

**Analysis, Design and Implementation of  
the Albanian Post Management System,  
e- Albanian Postal Services (e-APS)**

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# **Analysis, Design and Implementation of the Albanian Post Management System, e- Albanian Postal Services (e-APS)**

**By**

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Department: Business Informatics

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## **DEDICATION**

I dedicate this work and all my efforts and successes during these three years of study to my precious family. To my wonderful mother and father for their endless sacrifices that have done for my life and their pure love and support offered to me in every step of my life, to my lovely little sisters which are my inspiration muses, to my uncles, to my dear grandparents for which I am so lucky to have in my life and also to my grandparents that unfortunately are gone especially to my grandmother whose last wish was to live just one more year to enjoy my graduation and see my diploma but sadly the destiny did not allow her to have this pleasure. I want for all these people to feel proud of me and in particular I wish to be a good model to follow for my sisters.

## ABSTRACT

**Faculty of Architecture and Engineering**  
**Department: Business Informatics**

**Advisor:** Igli Hakrama

E-Albanian Postal Services (e-APS) is a system which includes administrator, employee and customer online protected accounts that can be accessible from every computer in any time by the owner of these accounts in order to use different system functionalities.

This system will facilitate the job of the workers since the data will no more be recorded manually in handwritten notebooks and so on the service quality, efficiency and performance will be increased and the costs will be cut off.

The clients will get information about their packages online very fast and directly from their homes. They do not need to go to the post offices every time they are waiting for a new package to arrive. They can also view their records history and see the packages that are taken and the ones that are not. This option will prevent problems like being confused for a package if it is taken or not.

For example a real current problem that occurs is: The customer has taken the package, but he does not remember and he goes again to the post office to take the same package which is not any more in the inventory and what happens is that the employee searches and searches for it and does not find that package, then she has to open the record's books and check all the records in order to find if it is taken or not. At the end she finds that it is taken but a long time is wasted from these processes and a huge waiting line is created. But by implementing the system this problem will be solved.

Also the notification will be sent electronically to the customers directly in the moment when the packages are registered to the post office.

These and much other functionality will make this system to be very successful and useful for our society.

**Keywords:** eAPS, system, functions, software analysis, economic analysis, customer satisfaction, study, survey,

## ABSTRAKT

**Fakulteti i Arkitekturës dhe Inxhinierise  
Departamenti: Informatike Ekonomike**

**Udheheqes:** Igli Hakrama

E-Sherbimet Postare Shqiptare (e-SPS) eshte nje sistem i cili perbehet nga llogari online te administratorit, punonjesit dhe klientit te cilat jane te aksesueshme nga i zoti i llogarise ne cdo kompjuter dhe ne cdo kohe ne menyre qe te perdoren funksionalitet e sistemit.

Ky system do te lehtesoje goxha punen e punonjesave duke qene se te dhenat nuk do te rregistrohen me manualisht neper bloqe me shkrim dore dhe si rrjedhoje kualiteti, efikasiteti and performanca e sherbimit do te rriten dhe kostot do te shkurtohen.

Klientet do te marrin informacione rreth paketave te tyre online, shume shpejt dhe direkt nga shtepia. Atyre nuk do u duhet per te shkuar tek zyrat postare cdo here qe ato presin nje pakete te re. Gjithashtu ata mund te shikojne historine e tyre dhe te shikojne paketat qe i kane terhequr dhe ato qe nuk i kane terhequr. Ky opzion do te parandaloje probleme si to qenurit konfuz nese nje pakete eshte terhequr apo jo.

Per shembull nje problem qe ndodh konkretisht per momentin eshte: Klienti e ka terhequr me pare paketen por per arsyte te ndryshme ai nuk e mban mend mire kete fakt keshtu qe ai shkon perseri ne poste per te terhequr te njejtën pakete e cila nuk ndodhet me ne inventarin e postes dhe cfare ndodh eshte qe punonjesi e kerkon dhe e kerkon paketen dhe nuk e gjen, me tej ai hap rregjistrat per te pare cdo rregjitim te paketave dhe per te pare nese eshte terhequr apo jo. Dhe se fundmi shikon qe paketa eshte terhequr por nderkohe nje kohe e gjate eshte harxhuar dhe nje rradhe shume e madhe eshte krijuar. Por duke implementuar sistemin ky problem zgjidhet me se miri.

Gjithashtu lajmerimet do te dergohen ne menyre elektronike tek klientet qe ne momentin kur paketa rregistrohet ne zyren postare. Keto dhe shume funksione te tjera do ta bejne kete system te jete shume i sukseshem dhe i vlefshem per shoqerine tone.

**Fjalet kyce:** eAPS, sistem, funksion, analize software-i, analize ekonomike, studim, pyjetesor.

## ACKNOWLEDGEMENTS

I would like to express my very great appreciation to the staff of Epoka University, to all the professors who have taught me the fundamentals of Economic and Computer Engineering Sciences.

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I am particularly grateful for the assistance given by my sister Klaudia in collecting data for my study and supporting for my thesis.

My special thanks are extended also to my family for their support, encouragement and presence in every step of my life.

Thank you all!

## **DECLARATION**

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Epoka University or other institutions.

Adela Tufina

June 2014

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## CHAPTER 1

### INTRODUCTION

Albanian Post is one of the most powerful postal service companies in Albania but unfortunately there are some problems related to the service and procedures of distribution of the parcel.

While investigating the opinions of the Albanian Post's current clients about the customer service in the post office it resulted that several problems occurs during the distribution process like: late notification deliveries, huge waiting queues, slow service, time wasted client information service and many other ones and unfortunately most of the customers are not satisfied with the service. On the other hand critical eyes have analyzed the performance of the staff which is responsible for handling with customers' requests and it has been concluded that they work hard on their duty but for them is impossible to handle all the customers' requests since the same person is responsible for registering the data of the packages and customer, go and find the packages in the inventory and write bills and the worst is that everything is done manually. For these problems it is needed to find a solution how to make the service more efficient, how to increase the service response time and speed and how to facilitate the job of the workers as well as the customers' requests.

As it is easily seen the main problem of the postal service is that most of the work is done manually. The information is stored in handwritten notebooks. This decreases a lot the response time of the service. The slow service procedure causes a huge waiting queue and the customers are very dissatisfied. In order to resolve this problem, a system is designed that will do most of the work automatically. The system is called e- Albanian Postal Services (e-APS).

The system will manage all the information needed for each record in the post office regarding to the packages received or sent. The administrator will have direct access to the database; will see all the incoming packages, outgoing ones, customers and

employees. The administrator will have the privilege to create, edit and view employee's accounts. The Data-enters and Client-Service Employees will have a username and password to log in in the system. The data-enter puts into the database all the information about the incoming packages. If the receiver customer already has an account to the system directly an electronic message is sent to him in order to notify that a package has arrived for him and he can go and get it to the post office. If not than the data-enter writes a handwritten notification to be delivered by the postman to the receiver. The data-enter can also view all the records written for incoming packages and query them. Customers can see the info of their packages, sent or received. Can read messages for the notifications sent by the data-enter. See the status of their package. For example If they have taken it or not, can calculate the shipping fee, find a zip code, reserve an appointment, check the waiting queue status etc. Incoming-Client-Service Employees can query about the packages in the system, see if they are taken or not. If the package is not taken and it is distributed to the receiver than the employee must update the package to taken. Outgoing-Client-Service employees can enter to the system the information about the outgoing packages. Simple guests can be signed up as customers by entering the required information by the system. These and other functions will be explained in details on chapter 4, Software Analysis and Design.

This product is thought to be very useful. Today the technology is in its highest levels and it should be used anywhere where is possible in order to facilitate our life. The Albanian Post is in an urgent need to use the technology in their daily operations in order to provide a better service to its customers and be more effective and lower costly. The primary stakeholders are the employees as well as the customers.

To enforce and prove that this idea is a good one a study is done which consists on evaluating the current customer satisfaction level to the post office as well as obtaining customer opinions about the software idea. A detailed analyze of the study is found on Chapter 3, Case Study and Economic Analysis. There are found statistical analysis, econometrics model, regression analysis and forecasts in the increase on the overall customer satisfaction level supposing that the software will be implemented.

This system is a web based one and so there are used different web technological tools in order to build and develop the software in dynamic way and as much efficient as

possible. The technologies used are: Hypertext Markup Language, Hypertext Preprocessor, Cascading Style Sheet, JavaScript and MySQL.

These technologies will be explained in details in chapter 5, Implementation. In this chapter it is also found an overview of the interface and functionalities of the system inside by showing up also snapshots of the program.

## CHAPTER 2

### LITERATURE REVIEW

This chapter consists in describing the global background and the advantages of digital management systems. Here will be shown the solutions offered from others for solving problems faced by the posts worldwide and also the importance of customer satisfaction and the factors that affect to it will be analyzed.

#### **2.1 Advantages of web-based and digital management systems.**

Web-based systems have many advantages in term of efficiency and costs compared to telephone-based methods, printed materials and walk-in offices that offer services to citizens. In today world the institutions, businesses and customers are willing to use technological innovations and prefer to use digitalized systems in order to facilitate their everyday operations. Some of the main advantages that have made the digitalized systems become one of the most important tools for businesses are the following [1]:

*Faster response:* Digital systems respond immediately. They offer information and respond to different requests 24 hour in 24 hours of the day and 7 days in a week.

*Lower costs:* Salaries, office spaces and printed materials considered all together are much more expensive than computer systems. So definitely the computer systems cut the costs for the companies.

*Up-to-date information:* Digital systems store all the information in real-time databases which are updated daily and so on these systems can provide efficient and fast access to millions records in the database.

*Reduce paper works:* Since all the data are stored in computerized databases there is no need to manually store them in printed papers.

*Eco-Friendly operations:* As stated above the printed papers will be reduced in huge quantities and as a consequence the environment will be protected from these anti-environmental materials.

*Large data management and record keeping:* As records increase day by day the difficulties of manually managing them increase in exponential levels, so the best solution is to manage them by a digital and dynamic system.

## **2.2 Post office management systems examples in the world**

The United States Postal Service (USPS) [2] has implemented a web based and also a mobile system to offer real-time and efficient information to their citizens about the postal services. Some of the functionalities provided from this system are: scheduling pickups for the next day, find a Post Office or an Approved Postal Provider and all the necessary information like last collection time, working hours and special hours, request to hold the mail when being away and keep safe the mails at local Post Office until coming back home, look up a zip code, calculate shipping prices, order different postal supplies etc. The customers have found these options really interesting and useful. Day by day more people become users of this system.

Canada Post [3] has almost the same system as USPS. It offers to find parcel delivery standards, post offices, rates, postal codes and addresses. It allows the users to view information about postal services, track items, ship in a click and forward mail.

FedEx [4] system allows the users to create a shipment, ship with credit card, get transit time and rates, schedule a pickup, open a FedEx account, view and pay online bills, online shipping services and order supplies.

United Parcel Service (UPS) [5] is another postal service company that has implemented a system which allows users to create their UPS account, track items, find locations, calculate time and shipping costs, get detailed shipping history and orders supplies.

DB Schenker [6] also offers an online account for the customers which provide problem free scheduling, pricing, booking and tracking by means of uniform global access.

These and many other shipping companies worldwide have implemented web based applications in order to offer to their clients real-time information and facilitate

their operations. These systems have been very successful and the customers and companies have found these very useful.

Now it's time for Albanian Post to make improvements and offer services to the same levels as global best companies.

### **2.3 Importance of customer satisfaction**

Customer satisfaction is a subject that has gained the attention of the researchers worldwide. To become a successful business the level of customer satisfaction should be very high; otherwise most probably the things would go down and down. But why is it so important in business life? It is, because it is the main key that helps the managers to improve the businesses by becoming closer to the customers and more preferable to them. As Ross Beard [7] has concluded from his study there are 6 main reasons why customer satisfaction is so important to businesses. First it's a leading indicator of consumer repurchase intentions and loyalty. If the customers are satisfied with the business they prefer more to stay as a continuous customer of the company rather than search for a new similar company to get what they want. Second it's a point of differentiation. High level of customer satisfaction is the main goal that each company should have, because if the business reaches this goal then the profit goal is already reached. Third it reduces customer churn. Fourth it increases customer lifetime value. As we mentioned above if a customer is satisfied with a business he is more willing to stay in that business rather than to go to another business which may have different purchase procedures or the customer may have some fear that the quality is not as it seems and so on the customers does not want to start from the beginning everything and decides to continue the relationship with the business that he already is used to. Fifth it reduces negative word of mouth. Unfortunately the word of mouth is spread very fast and it is like a poison to the company that leads it toward failure, so the businesses may be very careful to avoid this factor. And lastly it's cheaper to retain customers than acquire new ones. When the business already has taken a customer it does not have to pay any more to get his attention since the customer already knows the company.

