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<b>Title:</b>	<i>THE IMPORTANCE OF BUSINESS MODELING USING THE UNIFIED MODELING LANGUAGE (UML)</i>
<b>Author:</b>	Corina Ana BORCOȘI

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## THE IMPORTANCE OF BUSINESS MODELING USING THE UNIFIED MODELING LANGUAGE (UML)

Corina Ana BORCOȘI<sup>1</sup>

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### ABSTRACT:

EVERY BUSINESS IS MANAGED WITH THE PURPOSE OF PRODUCING GOODS AND SERVICES NECESSARY TO SATISFY THE REQUIREMENTS OF CUSTOMERS, FOR OBTAINING PROFIT, ADDED VALUE. PROSPEROUS BUSINESS GIVE US A HIGH STANDARD OF LIVING, QUALITY OF LIFE, DEVELOPMENT. BUSINESS PROCESSES ARE THE STAGES THROUGH WHICH AN ORGANIZATION GOES TO OBTAIN THE FINAL PRODUCT FOR SALE. THE STUDY OF BUSINESS PROCESSES IS IMPORTANT BECAUSE THE QUALITY OF THE PRODUCTS AND SERVICES OBTAINED DEPENDS ON THEIR GOOD DEFINITION, ELABORATION, COORDINATION. EACH ACTIVITY OF THE ORGANIZATION, WHICH REQUIRES THE DEFINITION OF A FIRST STEP, BUT ALSO A LAST, FINAL STEP, IS CONSIDERED A PROCESS. OPTIMIZING BUSINESS PROCESSES, THEIR GOOD DEFINITION AND STRUCTURING BRING BENEFITS SUCH AS: EFFICIENT USE OF RESOURCES, REDUCING RISKS, INCREASING PERFORMANCE, MANAGING RESPONSIBILITIES. BUSINESS PROCESSES HAVE DIFFERENT DIMENSIONS, DIFFERENT PURPOSES, CONTRIBUTE TO THE IMPLEMENTATION OF DIFFERENT TYPES OF ACTIVITIES. THERE ARE OPERATIONAL BUSINESS PROCESSES, SUPPORT PROCESSES, MANAGEMENT PROCESSES.

BUSINESS PROCESS MODELING USING THE UNIFIED MODELING LANGUAGE (UML) IS A VISUAL REPRESENTATION OF A PROCESS, OF A BUSINESS, OF THE STRUCTURE OF AN APPLICATION, OF A DETAILED SPECIFICATION OF A SYSTEM. MODELING SURPRISES THE ACTIVITY OF THE ORGANIZATION, ALLOWING THE ANALYSIS AND SIMULATION OF ALL THE CHANGES NECESSARY TO OPTIMIZATIONS, MAINTAIN, RESTRICT OR DEVELOP ITS BUSINESS. THE PAPER PRESENTS THE IMPORTANCE OF BUSINESS MODELING USING THE UNIFIED MODELING LANGUAGE (UML) AND REALIZED THE MODELING OF A BUSINESS USING THIS STANDARD MODELING LANGUAGE BY COMPARISON WITH A CLASSIC MODELING (AN ORGANIZATION CHART OF A MANUFACTURING ENTERPRISE).

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**KEY WORDS:** BUSINESS, MODELING, UNIFIED MODELING LANGUAGE (UML) ORGANIZATION CHART

### 1. INTRODUCTION

The increasing competition existing in the market between companies, the need to increase the quality of products and services more and more, makes business processes to be continuously improved.

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<sup>1</sup> Scientific researcher II, PhD, Constantin Brancusi University, Romania, anacorinaborcosi@gmail.com.

Business modeling is carried out, building business process models. Modeling contributes to the optimization of business processes, to the improvement of business in general.

The description of business, business processes can be done using diagrams or text. The most widely used business modeling method involves the use of the Unified Modeling Language (UML).<sup>2</sup>

Business modeling helps to understand, through modeling, the business purpose, objectives, processes, activities, types of resources used, etc.<sup>3</sup> A standard business modeling will allow enterprises to operate as if they were component parts of a global business network<sup>4</sup>.

Unified Modeling Language (UML) arose from the need as software systems, created for the business environment, to support business, to help improve its processes. UML was originally used for modeling software systems. This language has the ability to describe all aspects of business<sup>5</sup>:

- organization mode;
- the objectives of the organization;
- resource structure;
- behavioral aspects;
- business rules, which influence both business structure and behavior.

