose certain conditions affecting the digestive tract. It is used to detect the presence of blood or other gastrointestinal abnormalities, such as colon or gastric cancer, inflammatory bowel disease, hemorrhoids, anal fissures or infections.

**Urine Examination**

Urine examination used to detect and manage a wide range of disorders, such as urinary tract infections, kidney disease and diabetes. A urine examination involves checking the appearance, concentration and content of urine. For example, a urinary tract infection can make urine look cloudy instead of clear. Increased levels of protein in urine can be a sign of kidney disease.

**Uric Acid (Fluid)**

The fluid uric acid test measures levels of uric acid which is a normal body waste product. It is formed when natural substances called purines break down. Purines are found in the body and also in many foods such as liver, shellfish, and alcohol.

A person may need this test in case of symptoms of gout, such as joint pain, soreness or swelling, red skin around a joint, hot-to-touch joint or skin that looks shiny, red or purple.

**Radiological Tests****X-Ray**

X-Ray is an image of organs, tissues and bones of the body. These images are produced with the help of radiations. An X-ray is normally conducted to examine an area where a patient is experiencing pain or discomfort.

**Ultrasound**

Ultrasound, also called sonography, is a medical test that uses high frequency sound waves to capture live images from inside of a patient's body. Ultrasound test is performed when a patient is having pain, swelling, or other symptoms that require an internal view of organs i.e., kidney, liver, spleen, bladder, ovaries, uterus, pancreas, thyroid, blood vessels, etc.

**5.1 Major Equipment Required for Medical Laboratory****Digital Water Bath**

A water bath is used to incubate<sup>1</sup> samples at a constant temperature over a long period of time. A water bath generally consists of a heating unit, a stainless-steel chamber

---

<sup>1</sup> Incubate means to maintain something under conditions favorable for development or reaction.

that holds water and the samples, and a control interface. Figure 1: shows a digital water bath.

**Figure 1: Digital Water Bath**



### **Microscope**

A microscope is an instrument that is used to magnify the images of small objects. Some microscopes can even be used to observe an object at the cellular level, allowing scientists to see the shape of a cell, its nucleus, mitochondria<sup>2</sup>, and other organelles<sup>3</sup>. It is used in a medical laboratory to examine cells of blood or different tissues. This makes the object look bigger than it actually is. Figure 2: shows a microscope used in a medical laboratory.

**Figure 2: Microscope**



---

<sup>2</sup> **Mitochondria** are membrane-bound cell organelles that generate most of the chemical energy needed to power the cell's biochemical reactions.

<sup>3</sup> **Organelles** are specialized structures that perform various jobs inside cells. The term literally means "little organs."



### **Clinical Chemistry Analyzer**

A clinical chemistry analyzer is used to analyze body fluids, which helps in determining the levels of various chemical compounds in bodily fluids. Micro lab is used to perform RFTs and LFTs. Figure 3: shows a micro lab used as chemistry analyzer.

**Figure 3: Chemistry analyzer**



### **Centrifuge Machine**

Centrifuge Machines are used in various laboratories to separate fluids, gases, or liquids based on density. Separation is achieved by spinning a vessel containing materials like blood at high speed. The centrifugal force pushes heavier materials to the outside of the vessel. In laboratories, centrifuges are often used for cell, organelle, virus, protein, and nucleic acid purification. Figure 4 shows a centrifuge machine.

**Figure 4: Centrifuge Machine**



### **Ultrasound Color Doppler Machine**

The sonographer presses a small device (transducer) against the skin. It comes along with this machine. As they move the device around, it sends sound waves into the body. The waves bounce off the blood cells, organs, and other body parts, then back to the device.

The Ultrasound Color Doppler machine, illustrated in Figure 5, takes all the sound waves and turns those into moving images that can be seen live on a screen. It usually takes about 15 to 20 minutes. The results from a Doppler ultrasound are obtained very quickly. Then, the images are available for the doctor to review.

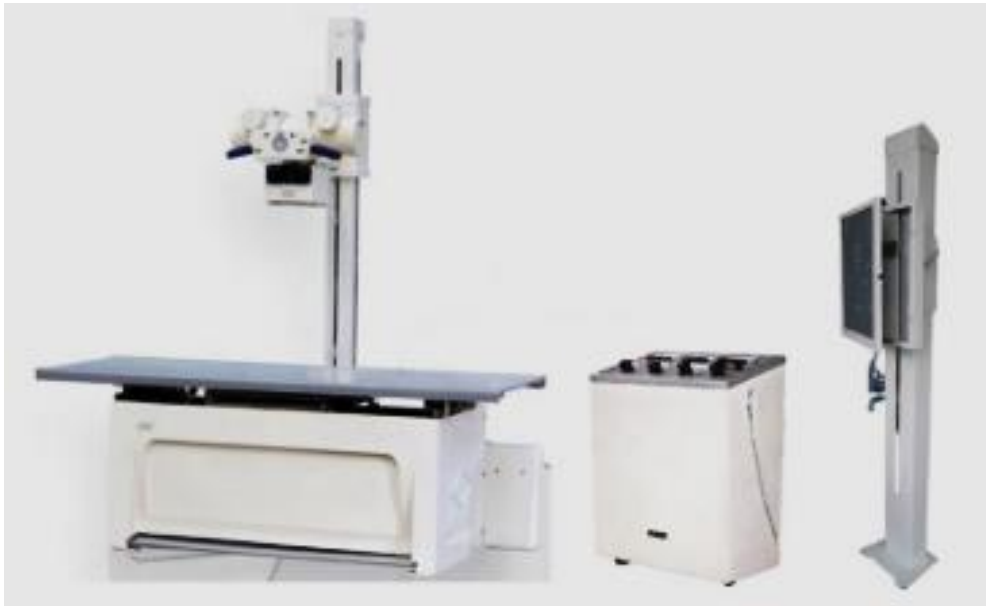
**Figure 5: Ultrasound Color Doppler**



### **X-Ray Machine**

A radiology technologist performs x-ray or digital radiography by using the Digital X-ray machine shown in Figure 6. It produces a digital radiographic image instantly on a computer. This technique uses x-ray sensitive plates to capture data during object examination, which is immediately transferred to a computer. The incident x-ray radiation is converted into an equivalent electric charge and then to a digital image through a detector sensor.



**Figure 6: Digital X-Ray Machine****Dry Bath Incubator**

A dry bath incubator is used to heat blood samples in a variety of applications. Most dry bath incubators are made of an aluminum alloy, which allows distribution of the heat in a uniform manner. Figure 7: shows a dry bath incubator.

**Figure 7: Dry Bath Incubator****Carbon Dioxide CO<sub>2</sub> Incubator**

CO<sub>2</sub> incubator is a necessary equipment for clinical laboratories conducting cell culture and tissue culture work. CO<sub>2</sub> incubators can be used for routine applications such as blood cells cultivation or for specific protocols such as In Vitro Fertilization (IVF) and stem cell applications. Figure 8 shows a CO<sub>2</sub> incubator.

**Figure 8: CO<sub>2</sub> incubators****Pipettes**

A pipette is a laboratory instrument used to measure out or transfer small quantities of liquid, in volumes of milliliters (ml) or microliters ( $\mu\text{L}$ ). Figure 9 shows Pipettes.

**Figure 9: Pipettes****Balance Scale**

It is used for measuring the weight or mass of a sample. Figure 10 shows a balance scale.

**Figure 10: Balance Scale**

### **pH Meter**

pH stands for the "power of hydrogen" and is a logarithmic scale for how acidic or basic a solution is. A pH meter, illustrated in Figure 11, is a scientific instrument that measures the hydrogen- ion activity in solutions, indicating its acidity or alkalinity expressed as pH value.

**Figure 11: PH Meter**



### **Laboratory Vials / Tubes**

Vials / Tubes are small containers composed of glass or plastic used to hold samples. There are various types of laboratory Vials/Tube used in laboratories such as red tube, yellow tube, light-blue tube, green tube, lavender tube, grey tube, royal blue tube and black tube. Vials/tube required for the proposed laboratory are mentioned below.

