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# A Investment Preliminary Study for the distribution of Internet, in the rural areas of Kosovo

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**Abstract.** According to daily reports, the income from internet services is getting lower each year. Landline phone services are running at a loss, whereas mobile phone services are getting too mainstream and the only bright spot holding together cable operators (ISP) in positive balance is the income from broadband services (Fast internet, IPTV). Broadband technology is a term that defines multiple methods of information distribution through internet at great speed. Some of the broadband technologies are: optic fiber, coaxial cable, DSL, Wireless, mobile broadband, and satellite connection. The ultimate goal of any broadband service provider is being able to provide voice, data and the video through a single network, called triple play service. The Internet distribution remains an important issue in Kosovo and particularly in rural zones. Considering the immense development of the technologies and different alternatives that we can face, the goal of this paper is to emphasize the necessity of a preliminary study of such investment and to give an experience in this aspect. Because of the fact that in this investment are involved many factors related to population, geographical factors, several technologies and the fact that these factors are in continuously change, the best way is, to store all the data in a database and to use this database for different results. This database helps us to substitute the previous manual calculations with an automatic procedure of calculations. This way of work will improve the work style, having now all the tools to take the right decision about an Internet investment considering all the aspects of this investment.

**Keywords:** broadband technology, triple play, database, return of investment, accounting, etc.

## 1 Introduction

Investment decisions are always conditioned by numerous factors. Some firms invest as a response to a favorable economic situation, possibly unexpected, while others invest due to expected higher demand over the medium or long run. This may co-exist with firms that do not invest at all simply because they have already achieved their desired capital stock [1].

The objective of this article is to give a methodology in investment forecasting related to the Internet Distribution in rural zones of Kosovo.

The existing situation in Kosovo, related to the Internet use is as follows:

In the rural areas and in the whole Kosovo the economic state has been in a rough position. A factor that could help soothe this condition is the growth of investment so that we can have limitless faster Internet. This can be achieved through investment in broadband technology [2]. This would also help that the enterprises in rural areas to sell their products through the internet.

This situation dictates the emergency of the Internet distribution in rural zones where the Internet does not work. The Internet impact is evident phenomena today in all the society and it is an imperative task to make it available in all the rural zones.

Up to now, there was not used a forecasting methodology in such an investment in Kosovo. However the experience gained in this field makes us to think that we have to forecast the future investments.

This investment is conditioned by a numerous factors such as geographical, social and economical. In this article an experience is given how the information about these factors is organized in a database and how this database helps us for a forecasting investment in the field of the Internet distribution.

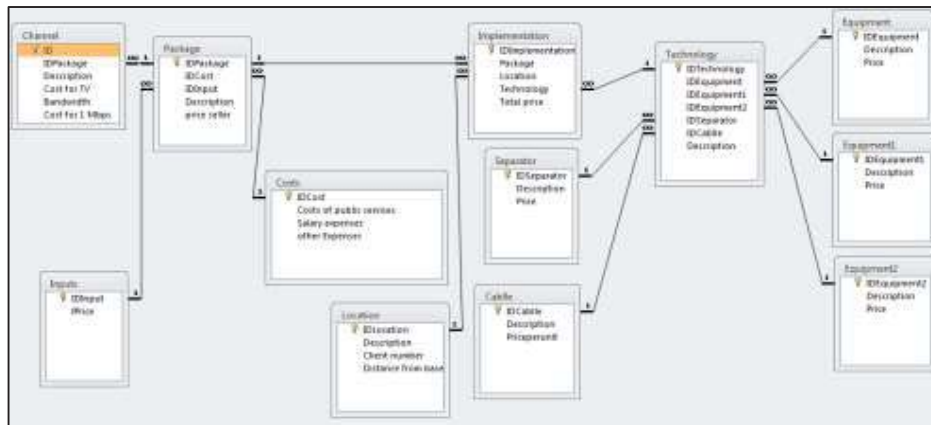
## 2 Organizing the data in the database

As the result of the information analysis done the following entities are defined [3]

**Table 1.** Organizing Data

Channel	The channel entity has four TV channels with two options each.
Inputs	The Inputs entity shows the number of Tv companies and the price they need to pay to be put on offers.
Packages	Entity Packages shows the selling prices of the packages.
Costs	Entity Costs shows the fixed prices that are created during the work.
Location	Entity Implementation shows which package in which place and with what price is implemented.
Implementation	Entity Separator shows the kinds and the prices of the used separators.
Separator	Entity Cable describes the kinds of cables and their prices used in the investment.
Cable	Entity Technology describes the equipment and the used cables in the technologies we have implemented
Technology	Entities Equipment, Equipment1 and Equipment2, describe the kind of equipment used and their prices.

