**MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF**

**KAZAKHSTAN**

**“Kazakh-British Technical University” JSC**

**Faculty of Information Technologies**

**ADMITTED TO DEFENCE**

Dean of FIT,

Professor, PhD

\_\_\_\_\_\_\_\_\_\_\_ F.A. Hajiyev

“\_\_\_”\_\_\_\_\_\_\_\_\_\_\_ 2018

**EXPLANATORY NOTE**

**TO GRADUATION PROJECT (work)**

**Theme**: “Development of intelligent framework for mash-up internet application: WEB-platform”

**Consultant on economic issues: Supervisor**

Professor,

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ N.F. Surname

“\_\_\_”\_\_\_\_\_\_\_\_\_\_\_\_ 2018

**Student**

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“\_\_\_”\_\_\_\_\_\_\_\_\_\_\_\_ 2018

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“\_\_\_”\_\_\_\_\_\_\_\_\_\_\_\_ 2018

**Almaty, 2018**

**MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN**

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**Specialty 5B070200 “Automation and Control”**

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\_\_\_\_\_\_\_\_\_\_\_ F.A. Hajiyev

“\_\_\_”\_\_\_\_\_\_\_\_\_\_\_ 2018

**DIPLOMA PROJECT ASSIGNMENT**

Student: Serik Seidigalimov

Project title: “Development of intelligent framework for mash-up internet application: WEB-platform”

Approved by the KBTU order: № \_\_\_\_\_\_\_dated “\_\_\_” \_\_\_\_\_\_\_\_\_\_\_

Submission deadline: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

List of issues addressed in the diploma project or its brief content:

1. Research section.
2. Implementation of web-platform.
3. Used technologies.
4. Project results.
5. Economic section.
6. Occupational health and safety section.

List of graphics (with precise indication of obligatory drawings):

1. Tables (11).
2. Figures (12).

Consultations regarding the project with indication of respective reasons:

|  |  |  |  |
| --- | --- | --- | --- |
| Section | Consultant  (academic degree, title) | Timeline | Signature |
| Main | Supervisor name and surname,  Position |  |  |
| Special | Supervisor name and surname,  Position |  |  |
| Economic | G.B.Yestekova  Assistant Professor, PhD |  |  |
| Occupational health and safety | S.T. Anarbaeva  Senior lecturer, MSc |  |  |

**DIPLOMA PROJECT WORK SCHEDULE**

|  |  |  |
| --- | --- | --- |
| Sections, issues addressed | Submission deadline | Notes |
| Main |  |  |
| Special |  |  |
| Occupational health and safety |  |  |
| Economic |  |  |

Project supervisor \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ N.F. Surname

(signature)

Student \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_S.A. Seidigalimov

(signature)

Date «\_\_\_\_» \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_2018

**Project sheet**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| № | Format | Designation | Denomination | Quantity | Note |
| 1 | А4 |  | Explanatory note | 2 | 73p |
| 2 | .docx |  | Electronic copy of the diploma project | 1 |  |
| 3 | .pptx |  | Presentation Files | 1 |  |

**ABSTRACT**

The explanatory note contains 73 typewritten pages, 11 tables, 12 figures, list of references – 11 references, 4 appendices.

DEVELOPMENT OF INTELLIGENT FRAMEWORK FOR MASH-UP INTERNET APPLICATION: WEB-PLATFORM

The object of the diploma project is the development and creation of web-platform using mash-up technology with intelligent component

"Research section" provides information about the basis, requirements and purpose of project development.

"Implementation of web-platform" provides the detailed description of step by step creation the project starting from database and ending by designing. Also I described the basic concepts of web technologies.

"Used technologies” provides information about the software tools, different frameworks and programming languages that I used to implement my diploma project.

"Results of the project" section provides information about the user interface and admin page of the completed project.

"Occupation health and safety" includes information on labor, fire and industrial safety and health of workers.

Economic section deals with the profitability, the total revenue and the cost of production in the implementation of the system.

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# INTRODUCTION

Diploma project represents how start-ups ecosystem is constructed and considers why this kind of business is specific compared to already established businesses. The project mostly oriented to the valuation of start-ups and shows that traditional methods of valuing do not provide so much insights. The main purpose of my diploma project to compare start-ups with other types of businesses and provide the most flexible method of valuation so that investors and owners could come to the common agreement.