- ***Lavender Tube***

These Tubes are generally used for hematology tests such as ESR and CBC test, where whole blood is required for analysis. It includes EDTA (Ethylene Diamine Tetra Acetic Acid), which removes calcium, preventing clotting of blood.

- ***Green Tube***

This commonly used tube is used for biochemistry tests such as Electrolyte's test, which require heparinized<sup>4</sup> plasma or whole blood for analysis. It includes Heparin (Sodium / Lithium / Ammonium) which prevents formation of clotting. **Error! Reference source not found.** shows vials of different colors.

---

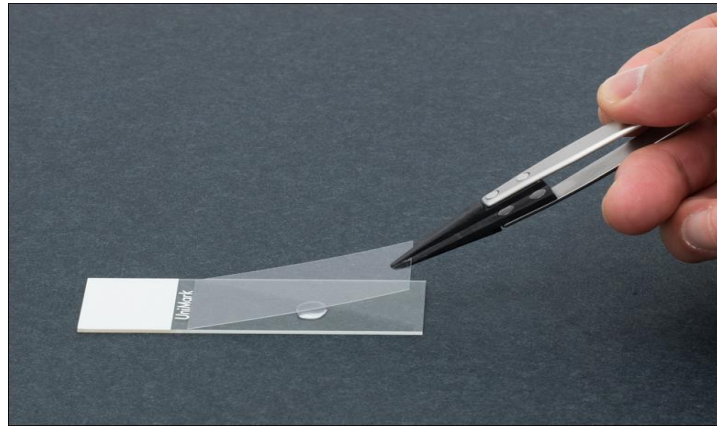
<sup>4</sup> It is a process to add heparin to (blood or a container about to be filled with blood) to prevent it from coagulating. Heparin is a compound occurring in the liver and other tissues which inhibits blood coagulation.

**Figure 12: Laboratory Vials****Test tubes**

Test tubes are the containers used for liquid chemical solutions for mixing, heating or cooling, producing cultures, and other applications. Figure 13 shows test tubes used in a lab.

**Figure 13: Test Tubes****Cover Slips**

The main function of the cover slip is to keep solid specimens pressed flat, and liquid samples shaped into a flat layer of even thickness. This is necessary because high-resolution microscopes have a very narrow region within which they focus. Figure 14 shows a cover slip being placed on a specimen slab.

**Figure 14: Cover Slips**

### **Electrolyte Analyzer**

An electrolyte analyzer is a device for measuring the electrolytes i.e., sodium, potassium, chloride, etc. in the specimen fluids of the human body. The analyzer is primarily used for quantitative measurement of these electrolytes in whole blood, serum, or plasma. Figure 15: shows an Electrolyte Analyzer.

**Figure 15: Electrolyte Analyzer**

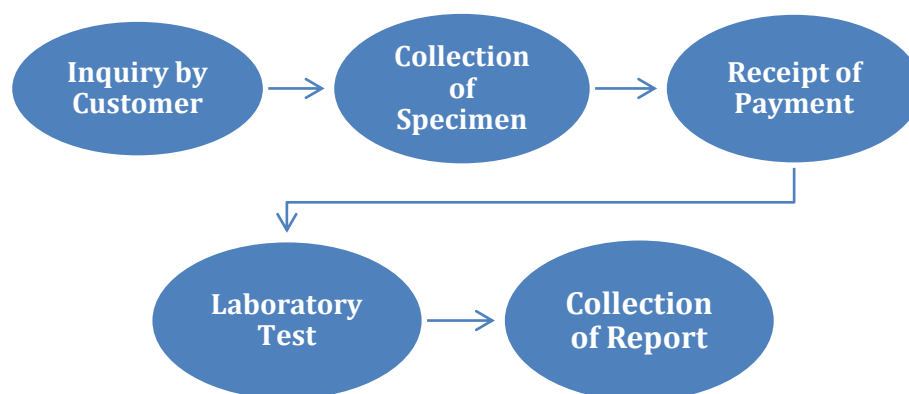
### **Compound Digital Microscope**

A digital microscope is a variation of a traditional optical microscope that uses optics and a digital camera to output an image to a monitor. It is used to examine various samples in a lab. Figure 16 shows a compound digital microscope.

**Figure 16: Compound Digital Microscope**

## 5.2 Service Flow

The general service flows of pathological and radiological medical laboratories are shown in Figure 17 and Figure 18 respectively.

**Figure 17: Process Flow for Pathology Tests**

A brief description of service flow for pathology tests is given below:

### **Inquiry by Customer**

A customer may visit or call the reception of the laboratory to inquire about the particular tests required by him/her. The receptionist provides information about the

tests, the specimens and any specific requirements related to those tests (such as fasting, drinking water before tests, etc.). The customer is also informed about the charges of those tests.

### **Collection of Specimen**

Required specimen is collected in a vial by trained phlebotomists or medical personnel as per the specific requirements of the tests that are to be performed.

### **Receipt of Payment**

After collection of specimens, bill is generated by account staff. Advance payment is received upon collection of specimens and receipt is issued to customer.

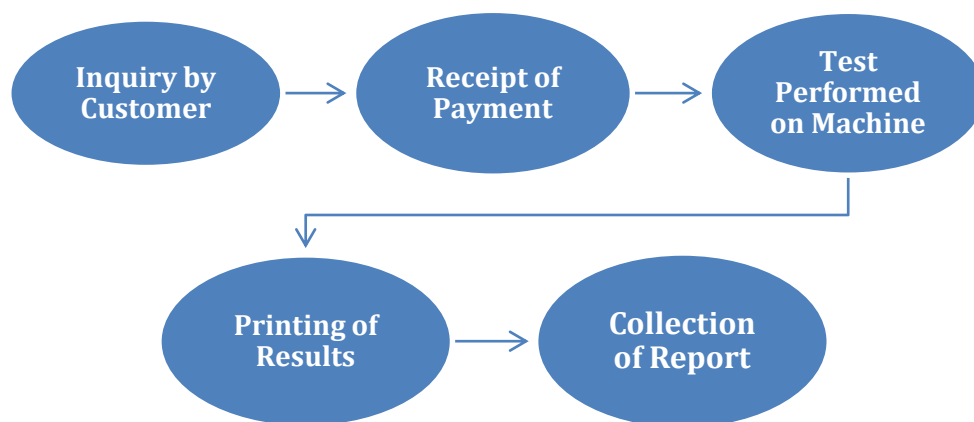
### **Laboratory Test**

The specimen is sent to laboratory where tests are performed by qualified laboratory technicians.

### **Collection of Report**

The report is made available online as well as for collection by customer after it has been reviewed by a pathologist.

**Figure 18: Process Flow for Radiology Tests**



A brief description of service flow for radiology tests is given below.

### **Inquiry by Customer**

A customer may visit or call the reception of the laboratory to inquire about the particular tests. The receptionist provides information about the tests and any specific requirements related to those tests (such as fasting, drinking water before tests, etc.). The customer is also informed about the charges of those tests.



**Receipt of Payment**

The payment for radiology tests is received in advance before performing tests and a receipt is issued to a customer.

**Test Performed on Machine**

An X-Ray is performed by an X-Ray technologist or radiologist. The patient is positioned on an examination couch that carefully positions the particular part of the body that is to be x-rayed between the X-ray machine and a cassette containing the X-ray film. Depending on the nature of the test, X-ray may be performed with the patient in sitting, standing or laying positions.

The X-ray beam is then focused on the area to be photographed. The technician steps behind a protective window and the image is taken. Sometimes, various X-rays may have to be taken at different angles, such as the front and side views.

An Ultrasound is performed by a sonographer. Gel is applied to the skin over the area being examined. It helps prevent air pockets, which can block the sound waves that create the images. This water-based gel is easy to remove.

The sonographer presses a small, hand-held device (transducer) against the area being studied and moves it as needed to capture the images. The transducer sends sound waves into the body, collects the ones that bounce back and sends them to a computer, which creates the images.

**Printing of Results**

The results of X-Rays and Ultrasounds are then printed on X-Ray films and Ultrasound Films respectively.