## 2.4 Factors that affect customer satisfaction

It is found by Ken West [8] that some of the main factors that affect the customer satisfaction are:

*Service quality:* No matter how much marketing the businesses will do on a service they offer, if the service is not one with high quality everything is wasted and the business has reserved the way to failure.

*Technology and accessibility of the service:* accessing the service is related to web site and search engine optimization. The clients does not want to have barriers in accessing every info that they want so being as much as possible transparent to them is a key to success. The perfect way to follow in order to be closer to your customers is using the latest technologies and information access methods

*Face value:* The business should always offer great customer service and treat their customers as they are kings of their kingdom.

*A nice atmosphere:* Of course a friendly atmosphere can increase the level of the satisfaction as well as bringing new customers to the company.

*Waiting time:* Customers always want to get what they want in the fastest time possible, so the companies should be able to offer flexible and fast service to their clients.

*Responsibility and company care:* The company should be responsible towards their clients as well as they should pay attention to every suggestion they made in order to make further improvement.

## CHAPTER 3

### CASE STUDY AND ECONOMIC ANALYSIS

This chapter consists in economic analysis related to the market evaluation about the Post Management Software. A study is made up about the current customer satisfaction level to Albanian Post and from the data gathered from this study the opinions of real customers are evaluated about the implementation of software then it is worked with statistical analysis, econometrics model, regression analysis and forecasting the increase in the overall customer satisfaction level supposing that the software will be implemented and used.

#### **3.1 A Case Study in Albania (*Albanian Post*)**

##### ***3.1.1 The steps followed to find and evaluate the factors that have impact on customer satisfaction***

First the sample that participated in the study was targeted. Then a survey was created which provided enough information to build variables for the model. After that the survey has been distributed to the target sample to get the responses of random individuals. All the responses have been gathered and recorded to a table that provides all the raw data that is needed for the study. After all these steps were done the statistical analysis were developed, the econometric model was built and the econometrics analysis were provided.

##### ***3.1.2 The sample and aim of the study.***

The focus of this study topic is to evaluate the customer satisfaction level depended on different factors like service quality, service speed, staff efficiency etc. For this study an Albanian service company, the Albanian Post is chosen, so the sample consists of a random selection of Albanian Post customers. The aim of this study is also to show the importance of software innovations implementation into the business and the impact of it on customer satisfaction and work efficiency.

### ***3.1.3 Survey creation, distribution and data gathering.***

A survey was sent out to real customers of the company. The survey format is found at appendix A. The study is focused only at the distribution of parcels and insured parcels to the customers. There were gathered a total of 73 responses from the customer target. All the data were initially registered in an excel table in order to be more easy to work with them.

Nr.	Quality	Fee	Organization	Speed	Efficiency	Notifications	Procedure	Cleanliness	Registration	Waiting queue	Voice Windo	Satisfaction	Mean	Implementation	Account	Age	Sex	Profession
Nr.	Kualiteti	Pagesa	Organizimi	Shpejtësia	Efikasiteti	Lajmerimet	Procedura	Pastertia	Rregjistrimi	Rradha	Spotelet	Pelqimi	Mesatarja	Implementimi	Llogaria	Mosha	Seksi	Profesioni
1	1	1	0	1	1	1	1	0	-1	-2	-1	0.181818	1	1	1	30	0	Bankiere
2	1	0	1	0	0	1	-1	-1	-1	1	0	0.090909	2	1	1	21	0	Studente
3	1	0	0	-1	-1	0	1	-2	0	-2	0	-0.36364	4	1	1	21	0	Studente
4	-1	1	1	0	0	2	-1	2	-2	-2	-2	-0.18182	3.5	1	1	22	0	Studente
5	-1	0	0	-1	-1	-1	1	0	0	-2	-1	-0.54545	0.5	1	1	21	1	Student

**Figure 1(Customer's Replies Database)**

## **3.2 Statistical Analysis.**

### ***3.2.1 How the postal service quality can be increased***

Out of the entire sample participated in the study, 35% answered the open question “How do you think the postal service quality can be increased?” and 85% of them gave the answer that the solution was to develop a computerized management system to handle and register all the transactions that actually are registered manually on notebooks which is such an old fashioned way of managing information and so much time consuming and costly for both customers and post office itself.

### ***3.2.2 Customers opinions about software implementation in Albanian Post and their relation with technology and internet connection***

The average age of the customers was found to be 27, which means that the majority of the customers belongs to the new generation of the population and as other studies has shown; the new generation is very flexible with technology and is a fan of it.

Two important questions were made in the questionnaire in order to forecast somehow the success and usage level of the software. The first question was: "Do you think that the implementation of the software where every transaction will be recorded automatically and the notifications will be delivered to you in real time will increase the service speed?" And the second question was: "If it was possible that you can have a personalized account where you can check all your transactions in the post and the notifications can be sent to you electronically would you be willing to create and use this account?"

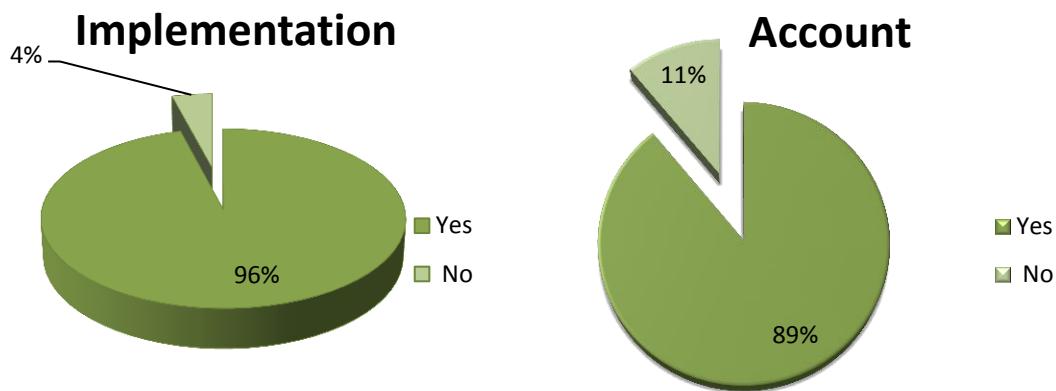


Figure 2(Opinions about the software)

From the answers obtained for the above questions it resulted that 96% of the customers stated that they find really useful the implementation of a management system software to Albanian Post and 89% of them were willing to use a personalized account where they can find all their transactions data online in real time, without needing to go to the post office and wait in the queue just for asking if their package has arrived in Albania or wait for the notification to come in the house after some days.

From these data it is easily concluded that there is a very high possibility that the software will have success and will be very useful to customers as well as to the Albanian Post since more and more customers will be involved in the system the more the costs of the post will be decreased. On the other hand the possibility to increase the overall customer satisfaction will be also very high since the software is directly related to service efficiency, speed, quality and other factors which are very significant to the

customer satisfaction and will be analyzed in details later on in the model presented at the econometrics studies section.

Since this software consists of a web based application its primary requirement is internet connection so there is found some important data published from AKEP [9] related to internet usage in Albania. From the data in the table below it is found out that the total number of subscribers with fix and mobile (3G) broadband has been increased by 24% from 2011 to 2012. The total number of subscribers of fix broadband has been increased by 16% from 2010 to 2011, from 2011 to 2012 there was again an increase of 15% and from 2012 to the first half of 2013 there was an increase of 5%. It is easily concluded that the trend of internet usage in Albania is going up and up, so there exists a sufficient market for web application innovations in Albania.

	Albtelecom	Abcom	Abissnet	ASC	OA te tjere	Total Fiks	AMC	Vodafone	EM	Total Fiks +3G
2010	70,597	13,575	7,000	5,666	23,162	120,000				120,000
2011	60,055	29,321	15,321	10,129	24,871	139,697	9,000	25,493		174,190
2012	66,757	35,870	17,719	11,777	27,965	160,088	17,833	37,572		215,493
2013/1	67,855	41,980	18,982	10,309	28,642	167,768	17,971	21,049	2,882	209,670

Figure 3(AKEP-Internet usage in Albania)

## Fix Broadband subscribers in Albania

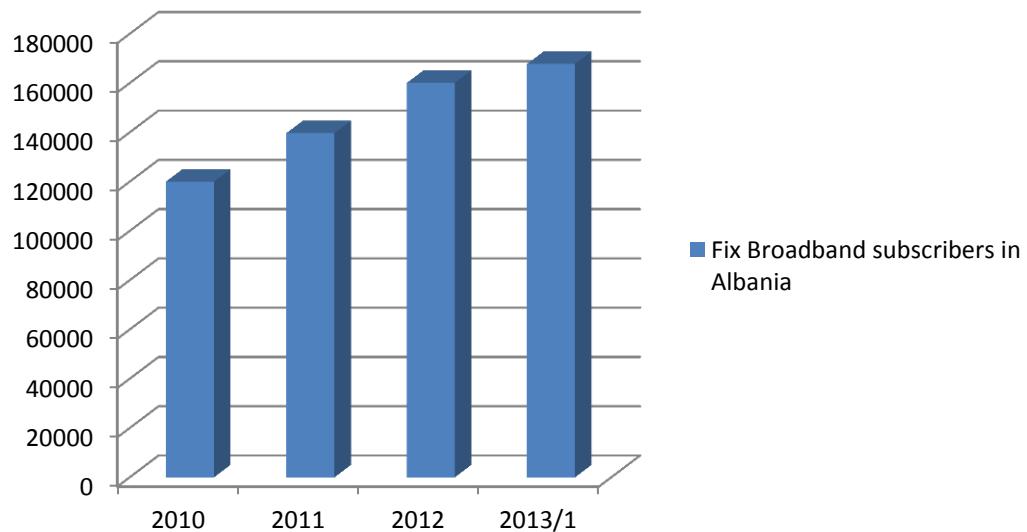


Figure 4(Fix broadband subscribers in Albania)

On the other hand Albania is in an urgent need of new online services that will facilitate the everyday life of the citizens. So providing new service applications in Albania is something worth.

### 3.2.3 *Statistics about post services in Albania, Albanian Post*

Albanian post is one of the most powerful postal services in Albania that has a total market share of around 85% in Albania.

Nr	Shërbime postare të ofruara	Objekte postare
	<b>Posta Shqiptare sh.a</b>	
<b>1</b>	<b>Shërbime bazë postare</b>	
<b>1.1</b>	<i>Postë Brenda vendit</i>	<b>18.341.349</b>
<b>1.2</b>	<i>Postë ndërkombëtare</i>	<b>442.700</b>
<b>1.3</b>	<b>Totali (1.1 +1.2)</b>	<b>18.784.049</b>
<b>2</b>	<b>Dërgesa ekspres</b>	
<b>2.1</b>	<i>Postë brenda vendit</i>	<b>458.505</b>
<b>2.2</b>	<i>Postë ndërkombëtare</i>	<b>10.408</b>
<b>2.3</b>	<b>Totali (2.1 + 2.2)</b>	<b>468.913</b>
<b>2.4</b>	<b>Totali (1.3 + 2.3)</b>	<b>19.252.962</b>

Figure 5(Albanian Post transactions 2012)

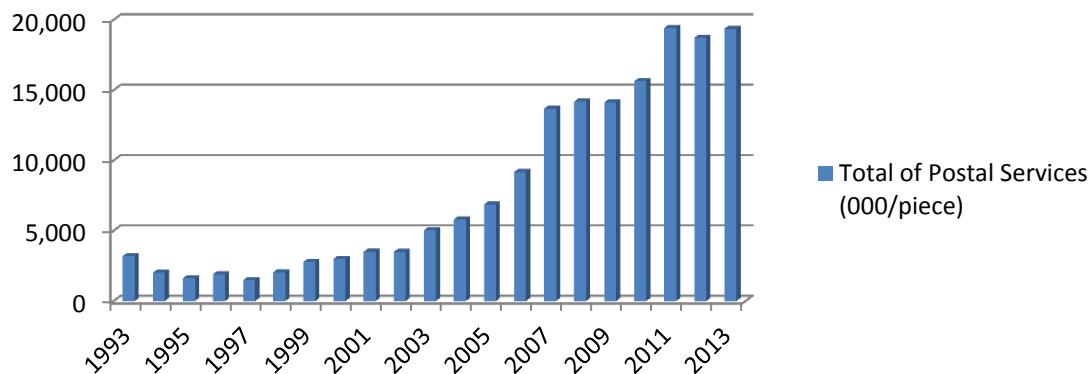
From the above table posted by AKEP [9] there was a total of 19.252.962 transactions occurred in 2012 at Albanian Post. Hand written bookkeeping uses paper format of A4. In a single page there can be recorded around 20 transactions. Each transaction is recorded at least 2 times, once when the customer signs and once when the staff records it. This brings out that in 2012 Albanian Post has used approximately at least 1.925.296 A4 papers. An A4 paper has a breadth of 0.01mm and by doing calculations; to keep all the records in handwritten papers and if the papers were all putted together one on another the Albanian Post has needed a column of approximately 19 meters long. Or a cuboid place with a volume about  $1.2 \text{ m}^3$ . As told above this is the space storage just for one year. The physical storage wasted to keep the records in handwritten books for years can be easily calculated to be very huge and of course very costly in money as well as in environmental damages. But if these records will be recorded in a computerized database no physical space will be needed to keep them, so the physical space can be used more efficiently for different other purposes like creating new office space or something else

that will be more effective from the management point of view and meanwhile protect the environment by printing less and less papers.