UML models business, contributes to the correct identification of the requirements that must be fulfilled by the software components used in the business, so that the software can contribute to support and improve the business. It is important how to create a business model, how to define business rules.

The paper, starting from classical modeling (the use of organizational charts – Figure 1) for the presentation of enterprises, realized modeling of the enterprise using the Unified Modeling Language (UML) which brings new details regarding the components of the enterprise, thus contributing to a better understanding of the business, making improvements to business processes easier.

## **2. THE IMPORTANCE OF BUSINESS MODELING USING THE UNIFIED MODELING LANGUAGE (UML)**

Businesses are complex systems, they have hierarchical structures, they are organized by departments, in which certain distinct activities are performed. The traditional representation of a business, using the departmental structure (for example the Research - Development Department, the Marketing Department, the Production Department, etc.) is limited only to representing the business from a structural, organizational point of view, without also presenting the business processes, which sometimes they can realize several departments (creating a new product or service, for example)<sup>6</sup>.

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<sup>2</sup> Nawrocki, J.; Nędza, T.; Ochodek, M.; Olek, Ł. - Describing Business Processes with Use Cases, Business Information Systems, Proceedings of BIS 2006, Poznań, Poland, Witold Abramowicz (ed.)

<sup>3</sup> Eriksson, H.-E.; Penker, M. - Business Modeling with UML: Business Patterns at Work, Ed. John Wiley & Sons, Inc., 2000

<sup>4</sup> Marshall, C.; Enterprise modeling with UML: designing successful software through business analysis, Addison – Wesley Logman, 2000

<sup>5</sup> Eriksson, H.-E.; Penker, M. - Business Modeling with UML: Business Patterns at Work, Ed. John Wiley & Sons, Inc., 2000

<sup>6</sup> Eriksson, H.-E.; Penker, M. - Business Modeling with UML: Business Patterns at Work, Ed. John Wiley & Sons, Inc., 2000

Business modeling tells us what a system should do, not how to do it<sup>7</sup>.

The business processes, the ways of realized them, the resources used, the problems encountered in achieving the objectives cannot be captured in the traditional business modeling.

A traditional model of a business is shown in figure 1 (the organizational chart of a manufacturing business).

It is important to do business modeling because<sup>8</sup>:

- ✚ we need to understand the key mechanisms of a business;
- ✚ the modeling must provide information that supports the operation of the business;
- ✚ we need models that contribute to improving the structure of the business, its way of functioning;
- ✚ an innovative business can be built;
- ✚ new opportunities for existing business development can be identified.

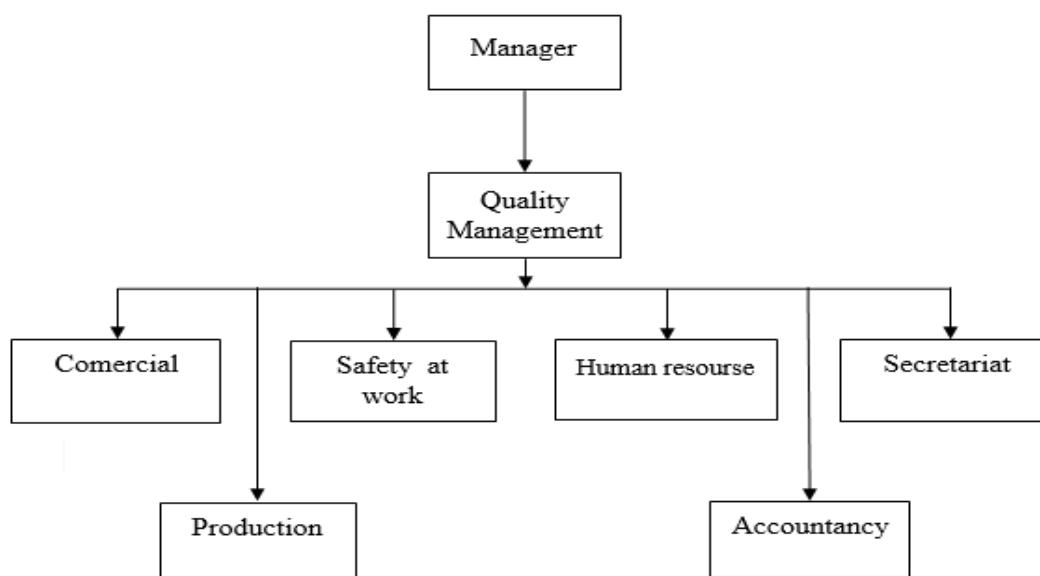


Figure 1 A classic modeling of a business, using departmental organization – Organizational Chart