**Collection of Report**

The X-Ray and Ultrasound reports are then made available for collection by customer.

**5.3 Installed and Operational Capacities**

The proposed Medical Laboratory will have maximum operational capacity of conducting 99,600 tests in a year. It is assumed to conduct 49,800 tests in the 1<sup>st</sup> year of operation at 50% operational capacity. The operational capacity has been assumed to increase by 5% per year. Maximum operational capacity is estimated at 90%, which is expected to be achieved during 9<sup>th</sup> year after commencement of operations.

The laboratory would operate for 12 hours per day, working in one shift per day for 300 working days in a year. Based on the calculations, the laboratory will attain a capacity of 50% during the initial year of operations.



Table 1 and Table 2 depict the installed and operational capacity of the proposed unit for the initial year.

**Table 1: Installed and Operational Capacity for Pathology Tests**

<b>Test</b>	<b>Ratio of Tests</b>	<b>Available Time / Day (Hours)<sup>5</sup> A= (48 * Ratio of Tests)</b>	<b>Total Required Time per Test (Hours)<sup>6</sup>(B)</b>	<b>Test per Day C= (A/B)<sup>7</sup></b>	<b>Tests per year (Installed Capacity) D= C*280</b>	<b>Operational Capacity @ 50% (tests)</b>
Complete Blood Count (CBC)	8%	6	0.42	14	4,200	2,100
Liver Function Tests (LFTs)	8%	6	0.34	17	5,100	2,550
Renal Function Test (RFTs)	7%	5	0.25	20	6,000	3,000
Thyroid Function Tests (TFTs)	5%	4	0.42	9	2,700	1,350
Erythrocyte Sedimentation Rate (ESR)	3%	2	0.34	6	1,800	900
ABO Typing Test (Blood Group)	6%	4	0.17	25	7,500	3,750

<sup>5</sup> Total Available hours have been computed based on number of laboratory technicians. The proposed project assumed to have four laboratory technicians which are mentioned later in this document. i.e., 4 persons x12 hours per day.

<sup>6</sup> Total time required to perform medical test is based on comprises of machine setup time and time for performance of test.

<sup>7</sup> Difference is due to rounding off.

HBA1C (glycosylated Hemoglobin) Test	4%	3	0.13	22	6,600	3,300
Insulin level Test	5%	4	1.50	2	600	300
HBsAg (Hepatitis B)	5%	4	0.50	7	2,100	1,050
Anti-HCV test (Hepatitis C)	5%	4	0.50	7	2,100	1,050
Anti-HIV (Aids)	7%	5	0.33	15	4,500	2,250
Serum Electrolyte Test	3%	2	0.25	9	2,700	1,350
Serum Calcium Test	4%	3	0.13	22	6,600	3,300
Lipid profile (cholesterol)	6%	4	0.17	25	7,500	3,750
RA Factor	5%	4	0.25	14	4,200	2,100
Stool Examination Test	4%	3	0.67	4	1,200	600
Urine Examination	5%	4	0.25	14	4,200	2,100
Uric Acid (Fluid)	10%	7	0.20	36	10,800	5,400
<b>Total</b>	<b>100.00%</b>	<b>72</b>				<b>40,200</b>

Table 2: Installed and Operational Capacity for Radiology Tests

Test	Ratio of Tests	Available Time / Day (Hours)	Total Required Time per Test (Hours)	Test per Day	Test per Year (Installed Capacity)	Operational Capacity @50%
X-Ray	50%	12	0.42	29	8,700	4,350

Ultrasound	50%	12	0.34	35	10,500	5,250
<b>Total</b>	<b>100%</b>	<b>24</b>				<b>9,600</b>

## 6 CRITICAL FACTORS

Before making the decision to invest in Medical Laboratories, it is important to carry out a careful analysis of the associated risk factors. Following factors should necessarily be considered:

- Engagement of reputed pathologists and radiologists
- Engagement of reputed trained and professional paramedical staff
- Availability of modern high-quality equipment
- Courteous administration staff for customer satisfaction
- Ability to build and maintain clean environment
- Accurate maintenance of patients' records
- Establishment of clear business strategy
- Strict compliance with the standards of hygiene
- Good working atmosphere
- Confidentiality of patient's medical records
- Healthcare Establishment (HCE) License from respective provincial healthcare commission/ department

## 7 GEOGRAPHICAL POTENTIAL FOR INVESTMENT

The proposed Medical Laboratory may be established in metropolitan cities like Karachi, Lahore, Islamabad, Peshawar, Quetta and medium cities such as Faisalabad, Multan, Rawalpindi, Bahawalpur, Sargodha, Sukkur, Gujranwala Sialkot, Sahiwal, etc. Medical Laboratories may also be established in other smaller cities of Pakistan.

## 8 POTENTIAL TARGET MARKETS

The credibility of medical laboratories is paramount to the health and safety of the patients. Because of rising awareness about importance of diagnosis of diseases, the medical and diagnostic laboratories are in high demand these days.

With the passage of time, the Government of Pakistan's expenditure on health has increased. In 2019-20, the health expenditure increased by 14.3% from PKR 421.8 billion in 2018-19 to PKR 482.3 billion. It amounted to 1.2% of Gross Domestic Product. The federal and provincial governments health expenditures from 2010-11 to 2019-20 are shown in

Figure 19 and Figure 20:<sup>8</sup>

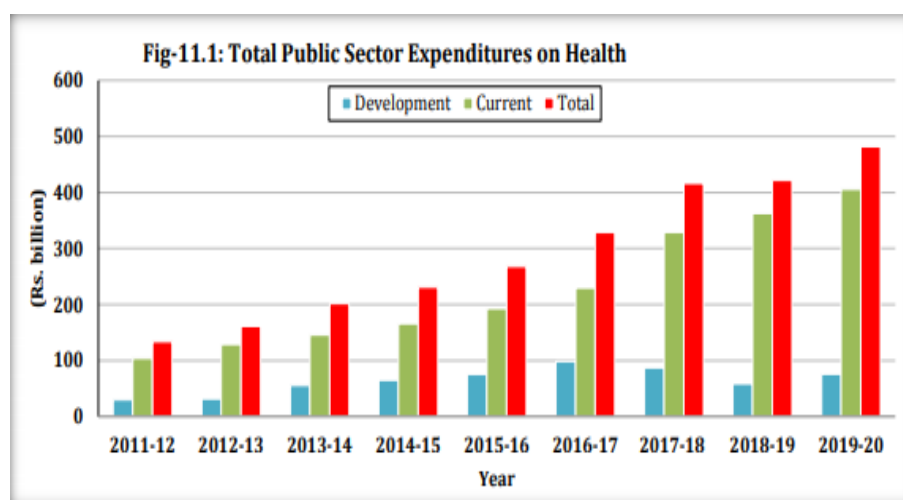
**Figure 19: Health Expenditure - Pakistan**

Fiscal Years	Public Sector Expenditure (Federal and Provincial) Rs million			Health Expenditure as % of GDP
	Current Expenditure	Development Expenditure	Total Health Expenditures	
2011-12	104,284	29,898	134,182	0.7
2012-13	129,421	31,781	161,202	0.6
2013-14	146,082	55,904	201,986	0.7
2014-15	165,959	65,213	231,172	0.7
2015-16	192,704	75,249	267,953	0.9
2016-17	229,957	99,005	328,962	1.0
2017-18	329,033	87,434	416,467	1.2
2018-19	363,154	58,624	421,778	1.1
2019-20 (P)	406,011	76,254	482,265	1.2

P: Provisional

Source: PRSP Budgetary Expenditures, (EF-Policy Wing), Finance Division, Islamabad.

**Figure 20: Public Expenditure on Health<sup>9</sup>**



The increasing trend in public health expenditure shows the growing need of healthcare facilities in the country. Given the current economic and welfare conditions of the country, the government's spending is insufficient to cater to the increasing healthcare requirements of the local population. The private sector thus has to play a major role in minimizing the demand-supply gap by investing in these potential sectors.