From the data in the table there are also derived some other interesting facts. The total population of Albania in 2012 was 2.821.977 so by doing a simple calculation it gives that the average total number of postal objects per person in Albania in 2012 was 6.8 postal objects / resident.

To be more specific and near to reality, in the survey was created a question in order to check the average of the total packages received by each customer in a month. After getting all the answers the average was found to be 4.81 packages/person. This means that in a month each customer receives in average 5 packages. The max number of packages received in a month from the sample was 30 which is a considerable value. It can be concluded that most of the customers are using post services more than once in a month which means that they are continuous clients and most probably they will join the system and create their online accounts in order to have faster access to their transactions and events occurred in the post office. Since the customers provide once personal information to the post office they should not have to provide the same information each time that they go to the post office. It's a waste of time and not very flexible procedure. So by using the management software the data will be already in the database and they can be queried every time needed. There will be no need to write the same data every time a customer uses the post service and so on the job for the staff will be much easier and time effective. This will also facilitate well enough the customer's procedures.

**Total of Postal Services (000/piece)**



**Figure 6(Total postal services) [10]**

From the graph it is shown that there is a general increasing trend of postal services, so as we can see there is an urgent need for Albanian Post to implement an automated system to handle all these transactions, because the job by handwritten bookkeeping is being more difficult and time consuming day by day. Management system software would be extremely useful for the Albanian Post and also very practical for its customers. It is thought that this will be a very good solution in solving many problems faced in this institution.

### 3.2.4 Descriptive Statistics

	EFFICIENT	CLEAN	NOTIFICATI	ORG	PROCEDUR	QUALITY	REGISTER	SPEED	WINDOW	SATISFACTI
Mean	0.301370	0.753425	0.479452	-0.164384	0.095890	0.356164	0.000000	-0.178082	-0.630137	0.054795
Median	0.000000	1.000000	1.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-1.000000	-0.090909
Maximum	2.000000	2.000000	2.000000	2.000000	2.000000	2.000000	2.000000	2.000000	2.000000	1.545455
Minimum	-2.000000	-2.000000	-2.000000	-2.000000	-2.000000	-2.000000	-2.000000	-2.000000	-2.000000	-2.000000
Std. Dev.	1.287600	1.244776	1.292173	1.130557	1.405983	1.240182	1.384437	1.315954	1.409362	0.727074
Skewness	-0.340147	-0.785851	-0.362749	-0.080254	-0.171122	-0.393148	-0.094867	0.036973	0.522648	0.067530
Kurtosis	2.105282	2.698859	2.013613	1.978839	1.658329	2.160444	1.770951	1.744399	1.882628	2.826407
Jarque-Bera	3.842603	7.789514	4.560392	3.250116	5.831520	4.024478	4.704118	4.811923	7.121043	0.147144
Probability	0.146416	0.020348	0.102264	0.196900	0.054163	0.133689	0.095173	0.090179	0.028424	0.929069
Observations	73	73	73	73	73	73	73	73	73	73

Figure 7(Descriptive Statistics)

In the table above are shown the descriptive statistics of some of the most important factors that affect the customer satisfaction. The most important variable of all these is the overall customer satisfaction so later on it is going to be explained in more details.

The mean for the overall customer satisfaction is 0.055 that is near 0 and it means that currently the customers are neither satisfied nor dissatisfied. Their opinion is neutral. This is not good for the company since an optimal value of satisfaction level should be at least 1 which means that the customers should be somehow satisfied.

The media for customer satisfaction is -0.091. This shows that 50% of all the customers have a total satisfaction level less than -0.091 which is not good since at least 50% of the customers seem to be not satisfied.

The standard deviation of the satisfaction level is 0.727. This shows us that most of the data are between -0.672 and 0.087 which enforces the fact that the customers are not satisfied with the post services.

The graph below also shows that the concentration of the responses lies between 0.5 and -1 which unfortunately is not a good satisfaction level.

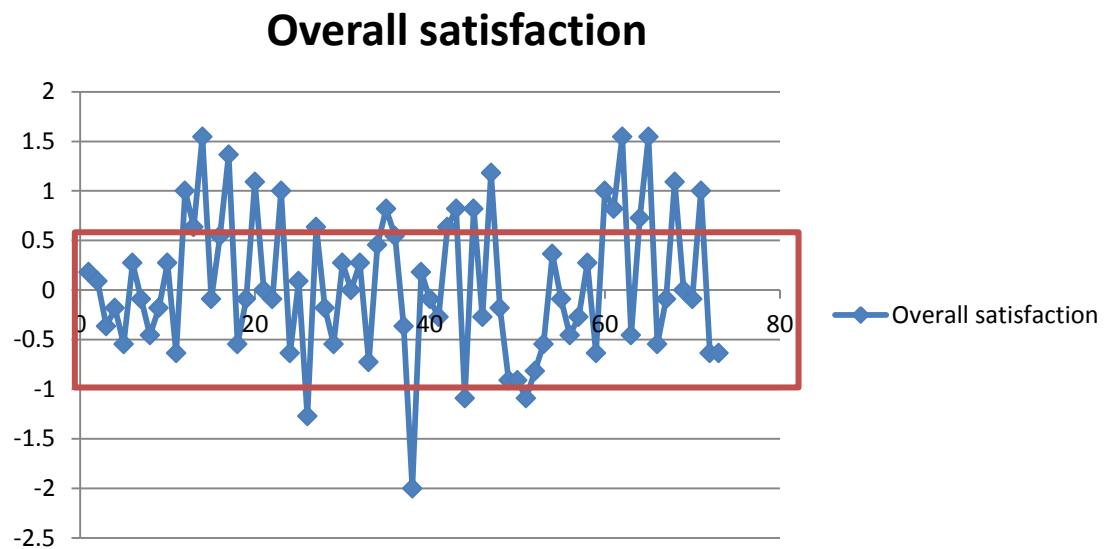


Figure 8(Overall Customer Satisfaction)

### 3.3 Econometric Model and Regression Analysis

The econometric theories and formulas are taken from the Econometrics book by Jeffrey Wooldridge [11].

#### 3.3.1 *Presentation of the regression model*

The dependent variable of the model is SATISFACTION and all other independent variables are: QUALITY, REGISTER, CLEAN, EFFICIENT, NOTIFICATION, ORG, PROCEDURE, SPEED and WINDOW.

The estimated model is:

$$(EQ.01) \widehat{satisfaction} = -0.075 + 0.115quality + 0.072register + 0.116clean + 0.117efficient + 0.107notification + 0.11org + 0.114procedure + 0.091speed + 0.0987window + u$$

This model allows checking the relationship of the independent variables with the dependent one. The highest impact in the customer satisfaction is from the efficiency of the staff which has an estimated coefficient of 0.117. It is predicted that a unit increase in efficiency generates an increase of 0.117 units in customer satisfaction. The same logic stands also for the other variables.

### ***3.3.2 Commenting on the statistical significance of the estimated coefficients of interests (through hypothesis testing)***

Efficiency of the service staff of the post is one of the factors that can be improved by the software, so if this variable results to be significant to the model it is sure that after implementing the software the efficiency of the staff will be increased and as a consequence the overall customer satisfaction will be increased too. It is seen from the EVIEWS output (appendix B) that efficiency is also one of the factors that has the highest impact on the overall customer satisfaction as it has the biggest estimated coefficient value. To test whether it is statistical significant or not the t-test has been used (appendix C). After doing the test it is verified that the staff efficiency is very important to customer satisfaction so the company should invest in improvements on it.

It is also important to test whether three other very important variables which are *quality*, *speed* and *org* that can also be improved by using the software, do have any effect on the overall customer satisfaction or not. The null hypothesis in this case is that they are not significant so their coefficients will be 0. For testing their statistical significance the F-test has been used (appendix D). After the F test is done it is proved that there is no chance that *speed*, *quality* and *org* do not have any impact on customer satisfaction. It is verified that they are very statistically significant to the model. This conclusion derives that the Albanian post should improve these processes of the service in order to increase the overall customer satisfaction.

### ***3.3.3 Customer level predictions by using some assumptions***

It is supposed that by implementing the software the efficiency of the service staff will be increased by 2 units the speed of the service by 2.5 units the quality of the service

by 1.8 units and the overall service procedures organization by 2.2 units. By using these assumptions it is predicted that the overall customer satisfaction will be increased and it will be increased by 0.95 units in total. It will move almost 1 satisfaction level up which is very good for the company. The satisfaction will move from 0.055 that is the current level to 1.005 which is an optimal level since the customers seem to be satisfied with the service.

### **3.3.4 Testing for Heteroscedasticity - White's test**

It is important also to check whether there is evidence that Heteroskedasticity exist in the model or not in order to check if the hypothesis and conclusions generated in the previous section are valid or not.

**White Heteroskedasticity Test:**

F-statistic	11.54802	Probability	0.000000
Obs*R-squared	70.48668	Probability	0.036616

**Figure 9(White Heteroskedasticity Test)**

Since  $p\text{-value} < F\text{-statistics}$  the null hypothesis that there does not exist Heteroskedasticity in the model is rejected. Unfortunately Heteroscedasticity is not a good thing to be present in the model. This brings up the risk that the hypothesis that were tested before in section 3.3.4 may be invalid and the results may be incorrect. In order to check whether the Heteroskedasticity presence causes such a problem or not it is necessary to generate the corrected standard errors.

- *Heteroscedasticity Corrected Standard Errors*

It is found that the coefficients are the same but the uncorrected std. Errors are mostly smaller. Directly from the output of EVIEWS after applying Heteroskedasticity - Consistent standard errors and covariance (appendix E) it is found that the probabilities (p-values) are 0 and smaller than the t-statistics values so again there is enough evidence to reject the null hypothesis that the variables are not significant to the model so all the results derived on section (3.) are all valid and correct.

## CHAPTER 4

### SOFTWARE ANALYSIS AND SYSTEM DESIGN

This chapter consists of developing the documentation of the Post Office Management System software. The documentation contains two main parts: The analysis part that gives a detailed description of all requirements which are functional, non-functional and feature requirements. And the design part that gives a detailed picture of all system functions and operations by using different kinds of diagrams like: activity diagram, state diagram, class diagram, component diagram etc. [12][13]

#### 4.1 Requirements

##### 4.1.1 Functional Requirements

###### 1. Administrator functionalities

The administrator can be logged in to the system with the username adm and a password. He has the privilege to create employee's accounts. There are a total of three different types of employee's accounts: Data-Enters, Incoming-Client-Service and Outgoing-Client-Service accounts. The administrator can also view the employees' accounts and their personal data like name, surname, address, phone number etc. He can check all the work done by each employee like the total number of finished work, total payments received etc. As he is able to create the employees' accounts he can also delete them if one employee for example leaves the job but he cannot update the accounts. This is a privilege only for the owner of the account which in this case is the employee. The administrator can also view customers' accounts and query about them. He can view their personal data like name, surname, phone number as well as the transactions done by them at the post office. The administrator can view reports of all the work done during the day or the month. He is responsible to approve or disapprove customers' registration applications in order to prevent the system from fake accounts creation. He can do as well other operations like updating shipping fees, update service fees and logout.

