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**Intituled:**

**Conception and realization of Crowdfunding Web  
Application**

**Defended in front of the jury composed of:**

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# Dedication

*I dedicate this modest work:*

*To my dear mother for her sacrifices since she gave birth to me.*

*To my husband Djamel. `*

*To my dear brother Bilal. `*

*To my grandmother, may God bless her. `*

*To my uncles, aunts, cousins. `*

*To my friends those with whom I have travelled the long road with so much pain and joy. `*

*And especially to my lovely best friend Cheyma without her the graduation wouldn't be complete, thank you for being in my life.*

*Ms. Lina Benazi*

*I dedicate this work to my mother, whose unwavering love and support has been my guiding light, and to my sisters, whose constant encouragement and strength have lifted me up.*

*I also extend my heartfelt gratitude to my father and brother, whose belief in me has been a source of motivation.*

*To my dear friends who have been with me throughout my university years, thank you for your companionship, motivation, and the shared experiences that have made this journey more meaningful and enjoyable.*

*Lastly, I want to extend a special thank you to my sister from another mother, Lyna, for all the years we spent together. Her presence has added depth and joy to this journey.*

*Miss Cheyma Messili*

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# General Introduction

Computer science is a dynamic field encompassing scientific, technical, and industrial activities focused on automating information processing through the execution of computer programs by machines such as embedded systems, computers, and automatons. The evolution of information technology has opened up vast possibilities and enhanced communication opportunities through virtual platforms, connecting people and organizations worldwide. These platforms serve as a hub for sharing ideas and areas of interest with a global user base.

In the realm of business, having a great idea is only the beginning. Transforming that idea into reality requires securing the necessary funds, as without financial backing, even the most innovative and creative ideas remain unrealized. Entrepreneurs often find their hidden business potential limited by the lack of capital, hindering their ability to bring their ideas to fruition.

The objective of this work is to establish a crowdfunding platform where opportunities and dreams converge. This platform aims to enable individuals, companies, and creative ventures to acquire the necessary funding and turn their ideas into reality. Crowdfunding provides a stage to showcase your vision and connect with a global community of backers. Whether you are a budding entrepreneur with an innovative product, an artist seeking support for your next masterpiece, or a charitable organization looking to make a difference, crowdfunding offers the means to realize your dreams. By harnessing the power of collective support, crowdfunding empowers you to achieve your goals.

To carry out this work, we have divided our development process into three stages, each characterized by a dedicated chapter:

- The first chapter provides a comprehensive overview of crowdfunding, including its functions, actors, types, ethics, advantages, and disadvantages.
- The second chapter focuses on analysis and conception, specifying the functional and non-functional requirements of our system. It also includes the creation of dynamic models using use case diagrams and sequence diagrams, illustrating interactions and temporal sequencing of operations. Additionally, a static model is presented through class and object diagrams, providing an overview of the database structure.

- The third chapter is dedicated to realization, where we showcase the implementation techniques employed and provide an overview of the final outcome through selected Human-Machine Interfaces (HMIs).

By following this structured approach, we aim to explore the potential of crowdfunding in computer science and develop a web application that facilitates the transformation of ideas into tangible results.

**CHAPTER 1**  
**ABOUT CROWDFUNDING**

## **1.1 Introduction**

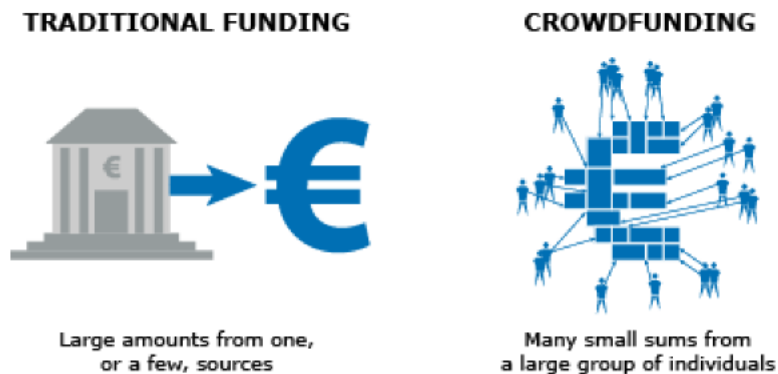
Crowdfunding is a new and exciting way of financing that has emerged in recent years, providing an alternative to traditional financing methods. This method allows individuals and organizations to raise funds from a large number of people who contribute small amounts of money through an online platform [1]. Crowdfunding has become a popular way to finance a variety of projects, including small businesses, creative ventures, and charitable causes.