<sup>8</sup> [https://www.finance.gov.pk/survey/chapters\\_21/11-Health.pdf](https://www.finance.gov.pk/survey/chapters_21/11-Health.pdf)

<sup>9</sup> [https://www.finance.gov.pk/survey/chapters\\_21/11-Health.pdf](https://www.finance.gov.pk/survey/chapters_21/11-Health.pdf)

Health sector is one of potential sectors in Pakistan, which requires advanced and state-of-the-art facilities including medical laboratories.

Currently 666 and 301 medical laboratories are registered with Punjab Healthcare Commission (PHC)<sup>10</sup> and Sindh Healthcare Commission (SHCC)<sup>11</sup> respectively.

The health sector in Pakistan is not much developed and still has a lot of room for improvement and advancements. Furthermore, very few high-quality labs are operational and that too in the major cities only. Hence high-quality hospitals, health care centers and medical laboratories are much needed.

## 9 PROJECT COST SUMMARY

A detailed financial model has been developed to analyze the commercial viability of the medical laboratory. Various costs and revenue related assumptions along with results of the analysis are outlined in this section.

The projected Income Statement, Cost of Goods Sold, Cash Flow Statement and Balance Sheet are attached as annexure of this document.

All the figures in this financial model have been calculated after carefully taking into account the relevant assumptions and target market.

### 9.1 Project Cost

Table 3 provides fixed and working capital requirements for establishment and operations of medical laboratory.

**Table 3: Project Cost**

Description	Cost (PKR)	Reference
Land	-	9.1.1
Building / Infrastructure	2,875,620	9.1.2
Machinery & equipment	7,582,000	9.1.3
Furniture & fixtures	1,020,000	9.1.4
Office vehicles	90,900	9.1.5
Office equipment	3,794,000	9.1.6
Software	500,000	
Medical Instruments	172,000	9.1.7
Pre-operating costs	482,561	9.1.8

<sup>10</sup> [https://www.phc.org.pk/Registered\\_Labs.aspx](https://www.phc.org.pk/Registered_Labs.aspx)

<sup>11</sup> : <http://shcc.org.pk/page.aspx/licensing/registered-and-licensed-hce>

Security against building	1,080,000	9.1.9
License Fee	10,000	9.1.10
<b>Total Capital Costs</b>	<b>17,607,081</b>	
<b>Working Capital</b>		
Consumables Inventory	409,767	
Upfront Building Rent	360,000	
Cash	2,500,000	
<b>Total Working Capital</b>	<b>3,269,767</b>	
<b>Total Investment</b>	<b>20,876,848</b>	

### 9.1.1 Land

The laboratory will be established in a rented building to avoid the high cost of land. Suitable location for setting up a laboratory can be easily found on rent. Therefore, no land cost has been added to the project cost. Total space requirement for the proposed center has been estimated to be 3,600 sq. ft. Breakup of the space requirement is provided in Table 4.

**Table 4: Breakup of Space Requirement**

Description	% Break-Up	Number	Area Sq. Ft.
Executive Office	4%	1	150
Specimen Collection Area	12%	1	440
Laboratory	25%	1	900
X-Ray Room	14%	1	500
Ultrasound Room	6%	1	225
Change Room	2%	1	80
Store Room	6%	1	225
Kitchen	2%	1	80
Washrooms	8%	10	280
Waiting Area	13%	1	480
Admin and Finance	3%	1	100
Reception Area	4%	1	140
<b>Total</b>	<b>100%</b>		<b>3,600</b>



### 9.1.2 Building / Infrastructure

There will be no cost of building since the proposed business will be started in the rented premises. However, there will be a renovation cost required to make the building ready to use for the business. The proposed project requires electricity load of around 36 KW for which an electricity connection under the Commercial Supply Tariff- single phase will be required. Cost of such electricity connection has not been considered in this document since electricity connection is generally available in the buildings, which are offered for rent. Building rent of PKR 360,000 per month has been included in the operating cost. Building renovation cost is shown in Table 5.

**Table 5: Building Renovation Cost**

Cost Item	Unit of Measurement	Total Units	Cost/Unit (PKR)	Total Cost (PKR)
Paint Cost	Liter	120	500	59,940
Labor Cost - Paint	Sq. Feet	11,988	10	119,880
Curtains	Units	20	8,000	160,000
Blinds	Units	20	3,000	60,000
Tiles	Sq. Feet	4,140	300	1,242,000
Labour Cost - Tiles	Sq. Feet	3,600	30	108,000
Ramp	Sq. Feet	100	500	50,000
Glass Partition	Sq. Feet	783	800	626,400
Plywood Partition	Sq. Feet	1,647	200	329,400
Shelves - Precast Concrete	Sq. Feet	300	400	120,000
<b>Total (PKR)</b>				<b>2,875,620</b>

### 9.1.3 Machinery and Equipment

Table 6 provides details of machinery and equipment for the project.

**Table 6 Machinery Equipment**

Cost Item	No. of Items	Unit Cost (PKR)	Cost (PKR)
Digital Water bath - Two Row Four Opening	2	25,000	50,000
CBC Analyzer	1	400,000	400,000
Chemistry Analyzer (Micro Lab 300) - LFTs	1	300,000	300,000

Chemistry Analyzer (Micro Lab 300) – RFTS	1	300,000	300,000
Electrolyte Analyzer	1	500,000	500,000
Compound Digital Microscope (Mechanical Stage:130x140mm Moving Range 75mmx45mm)	1	45,000	45,000
Carbon dioxide (CO2) Incubator (600Watt, Temperature range RT+5-50°C)	1	700,000	700,000
Inverted Microscope (10.1" LCD, 5MP High Resolution)	1	250,000	250,000
Ultrasound - Color Doppler Machine (17" LED, Cine loop: 1024 frames)	1	1,050,000	1,050,000
Thermal Ultrasound Printer	1	100,000	100,000
Digital X-Ray Machine (35KW, Main inverted Frequency: 50khz)	1	1,500,000	1,500,000
PRP Centrifuge Machine (MM7, AC 220 V, 8-15 ml PRP Tubes, Max Speed: 4000r/min)	1	40,000	40,000
Ci4100 Chemistry Analyzer	1	2,000,000	2,000,000
Centrifuge (220V)	1	3,000	3,000
X-Ray Illuminators	2	2,000	4,000
X-Ray Printer	1	30,000	30,000
Dry Bath Incubator	2	50,000	100,000
Weigh Scale (Max capacity: 310g, 220 V)	1	50,000	50,000
pH Meters – Portable	5	20,000	100,000
Urine Analyzer	1	50,000	50,000
Testing Meter (insulin level)	1	10,000	10,000
<b>Total</b>			<b>7,582,000</b>

### 9.1.4 Furniture & Fixtures

Table 7 provides details of the furniture and fixture requirement of the project.

**Table 7: Furniture and Fixtures**

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Executive Chairs	1	20,000	20,000
Executive Table	1	30,000	30,000
Sofa Set	4	35,000	140,000
Visitors' Chairs	10	10,000	100,000
Office chairs	24	10,000	240,000
Wooden Cabinets	10	8,000	80,000
Racks	20	15,000	300,000
Examination Couch	2	15,000	30,000
Wheel Chairs	5	11,000	55,000
Instrument / Specimen Trolleys	5	5,000	25,000
<b>Total (PKR)</b>			<b>1,020,000</b>

### 9.1.5 Office Equipment

Details of office equipment required for the project are provided in Table 8.

**Table 8: Office Equipment**

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Air Conditioners	11	90,000	990,000
Laptop	5	80,000	400,000
Desktop Computer	7	30,000	210,000
Printer	2	15,000	30,000
Lab Refrigerator	1	120,000	120,000
Water Dispenser	2	20,000	40,000
Security System (2 MP Cams)	8	2,000	16,000
DVR	1	12,000	12,000
LED TV	2	40,000	80,000
Wi-Fi/ Internet Connection	2	5,000	10,000

Ceiling Fans	12	5,000	60,000
Exhaust Fans	13	2,000	26,000
UPS	2	250,000	500,000
Generator (30 kW)	1	1,300,000	1,300,000
<b>Total (PKR)</b>			<b>3,794,000</b>

### 9.1.6 Office Vehicle

Details of office vehicle required for the project are provided in Table 9.