## *2. Data-Enter functionalities*

The Data-Enter employee can be logged in to the system with his unique id as username and a password. He can register the new incoming packages information to the database so the info is entered to the system only once. No need to write the same information several times in different documents which is a waste of time. He can as well update a record or delete one if it is incorrect. As stated above the information will be stored in database so it can be accessed from several system functions when is needed. After the information of each package is entered to the system an electronic message is sent to the receiver customer if he already has an account to the system, in order to notify that a package has arrived for him and he can go and get it to the post office. This employee can also view his personal account and update the allowed information. In order to check which customers are not notified by the system for the package arrival he can see the list of all the respective ones and then he has to write manual notifications to them. He is able to view his personal work reports, daily as well as monthly ones.

## *3. Customer functionalities*

First of all the customer can be logged in to the system. He can view information about his sent or received items. When a package has arrived in Albania for him the receiver is informed directly by a message in his account. He can read this message in his mail box. No need to wait for days for the postman to bring the notification into the home or even worst unfortunately sometimes it may be lost on the way and the receiver will not know that his package has been arrived. The customer can reserve online an appointment to get the package in a particular available time. This reservation gives him priority in getting the service. The customer can also get live information about the waiting queue in the post office. There is also a function that provides price calculations of shipping an item just by entering some necessary data for calculations. The customer can search zip codes for all addresses he wants. From the system the customer can see all the history of

his transaction. All the packages received, taken ones and non-taken ones. He can edit his personal information and of course he can be also logged out from the system.

#### *4. Incoming-Client-Service Employee functionalities*

This user can be logged in as Incoming-Client-Service Employee with his unique id as username and a specific password. He can search for a customer by name and surname and he can also search packages by their id. When a customer comes to get his package he just gives his name and shows his ID card for verification and all the information like: receiver, sender, source address, and destination address, personal nr of the receiver, package information (weight, tracking number, and position) will be found in the system. No need to write all this info by hand in notebook. The customer will sign in a digital platform and the sign will be added to the system. After the verification of the customer id and the distribution of the package to the receiver this employee must mark the delivered packages as taken. The bill will be automatically printed by the system in a PDF format. No need for the employee to write it by hand. He can as well see his personal account, update the info, and view daily and monthly reports of his job and logout from the system.

#### *5. Outgoing-Client-Service Employee functionalities*

The Outgoing-Client-Service Employee can be logged in to the system with his unique id as username and a password. He can enter into database the information about the outgoing packages and logout from his account.

##### **4.1.2 Non-Functional Requirements**

Non-functional requirements are extra requirements that support the functional ones. They are mostly focused on building up constrains about the design and implementation of the system. They explain the security, performance, reliability and cost characteristics required by the system.

#### *4.1.2.1 Product Requirements*

*Usability Requirements:* The screen element density should not be very high. The information should be easily identified by the user. The language of the software will be English and Albanian. A help menu should be provided to system users in order to give detailed information about functionalities. User manual should be provided to explain how to use the system. Employees should be trained at least 2 hours before using the system. Confirmation or error messages should be given after each successful or unsuccessful operation.

*Interface Requirements:* The system should have a user friendly interface that will be easily understandable by the customers and also for the employees that will work with this system.

*Reliability Requirements:* The system should be available at any given time, so the servers should be online 24 hours in 24 hours. If suddenly the system is broken the recovery back up should be ready for at max time 2 minutes. The max acceptable down-time will be 10 minutes in 24 hours. The system should handle multiple operations at the same time and the availability should be 98.99%.

*Security requirements:* Password should be encrypted for security purposes. Password should contain special characters and the minimum length must be 8 characters. Use method POST to read the users input in order to not show them to the URL. The database is not fully accessed by the customers and cannot make modification on it. They can only see a part of database that is related to them. The inputs from the users should be validated before entered into the database. Backup operations for the system should be every 24 hours and the data copies should be saved in a safe location.

*Efficiency Requirements:* The server response time should be very fast. Let's say less than 2 sec and search operation should be very fast to the database. The system requires a large amount of server memory in order to store all the data of the system.

#### *4.1.2.2 Organizational Requirements*

Organizational requirements include Delivery Requirements, Implementation Requirements and Standards Requirements.

#### *4.1.2.3 External Requirements*

*Ethical Requirements:* The system will use the personal user's data only for internal purposes of the system that the user is informed about.

*Interoperability Requirements:* This system will be stand-alone that is it will not cooperate with other systems, so interoperability is not a concern in this case.

*Legislative Requirements:*

- Privacy Requirements: The system shall not disclose any personal information about system users and personal information will be used only inside the company that has implemented the system.
- Safety Requirements: The system shall not operate until users confirm the system policies before being involved into the system.

### 4.1.3 Feature Requirements

#### User stories

Nr.	User Story Name	Description
1	Login	Administrators, Employees and Customers need to be logged in in order to access the system.
2	Sign up	Guests can sign up when they are waiting for a packet to arrive or when they wish to send a package in order to see their transactions and become customers
3	View history	Customers will be able to see their transactions to the post office. Sent packages and received ones.
4	Read messages	Customers can open mailbox in order to read messages sent from the post office staff.
5	Reserve appointments	Customers can reserve an appointment to get or send their packages when the post office will be free.
6	Check waiting queue	Customers can see if there is or not a queue in the post office.
7	Calculate the shipping fee	Customer can calculate how much he will need to pay as a postal fee when he needs to post a package.
8	Search zip codes	Customer can search zip codes for a specific address that he needs.
9	Edit personal information	Customers may update their personal information like e-mail, phone number and address.
10	Print command	Incoming-Client-Service Employee and Outgoing-Client-Service Employee can print the receipts of the customer's transactions.
11	Mark as taken	Incoming-Client-Service Employees can mark as taken the packages that the customers received.
12	Register outgoing packages	Outgoing-Client-Service Employees can enter data into database about the outgoing packages of the post.
13	Create employee accounts	Administrator can create new employee accounts into the system.
14	View reports	Administrator can see reports and data about employees, customers, packages etc.
15	Delete employee accounts.	Administrator can delete the employee accounts as they may leave the company and will not work for the post any more.
16	Search customers or employees	Administrators can search about customers and employees. They can query to view an account for a specific customer for example and all the data for that customer will be shown to the administrator
17	Approve registration	Administrator must approve the customer registration and then the account is saved into database.
18	Update shipping fees	Administrator can update the shipping fee in the database for each country.
19	Update service fees	Administrator can update the service fee in the database for customer service in order to print the receipt.
20	Register incoming packages	Data-Enters Employees can enter into the database all the information about incoming packages in the post.
21	Send messages	Data-Enters Employees can send a notification messages to customers if they are registered to the postal system.
22	Logout	All users can logout from the system.

Figure 10(User Stories)

## 4.2 System Design and modeling (UML)

### 4.2.1 Cases and Scenarios

The use cases give us a detailed description of the actors that participate in a system's interactions and of course it shows us also the type and name of the each possible interaction. On the other hand scenarios build a detailed story for these interactions.

- Use Case 1 *Customer activities*

The customer enters his username and password to login form, submits the login form and if the username and password are correct and match with each other the customer can access the system's functionalities that are allowed for him. If the username does not exists in the systems database than a message is printed to inform the user and it suggest him to register if he is new to the system. Another case may be when the customer has forgotten his password so a message in his email address will be sent in order to reset the password. After logging in to the system the customer can do many things. He can read the messages from the post in his inbox. If there is any new message for him the message is putted in the "New Messages" section and if there is no new message for him an informational message is printed in this section in order to show him that his new messages mail box is empty. The customer can also see all his transactions in the post office. He is able to see the list of all packages that he has sent out all the packages he has already received an all the packages that has arrived in the post office and are ready to be taken by him. He can of course update his personal info, shipping price calculation, check the queue state, search for a specific address zip code and at the end he can also be logged out from the system.

- Use Case 2 *The overall system activities*

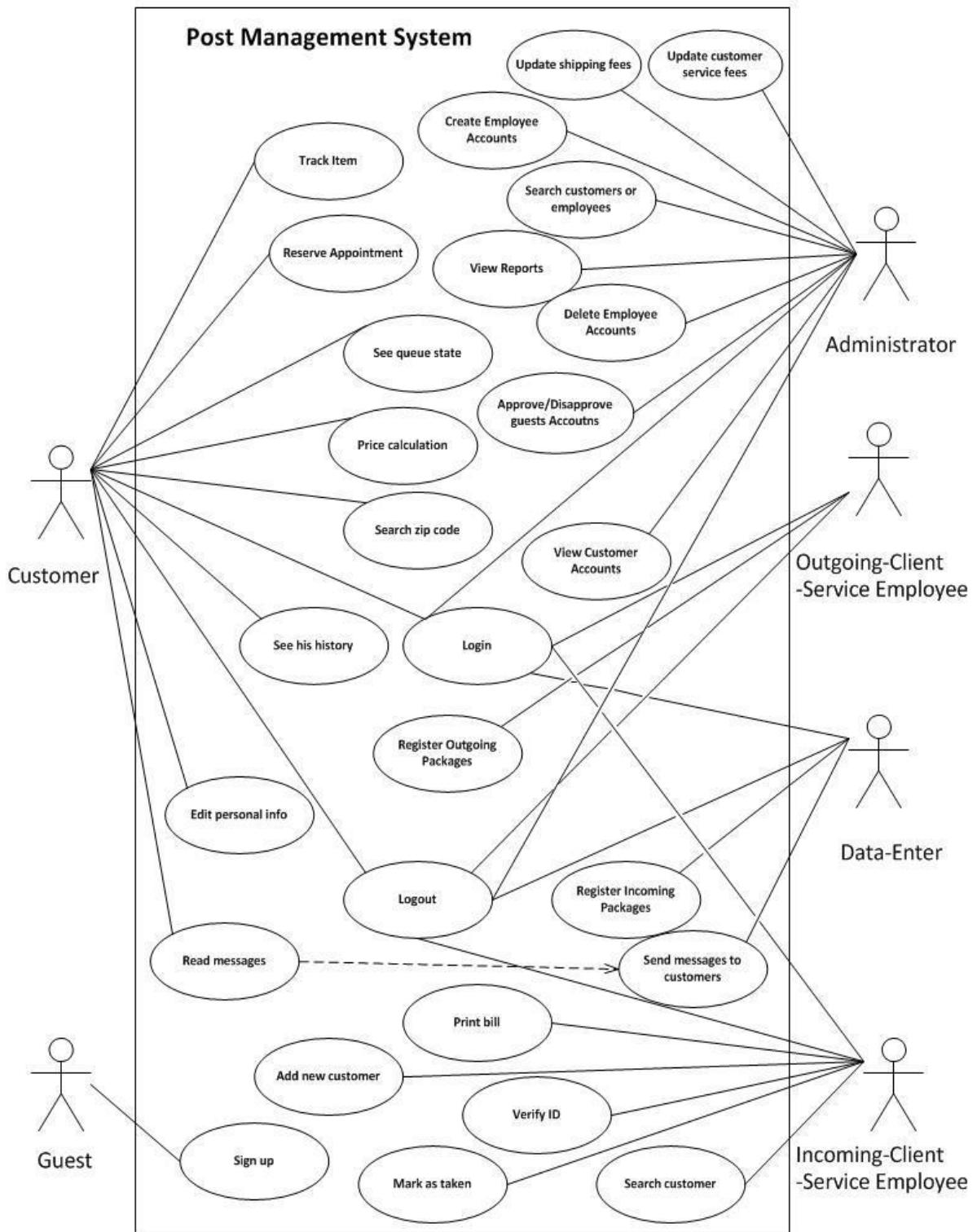


Figure 11(Use Case Diagram)

#### 4.2.2 *Activity Diagram*

The Activity Diagram in the next page shows the overall activity of the system.

When the user first visits the website there are two possibilities. The visitor is already a member of the system and he is able to login in order to access the functionalities of this system or the visitor is a guest and he can be registered as a customer in order to become a member of the system.