Where the relationship between them is shown in the picture 1 [4].



When the investing firm looks at the decisions of the investing capital, it does not take into account that it is dealing with the perfect market, the competition. It might have only a few competitors which are specialized in these particular business geographic areas, and it might have some unique assets (wealth), that will offer a priority towards other competitors [5].

## 3 Some Analysis Operation using the Database

### The invested amount

We use a calculated query field in a query that combines the tables: Location, Separator, Cable, Technology, Equipment, Equipment1, and Equipment2.

Associated by the formula

$$\begin{aligned}
 \text{Invested Total: } & ([client\ number] / [Equipment\ number\ of\ clients]) * [Equipment.price] + [client\ number] * [Equipment1.Price] + [client\ number] * [Equipment1.Price] + [Distance\ from\ base] * \\
 & [priceperunit] + (([client\ number] / [Equipment\ number\ of\ clients]) * [Equipment\ ports]) * \\
 & [Separator.price]
 \end{aligned}$$

### 3.1 Investment on a customer

To calculate the investment on a customer, then we use the fields and the calculations of the above query:

$$\text{Investment per Client: } [Invested\ Total] / [client\ number]$$

The query you can see above, calculates the investments on one client according to the prices of the equipment we have used, number of the clients, and the distance from the base of transmission.

### 3.2 Estimating the amount invested in other technologies (dsl)

We use a calculated query field in a query that combines the tables: Location, Separator, Cablle, Technology, Equipment, Equipment1, and Equipment2.

$$\text{Invested total: } ([client\ number] / [Equipment\ number\ of\ clients]) * [Equipment.price] + [client\ number] * [Equipment1.price] + [client\ number] * [Equipment2.price] + [Distance\ from\ base] * [price\ per\ unit] + [separator.price] * [client\ number]$$

In the case of gpon technology the used formula was:

$$\text{Invested total: } ([client\ number] / [Equipment\ number\ of\ clients]) * [Equipment.price] + [client\ number] * [Equipment1.price] + [client\ number] * [Equipment2.price] + [Distance\ from\ base] * [price\ per\ unit] + (([client\ number] / [Equipment\ number\ of\ clients]) * [Equipment\ ports]) * [separator.price]$$

There where the two formulas differ, are underlined

### 3.3 Calculation on investment return

The company which implements this business is interested on the time of investment return, that is to say that in the optimal offer the return on investment to be as immediate as possible. To calculate the return on investments (ROI – return of investments) first you have to find out the gross profit. The bruto profit tells the difference of the general income and the cost (costs are a measurement with monetary terms of the amount of resources used to generate revenue) of the sold services. (gross profit = inputs – Cost of services sold). After we find the bruto profit, then we find the profit before the tax [6]. The profit before the tax is calculated as a difference between the bruto profit and the costs. (profit before tax = gross profit – expences). Then, the profit before taxes, is multiplied by the value on the tax, then we get the tax (tax = profit before taz \* tax value). Whereas the neto profit (neto profit is the difference between the profit before the tax, and the tax calculated in this profit) [7]. All of these form the statement of income. So, the income statement is financial statement that shows the financial performance of a company in a period of time (monthly, quarterly or yearly) [8]. Also it is called a profit statement or a loss statement.

**Table 2.** Monthly Incomes

Inputs	1
Cost of services sold	2
GROSS PROFIT (1-2)	1 - 2
Public services expenses	3
Salary expenses	4
Other expenses	5
EXPENCES	3 + 4 + 5
PROFIT BEFORE TAX (I-II)	(1 - 2) - (3 + 4 + 5)
Tax 20 %	((1 - 2) - (3 + 4 + 5)) * 0.2
NET PROFIT (III-Tatimi)	((1 - 2) - (3 + 4 + 5)) - (((1 - 2) - (3 + 4 + 5)) * 0.2)

First off, we have to say, that a business is effective and efficient only if it successful in offering the goods and services required by clients, and if it keeps their costs lower than the prices of their sale [9].

After all of these are calculated then we can find the return of investments, which can be found through this formula [10].

$$\text{Investment return (ROI)} = \frac{\text{profit}}{\text{invested total}} * 100 \%$$

The formula you can see above presents the return of investments according to percentage, whereas the formula of the return of investments according to months is below:

$$\text{Investment return (ROI)} = \frac{\text{invested total}}{\text{profit}}$$

Now we will find return of investments according to the offered packages (Package 1 –Package 8) in an auto matic way through the queries of the database. From the table above we can see that we have to find the revenues and the cost of sold services.