**Table 9: Office Vehicle**

Cost Item	No. of Vehicles	Unit Cost (PKR)	Registration Charges (PKR)
Motorcycle	1	90,000	90,000
Registration Charges		1%	900
<b>Total (PKR)</b>	<b>1</b>		<b>90,900</b>

### 9.1.7 Medical Instruments

Details of medical instruments needed for the project are shown in Table 10.

**Table 10 Medical Instruments**

Instruments	Number of Items	Unit Cost (PKR)	Cost (PKR)
Bunsen Burner	5	1,500	7,500
Stopwatch	10	3,000	30,000
Dropper	10	250	2,500
Crucible Tong	10	2,700	27,000
Tuning Fork	10	600	6,000
Stethoscope	5	2,500	12,500
Magnifier	10	1,500	15,000
Dissecting Set	5	300	1,500

Test tube rack	15	3,000	45,000
First aid Kits	5	5,000	25,000
<b>Total (PKR)</b>			<b>172,000</b>

#### 9.1.8 License Fee

The cost considered for the proposed project is Punjab Healthcare Commission (PHC) license cost. The regulatory bodies in other provinces are Sindh Health Care Commission (SHCC), Health Department of Government of Balochistan, Khyber Pakhtunkhwa Healthcare Commission (KPHCC), The Health Department of Gilgit Baltistan and Health Department of Azad Jammu and Kashmir. The details of license fee for the proposed project are provided in Table 11.

**Table 11: License Fee**

Particulars	Renewal	Cost (PKR)
Punjab Healthcare Commission	5 years	10,000
<b>Total (PKR)</b>		<b>10,000</b>

#### 9.1.9 Security against building

Detail of security against building is provided in Table 12.

**Table 12: Security against Building**

Description	Months	Per month rent (PKR)	Total (PKR)
Security against Building	3	360,000	1,080,000

#### 9.1.10 Pre-operating Cost

Details of pre-operating cost for the purposed project are shown in Table 13.

**Table 13: Pre-operating cost**

Description	Per Month (PKR)	Months Before operating	Total (PKR)
Administration exp.	340,000	1	340,000
Utilities exp.	159,216	1	142,561
<b>Total (PKR)</b>			<b>482,561</b>

## 9.2 Financial Feasibility Analysis

The financial feasibility analysis provides the information regarding projected Internal Rate of Return (IRR), Net Present Value (NPV) and Payback period of the study, which is shown in Table 14.

**Table 14: Financial Feasibility Analysis**

Description	Project Values
IRR	47%
NPV (PKR)	57,939,733
Payback Period (years)	3.01
Projection Years	10
Discount Rate used for NPV	15%

## 9.3 Financial Feasibility with 50% Debt Financing

The financial feasibility analysis provides the information regarding projected IRR, NPV and payback period of the study on the basis of Debt: Equity Model (50:50), which is shown in in Table 15.

**Table 15: Financial Feasibility Debt Financing**

Description	Project
IRR	48%
NPV (PKR)	69,694,549
Payback Period (years)	2.96
Projection Years	10
Discount Rate used for NPV	13%

## 9.4 Breakeven Analysis

Breakeven analysis is provided in Table 16.

**Table 16: Breakeven Analysis**

Particulars	Amount First Year (PKR)	Ratios
Sales	33,178,500	100%
Variable Cost	19,299,692	58%
Contribution	13,878,808	42%
Fixed Cost	12,320,127	37%
Breakeven Tests (Number)	44,207	

Breakeven Revenue (PKR)	29,452,336
Breakeven Capacity	44%

## 9.5 Revenue Generation

Based on the 50% capacity utilization of the medical laboratory, services revenue during the first year of operations are estimated in Table 17, Table 18 and Table 19.

**Table 17: Total Revenue**

Tests	No. of Tests	Revenue (PKR)
Pathology	40,200	27,508,500
Radiology	9,600	5,670,000
<b>Total</b>	<b>49,800</b>	<b>33,178,500</b>

**Table 18: Revenue from Pathology Tests**

Tests	Number of Tests (A)	Price Charges / Test (PKR) (B)	Revenue (PKR) (A*B)
Complete Blood Count (CBC)	2,100	500	1,050,000
Liver Function Tests (LFTs)	2,550	100	255,000
Renal Function Test (RFTs)	3,000	1,300	3,900,000
Serum Electrolyte Test	1,350	800	1,080,000
Thyroid Function Tests (TFTs)	1,350	1,250	1,687,500
Erythrocyte Sedimentation Rate (ESR)	900	600	540,000
Urine Examination	2,100	2,000	4,200,000
HBA1C (glycosylated Hemoglobin) Test	3,300	120	396,000
Insulin level Test	300	1,000	300,000
HBsAg (Hepatitis B)	1,050	1,000	1,050,000
Anti-HCV test (Hepatitis C)	1,050	1,200	1,260,000
Anti-HIV (Aids)	2,250	1,000	2,250,000
Lipid profile (cholesterol)	3,750	300	1,125,000
RA Factor	2,100	1,000	2,100,000



Serum Calcium Test	3,300	600	1,980,000
Stool Examination Test	600	500	300,000
ABO Typing Test (Blood Group)	3,750	500	1,875,000
Uric Acid (Fluid)	5,400	400	2,160,000
<b>Total</b>	<b>40,200</b>	<b>-</b>	<b>27,508,500</b>

**Table 19: Revenue from Radiology Tests**

<b>Tests</b>	<b>Number of Tests (A)</b>	<b>Price Charges / Test (PKR) (B)</b>	<b>Revenue (PKR)</b>
X-Ray	4,350	700	3,045,000
Ultrasound	5,250	500	2,625,000
<b>Total</b>			<b>5,670,000</b>

## 9.6 Variable Cost Estimate

Variable costs of the project have been provided in detail in Table 20.

**Table 20: Variable Cost Estimate**

<b>Description</b>	<b>Cost (PKR)</b>
Medical and other consumables	4,917,205
Staff salaries	12,480,000
Utilities Direct	653,287
Communications expense (phone, fax, mail, internet, etc.)	172,800
Office vehicles running expense	78,000
Office expenses (stationery, entertainment, janitorial services, etc.)	998,400
<b>Total Variable Cost (PKR)</b>	<b>19,299,692</b>

**Table 21 Direct Labor**

Description	Number of Employees	Monthly Salary (PKR)	Annual Salary (PKR)
Pathologist (Doctor)	1	100,000	1,200,000
Radiologist(Doctor)	1	100,000	1,200,000
Phlebotomist	3	100,000	3,600,000
Lab Technician	6	50,000	3,600,000
Lab Assistants	3	30,000	1,080,000
X-Ray Technician / Radiological Technologist	1	50,000	600,000
X-Ray Technician - Printing	1	50,000	600,000
Sonographer (Ultrasound Technician)	1	50,000	600,000
<b>Total</b>	<b>17</b>		<b>12,480,000</b>

**Table 22: Variable Cost Assumptions**

Description	Assumption
Communications expense (phone, fax, mail, internet, etc.)	8% of administration expenses
Office expenses (stationery, entertainment, janitorial services, etc.)	8% of administration expense

## 9.7 Fixed Cost Estimate

Details of fixed cost for the project are provided in Table 23.

**Table 23: Fixed Cost Estimate**

Description	Amount per Annum (PKR)
Management Staff	2,160,000
Administration benefits expense	1,464,000
Building rental expense	4,320,000
Utilities	1,057,447
Utilities	663,570
Depreciation expense	2,246,597

Amortization of pre-operating costs	96,512
Amortization of Licenses	2,000
Amortization of website	50,000
Website updation charges	20,000
Web hosting charges	240,000
<b>Total Fixed Cost (PKR)</b>	<b>12,320,126</b>

Table 24 Management Staff

Description	Number of Employees	Monthly Salary (PKR)	Annual Salary (PKR)
Admin. & Accounts Officer	1	75,000	900,000
Receptionist	1	25,000	300,000
Security Guard	2	40,000	480,000
Office Boy	2	40,000	480,000
<b>Total</b>	<b>6</b>		<b>2,160,000</b>

Table 25 Fixed Cost Assumptions

Description	Assumption
Depreciation expense	
Building	10% of cost
Office Equipment/Vehicle/Furniture and Fixture	15% of cost

## 9.8 Human Resource Requirement

For the 1<sup>st</sup> year of operations, the human resource requirements are projected in Table 26.