The growth of crowdfunding has been facilitated by advancements in technology and the rise of social media, which has made it easier for entrepreneurs, artists, and non-profits to reach a wider audience and raise funds. The popularity of crowdfunding is due to its accessibility, transparency, and ability to democratize the funding process.

However, crowdfunding is not without its challenges, and it is important to understand the risks and benefits before launching a campaign. This chapter will explore a brief history of crowdfunding, crowdfunding actors, the different types of crowdfunding, functioning of crowdfunding, Advantages and disadvantages of crowdfunding, Crowdfunding success factors, and finally ethics of crowdfunding.

## **1.2 Definition of crowdfunding**

As we mentioned, Crowdfunding is a way to raise funds for a project by gathering small contributions from a large group of people through the internet. It differs from traditional methods of financing, which often involve large sums of money from a small group of investors. Crowdfunding operates by pooling together contributions from multiple backers, and it often bypasses the involvement of traditional financial intermediaries. This approach draws on the principles of crowdsourcing, and has enabled the emergence of new financing channels that can support a variety of projects, including commercial, cultural, humanitarian, social, political, environmental, and technological initiatives [2]. See example below.



**Figure 1.1** :Traditional funding vs crowdfunding [3]

### 1.3 Brief history of crowdfunding

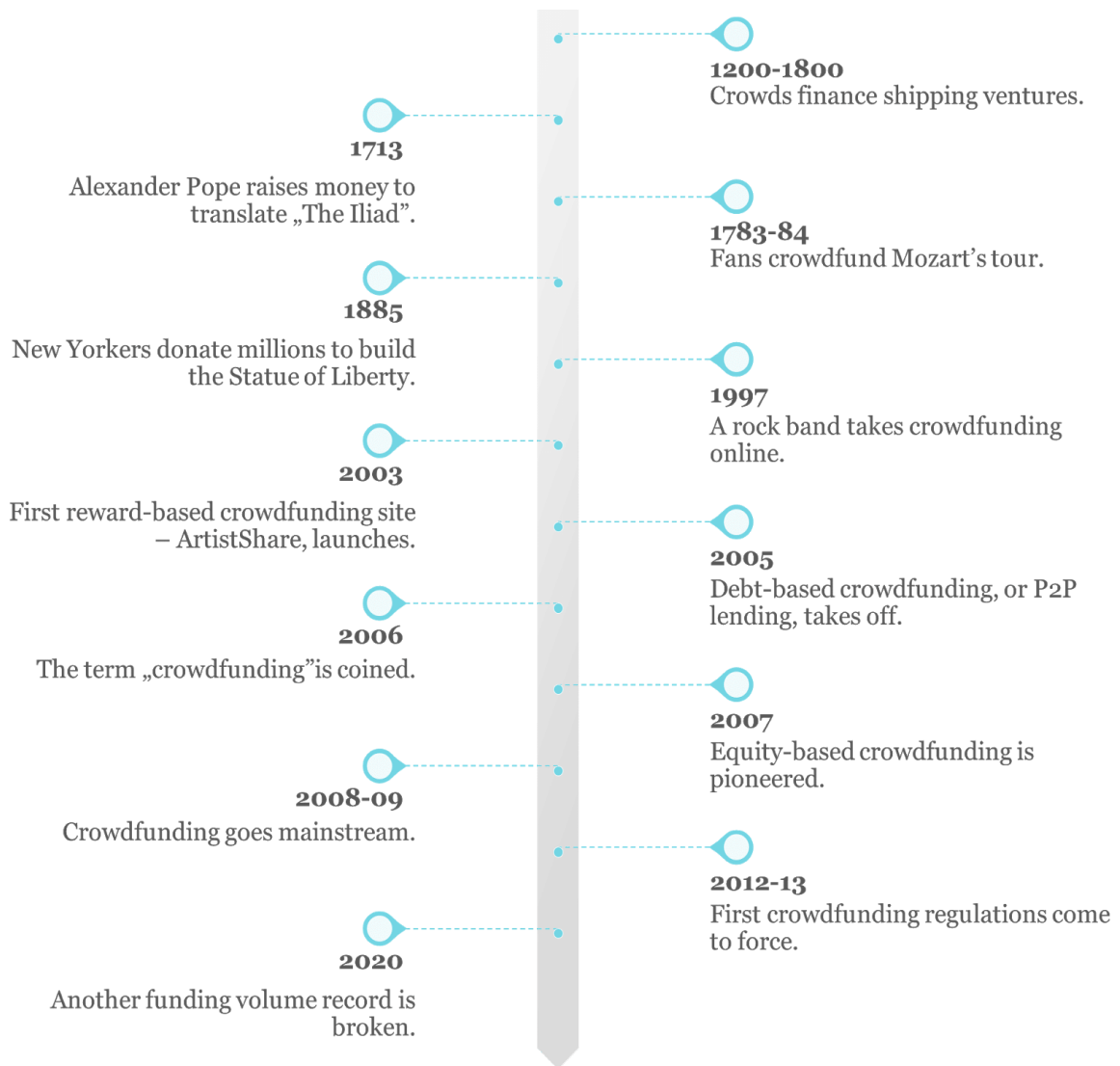
The concept of crowdfunding can be traced back to the 18th century, when subscriptions were used to fund projects such as the construction of the Statue of Liberty. However, it wasn't until the advent of the internet that crowdfunding became a widespread practice.