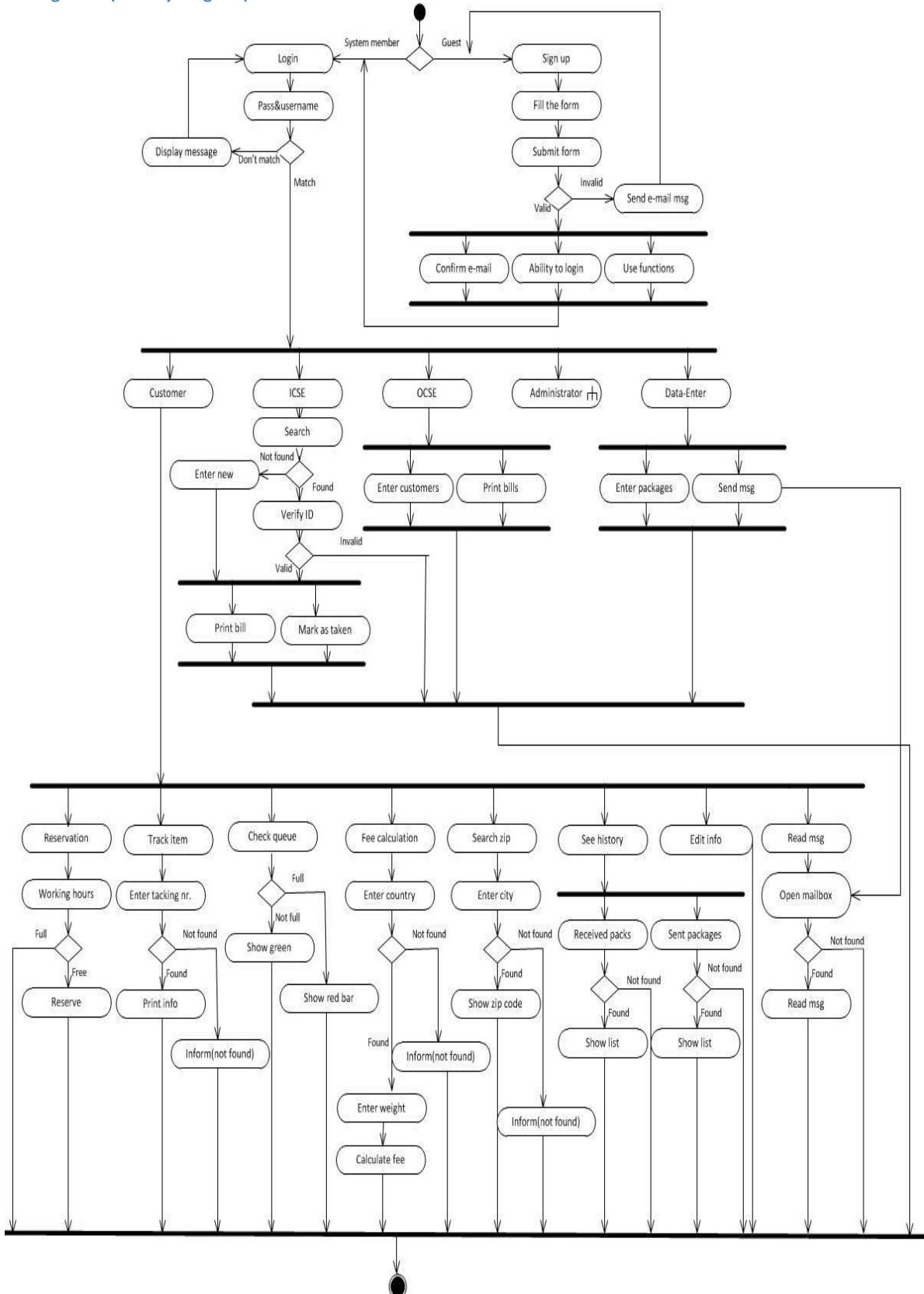
To be registered the guest has to provide to the system some valid data like, name, surname, id card, id card documentation, address, phone number, city and state to the registration form and then submit it for confirmation. The administrator receives the request and verifies if the data entered by the user are valid or not. If the data are valid a confirmation e-mail is sent to user with his username and initial password. If the data are not valid an e-mail is sent to the user that the request was not accepted and he has to reapply and provide valid information.

Then in the activity diagram are shown all the login cases which are:

- Login as a customer
- Login as an administrator
- Login as a data-enter employee
- Login as a ICSE
- Login as a OCSE

Then after login there is shown is shown in detail each function that each user can perform in the system. The customer can see his history, edit his personal data, search zip codes, calculate fees, read messages, track items, reserve appointment and check queue. The administrator can update service fees, update shipping fees, create edit and delete employees' accounts, view reports, approve registrations and view customers. Data-enters can enter new records of incoming packages into the database and send messages to customers. ICSE verify the id of customers, register processed packages, and mark as taken the incoming packages and also print bills. OCSE can enter new outgoing packages to the system.

**Figure 12(Activity Diagram)**



#### 4.2.3 Sequence diagram

This sequence diagram shows the performance of every task in the system and how the objects interact with each other by using the methods that are shown below in the diagram.

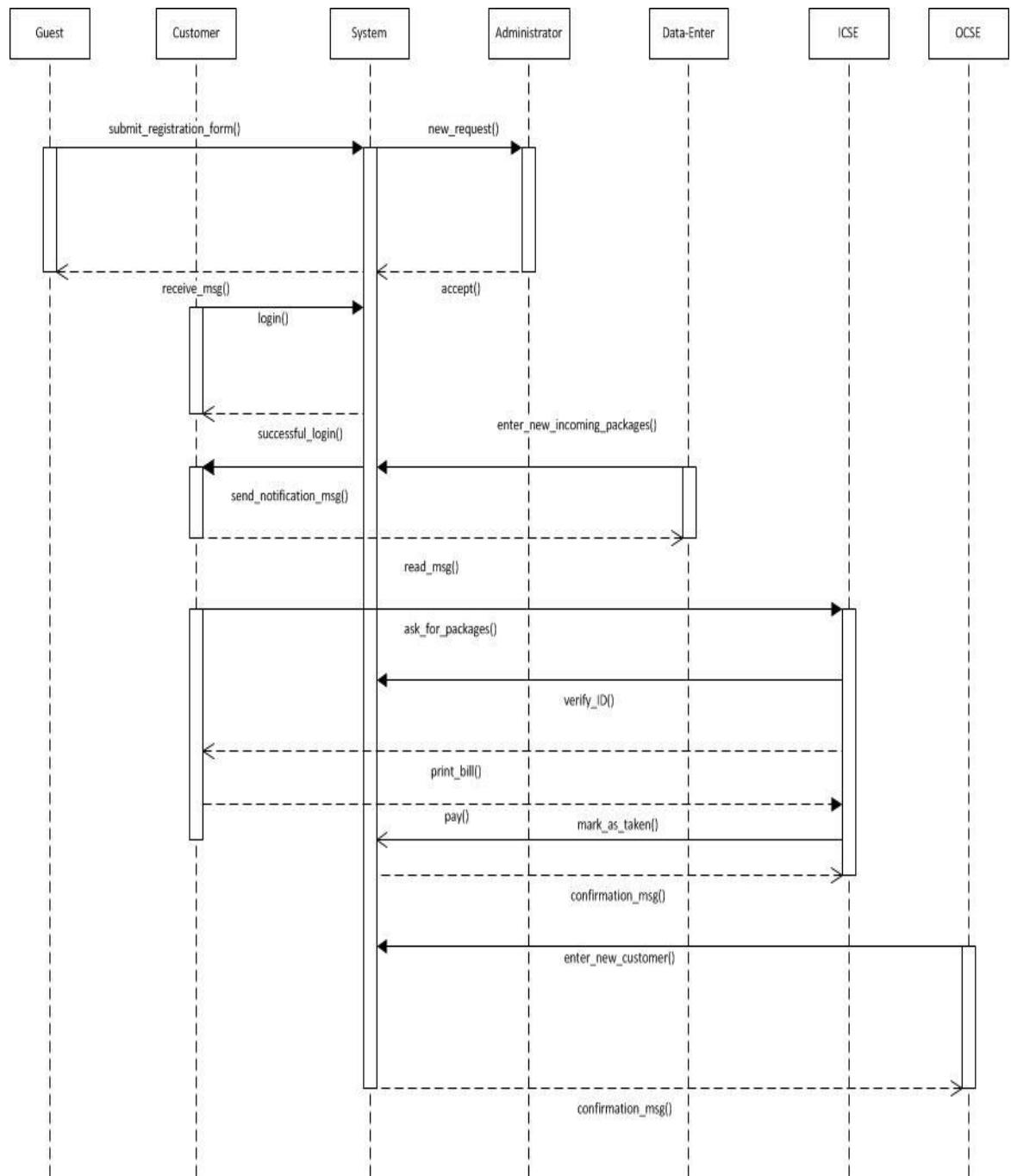


Figure 13(Sequence Diagram)

The guest submits the registration request. This request is delivered to the system administrator. Based on the data filled from the guest like name surname and ID card the administrator verifies the validation of these data. If they are valid he accepts the registration request and makes the account available. The customer is notified by an email when his account is activated. Customer logs in in the system. In the other side of the system the data enter enter to the database th enew incoming packages with all the attached details. A notification message is send to the customer's account. The customer reads the message. Then the customer goes to the post office too get his packages. He makes the request. The Incoming Client Service Employee verifies his id card number and than print the bill. The customer pays and get his package. The ICSE mark the package as taken and the information is updated in the database.

#### ***4.2.4 Collaboration Diagram***

The following collaboration diagram shows the collaboration between the users and objects which are: Register, Confirmation, Payment, Appointment, Mailbox, Database for the process from the registration of a customer to the system to the package delivery to the customer.

The functions represented in this collaboration Diagram are: submit\_register\_form(), confirmation\_msg(), send\_for\_confirmation(), new\_register\_request(), success(), accept(), reserve\_appointment(), able\_to\_login(), pay(), print\_bill(), mark\_as\_taken(), verify\_ID(), enter\_incoming\_packages(), notification\_msg(), read\_msg().

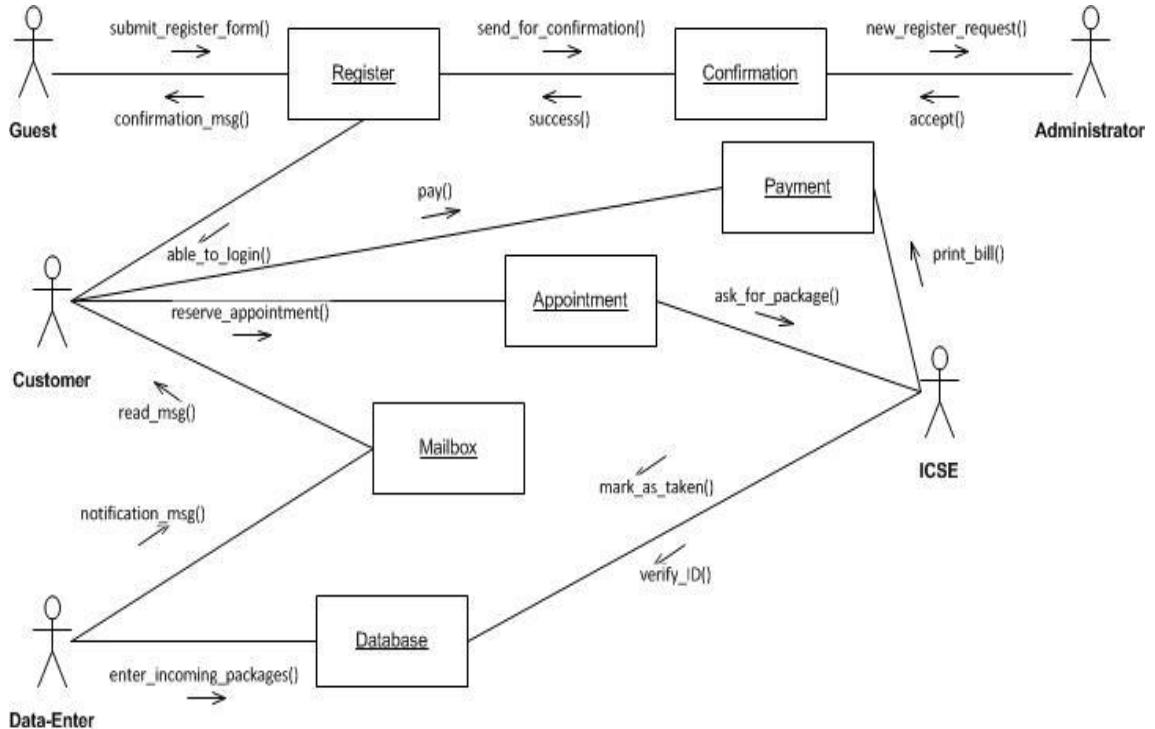


Figure 14(Collaboration Diagram)

#### 4.2.5 Entity Relationship Diagram

In the Entity Relation Diagram is shown the database structure. There is a total of ten tables in the main database named (`post_office_db`). The tables are: customer, incoming\_packages, outgoing\_packages, data\_enter, ICSE, OCSE, administrator, zip\_codes, shipping\_fees and service\_fees. The tables are written inside of a rectangle. All of these tables have their own attributes. Atributes are represented by oval shapes. Some of the tables contains also primary keys that are also used by other tables through foreign keys. The primary keys are written in underline font style. The diamond shapes represent the relationships between different tables.