**Table 26: Human Resource Requirement**

Description	Number Of Employees	Monthly Salary (PKR)	Annual Salary (PKR)
Owner	1	-	-
Pathologist (Doctor)	1	100,000	1,200,000
Radiologist(Doctor)	1	100,000	1,200,000
Phlebotomist	3	100,000	3,600,000
Lab Technician	6	50,000	3,600,000
Lab Assistants	3	30,000	1,080,000
X-Ray Technician / Radiological Technologist	1	50,000	600,000
X-Ray Technician - Printing	1	50,000	600,000
Sonographer (Ultrasound Technician)	1	50,000	600,000
Admin & Accounts Officer	1	75,000	900,000
Receptionist	1	25,000	300,000
Security Guard	2	20,000	480,000
Office Boy	2	20,000	480,000
<b>Total</b>	<b>24</b>		<b>14,640,000</b>

## 10 CONTACT DETAILS

Details of suppliers of Machinery and Equipment are provided in Table 27.

**Table 27: Suppliers of Machinery and Equipment**

Medical Equipment Suppliers	City	Contact Number	Website
Quality Surgical and Scientific	Karachi	03214265984	<a href="mailto:quality.surgical92@gmail.com">quality.surgical92@gmail.com</a>
Science Emporium	Lahore	04237249228	<a href="http://www.science-emporium.com.pk">www.science-emporium.com.pk</a>
3n-Lifemed	Lahore	04237311381	<a href="http://www.lahoreindustry.com">www.lahoreindustry.com</a>
Advance System	Lahore	02132789199	<a href="http://www.awgroup.pk">www.awgroup.pk</a>
A.M Traders	Lahore	04237429665	<a href="mailto:avaisilyas@aol.com">avaisilyas@aol.com</a>
Synertech	Karachi	04237402532	<a href="http://www.synertech.com">www.synertech.com</a>
Acheron Instruments	Lahore	02134390918	<a href="http://www.acheron-instruments.com">www.acheron-instruments.com</a>
Scientific System	Karachi	04235173781	<a href="http://www.ssscscientificsystem.com">www.ssscscientificsystem.com</a>
Al Aziz Importex Global	Lahore	02132626820	<a href="http://www.alaziz.com">www.alaziz.com</a>
Biotroll	Lahore	03347747970	<a href="http://www.biotroll.net.pk">www.biotroll.net.pk</a>
Haq Chemicals	Peshawar	04235836688	<a href="http://www.haqchem.skynova.io">www.haqchem.skynova.io</a>
Crystal Instruments	Lahore	0912565634	<a href="http://www.crystal-instruments.business.site">www.crystal-instruments.business.site</a>
Peshawar Medical equipment	Peshawar	042-37246672	<a href="mailto:peshawarmedicalequipments@yahoo.com">peshawarmedicalequipments@yahoo.com</a>
Crescent Scientific	Multan	03009344395	<a href="http://www.cspl.in">www.cspl.in</a>
Kashmir Chemicals & Scientific Store - Laboratory Equipment	Rawalpindi	0322 5147380	<a href="https://kashmir-chemicals-store.business.site/">https://kashmir-chemicals-store.business.site/</a>
Khan Traders	Quetta	0303 3302002	

## 11 USEFUL LINKS AND CONTACTS

Table 28: Useful Links

Name of Organization	Website
Small and Medium Enterprises Development Authority (SMEDA)	<a href="http://www.smeda.org.pk">www.smeda.org.pk</a>
National Business Development Program (NBDP)	<a href="http://www.nbdp.org.pk">www.nbdp.org.pk</a>
Government of Pakistan	<a href="http://www.pakistan.gov.pk">www.pakistan.gov.pk</a>
Government of Punjab	<a href="http://punjab.gov.pk/">punjab.gov.pk/</a>
Government of Sindh	<a href="http://sindh.gov.pk/">sindh.gov.pk/</a>
Government of Balochistan	<a href="http://balochistan.gov.pk/">balochistan.gov.pk/</a>
Government of Khyber Pakhtunkhwa	<a href="http://kp.gov.pk/">kp.gov.pk/</a>
Government of Gilgit Baltistan	<a href="http://gilgitbaltistan.gov.pk/">gilgitbaltistan.gov.pk/</a>
Government of Azad Jamu & Kashmir	<a href="http://ajk.gov.pk/">ajk.gov.pk/</a>
Security and Exchange Commission of Pakistan	<a href="http://www.secp.gov.pk">www.secp.gov.pk</a>
State Bank of Pakistan	<a href="http://www.sbp.gov.pk">www.sbp.gov.pk</a>
Medical Laboratory Technologists Association of Pakistan	<a href="http://www.mltap.com.pk/">www.mltap.com.pk/</a>
Pakistan Medical Laboratory Association	<a href="http://www.pmla.pk/">www.pmla.pk/</a>
Drug Regulatory Authority of Pakistan	<a href="http://www.dra.gov.pk/">www.dra.gov.pk/</a>
National Institute of Health	<a href="http://www.nih.org.pk/">www.nih.org.pk/</a>
Pakistan Medical Commission	<a href="https://www.pmc.gov.pk/">https://www.pmc.gov.pk/</a>

**Table 29 Healthcare Commissions**

<b>Name of Organization</b>	<b>Website</b>	<b>Contact</b>
Islamabad Healthcare Regulatory Authority	<a href="https://ihra.gov.pk">https://ihra.gov.pk</a>	051-9199902
Punjab Healthcare Commission	<a href="https://www.phc.org.pk">https://www.phc.org.pk</a>	042-99333161
Sindh Healthcare Commission	<a href="http://shcc.org.pk">http://shcc.org.pk</a>	111-117-422
Khyber Pakhtunkhwa Healthcare Commission	<a href="http://hcc.kp.gov.pk">http://hcc.kp.gov.pk</a>	091-9213242
Balochistan Healthcare Commission	<a href="https://balochistan.gov.pk/departments/health/">https://balochistan.gov.pk/departments/health/</a>	081-9202287
Directorate of Health Services Gilgit Baltistan	-	05811-920280
Department of Health Services Azad Jammu & Kashmir	<a href="https://health.ajk.gov.pk">https://health.ajk.gov.pk</a>	0582-2920015