Source: Borcoși, C. A.; Metode și tehnici de management aplicate în IMM-uri, Editura Academica Brâncuși, Târgu Jiu, 2011, p. 237

A good business model includes all the information necessary to understand both the structure of the business and the mode of operation, in order to be able to discover solutions to the problems that have arisen, and which can be implemented in real time. We cannot say that a model of a business is fully structured or that reflects reality in the most detail, because it would become a model that is difficult to understand, with too many details. Business modeling languages can't capture all the details anyway. The business model must capture the essence of the business, the goals to be achieved and its most important mechanisms.

<sup>7</sup> Nica, I.; Ionescu, Ș.; Business process modeling. Using Unified Modeling Language to streamline the design of the TO-BE system within a company, Theoretical and Applied Economics Volume XXVII (2020), No. 4(625), Winter, 89-106

<sup>8</sup> Eriksson, H.-E.; Penker, M. - Business Modeling with UML: Business Patterns at Work, Ed. John Wiley & Sons, Inc., 2000

Business modeling methods and techniques needed a common language, a standard representation system. The Unified Modeling Language (UML) provides the tools needed to create systems that describe business, model business, so that they can be better understood, applied, improved, developed.

The Unified Modeling Language (UML) was developed by Grady Booch, James Rumbaugh, and Ivar Jacobson. In 1997 it was standardized by the Object Management Group (OMG)<sup>9</sup>. It is used as a modeling language by<sup>10</sup>:

- ✚ management consulting firms;
- ✚ software engineering;
- ✚ software developers;
- ✚ software programmers;
- ✚ business analysts.

This language comprises a set of symbols and rules that must be followed when making the model. The diagrams developed using the Unified Modeling Language have the role of synthesizing, in a visual form, the most important information that defines a system or characterizes a process<sup>11</sup>.

UML has nine categories of diagrams that can be used in modeling<sup>12</sup>:

- class diagrams – describe the structure of the system, what is made up of classes and the connections between them. Classes represent information, products, organizations, etc.;
- object diagrams – used to exemplify a class diagram;
- state diagrams – describe the possible state of a class or even a system;
- activity diagrams – describe the activities, the actions carried out in a system;
- sequence diagrams – describe sequences of messages that are transmitted to a set of objects;
- collaboration diagrams – describe the collaboration between a set of documents;
- use case diagrams – show the connections between use cases. Each use case diagram describes a part of a system's functionality.
- component diagrams – describe the components inside a system;
- implementation diagrams – describe the hardware component of a system.

We next present the modeling of a business (same business represented in figure 1) using a standard modeling language – the Unified Modeling Language (UML).

### **3. MODELING OF AN ENTERPRISE USING THE UNIFIED MODELING LANGUAGE (UML)**

Modeling an enterprise using the Unified Modeling Language (UML) simplifies the complexity of reality by removing irrelevant details and emphasizing the important aspects of the business<sup>13</sup>.

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<sup>9</sup> Eriksson, H.-E.; Penker, M. - Business modeling with UML: business patterns at work, John Wiley & Sons, Inc., 2000, 21

<sup>10</sup> Eriksson, H.-E.; Penker, M. - Business modeling with UML: business patterns at work, John Wiley & Sons, Inc., 2000, 21

<sup>11</sup> Nica, I.; Ionescu, Ș.; Business process modeling. Using Unified Modeling Language to streamline the design of the TO-BE system within a company, Theoretical and Applied Economics Volume XXVII (2020), No. 4(625), Winter, 89-106

<sup>12</sup> Eriksson, H.-E.; Penker, M. - Business modeling with UML: business patterns at work, John Wiley & Sons, Inc., 2000, 21

The business is in the field of production, has the organizational chart shown in figure 1 and has the following components:

- ✓ The company manager (Manager);
- ✓ Quality management assurance department (Quality management);
- ✓ Commercial department (Commercial);
- ✓ Department regarding ensuring the safety and health at work of the employees (Safety at work);
- ✓ Human resources department (Human resource);
- ✓ Company secretariat (Secretariat);
- ✓ Production department (Production);
- ✓ Accounting department (Accountancy).