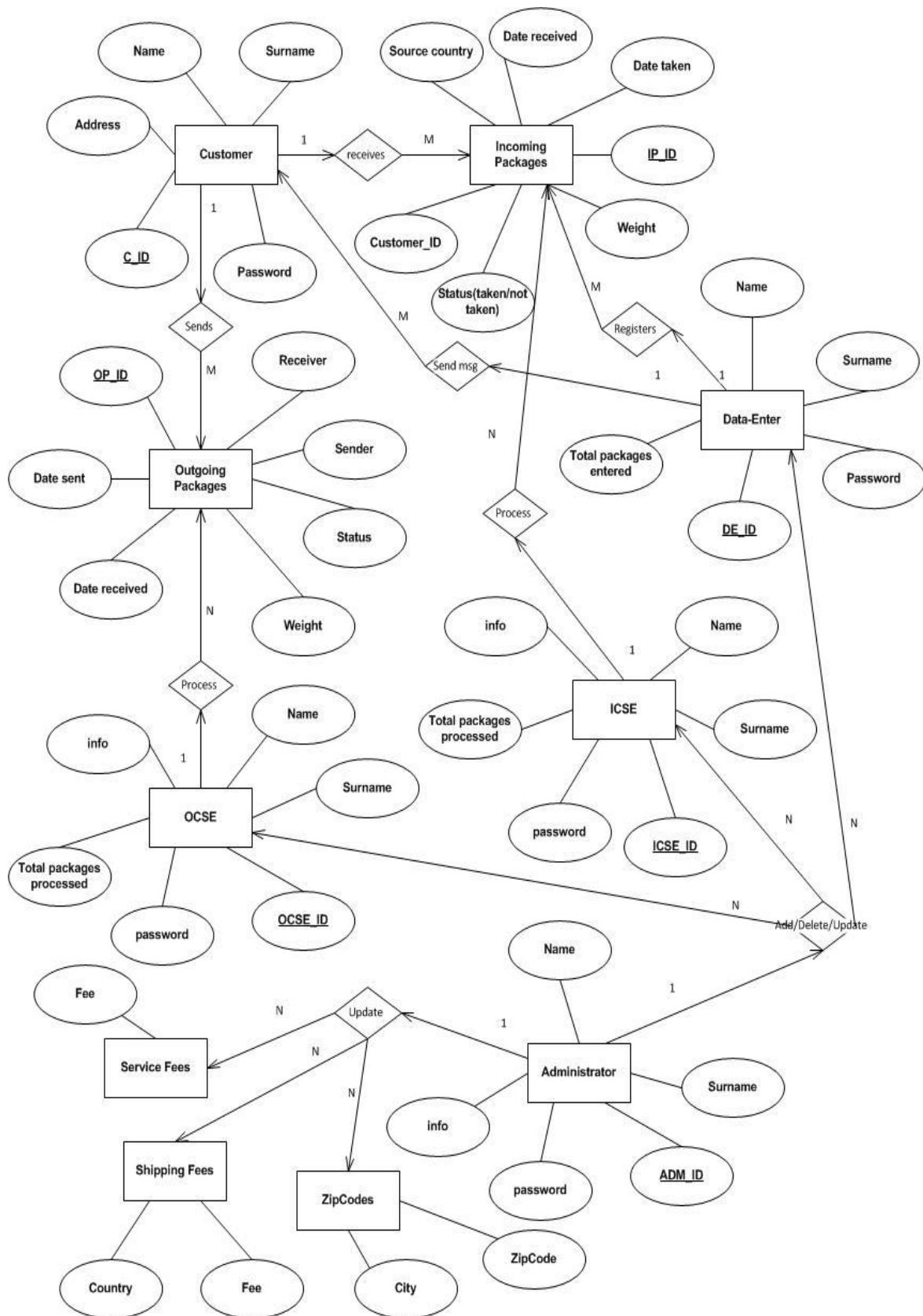


Figure 15(Entity Relationship Diagram)

#### 4.2.6 Class Diagram

*Data enter* class is designed to have at all ten attributes and twenty eight functions. Twenty of these functions are getters and setters for each of the attributes and the remaining eight functions are the functions that provide the functionalities of the data-enter employee. The function `add_new_incoming_packages()` registers all the new incoming packages with all the details into the database. If any of the fields of the form submitted by the user of the account is empty, the record is not entered into the database. The user is also asked if he is sure to add the new record or not. He can click Ok in order to continue with the insertion or click the cancel button to stop the operation. This function also checks whether the receiver of the just entered package has an account to the system or not. If the receiver already exists in the system an automated message is sent to his inbox by calling the function `sendmsg()`. The function `showList()` is built to provide a list of all the records of the incoming packages whose receivers have not received an electronic message in order to be informed for their packages. The function `delete()` deletes a record from the database. `update()` updates a record. `photoupload()` is a function that is used to retrieve an image from the database and display it on the screen. `accountinfo()` is developed in order to fill the setter functions with specific information retrieved from the database and `updateinfo()` is a function that enables the data-enter users to update their personal information in their accounts.

*ICSE* class beside its own setters and getters has also three similar functions with Data-Enter class which are `photoupload()`, `accountinfo()` and `updateinfo()` that provide the same functionalities like the ones at Data-Enter class with the only difference that the data are retrieved from the *icse* table of the database instead of *data-enter* table. The function `search_incoming_packages()` is programmed to search packages into the database by customer name and surname in order to show the list of all untaken packages for that specific customer. This function calls the class *mark* which contains two other main functions that are `mark_as_taken()` and `print_pdf_bill()`. The second function is called by the first one in order to generate the bill after the package is marked as taken by the ICSE when the customer gets his package. This class has also another function named `search_by_id_incoming_packages()` which enables the ICSE to search by package id and then follow the same procedures as before when using `search_incoming_packages()`.

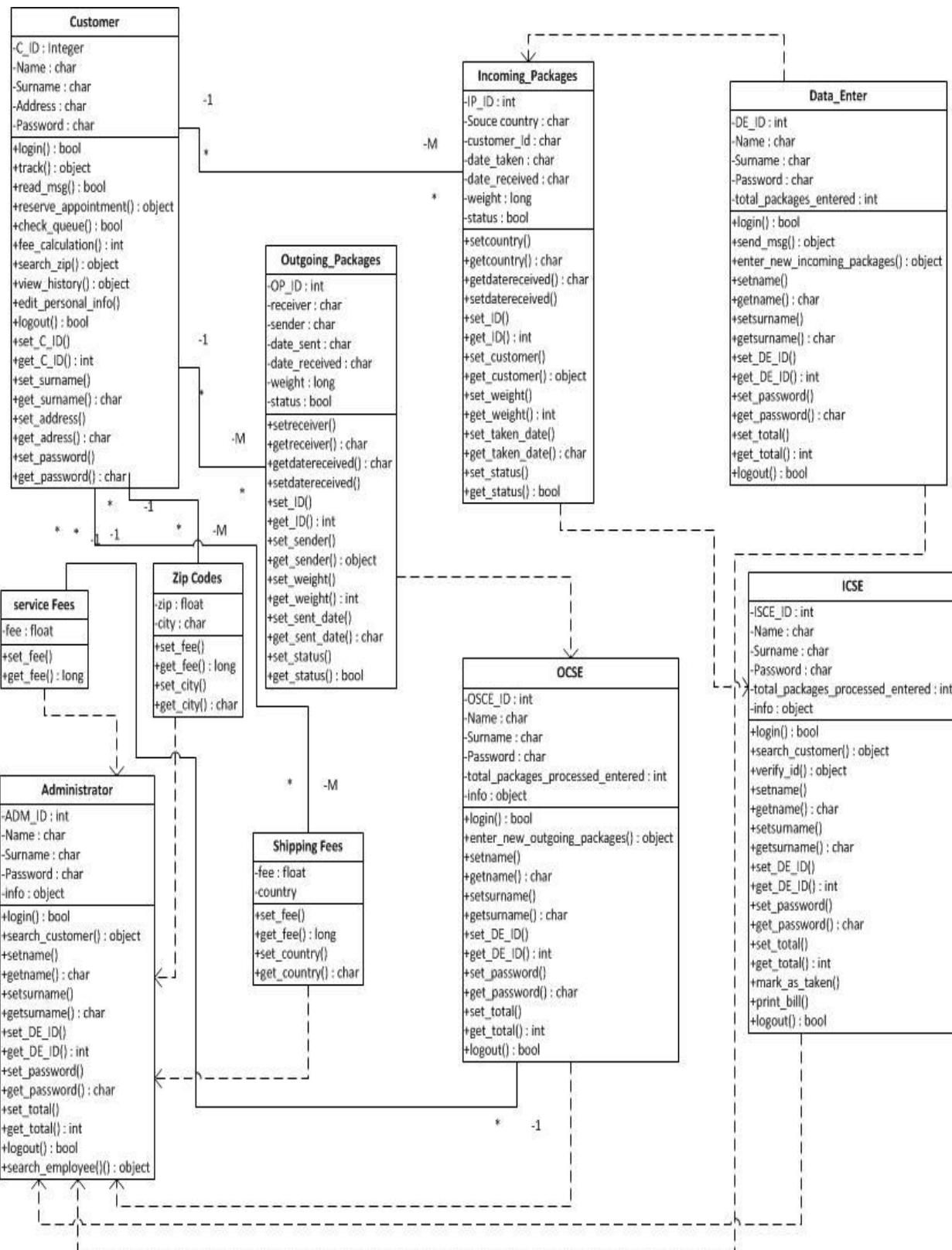


Figure 16(Class diagram)

#### 4.2.7 Component Diagram

Component diagrams are necessary when the systems are complex in order to illustrate the structure of these systems more easily. It shows the relationship and connection of some components and how these connections form larger ones or the entire system.

In this system there are a total of five interfaces which are linked to some other functional components of the system by cooperating also with the database component. In the following component diagram the “Data Access” means write privileges and the other port means read privileges.

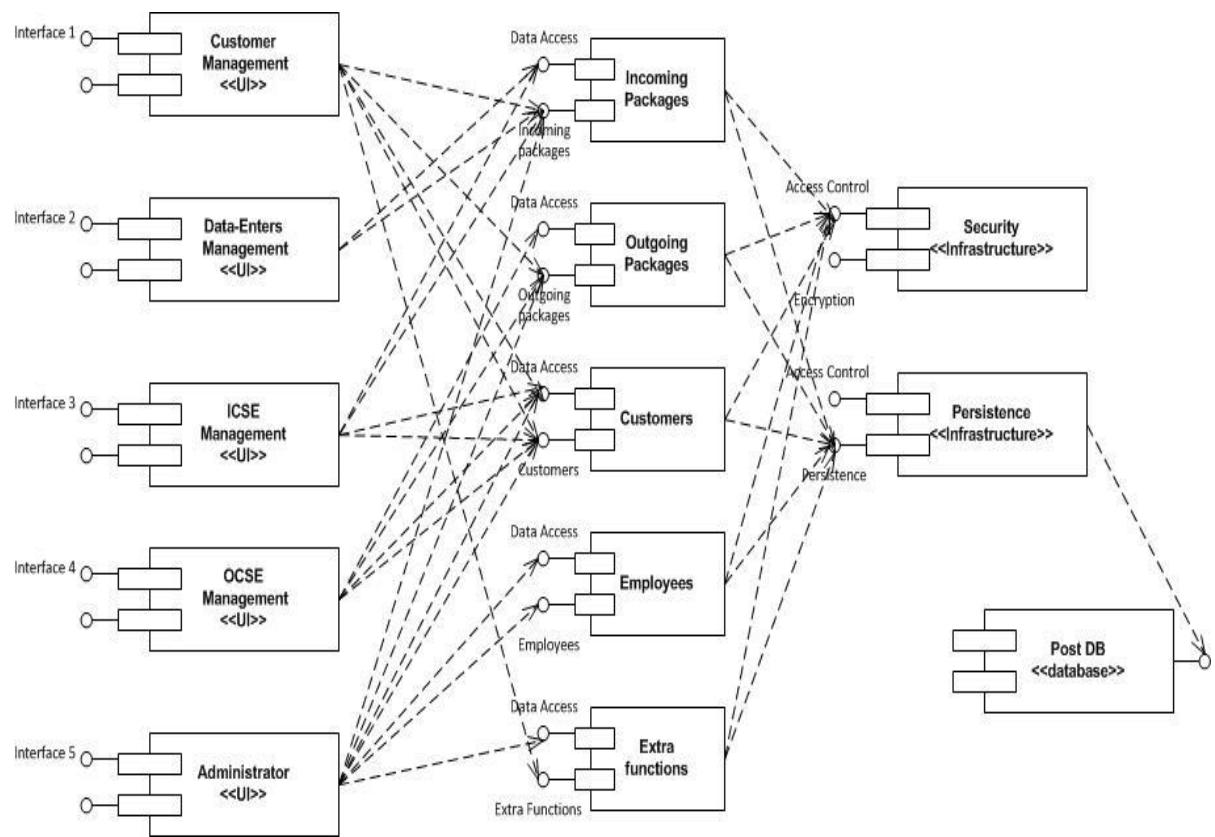


Figure 17(Component Diagram)

## CHAPTER 5

### IMPLEMENTATION

This chapter is focused on the code of the system and the interface of the software. Here I will show how my software is built, what technology is used how the functions are implemented and other details that will be explained one by one.