To realize my main purpose I am going to use a hotel industry, which belongs to the established business, as a comparision to the start-up company. According to my plan I'm going to reflect financial information of both to excel and try to simulate their future incomes and costs. All the simulated data will be shown with the usage of tornado and spider charts. With estimated forecasts to the future cash flows, I will be able to calculate expected Net Present Value of those companies. Having financial information, I will use 2 different methods of company valuation to established business and start-up, where in the result I will get a clear comparision of different types of businesses.

The diploma project is expected to describe the following sections:

1. Research Section;
2. Theory;
3. Methods;
4. Technical implementation;
5. Economic section;
6. Occupational health and safety section.

Now I would like to briefly explain the main idea of each section that were mentioned above. In the Research section, I determine what is a start-up and its advantages and disadvantages. This part describes what kind of problems it meets and why is it important to solve them at the initial stage of start-up. Additionally, I will specify to what kind of professionals, my diploma project will be beneficial.

The next stage of my project is called theory, where I am going to introduce the basis financial aspects of company structure, investments, company valuation.

The section methods considers the ways of company valuation. In this stage I'm planning to describe what kind of traditional ways of valuation exist and focus on new approaches of valuing and distinguish their advantages compared to traditionals.

The next section called technical implementation is the most important part of diploma project. In this stage I am going to reflect the theory in real numbers and run simulations. Based on generated data, there will be constructed a graph that will show us the full picture of this diploma project. Moreover, there will be explained how simulations are working, what formulas are used.

The economic section was based on estimations of human resources exploited in the given diploma project. Creating a software product as well as any other product, must be justified also from an economic point of view. In this section I described calculation of time necessary for creation of web-platform, calculation of payroll and cost of purchased IT equipment.

The occupational health and safety section describes the system of acts of law, social and economic, organizational, technical, medical and preventive arrangements and facilities, ensuring safety, preservation of health and human performance on the job.

The last part of the project will conclude about all argument for and against start-up valuation and its importance. Additionally, based on the simulated data and other estimation, I am going to make some predictions about start-up development in Kazakhstan.

# 1 RESEARCH SECTION

## Start-up definition

The term «start-up» I heard for the first time when I studied in the 2nd course. When I studied in the 2nd course, there was an organization called «Techgarden» that help to new start-uppers to promote their prototypes and find new investors for them. After that I got interested in this direction.

In our 21st century there are a lot of companies that started from almost nothing and rapidly reached the success and become well-known companies. People throughout the world are coming with the bright ideas, work on it and deliver the final innovative product to the society, which in the result will impact on it.

Of course, it is wonderful that some unknown people create such technological products and in the result become millionares, or even billionares. Before, such people start from zero and become rich, the majority of people had an opinion that it is impossible to reach such peaks and the only to be a rich guy is to born in a family of president or in a family of billionare. However, such people proved the opposite and the popularity of such type of business captured the attention of the whole world. Communities talk about start-ups, but the only thing that they know is that it can bring million dollars and they do not understand it even briefly.

There are a lot of formulations of start-ups and each of them sounds differently. According to Timmons and Spinelli (2008) start-up companies are raw companies that have an innovaitve idea that develops into a high-growth company. The success relies on strong leadership from the main entrepreneur and on building a team with complementary talents. Giardino et al. (2014) write that startups are newly created companies with little or no history facing high volatility in technologies and markets. The start-up ecosystem is difficult to predict, because it is dynamic and every time it forces managers to make quick decisions, avoid failures and find a market where their product will be demanded. Actually start-up could be a product that can significantly impact on society and they way we live. Nowadays all start-ups refer to the high-technology sectors, but it does not have to be. According to Giardino et al, the probability of failure of start-ups in first five years of existence is more than sixty percent. On the other side, if start-up will be successful, it can gain 10 times more than it was initially invested.

10x of the investment sounds spellbinding and when people earn such amount of money, it seems that it is so easy. Unfortunately, it is not. What we see on the front-side is only the final product, we just use and do not even try to think how it is working or how it was made, but not everyone realise what is going on the backside. On the backside, programmers think about the structure of the product and try to optimize as much as it's possible, so that it will work properly without crashes. Start-up owners spend massive amount of time to find out investors, who are extremely needed for them, because only money makes money.