The use of the organizational chart to describe an enterprise is the classic modeling of the enterprise and is presented in figure 1.

The enterprise is, however, a living organism that carries out different activities, establishing connections between the components of the organization according to the objectives to be achieved, the activities to be carried out. We present below the main activities carried out in each department.

Each component of the organization represented in the organizational chart in figure 1 benefits, through the use of the Unified Modeling Language (UML), of distinct models, with the help of which the most important activities carried out by each component of the organization are clarified. This modeling helps us to understand the role of each department in the enterprise, which was not evident from the classical modeling, making improvements to business processes easier.

Business modeling using the Unified Modeling Language (UML) leads to the development of a set of diagrams (Use Cases diagrams) that are presented as follows:

1. the Company manager has a UML diagram in figure 2;
2. the Quality management assurance department has a UML diagram in figure 3;
3. the Commercial department has a UML diagram in figure 4;
4. the Department regarding ensuring the safety and health at work of employees has a UML diagram in figure 5;
5. the Human resources department has a UML diagram in figure 6;
6. the Company secretariat has a UML diagram in figure 7;
7. the Production section has a UML diagram in figure 8;
8. the Accounting department has a UML diagram in figure 9.

The Company manager (Figure 2) performs the following main activities:

- establishes the mission of the organization;
- develops the strategy;
- coordinates the implementation of the strategy;
- monitors the performance of the company's activities;

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<sup>13</sup> Zrnec, A.; Bajec, M.; Krisper, M.; Enterprise modelling with UML, Electrotechnical Review, Ljubljana, Slovenija, 2001

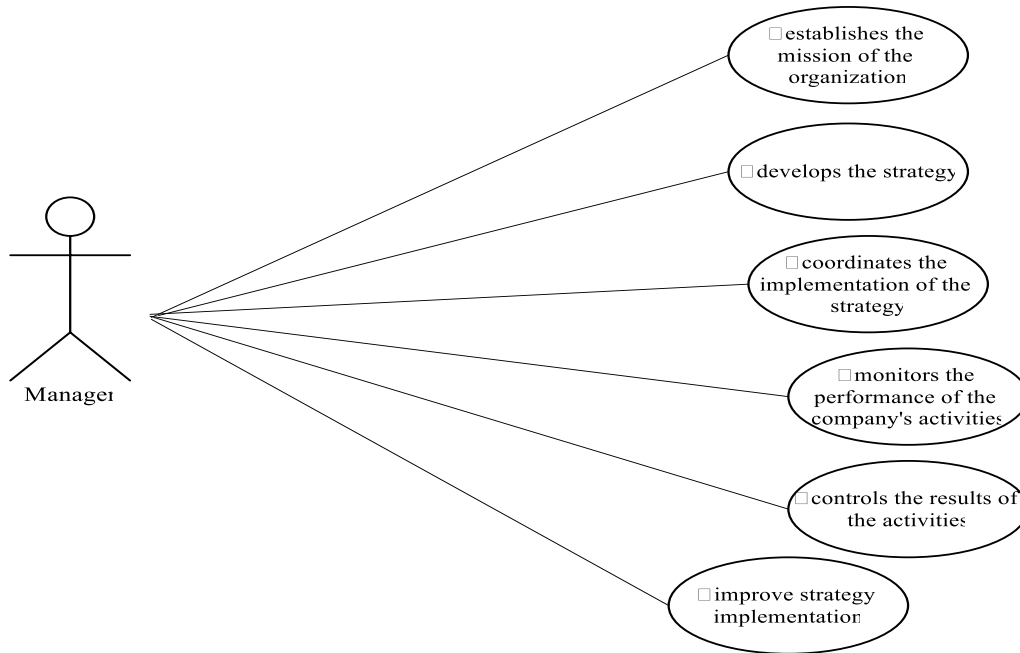


Figure 2 The company manager UML diagram  
Source: The design is done by the author

- controls the results of the activities;
- improve strategy implementation.

The Quality management assurance department (Figure 3) aims to develop the quality culture at the organization level. Develops and manages the documents necessary for the evaluation, auditing and continuous improvement of the quality of the entire activity of the enterprise.