The first known crowdfunding platform was launched in 1997 by a British rock band called Marilyn. The band wanted to organize a tour in the US but didn't have the funds to do so. They turned to their fans and asked them to contribute to the tour expenses in exchange for exclusive merchandise and access to the band. The campaign was a success, and Marilyn was able to tour the US thanks to the support of their fans.

In the early 2000s, platforms such as Artist Share and Sella band emerged, allowing musicians to raise funds for their projects through crowdfunding. The success of these platforms paved the way for the launch of Kickstarter in 2009, which became the first mainstream crowdfunding platform and allowed entrepreneurs and creative individuals to raise funds for their projects.

The passage of the JOBS Act in 2012 enabled equity crowdfunding, allowing startups and small businesses to raise funds from investors in exchange for equity in their company. This led to the emergence of equity crowdfunding platforms such as Seders and Crowd cube [2].

Today, crowdfunding has become a popular way to raise funds for a variety of projects, and it has disrupted traditional financing methods such as bank loans and venture capital. However, crowdfunding is still a relatively new phenomenon and there are many challenges that need to be addressed, such as investor protection and regulation. See example below.



**Figure 1.2:** timeline of crowdfunding history [4]

## 1.4 Crowdfunding actors

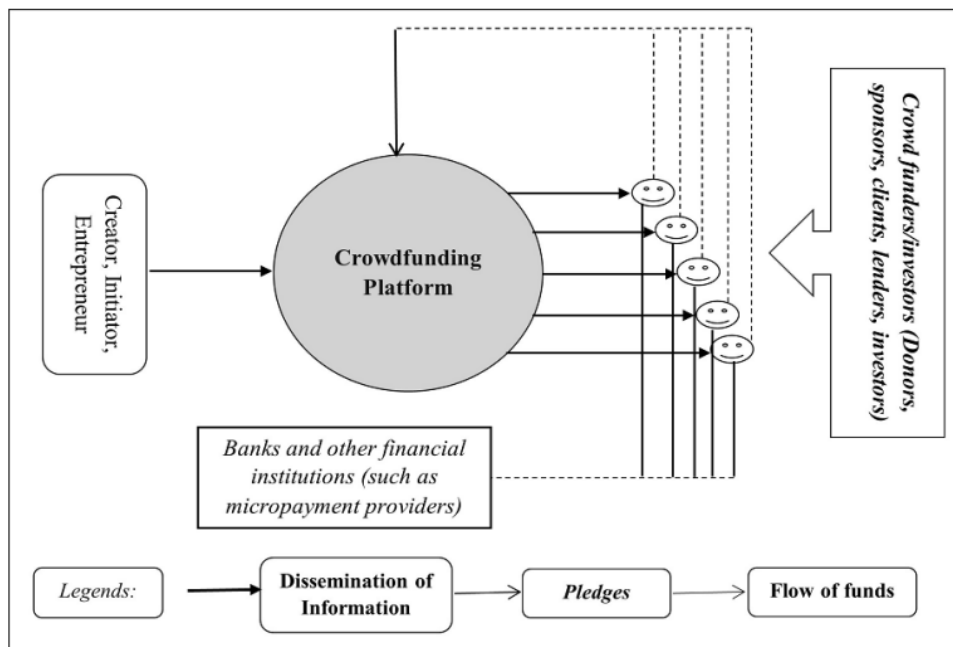
This modern crowdfunding model typically involves three primary participants. The first are the creators or project proposers, the second are the backers or the crowd and finally there are the crowdfunding platforms [5].