The hardest part of job lies on the shoulders of company owners and promouters. They need to convince investors so that they will be interested and invest into project with hope that in future it will become a huge company and they will be part of it, and earn much more money than they invested. Although investors want to put their dollars into modern project, they will not invest immediately. Investors are very smart people and they know how market is constructed and in what way cash is flowing. When they are investing they are trying to take the biggest part of the pie. Owners of a new company do not want to give the major part of equity; otherwise they will lose control over company that they were building for a long time. Such situations come to the question of company valuation, so that each side will get a fair part. This is only a tip of the iceberg, but it enough to understand how difficult start-ups are made.

## 1.2 Problem statement

As it was mentioned before start-up is a new type of business and just like other businesses, it needs financing to realize their idea into product and then it will be promouted to the market. Compared to the old and established businesses, this type of entrepreneurship gain investment from business angels or venture capitalists(risk investors) and from friends and family (Brealey et al., 2011). However, outside investment will bring only small amount of money, because there is a lack of financial history and the business idea was not tested before. At this stage we can clearly see the root of disease of all start-up companies. Most of the good start-up companies cannot rocket, because investors are scared about their money and if there is a little loss, they want to take their money back by which they do not consider future potential. The problem of all investments is that all decisions are made today and right now. Traditional methods of valuation assume that the investment is an all-or-nothing strategy and do not account for managerial flexibility, the concept that management can alter the course of an investment over time when certain aspects of the project’s uncertainty become known (Dr. Jonathan Mun, 2006). Therefore, such kind of approach makes it more risky. Consequently, with the growth of risk, the number of investors will decrease, which in the result leave potential start-ups without financing.

This problem will cause a chain of other issues like how much of equity will belong to investor, what kind of shares he will own and so on. Of course, the whole entrepreneurship is all about negotiation and trading, but in order to negotiate in a particular question both side have to have the same knowledge, otherwise they will never come to common agreement. Therefore, all financial questions about start-ups spin around the problem of valuation.

## 1.3 Target group

Actually this project will be useful for business people and employees. In this ecosystem there exist 3 types: young specialists, investors, and company owners or entrepreneurs.

Founders are first people who will find it beneficial, because compared to investors and young employees, they need to understand their business as clear as its possible. Often, potential start-ups crash because of wrong financial management. Company owners are those people who make decisions and if their business fails, it is because of their management. Therefore, founders are primary target for my diploma project.

Investors are people who are interested in success of the start-up and being part of a team so that in the result it will bring much more money than it was invested. My diploma project is also targeted to investors, because they are part of the system that I’m creating. The diploma project considers the perspective of investors very carefully, because in the result there should be created a bridge so that founders could find a common language with them. The research will include the flexibility of investments, which will positively impact to the deals.

The last category of business ecosystem is young specialists. Usually business environment consider them as labor and they are those who just should do a job, but actually they should understand what they are doing and for what purpose is this. My project will help them understand the whole business environment so that they can see what role do they play.

# 2 Theory

## 2.1 Financial statement

When people talk about any business they only know about such things like revenue, cost and profit. Actually, the financial system of any company is much more complicated. Actually this part of job fully belongs to accountant, but both investors and owners must know how do money flow. Financial statement or report is a formal record for the financial activities and position of a business. Usually financial statement consists of 4 major parts:

* Balance sheet
* Income statement
* Cash flow statement
* Statements of retained earnings or equity statement

These 4 reports reflect the whole picture of the current business. Based on this data company owners or business analysts can figure out is business works properly, if not they can find out where is the problem. Moreover, relying on this financial information and analyzing the performance of the enterpise, businessmans can make predictions for the nearest quartal or year. These statements are the lifeblood of any company and understanding them is key to finding investment opportunities. Each of them will be described futher.

According to Investopedia, which is a world’s leading source of financial content on the web, balance sheet provides an overview of assets, liabilities and stakeholders' equity as a snapshot in time. The date at the top of the balance sheet tells you when the snapshot was taken, which is generally the end of the fiscal year. The balance sheet equation is assets equals liabilities plus stockholders' equity, because assets are paid for with either liabilities, such as debt, or stockholders' equity, such as retained earnings and additional paid-in capital. Assets are listed on the balance sheet in order of liquidity. Liabilities are listed in the order in which they will be paid. Short-term or current liabilities are expected to be paid within the year, while long-term or noncurrent liabilities are debts expected to be paid after one year.