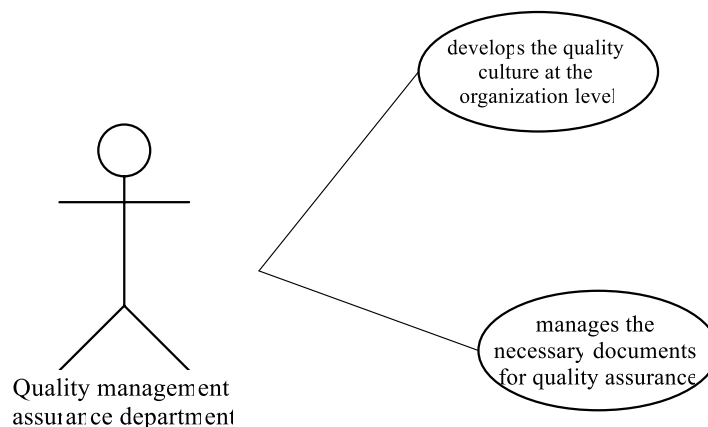


Figure 3 The quality management assurance department UML diagram  
Source: The design is done by the author

The Commercial department (Figure 4) carries out the following activities:

- ✓ sales - purchase transactions;

- ✓ draws up commercial contracts;
- ✓ solves the problems arising in the development of commercial contracts;
- ✓ ensures the purchase of raw materials, materials necessary for the company's activity.

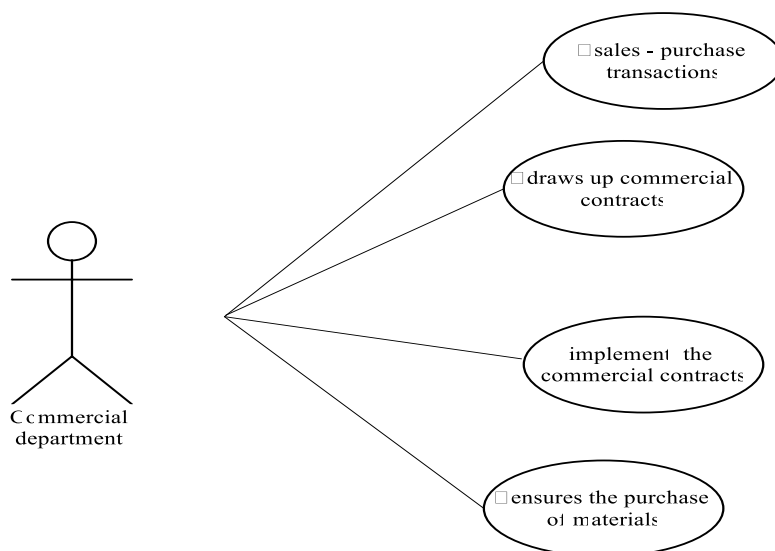


Figure 4 The commercial department UML diagram  
Source: The design is done by the author

The Department regarding ensuring the safety and health at work of employees (Figure 5) ensures<sup>14</sup>:

- ✓ organizes the activity of ensuring safety and health at work;
- ✓ insures employees for the risks of work accidents and occupational diseases;
- ✓ organize workplaces in such a way as to ensure the safety and health of employees;
- ✓ ensures permanent control of materials, equipment used in the work process, with the aim of ensuring the safety and health of employees.

<sup>14</sup> Legea 319 din 2006 - Legea privind securitatea și sănătatea în muncă, available at <https://www.iproctiamuncii.ro/legislatie-protectia-muncii/legea-319-2006>, accessed at 14.09.2022