## 12 ANNEXURES

### 12.1 Income Statement

Calculations	SMEDA									
Income Statement										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Revenue - Pathology	27,508,500	33,305,458	39,990,772	47,684,552	56,522,089	66,655,692	78,256,745	91,518,002	106,656,156	117,392,876
Revenue - Radiology	5,670,000	6,864,858	8,242,822	9,828,650	11,650,226	13,738,945	16,130,132	18,863,518	21,983,765	24,196,798
<b>Total Revenue</b>	<b>33,178,500</b>	<b>40,170,316</b>	<b>48,233,594</b>	<b>57,513,201</b>	<b>68,172,315</b>	<b>80,394,637</b>	<b>94,386,877</b>	<b>110,381,520</b>	<b>128,639,922</b>	<b>141,589,674</b>
<i>Cost of sales</i>										
Medical and other consumables	4,917,205	5,682,814	6,567,628	7,590,208	8,772,003	10,137,804	11,716,260	13,540,482	15,648,735	18,085,243
Staff salaries	12,480,000	13,690,560	15,018,544	16,475,343	18,073,451	19,826,576	21,749,754	23,859,480	26,173,850	28,712,713
Utilities Direct	653,287	656,016	658,992	662,237	665,775	669,633	673,839	678,426	683,427	688,880
<b>Total cost of sales</b>	<b>18,050,492</b>	<b>20,029,390</b>	<b>22,245,164</b>	<b>24,727,788</b>	<b>27,511,230</b>	<b>30,634,013</b>	<b>34,139,854</b>	<b>38,078,388</b>	<b>42,506,012</b>	<b>47,486,836</b>
<b>Gross Profit</b>	<b>15,128,008</b>	<b>20,140,926</b>	<b>25,988,429</b>	<b>32,785,414</b>	<b>40,661,085</b>	<b>49,760,624</b>	<b>60,247,023</b>	<b>72,303,131</b>	<b>86,133,910</b>	<b>94,102,837</b>
	46%	50%	54%	57%	60%	62%	64%	66%	67%	66%
<i>General administration &amp; selling expenses</i>										
Management Staff	2,160,000	2,369,520	2,599,363	2,851,502	3,128,097	3,431,523	3,764,381	4,129,525	4,530,089	4,969,508
Administration benefits expense	1,464,000	1,606,008	1,761,791	1,932,684	2,120,155	2,325,810	2,551,413	2,798,901	3,070,394	3,368,222
Building rental expense	4,320,000	4,752,000	5,227,200	5,749,920	6,324,912	6,957,403	7,653,144	8,418,458	9,260,304	10,186,334
Utilities	1,057,447	1,061,865	1,066,682	1,071,935	1,077,662	1,083,906	1,090,715	1,098,139	1,106,234	1,115,061
Communications expense (phone, fax, mail, internet, etc.)	172,800	189,562	207,949	228,120	250,248	274,522	301,150	330,362	362,407	397,561
Office vehicles running expense	78,000	85,852	94,494	104,007	114,477	126,001	138,685	152,646	168,012	184,926
Office expenses (stationery, entertainment, janitorial services, etc)	998,400	1,095,245	1,201,484	1,318,027	1,445,876	1,586,126	1,739,980	1,908,758	2,093,908	2,297,017
Promotional expense	663,570	803,406	964,672	1,150,264	1,363,446	1,607,893	1,887,738	2,207,630	2,572,798	2,831,793
Depreciation expense	2,246,597	2,246,597	2,263,839	2,263,839	2,284,537	2,284,537	1,685,040	3,924,906	3,954,736	3,954,736
Amortization of pre-operating costs	96,512	96,512	96,512	96,512	96,512	-	-	-	-	-
Amortization of Licenses	2,000	2,000	2,000	2,000	2,000	3,158	3,158	3,158	3,158	3,158
Amortization of website	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
Website updation charges	20,000	22,013	24,229	26,668	29,353	32,308	35,560	39,140	43,080	47,417
Web hosting charges	240,000	264,160	290,752	320,021	352,237	387,695	426,723	469,680	516,961	569,002
<b>Subtotal</b>	<b>13,569,327</b>	<b>14,644,741</b>	<b>15,850,968</b>	<b>17,165,500</b>	<b>18,639,512</b>	<b>20,150,882</b>	<b>21,327,688</b>	<b>25,531,304</b>	<b>27,732,082</b>	<b>29,974,734</b>
<b>Operating Income</b>	<b>1,558,682</b>	<b>5,496,185</b>	<b>10,137,462</b>	<b>15,619,914</b>	<b>22,021,573</b>	<b>29,609,742</b>	<b>38,919,335</b>	<b>46,771,828</b>	<b>58,401,828</b>	<b>64,128,103</b>
Other income (interest on cash)	-	-	-	-	-	-	-	-	-	-
Gain / (loss) on sale of machinery & equipment	-	-	-	-	-	-	1,895,500	-	-	-
Gain / (loss) on sale of office equipment	-	-	-	-	-	-	948,500	-	-	-
Gain / (loss) on sale of office vehicles	-	-	-	-	-	-	22,725	-	-	-
<b>Earnings Before Interest &amp; Taxes</b>	<b>1,558,682</b>	<b>5,496,185</b>	<b>10,137,462</b>	<b>15,619,914</b>	<b>22,021,573</b>	<b>29,609,742</b>	<b>41,786,060</b>	<b>46,771,828</b>	<b>58,401,828</b>	<b>64,128,103</b>
<b>Subtotal</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Earnings Before Tax</b>	<b>1,558,682</b>	<b>5,496,185</b>	<b>10,137,462</b>	<b>15,619,914</b>	<b>22,021,573</b>	<b>29,609,742</b>	<b>41,786,060</b>	<b>46,771,828</b>	<b>58,401,828</b>	<b>64,128,103</b>
Tax	414,731	1,068,855	2,668,111	4,586,969	6,827,550	9,483,409	13,745,120	15,490,139	19,560,639	21,564,835
<b>NET PROFIT/(LOSS) AFTER TAX</b>	<b>1,143,950</b>	<b>4,427,330</b>	<b>7,469,351</b>	<b>11,032,945</b>	<b>15,194,023</b>	<b>20,126,333</b>	<b>28,040,940</b>	<b>31,281,689</b>	<b>38,841,189</b>	<b>42,563,268</b>



## 12.2 Balance Sheet

Calculations	SMEDA										
Balance Sheet											
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>Assets</b>											
<i>Current assets</i>											
Cash & Bank	2,500,000	6,668,968	12,154,862	19,600,272	28,590,378	39,728,074	52,599,186	58,821,957	74,206,865	93,469,504	117,453,513
Consumables inventory	409,767	518,872	657,029	831,970	1,053,492	1,333,997	1,689,190	2,138,957	2,708,480	3,429,645	-
Pre-paid building rent	360,000	396,000	435,600	479,160	527,076	579,784	637,762	701,538	771,692	848,861	-
<b>Total Current Assets</b>	<b>3,269,767</b>	<b>7,583,840</b>	<b>13,247,490</b>	<b>20,911,403</b>	<b>30,170,946</b>	<b>41,641,855</b>	<b>54,926,138</b>	<b>61,662,452</b>	<b>77,687,037</b>	<b>97,748,010</b>	<b>117,453,513</b>
<i>Fixed assets</i>											
Land	-	-	-	-	-	-	-	-	-	-	-
Building/Infrastructure	2,875,620	2,588,058	2,300,496	2,012,934	1,725,372	1,437,810	1,150,248	862,686	575,124	287,562	-
Machinery & equipment	7,582,000	6,444,700	5,307,400	4,170,100	3,032,800	1,895,500	758,200	14,372,520	12,216,642	10,060,764	7,904,886
Furniture & fixtures	1,020,000	867,000	714,000	561,000	408,000	255,000	102,000	1,554,074	1,320,963	1,087,852	854,741
Office vehicles	90,900	77,265	63,630	49,995	36,360	22,725	9,090	138,495	117,721	96,947	76,172
Office equipment	3,794,000	3,224,900	2,655,800	2,086,700	1,517,600	948,500	379,400	7,191,947	6,113,155	5,034,363	3,955,571
Medical Instruments	172,000	86,000	206,483	103,242	247,880	123,940	297,577	148,788	357,237	178,618	-
Security against building	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000
<b>Total Fixed Assets</b>	<b>16,614,520</b>	<b>14,367,923</b>	<b>12,327,809</b>	<b>10,063,971</b>	<b>8,048,012</b>	<b>5,763,475</b>	<b>3,776,515</b>	<b>25,348,511</b>	<b>21,780,842</b>	<b>17,826,106</b>	<b>13,871,370</b>
<i>Intangible assets</i>											
Pre-operation costs	482,561	386,049	289,537	193,024	96,512	-	-	-	-	-	-
Software and License	510,000	458,000	406,000	354,000	302,000	265,790	212,632	159,474	106,316	53,158	-
<b>Total Intangible Assets</b>	<b>992,561</b>	<b>844,049</b>	<b>695,537</b>	<b>547,024</b>	<b>398,512</b>	<b>265,790</b>	<b>212,632</b>	<b>159,474</b>	<b>106,316</b>	<b>53,158</b>	<b>-</b>
<b>TOTAL ASSETS</b>	<b>20,876,848</b>	<b>22,795,812</b>	<b>26,270,837</b>	<b>31,522,398</b>	<b>38,617,471</b>	<b>47,671,120</b>	<b>58,915,285</b>	<b>87,170,438</b>	<b>99,574,195</b>	<b>115,627,274</b>	<b>131,324,883</b>
<b>Liabilities &amp; Shareholders' Equity</b>											
<i>Current liabilities</i>											
Accounts payable	-	1,003,804	1,119,996	1,250,875	1,398,527	1,565,377	1,754,255	1,968,468	2,211,898	2,489,116	2,588,373
Export re-finance facility	-	-	-	-	-	-	-	-	-	-	-
Short term debt	-	-	-	-	-	-	-	-	-	-	-
<i>Other liabilities</i>											
<b>Total Current Liabilities</b>	<b>-</b>	<b>1,003,804</b>	<b>1,119,996</b>	<b>1,250,875</b>	<b>1,398,527</b>	<b>1,565,377</b>	<b>1,754,255</b>	<b>1,968,468</b>	<b>2,211,898</b>	<b>2,489,116</b>	<b>2,588,373</b>
<i>Other liabilities</i>											
<b>Total Long Term Liabilities</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<i>Shareholders' equity</i>											
Paid-up capital	20,876,848	20,876,848	20,876,848	20,876,848	20,876,848	20,876,848	20,876,848	20,876,848	20,876,848	20,876,848	20,876,848
Retained earnings	-	915,160	4,273,992	9,394,674	16,342,095	25,228,895	36,284,182	64,325,122	76,485,448	92,261,310	107,859,662
<b>Total Equity</b>	<b>20,876,848</b>	<b>21,792,009</b>	<b>25,150,841</b>	<b>30,271,523</b>	<b>37,218,943</b>	<b>46,105,743</b>	<b>57,161,030</b>	<b>85,201,970</b>	<b>97,362,297</b>	<b>113,138,158</b>	<b>128,736,510</b>
<b>TOTAL CAPITAL AND LIABILITIES</b>	<b>20,876,848</b>	<b>22,795,812</b>	<b>26,270,837</b>	<b>31,522,398</b>	<b>38,617,471</b>	<b>47,671,120</b>	<b>58,915,285</b>	<b>87,170,438</b>	<b>99,574,195</b>	<b>115,627,274</b>	<b>131,324,883</b>