The next financial report is called income statement. Unlike the balance sheet, the income statement covers a range of time, which is a year for annual financial statements and a quarter for quarterly financial statements. This type of financial report provides an overview of revenues, expenses, net income and earnings per share. It usually provides two to three years of data for comparision. The structure of income statement is broken into several parts:

* Income from continuing operations
* Results from discounted operations (if any)
* Extraordinary items (if any)
* Cumulative effect of a change in accounting principle (if any)
* Net income
* Other comprehensive income
* Earnings per share information

The most important part of income statement is income from continuing operations, which includes sales or revenue, cost of goods sold, operating expenses, gains and losses, other revenue and expense items that are unusual or infrequent but not both, and income tax expense.

One of the important financial report is called cash flow statement. This type of financial report summarizes the amount of cash and cash equivalents entering and leaving a company (C.B.Murphy, 2018). The cash flow statement (CFS) estimates how well a company manages its cash position, which means that does company generate enough cash to pay it's debt obligations and operating expenses. In fact, this type is complementary for the balance sheet and income statement, but it is mandatory for any company's financial report. Even though it is like an addition to the previous statements, it has its own specifics. This report allows investors to understand how company's operations are running, where its money coming from, and how money is being spent. On the other hand, it can be used by creditors to determine how much cash is available (referred as liquidity) for the company to fund its operating expenses and pay its debts (C.B.Murphy, 2018). The main components of the statement are:

* Cash from operating activities
* Cash from investing activities
* Cash from financing activities
* Diclosure of noncash activities

Usually the last activity is sometimes included when prepared under the generally accepted accounting principles, or GAAP. Compared to balance sheet and income statement, cash flow statement's specifity is that it does not include the amount of future incoming and outgoing cash that has been recorded on credit (C.B.Murphy, 2018). For example, if somebody bought your product partly, which costs $200, and paid only $100 in income statement it will be recorded as $200, whereas in cash flow it will be recorded as $100. Therefore, this statement is called cash flow statement, because with cash the person paid only $100.

The last part of financial report is statement of retained earnings or equity statement. Equity statement outlines the changes in retained earning for a specified period. It reconciles the begining and ending retained earnings for the period, using information such as net income from the other financial statements. Retained earnings can refer to any any profits made by an organization that it decides to keep for internal use. Additionally, it can be referred to as retained profit, accumulated earnings or accumulated retained earnings. The main purpose of this financial report is to improve market and investor confidence in the organization. It is used like a marker to help analyze the health of the organization.

## 2.2 Investment decision and its valuation

The background of any company are their real assets, which can be used to provide goods and services that are sold to the customers. In our 21st century the bright example is a computer, which is used by different kinds of specialists to print the documents, send emails, create websites and so on. In this ecosystem the decision to purchase a real asset is usually called investment decision. When the company makes many investment decisions to buy real assets during the period is called capital budgetting or capital expenditure (CAPEX) decisions (O.A.Leskisenoja, 2015).

All real assets have their costs and in order to get them, companies finance their investments through financial assets or securities. For instance, it can be bank loans, corporate bonds or stocks to stockholders. With money that has been gathered from investment, company can buy either tangible assets – things that we can see and touch – or intangible assets – for example, company can spend money to do research and development (R&D) (O.A.Leskisenoja, 2015, p.13). The bright example of R&D is a biochemical company's decision to figure out possible results and after that make final decision. Such investment decisions are also included into capital budgetting.

There should be a difference between investment decision and financing decision. Investment and financing decisions are similar to strategy and tactics. In this case, investment decision is a strategy that is for looking for the long-term period purposes, whereas financing decisions are tactics, which is part of strategy and it answers to question how to and they are done in short periods. For instance, investment decision is to buy computers, then to do it company need money and they find it by borrow money from banks (debt financing) or raise money from present or future stockholders (equity financing), which is a financing decision.

However, when money come from outside they are not free and any company has to repay those money to banks, bondholders or as dividend or stock repurchase to stockholders at certain period of time. When company get money it will be spent on financing for the investment decision, but the future income may come one year or even later. It is obvious that to realize the investment to earn money need some time. Therefore, manageres have to plan the financing so that the company remains viable in the period between investment and revenue (O.A.Leskisenoja, 2015, p.13). If this part will be managed wrongly, the company will have delays in paying salaries or buy resources for productions. In wrost case, the company can bankrupt and all the investments will not realized. The consequences of managers' decisions may be crucial, which means that they to come to this problem responsibly and seriously. These people should think whether the is asset is necessary and how effective it will be for production.

The main purpose of any entrepreneurship of any size is to generate profits as much as it is possible. Company owners are trying to steer the company so that the return on equity (ROE) is as high as possible in both the short and long term. Therefore, to reach this they have to invest in real assets that are worth more than they cost. (Brealey et al., 2011). As it was mentioned asset can worth, not cost. However, there is a question what is the value of those assets.