### 3.4 Calculating the revenue and the costs

We use a calculated query field in a query that combines the tables: Channel, Inputs, Packages, Costs, and Location.

with the following formula:

$$\text{Cost of services sold: } [\text{client number}] * [\text{Cost for TV}] + [\text{Bandwidth}] * [\text{Cost for 1 Mbps}]$$

The field *Expences* adds three kinds of costs which happen during the activity of an enterprise. The formula is below.

$$\text{Costs: } [\text{Costs of public services}] + [\text{Salary expenses}] + [\text{other Expenses}]$$

We showed above that in the offered packages we can put others channels which are self-offered. Than its setting in the package will be done through the field *other inputs*. Here is the formula:

$$\text{other inputs: } 10 * [\text{input price}]$$

Number 10 in the formula above tells that there are 10 other TV channels placed in the package and that each of them has to pay the provider the price of € 2000. The latest field of this query is the field *inputs*, which is formed by the formula below:

$$\text{inputs: } [\text{client number}] * [\text{price seller}] + 10 * [\text{input price}]$$

So we get the income from multiplying the number of clients with the costing price of the plus package from multiplying 10 other channels that are put in the package.

### 3.5 Calculating the neto profit

We use a calculated query field in a query that combines the tables: Chanel, Inputs, Packages, Costs, and Location.

See the formula below.

$$\text{Gross Profit: } [\text{inputs}] - [\text{Cost of services sold}]$$

The field *Costs* is established after the infrastructure arises for the commencement of preparation and the company starts its activity. Namely, this sums up some operating expenses (operating expenses are those expenses which are crated when the enterprise starts the production or serving process) and which are: *Costs of public services*, *Salary expenses*, and *other Expenses*. The next field is *Profit Before Tax* which is made when we subtract the cost from the bruto profit. See the formula below.

$$\text{Profit Before Tax: } [Gross Profit] - [Costs]$$

The next field is the field *Tax* which we obtain when the field *Fitimi para tatimitis* multiplied by the value of the tax. Below you can see how we have calculated the tax from the profit before tax, if the value of the tax is 20 %. Look at the formula below.

$$\text{Tax: } 0.2 * \text{Profit Before Tax} = 0.2 * ([Gross Profit] - [Costs])$$

And the last field and our goal is the field *Net Profit* which is obtained if from the field *Profit Before Tax* we subtract the calculated tax on it. You can see the formula below:

$$\text{Net Profit: } [Profit Before Tax] - [Tax]$$

Now we will build a graphic which gives us the comparison of all the neto profit for all the packages.

### 3.6 Calculating the investment on a client

We use a calculated query field in a query that combines the tables: Channel, Inputs, Packages, Costs, Location, and Technology.

$$\text{Invested Total: } ([client number] / [Equipment number of clients]) * [Equipment.price] + [client number] * [Equipment1.Price] + [client number] * [Equipment1.Price] + [Distance from base] * [priceperunit] + (([client number] / [Equipment number of clients]) * [Equipment ports]) * [Separator.price]$$

The field *InvestimiPerKlient* is calculated as you can see below.

$$\text{Investment per Client: } [Invested Total] / [client number]$$

### 3.7 Calculating the return of investment by month

We use a calculated query field in a query that combines the tables: Chanel, Inputs, Packages, Costs, and Location.

The field *return of investment* is obtained through the formula below:

$$\text{Return of investment: } [Invested Total] / [Net profit]$$

So we can see here that for all the offered packages from the provider, the investment sum is the same, whereas the difference is made from the neto profit which is created from the packages.

### 3.8 Calculating the rate of investment returns

The field *Return of investment by rate* is obtained through the formula below:

$$\text{Return of investment: } [Net profit] / [Invested Total] * 100$$

## 4 Conclusion

Investments developed according to a previous plan that studies the market well are welcomed. In places like Kosovo, investments are vital for the population, and this is especially related to the possibility of increasing the revenue of the businesses. Such an investment is the distribution of broadband technology in rural areas so those places can have limitless internet. This would create the opportunity that businesses which are in rural areas sell through the internet and that client can previously see if there are the needed products in those businesses.

Our contribution has been creation of the databases with the technology information and other factor information which have to be considered in such investment like distribution of the Internet in rural zones. Besides calculating the sum of investments, the purpose of creating the database has been the automatic calculation of return on investments, which a potential investor might be more interested in.

The methodology proposed in this article is a practical and efficient approach for a preliminary study of an investment in the Internet distribution in rural zones.

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