#### 5.1 Technology Used

Albanian Post Management System is a web-based system so I have used to implement it different web technological tools for building and developing the code.

##### 5.1.1 *Hypertext Markup Language*

HTML is a standardized language that is used to build the interface of the system and format all the contents of it.

##### 5.1.2 *Hypertext Preprocessor*

PHP is a widely-used open source language which is used to build up all the functionalities of the system. PHP is embedded into HTML in order to link the interface with real functions. Without using PHP it is impossible to generate functional activities in the website. Of course my system is build up by using Object Oriented Programming.

##### 5.1.3 *Cascading Style Sheet*

CSS is a style sheet language which is used to format the interface of the website. It is used to build up the layout of it.

##### 5.1.4 *JavaScript*

JavaScript as the name itself states is a scripting language which is used for creating dynamic functions. It is mostly used for building up confirmation windows that will make the website more intractable and secured.

### 5.1.5 MySQL

MySQL is a database platform which is used in Albanian Post Management System in order to store and manage data of this system. The database is going to be explained in more details in the following section.

## 5.2 Database

The database platform used for this system is MySql. It is a very good platform, it offers persistence, flexibility to changes and as well it is very easy to be accessed in every browser.

One of the main tables is the “incoming\_packages” table. This table saves all the information needed for registering new incoming packages to the post office. It contains 13 attributes. *ip\_id* is the primary key of the table key which is the unique number of each packages. *de\_id* and *c\_id* are both foreign keys that are used to connect this table with the “data\_enter” and “customer” tables respectively. All these keys are of type varchar since they can contain numbers as well as characters. The field *message* is created to contain information if the notification message of the package arrival is send to the customer or not. *date\_received* and *date\_taken* contains information when the package has arrived in the post office and when it is taken by the receiver respectively.

Another important table is the one called “messages”. This table contains all the information related to the messages sent by the system to the customers in order to inform them for the package arrival. The same as in the table “incoming\_packages” explained before *de\_id* and *c\_id* are foreign keys of the table. In the *de\_id* is recorder the id of the data-enter that sends the automated message and *c\_id* is the id of the customer who receives the message. When the message is first sent the status is *nots* which means that the customer has not yet seen the message and as well the *date\_seen* does not have any value since the receiver has not read the message. Than when the message is seen the status is updated from *nots* to *seen* and also the *date\_seen* is updated with the value of the date and time when the messages is seen. *msg\_id* id the foreign key of this table and it is auto incremented.

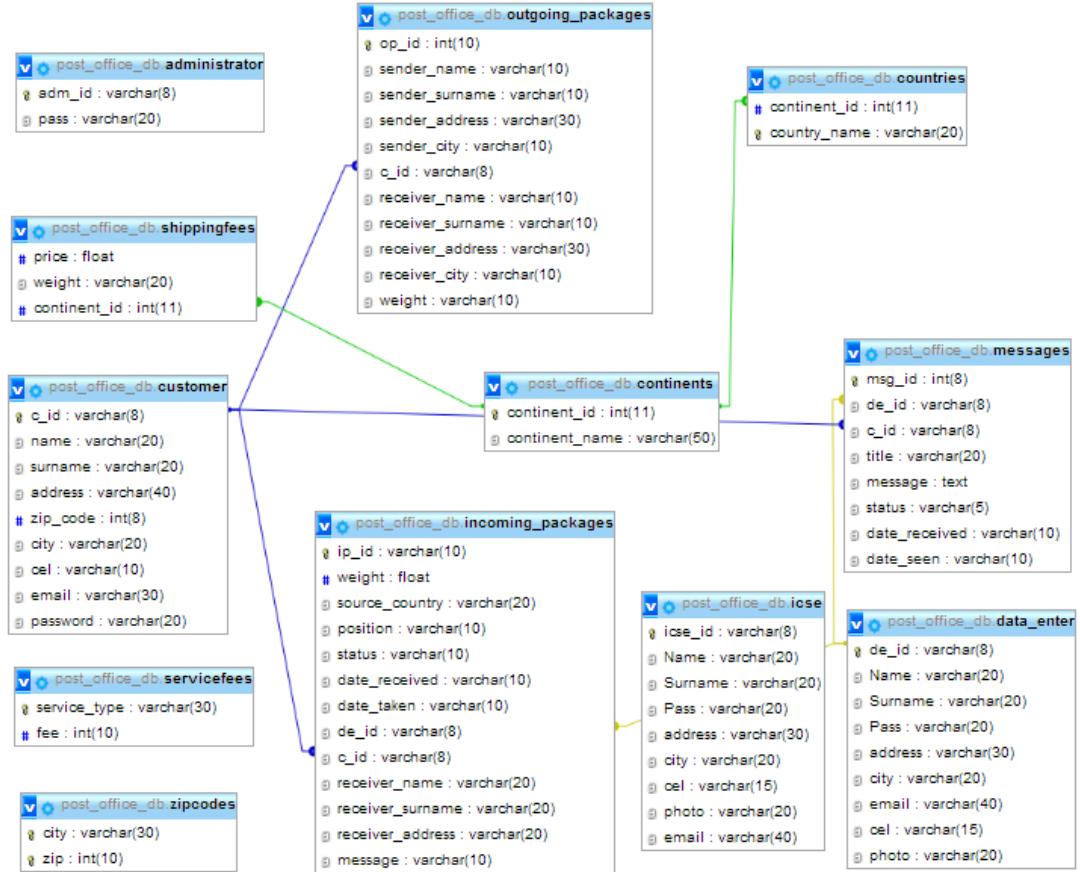


Figure 18(Database Design)

Table customer holds all the information of the customers. In fact these are just the customers that have an account in the system not customers that do not have a personal account. The data for customers not having their account are directly saved to the packages tables.

Since the customer id is used in other tables through foreign keys and in order to prevent problems when for example entering in the system a package that belongs to a customer with no account in the system, I have created an initial entry in the customer table with c\_id = 00000000 and all other attributes with 0 or null values in order to represent all the customers that does not use the online account.

The other table “data\_enter” contains only the basic information of the data-enter employees. It has of course a primary id *de\_id* which identifies each employee. This id is used as an username when the employee wants to log in his account.

### 5.3 Website Snapshots

#### 5.3.1 Add a New Incoming Package → Data-Enter Account

The employee fills the form with all the required data. Suggestions are also shown in the form text filed in order not to write the same thing several time and to make the job easier for the user.

The screenshot shows the 'DATA ENTER' website interface. At the top, there is a yellow header bar with buttons for 'HOME', 'ADD', 'DELETE', 'UPDATE', 'NOT MSG', and 'LOGOUT'. To the right of the header is a large orange folder icon with a green plus sign, indicating where new packages can be added. Below the header, on the left, is a profile box for 'Shqipe Ndreaj' featuring a photo of a woman and the text 'Your id: 00001'. In the center, there is a form for adding a package. The form fields include:

44	Package Id
France	Source Country
0.6	Weight
K9	Position
Adela	Receiver Name
Tufina	Receiver Surname
4 Deshmoret	Receiver Address
Hoxha Tasim	
Durres	

Below the form, there are three columns: 'MY ACCOUNT' (with a note about viewing account data), 'LINKS' (with links to Home, Add, Delete, Update, Not msg, and Logout), and 'KEEP IN TOUCH' (with links to Twitter, Facebook, and Google+). At the bottom of the page, there is a copyright notice: '© Copyright 2014. All rights reserved'.

Figure 19(Add new package)

After submitting the form a confirmation message box is popped up in the screen in order to make sure that the employee really wants to add that record. If the user clicks cancel or x button than the data just filled in the form are not added to the database and the user is return to the form again in order to add another record. When the employee clicks on the OK button then the record is added to the database. If the insertion is successful a message is printed on the screen to show the success and also all the just inserted data. If the insertion is not successful of course there is printed again a message to inform that the data were not entered to the database.

### 5.3.2 *Mark as taken and print the bill → Incoming Client Service Employee Account*

The ICSE query all the packages that have the requested receiver. All the necessary data are printed in a table and if the package is untaken the status checkbox is not ticked.

Package id	Receiver	Receiver Address	Source Country	Package Weight	Position	Status
45	Adela Tufina	4 Deshmoret	France	0.6	K9	<input type="checkbox"/>

After finishing the required procedures with the client who will get his package the ISCE mark the package as taken and update the information to the database.

Package id	Receiver	Receiver Address	Source Country	Package Weight	Position	Status
45	Adela Tufina	4 Deshmoret	France	0.6	K9	<input checked="" type="checkbox"/>

After the database is successfully updated the bill is generated in PDF format and it is printable. The bill contains the logo, the date when it is generated and other information that are shown in the picture below.



### 5.3.3 Messages → Customer Account

When the customer wants to see his mailbox he goes to the mail section and all the messages of his account are shown. At the unread messages section the title of the message is shown and also the date received. Go Home link turns the customer to his main home page.

#### Unread Messages(5):

Title	Date received
----- Notification	05/24/2014 00:08:04
----- Notification	06/03/2014 22:07:40
----- Notification	06/03/2014 23:40:22
----- Notification	06/04/2014 00:13:57
----- Notification	06/09/2014 00:11:15

#### Read Messages(7):

Title	Date received	Date seen
----- Notification	05/21/2014 18:58:25	05/21/2014 23:41:36
----- Notification	05/21/2014 21:48:31	05/21/2014 23:42:26
----- Notification	05/21/2014 21:49:00	05/21/2014 21:50:05
----- Notification	05/21/2014 21:50:41	05/21/2014 23:41:41
----- Notification	05/21/2014 21:51:18	05/21/2014 21:51:38
----- Notification	05/21/2014 22:00:50	05/21/2014 23:41:49
----- Notification	05/21/2014 22:05:20	05/24/2014 13:43:56

Go Home

When the user clicks one of the messages, a full overview of the message with all the detail like title, content, sender, date received is shown on the screen. If the message was an unread message it is updated to a read message and if the message was already read no update is done in the database.

## Notification

Sender	Message
Albanian Post	<p>Received: 05/24/2014 00:08:04</p> <p>Dear Adela Tufina, you have just received a new package from France on date 1400882884 with weight 0.6 and package id 234.</p>

Go to my personnal messages

## CHAPTER 6

### CONCLUSION AND FUTURE WORK

As resulted from the case study there is a high percentage that the customers will find the system very useful for their operations and transaction in the Albanian Post. The total service time definitely will be decreased and on the other hand the work efficiency will be increased so the customers will have the ability to receive faster what they want and the overall service procedures will be much more effective.

Also the successful examples of e-post systems worldwide enforce the idea that this software will be very useful for both parties, for customers as well as for the Albanian Post. By implementing this software the Albanian citizens will have the opportunity to get all the information that they want just by a click.

The technology is moving up day by day and everything is starting to be digitalized. The information transmitted in electronic way is rising exponentially. The age of paper and pen belongs to the old decade of people evolution history. Today we are in the year 2014 where every data assess and manipulation can be very fast, just by one click.

It will be better if the Albanian Post should give up from the old methodologies by recording everything in paper based documents in order to increase efficiency of the workers and also increase the level of customer and employee satisfaction.

By investing on such a system Albanian Post will very fast reach the European service standards and offer to Albanian customers the service that they deserve to.

Related to the future work there are a lot of things to do. We know that the Albanian Post besides the distribution and delivery of packages offers many other services like business balance sheets submissions, different documents submissions, purchase of passport cartoons and many other services that in the near future should be also implemented in the system.

Some investment on time and money should be made on training the existing staff to be proficient at using the software functionalities, on servers' implementations, security and maintenance of the system.