**The Project Creator:** the fundraisers (creators, founders, entrepreneurs, initiators, etc.) These are the individuals or organizations who propose projects or ventures that need funding.

They are responsible for collecting funds through a crowdfunding platform and ensuring that the project is completed as promised.

**The Backers or Investors:** (investors, lenders, supporters, contributors) These are the individuals or groups who contribute funds to the project. They are sometimes referred to as the "crowd" in crowdfunding, and they assume risk with the hope of receiving a return on their investment.

**The Platform Provider:** This is the intermediary that connects project creators with potential backers. The crowdfunding platform facilitates the funding process and helps entrepreneurs gain access to funding from interested investors. See example below.



**Figure 1.3:** Principal participants in Crowdfunding [6]

The project creator creates a project and launches a crowdfunding campaign on the platform provider's website. Backers and investors then visit the platform and contribute funds to support the project. The platform provider handles the collection and disbursement of funds to the project creator, while also providing tools and resources to help them promote their campaign and communicate with backers.

## 1.5 Type of crowdfunding

Crowdfunding is a term that encompasses various approaches to funding initiatives. there are different ways to classify the various types of crowdfunding [7].

**Not-for-profit crowdfunding:** refers to projects that aim to achieve social objectives, such as supporting charities, public research, or overseas development assistance. Backers who support these projects are typically motivated by the cause rather than the potential financial return on their investment.

**For-profit crowdfunding:** on the other hand, involves projects that aim to generate financial benefits for the project initiator and/or backers. These projects can include business ventures, new private assets, or creative endeavors like funding a song or film. Backers of for-profit projects may receive equity, profit sharing, or other financial incentives in exchange for their investment.

**Not defined:** refers to projects that are unsure if they will generate a profit or not. These could be social initiatives with a potential to make a profit or business ventures that have not yet determined their revenue model. Backers of not defined projects may be motivated by a combination of social impact and potential financial return.

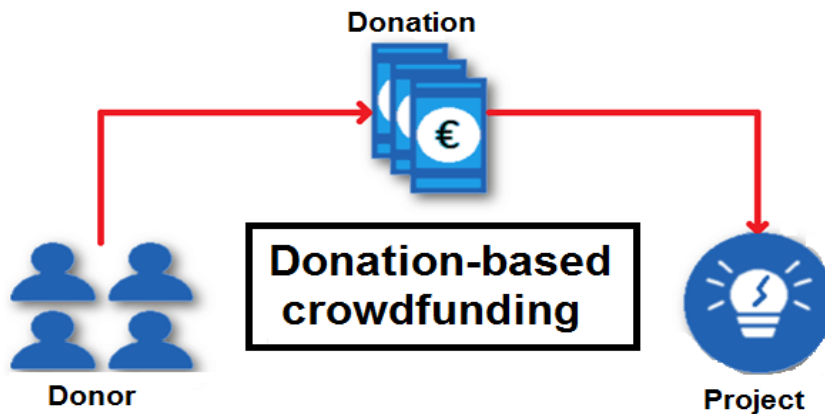
It's worth noting that while these three types of crowdfunding are distinct, there can be overlap between them. For example, a not-for-profit project may offer backers a reward in exchange for their donation, or a for-profit project may have a social mission as part of its business model.