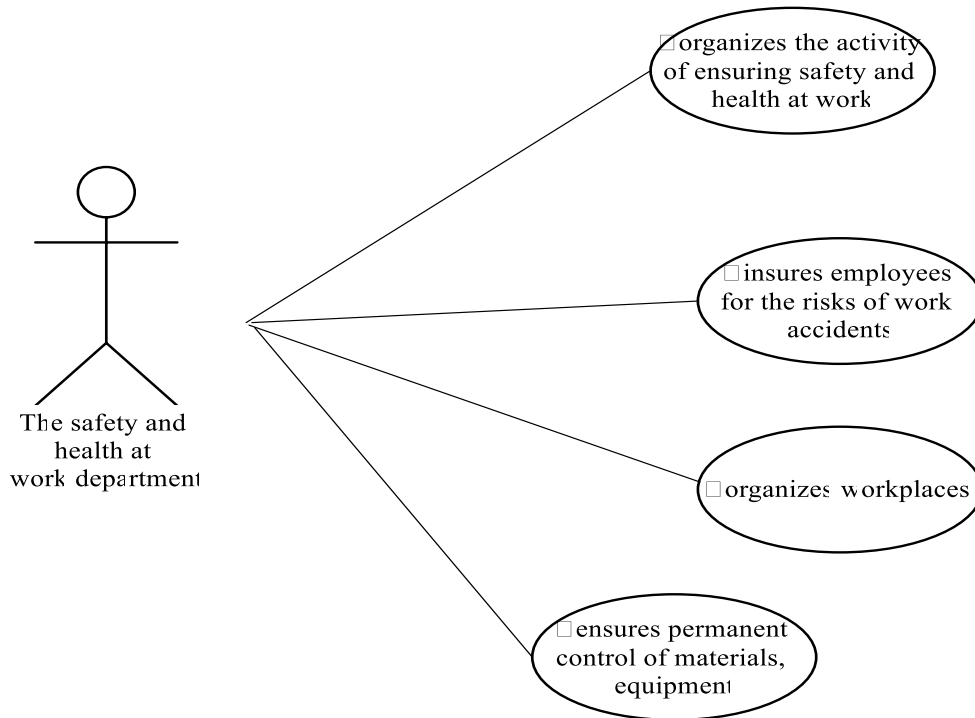


Figure 5 The department regarding ensuring the safety and health at work of employees  
Source: The design is done by the author

The Human resources department (Figure 6) ensures<sup>15</sup>:

- ✓ manage the human resource, who contribute to the achievement of the company's objectives;
- ✓ ensures the opportunity for employees to fulfill themselves professionally.

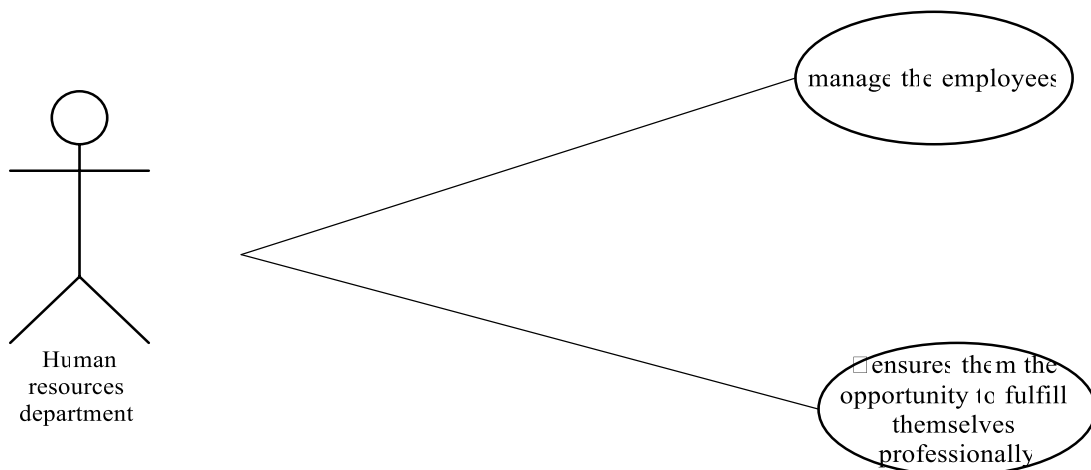


Figure 6 The human resources department UML diagram  
Source: The design is done by the author

<sup>15</sup> <https://www.business-academy.ro/ce-face-un-manager-de-resurse-umane#>, accessed at 14.09.2022

The Company secretariat (Figure 7) manages correspondence, takes and forwards calls, manages visits of customers, suppliers, guests etc.