After the web-based system will be perfectly developed and successfully implemented a mobile version should be developed in order to have even faster access to the system.

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## APPENDIXES

### Appendix A: The survey of the study

#### Pytesor mbi sherbimin e klientit ne Posten Shqiptare

Te dashur kiente ju kerkojme ndjese per shqetesimin por opinioni juaj eshte shume I rendesishem per studimin tone. Ky studim konsiston ne evaluimin e sherbimit postar per sa i perket dorezimit te kolipostave dhe gjetjen e nje zgjidhjeje per te ofruar nje sherbim me te shpejtje dhe efikas per klientet.

Kriteri	Vleresimi juaj				
	+2	+1	0	-1	-2
Kualiteti i sherbimit te shperndarjes.					
Pagesa per sherbimin.					
Organizimi i detyrate te vecanta te stafit te sherbimit deri ne momentin perfundimtar kur sherbimi vjen tek ju.					
Shpejtasia e sherbimit qe ju afrohet.					
Efikasiteti i stafit te sporteve.					
Procesi i dergimeve te lajmerimeve ne shtepine tuaj.					
Procedura qe ndiqet per rregjistrimin e paketave dhe kolive qe merrni ne sportel.					
Pastertia e zyres postare dhe nje ambient i kendshem.					
Rregjistrimi i te dheneve manualisht ne fletore nga personeli i sherbimit.					
Rradha e pristes.					
Numri i sporteve shperndarese					
Shpjegimi i zgjedhjeve					
+2 = Shume i/e kenaqur		0 = As i/e kenaqur as i/e pakenaqur		-1 = i/e pakenaqur	
+1 = i/e kenaqur				-2 = Shume i/e pakenaqur	
Sa here ne mnuaj mesatarisht perdomi sherbimin e postes shqiptare per te marre paketa ose koli? _____					
Si mendoni se mund te permiresohet sherbimi postar?					
Mendoni se implementimi i nje programi kompjuterik ku cdo e dhene te rregjistrohet automatisht ne sistem dhe cdo lajmerim do te vinte tek ju ne kohe reale do te rriste shpejtessine e sherbimit?	Po <input type="checkbox"/>	JO <input type="checkbox"/>	Ju lutem selektoni Po ose JO		
Nqs do te ishte e mundur te krijohej nje illogari e juaja e personalizuar online ku ju mund te shikon te gjitha informacionet persa i perket paketave hyrese dhe dalese si dhe tju dergojen lajmerimet ne menyre elektronike ne kohe reale a do te beheshit pjese e ketij sistemi?	Po <input type="checkbox"/>	JO <input type="checkbox"/>	Ju lutem selektoni Po ose JO		
(opsionale) Emri Mbiemri: Moshë: Seksi: Profesioni:					

JU FALEMINDERIT PER BASHKEPUNIMIN!!

### Appendix B: The Regression Model

Dependent Variable: SATISFACTION

Method: Least Squares

Date: 06/06/14 Time: 20:08

Sample: 1 73

Included observations: 73

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.074734	0.021611	-3.458136	0.0010
QUALITY	0.115406	0.016191	7.127648	0.0000
REGISTER	0.071867	0.013031	5.515045	0.0000
CLEAN	0.116327	0.014568	7.984946	0.0000
EFFICIENT	0.117168	0.015429	7.593796	0.0000
NOTIFICATION	0.107101	0.017445	6.139406	0.0000
ORG	0.111826	0.020640	5.417909	0.0000
PROCEDURE	0.113825	0.013528	8.414292	0.0000
SPEED	0.090906	0.016653	5.458703	0.0000
WINDOW	0.098745	0.012876	7.669040	0.0000
R-squared	0.973763	Mean dependent var	0.054795	
Adjusted R-squared	0.970015	S.D. dependent var	0.727074	
S.E. of regression	0.125902	Akaike info criterion	-1.179977	
Sum squared resid	0.998634	Schwarz criterion	-0.866216	
Log likelihood	53.06917	F-statistic	259.7973	
Durbin-Watson stat	2.209657	Prob(F-statistic)	0.000000	

### Appendix C: The T-Test

Let's suppose that the estimated coefficient of *efficient* variable is 0, which means that the staff efficiency is not significant to the model. After calculation we will see whether the null hypothesis will be rejected or not.

$$\left\{ \begin{array}{l} H_0: \beta_4 = 0 \\ H_1: \beta_4 \neq 0 \end{array} \right.$$

- This is a “Simple Hypothesis”, with “more general restrictions”, 2-tailed
- To test the hypothesis we use t-statistics. In order to continue with testing we have first to calculate the degrees of freedom.

$$df = n-k-1 = 73-10-1 = 62$$

- Testing the hypothesis:
  - The p-value of this 2 tailed hypothesis with  $df=62$  and  $t_{H_0} = 7.59$  is 0.00
  - Since  $p\text{-value} < t_{H_0}$ , we have enough evidence to reject the null hypothesis.
- *We rejected the  $H_0$ , so there is no possibility that the staff efficiency does not have any impact on customer satisfaction.*

#### *Appendix D f-test*

Let's check now if the null hypothesis is true or not

$$\left\{ \begin{array}{l} H_0: \beta_1 = \beta_6 = \beta_8 = 0 \\ H_1: H_0! \end{array} \right.$$

- This is a “Multiple Hypothesis”, with “exclusion restrictions”
- To test this Hypothesis we use F-Statistics. We can find the degrees of freedom.

$$df = q/(n-k-1) = 3/(73-10-1) = 3/62$$

- Besides the unrestricted model which is (Eq.01) that gives us  $R_{ur}^2 = 0.974$  and
- $SSR_{ur} = 0.9985$ , we need also the restricted model.
- Restricted model: (Eq.02)  
$$\widehat{satisfaction} = -0.075 + 0.072register + 0.116clean + 0.117efficient + 0.107notification + 0.114procedure + 0.0987window + u$$
- *We run this new regression on EVIEWS in order to obtain  $R_r^2$  and  $SSR_r$*

Dependent Variable: SATISFACTION  
 Method: Least Squares  
 Date: 06/06/14 Time: 23:21  
 Sample: 1 73  
 Included observations: 73

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.134677	0.034952	-3.853242	0.0003
REGISTER	0.080713	0.023337	3.458618	0.0010
CLEAN	0.120831	0.026181	4.615249	0.0000
EFFICIENT	0.196316	0.025092	7.823914	0.0000
NOTIFICATION	0.258644	0.023638	10.94208	0.0000
PROCEDURE	0.155599	0.024040	6.472427	0.0000
WINDOW	0.158152	0.021682	7.294033	0.0000
R-squared	0.905353	Mean dependent var	0.054795	
Adjusted R-squared	0.896749	S.D. dependent var	0.727074	
S.E. of regression	0.233629	Akaike info criterion	0.020809	
Sum squared resid	3.602438	Schwarz criterion	0.240442	
Log likelihood	6.240460	F-statistic	105.2213	
Durbin-Watson stat	2.087192	Prob(F-statistic)	0.000000	

- After I get the values  $R^2 = 0.905$  and  $SSR_r = 3.602$  we can calculate the F-test by using the formula below.

$$F \equiv \frac{(R_{ur}^2 - R_r^2)/q}{(1 - R_{ur}^2)/(n - k - 1)} \sim F_{q, n-k-1}$$

- After substituting all the values we get  $F(3,62) = 54.893$  and  $p\text{-value} = 0.00$
- Since  $F(3,62) > p\text{-value}$  we reject the null hypothesis

*Appendix E: Heteroskedasticity*

Dependent Variable: SATISFACTION

Method: Least Squares

Date: 06/07/14 Time: 02:31

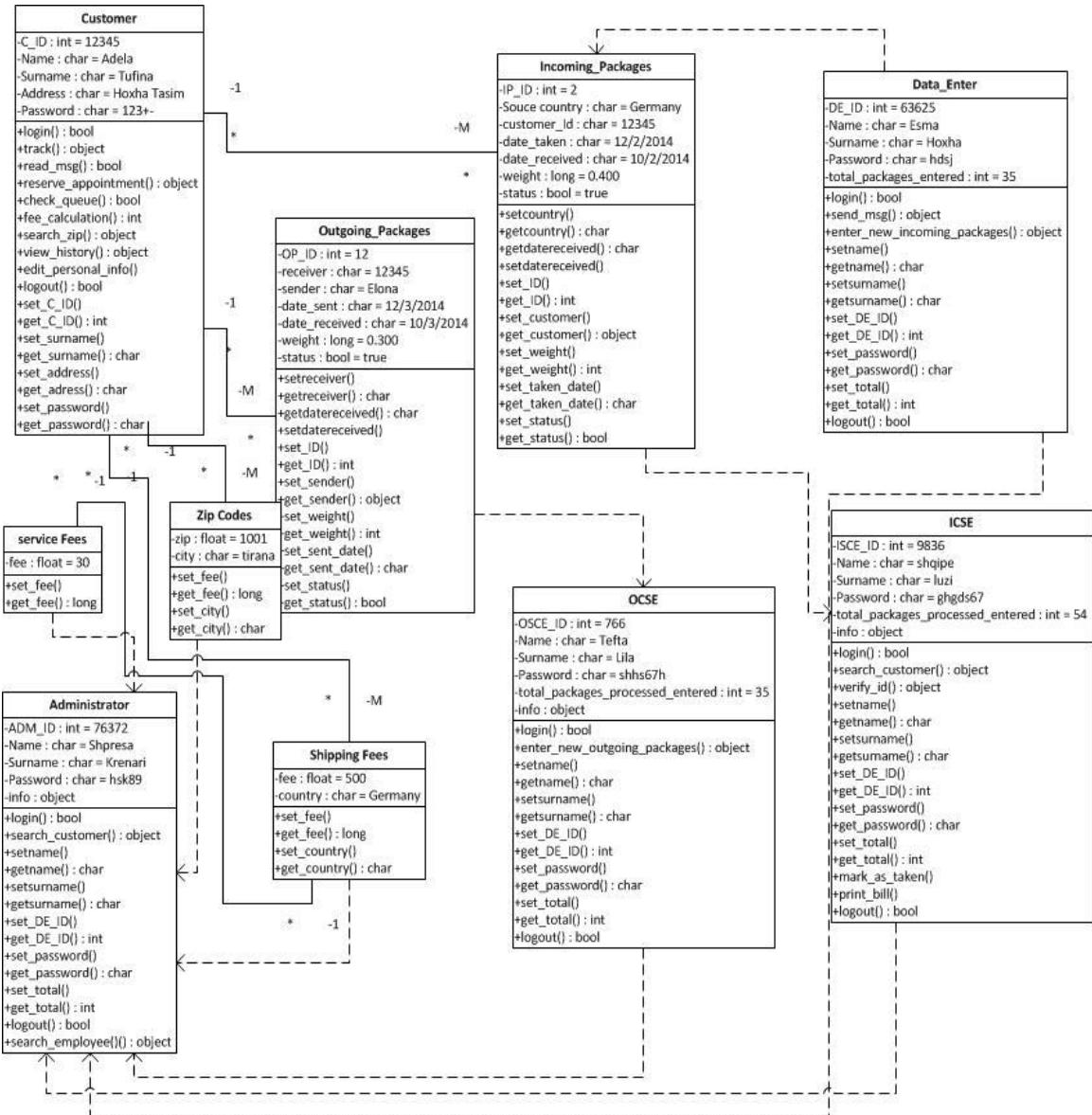
Sample: 1 73

Included observations: 73

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CLEAN	0.116327	0.014181	8.202757	0.0000
EFFICIENT	0.117168	0.015620	7.501155	0.0000
NOTIFICATION	0.107101	0.014553	7.359522	0.0000
ORG	0.111826	0.020770	5.383885	0.0000
PROCEDURE	0.113825	0.011044	10.30616	0.0000
QUALITY	0.115406	0.020582	5.607191	0.0000
REGISTER	0.071867	0.013812	5.203030	0.0000
SPEED	0.090906	0.018269	4.975880	0.0000
WINDOW	0.098745	0.013134	7.518236	0.0000
C	-0.074734	0.022451	-3.328786	0.0015
R-squared	0.973763	Mean dependent var	0.054795	
Adjusted R-squared	0.970015	S.D. dependent var	0.727074	
S.E. of regression	0.125902	Akaike info criterion	-1.179977	
Sum squared resid	0.998634	Schwarz criterion	-0.866216	
Log likelihood	53.06917	F-statistic	259.7973	
Durbin-Watson stat	2.209657	Prob(F-statistic)	0.000000	

## Appendix F: Object Diagram



*Appendix G: System Architecture*