## 12.3 Cash Flow Statement

Calculations											SMEDA
Cash Flow Statement											
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<i>Operating activities</i>											
Net profit		1,143,950	4,427,330	7,469,351	11,032,945	15,194,023	20,126,333	28,040,940	31,281,689	38,841,189	42,563,268
Add: depreciation expense		2,246,597	2,246,597	2,263,839	2,263,839	2,284,537	2,284,537	1,685,040	3,924,906	3,954,736	3,954,736
amortization of pre-operating costs		96,512	96,512	96,512	96,512	96,512	-	-	-	-	-
amortization of license		52,000	52,000	52,000	52,000	52,000	53,158	53,158	53,158	53,158	53,158
Accounts receivable		-	-	-	-	-	-	-	-	-	-
Consumables inventory	(409,767)	(109,105)	(138,156)	(174,942)	(221,522)	(280,505)	(355,193)	(449,767)	(569,523)	(721,165)	3,429,645
Raw material inventory	-	-	-	-	-	-	-	-	-	-	-
Pre-paid building rent	(360,000)	(36,000)	(39,600)	(43,560)	(47,916)	(52,708)	(57,978)	(63,776)	(70,154)	(77,169)	848,861
Accounts payable		1,003,804	116,192	130,879	147,652	166,850	188,877	214,213	243,431	277,218	99,257
<b>Cash provided by operations</b>	<b>(769,767)</b>	<b>4,397,758</b>	<b>6,760,876</b>	<b>9,794,079</b>	<b>13,323,509</b>	<b>17,460,710</b>	<b>22,239,734</b>	<b>29,479,808</b>	<b>34,863,507</b>	<b>42,327,966</b>	<b>50,948,925</b>
<i>Financing activities</i>											
Issuance of shares	20,876,848	-	-	-	-	-	-	-	-	-	-
Purchase of (treasury) shares											
<b>Cash provided by / (used for) financing activities</b>	<b>20,876,848</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<i>Investing activities</i>											
Capital expenditure	(17,607,081)	-	(206,483)	-	(247,880)	(15,790)	(297,577)	(23,257,037)	(357,237)	-	-
Acquisitions											
<b>Cash (used for) / provided by investing activities</b>	<b>(17,607,081)</b>	<b>-</b>	<b>(206,483)</b>	<b>-</b>	<b>(247,880)</b>	<b>(15,790)</b>	<b>(297,577)</b>	<b>(23,257,037)</b>	<b>(357,237)</b>	<b>-</b>	<b>-</b>
<b>NET CASH</b>	<b>2,500,000</b>	<b>4,397,758</b>	<b>6,554,392</b>	<b>9,794,079</b>	<b>13,075,629</b>	<b>17,444,920</b>	<b>21,942,157</b>	<b>6,222,771</b>	<b>34,506,270</b>	<b>42,327,966</b>	<b>50,948,925</b>

## 13 KEY ASSUMPTIONS

### 13.1 Operating Cost Assumptions

**Table 30: Operating Cost Assumptions**

Description	Details
Building rent growth rate	10%
Furniture and fixture depreciation	15%
Vehicle depreciation	15%
Office equipment depreciation	15%
Inflation rate	10.1 %
Wage growth rate	9.7%
Electricity price growth rate	9.0%
Office equipment price growth rate	9.6%
Office vehicle price growth rate	6.2%

### 13.2 Revenue Assumptions

**Table 31: Revenue Assumptions**

Description	Details
Price growth rate	10.1%
Initial capacity utilization	60%
Capacity growth rate	10%
Maximum capacity utilization	90%

### 13.3 Financial Assumptions

**Table 32: Financial Assumptions**

Description	Details
Project life (Years)	10
Debt: Equity	0:100
Discount Rate used for NPV	15%
Discount Rate used for NPV at 50% Debt	13%

### 13.4 Cash Flow Assumptions

**Table 33: Cash Flow Assumptions**

Description	Details
Accounts receivable cycle (in days)	-
Accounts payable cycle (in days)	15

### 13.5 Debt Related Assumptions

**Table 34: Debt Related Assumptions**

Description of Cost	Details
Project Life (Years)	10
Debt: Equity	50:50
Discount Rate	13%
Debt Tenure	5 years
Grace Period	1 Year
Interest Rate (KIBOR+3%)	10.3%

# Small and Medium Enterprises Development Authority

## HEAD OFFICE

4th Floor, Building No. 3, Aiwan-e-Iqbal Complex, Egerton Road, Lahore  
Tel: (92 42) 111 111 456, Fax: (92 42) 36304926-7

[www.smeda.org.pk](http://www.smeda.org.pk), [helpdesk@smeda.org.pk](mailto:helpdesk@smeda.org.pk)

REGIONAL OFFICE PUNJAB	REGIONAL OFFICE SINDH	REGIONAL OFFICE KPK	REGIONAL OFFICE BALOCHISTAN
3 <sup>rd</sup> Floor, Building No. 3, Aiwan-e-Iqbal Complex, Egerton Road Lahore, Tel: (042) 111-111-456 Fax: (042) 36304926-7 <a href="mailto:helpdesk.punjab@smeda.org.pk">helpdesk.punjab@smeda.org.pk</a>	5 <sup>TH</sup> Floor, Bahria Complex II, M.T. Khan Road, Karachi. Tel: (021) 111-111-456 Fax: (021) 5610572 <a href="mailto:helpdesk-khi@smeda.org.pk">helpdesk-khi@smeda.org.pk</a>	Ground Floor State Life Building The Mall, Peshawar. Tel: (091) 9213046-47 Fax: (091) 286908 <a href="mailto:helpdesk-pew@smeda.org.pk">helpdesk-pew@smeda.org.pk</a>	Bungalow No. 15-A Chaman Housing Scheme Airport Road, Quetta. Tel: (081) 831623, 831702 Fax: (081) 831922 <a href="mailto:helpdesk-qta@smeda.org.pk">helpdesk-qta@smeda.org.pk</a>