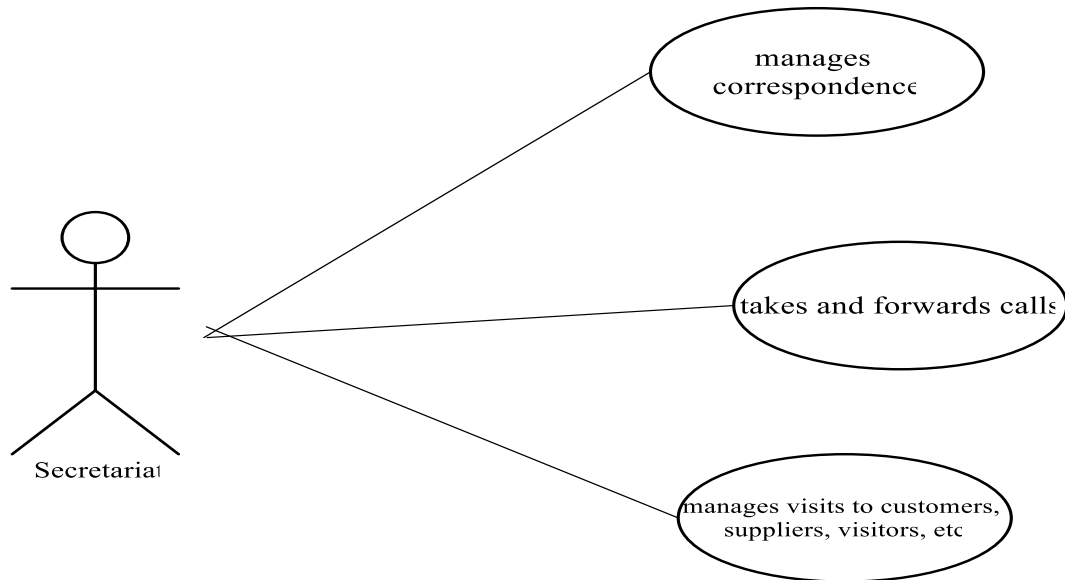


Figure 7 The company secretariat UML diagram  
Source: The design is done by the author

The Production section (Figure 8) ensures the production of goods and services, according to the business object and which are intended for sale.

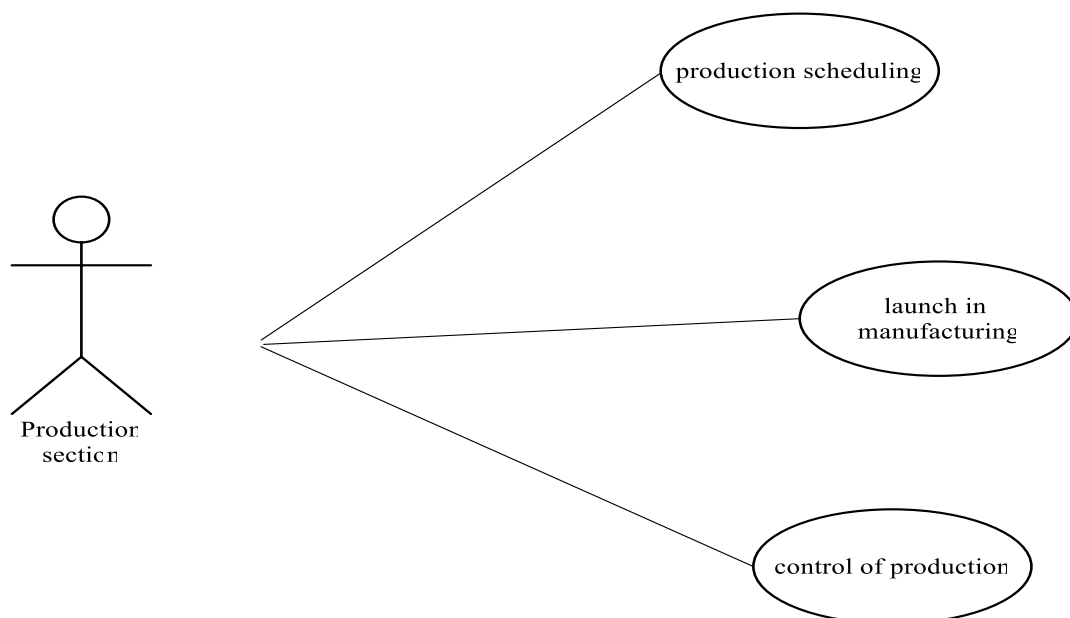


Figure 8 The production section UML diagram  
Source: The design is done by the author

The Accounting department (Figure 9) ensures:

- ✓ development and implementation of accounting policies;

- ✓ income and expenditure budgets;
- ✓ preparation of various financial-accounting statements.