The question of valuation is extremely important. Today we have different kind of products like gold, silver, paper, pencil and etc., which have own price that can be taken directly from existing markets. Unfortunately, such intangibles like research and development or company equipment, which can bring much more money than it costs, is another story. When company is operating there arise a lot of questions, whose answers are only partial with some probability. Mostly, those questions are more futuristic like: how many people will purchase our product in a year, will there be a devaluation of dollar or not, will the costs of salaries change in nearest five years or not? An investment valuation has to be carefully considered to answer questions that are written above. Of course, it is impossible to calculate the valuation in exact numbers, because things are changing everyday and anything could happen, but there should be an approximate evaluation of investment’s worth.

# 3 Methods

## 3.1 Traditional methods

Looking from financial perspective, value is defined as the single time-value discounted number that representative of all future net profitability. Economists distinguish the terms «value» and «market price», and they are not the same. Market price of an asset may or may not be equal to its value. The idea of valuation is to determine the price that closely resembles the true value of an asset (Dr. J. Mun, 2006). There are a lot physical, non-physical, intrinsic, or intangible aspects that can influence on the true value of an asset. Traditionally, there distinguish 3 methods of valuation, which are:

* Market approach;
* Income approach;
* Cost approach.

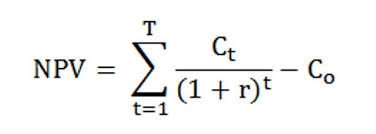
First approach considers the comparable asset in the marketplace and its prices. This method is called market approach, because the value of the asset will be determined by the supply and demand. So that by the law of supply and demand the value of the asset will be force to the equilibrium. It is further assumed that the market price is also the fair market value after adjusting for transaction costs and risk differentials. Sometimes a market-adjustment is warranted to bring the comparables closer to the operating structure of the firm whose asset is being valued. These approaches could include common-sizing the comparable firms, such as performing quantitative screening using criteria that closely resemble the firm’s industry, operations, size, revenues, functions, profitability levels, operational efficiency, competition, market, and risks (Dr. J. Mun, 2006).

The next method is called income approach. Proceeding from the name of the approach, this method focuses at the future potential profit or free cash flow generating potential of the asset and attempts to quantify, forecast, and discount these net free cash flows to a present value. The cost of implementation, acquisition, and development of the asset is then deducted from this present value of cash flows to generate a net present value. Often, the cash flow stream is discounted at a firm- specified hurdle rate, at the weighted average cost of capital, or at a risk-adjusted discount rate based on the perceived project-specific risk, historical firm risk, or overall business risk.

The last method called cost approach, works similarly to the income approach. The key word is a “cost”, therefore this way of valuation consider the cost a firm that would incur if it were to replace or reproduce the asset’s future profitability potential including the cost of its strategic intangibles, if the asset were to be created from the ground up. Although the financial theories underlying these approaches are sound in the more traditional deterministic view, they cannot be reasonably used in isolation when analyzing the true strategic flexibility value of a firm, project, or asset.

## 3.2 Discounted cash flow

The traditional valuation methodologies that were described above are based on the Discounted cash flow (DCF) method. It is used to estimate the attractiveness of the investment opportunity. According to the information provided by Investopedia, DCF analyses use future free cash flow projections and discounts them, using a required annual rate, to arrive at present value estimates. A present value estimate is then used to evaluate the potential for investment. The difference between present value and investment is called Net Present Value (NPV), and if NPV is positive, then it means that there may be a good opportunity. The formula for NPV is futher:



Where: t – year, Ct – is cash flow for year t, C0 – initial investment, r – discount rate.

The main purpose of DCF analysis is to figure out will investor gain money from his investment, adjusted for time value of money. The reason for discounting future money for the present time is that value of money devaluate over time. The time value of money is the assumption that a dollar today is worth more than a dollar tomorrow, because prices of goods and services increase and so on. Knowing this information, we can consider a simple example. Suppose that we have 2 choices:

1. Get 100000 dollars today
2. Wait 5 years and get 150000

Fortunately, we know the formula and let's consider the discount rate about 10%.

150000/ (1+0.1)5 = $ 93135, which is less than $ 100000.

Therefore, choice A is much better, because 150000 after 5 year will worth only 93135. That was the basic concept of discounting and for investment it work in the same way.

## 3.3 Real options valuation

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