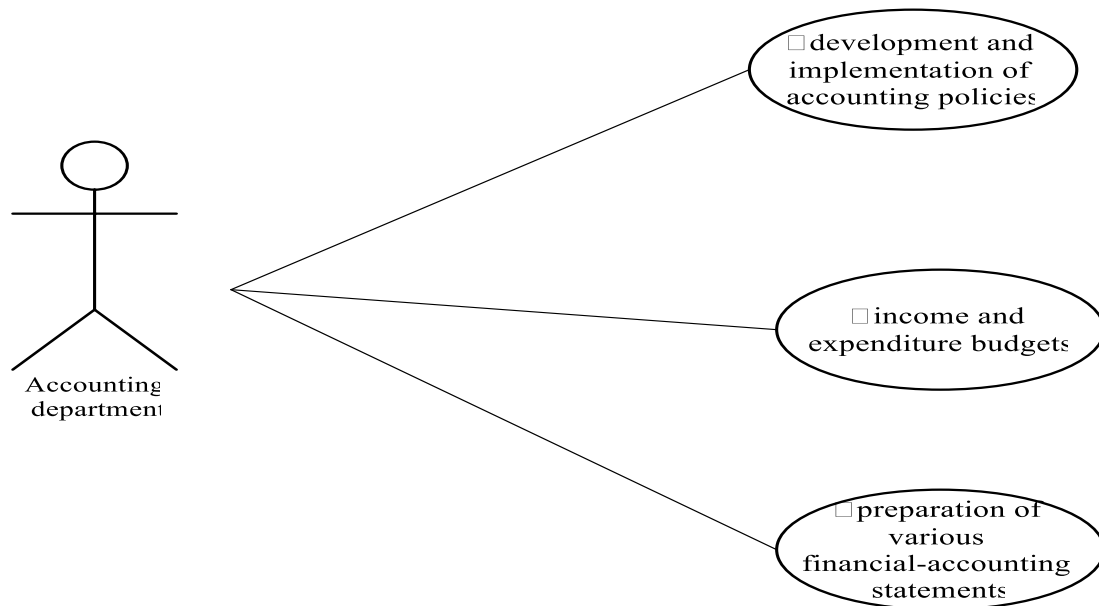


Figure 9 The accounting department UML diagram  
Source: The design is done by the author

## CONCLUSIONS

Business modeling can also be done using the Unified Modeling Language (UML). A business model is a synthesis of how the business works. The details are different, depending on the type of business, but also on the vision of the one who develops the model. The business model once created can contribute to the improvement of the business, the way of communication within the organization, it can generate innovation, it can support and develop the business.

The UML model of a business helps to understand the business, to establish weaknesses, to discover new opportunities, to improve the business. The classic presentation of the structure of a business in the field of production, which has a well-defined hierarchical structure, does not allow (except intuitively) to understand the activities carried out within each department or the connections between departments. The paper presents UML diagrams for each department, which helps to clarify the role of each department in the organization, making improvements to business processes easier.

## REFERENCES

1. **Borcoși, C. A.;** *Metode și tehnici de management aplicate în IMM-uri*, Editura Academica Brâncuși, Târgu Jiu, 2011
2. **Eriksson, H.-E.; Penker, M.** - *Business modeling with UML: business patterns at work*, John Wiley & Sons, Inc., 2000
3. **Marshall, C.;** *Enterprise modeling with UML: designing successful software through business analysis*, Addison – Wesley Logman, 2000
4. **Nawrocki, J.; Nędza, T.; Ochodek, M.; Olek, Ł.;** *Describing business processes with use cases*, Business Information Systems, Proceedings of BIS 2006, Poznań, Poland, Witold Abramowicz (ed.),
5. **Nica, I.; Ionescu, Ș.;** *Business process modeling. Using Unified Modeling Language to streamline the design of the TO-BE system within a company*, Theoretical and Applied Economics Volume XXVII (2020), No. 4(625), Winter, pp. 89-106
6. **Zrnec, A.; Bajec, M.; Krisper, M.;** *Enterprise modelling with UML*, Electrotechnical Review, Ljubljana, Slovenija, 2001
7. **\*\*\*Legea 319 din 2006 - Legea privind securitatea și sănătatea în muncă**, available at <https://www.iprotectiamuncii.ro/legislatie-protectia-muncii/legea-319-2006>, accessed at 14.09.2022
8. <https://www.business-academy.ro/ce-face-un-manager-de-resurse-umane#>, accessed at 14.09.2022