The specific characteristics of each project can vary widely depending on the platform, project initiator, and backers involved.

Here is a brief overview of the individual models [8].

### **1.5.1 Donation-based crowdfunding**

This financing approach is well-suited to various businesses and is regarded as a selfless deed where project leaders obtain funds from contributors without any expectation of quid pro quo. See example below.



**Figure 1.4:** Donation-based crowdfunding [9]

### **Advantages:**

Since it solely depends on people's willingness, there is no obligation to offer anything in exchange for their support. Moreover, in some instances, raising funds through donations for non-profit entities can accomplish their funding objectives with ease since it serves the common good of the community, in contrast to profit-driven enterprises that prioritize their own interests.

### **Disadvantages:**

As donors do not receive any benefits, contributions are usually modest. Therefore, the fundraising objective should be limited.

### **1.5.2 Rewards-based crowdfunding**

The most widely used funding model is the grant-for-gift approach, which is based on rewards given in-kind. Under this model, project leaders present their projects along with the desired funding amount and rewards. Once the project goes live, contributors make payments and receive their rewards based on the amount they have paid. This crowdfunding model, which is often used for artistic, cultural, educational, and new product ideas, tends to attract initial contributions from friends and family due to their personal connection with the project owner. The nature of the reward offered typically depends on the amount contributed and the type of project, such as a dedication, CD, artist autograph, or a small gift. See example below.

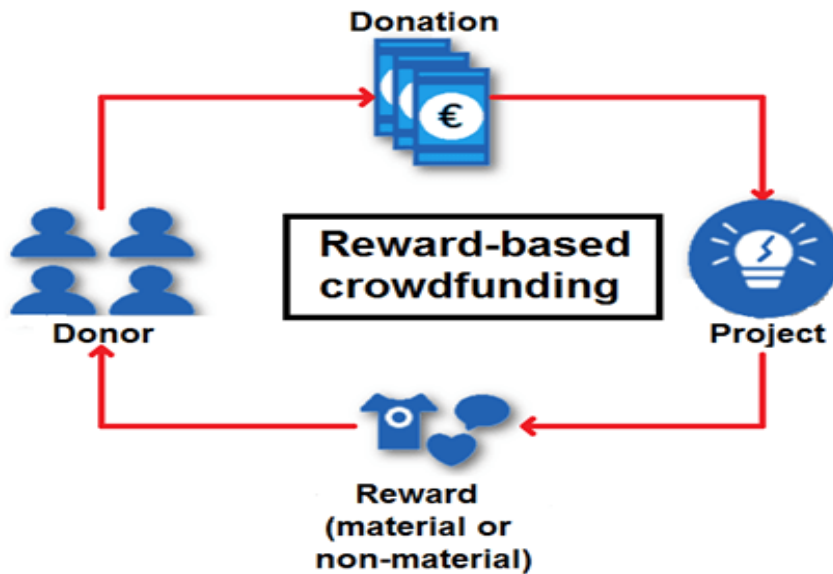


Figure 1.5: Reward-based crowdfunding [9]

#### Advantages:

Companies can acquire significant funds without any obligation to repay or sacrifice equity. Additionally, crowdfunding enables businesses to establish a customer base, validate their concept, and receive direct feedback from consumers.

#### Disadvantages:

In case the campaign reaches its target, the project initiator must fulfill their commitments and provide the promised rewards. However, the expenses of executing the project, producing the rewards, and delivering them to supporters can result in minimal funds available for the project's intended goals.

#### 1.5.3 Debt-Based Crowdfunding (crowd lending)

This crowdfunding model involves contributors lending money to project holders, usually entrepreneurs or startups, who seek to finance their projects at lower interest rates than those set by banks. Investors in this model expect returns in the form of interest. In another case, the investor may lend money to the project holder interest-free, with a greater focus on social motivation than financial gain. Lending money to finance a project through this model allows the project leader to test their product, and the loan approval process is simple and does not require collateral. See example below.

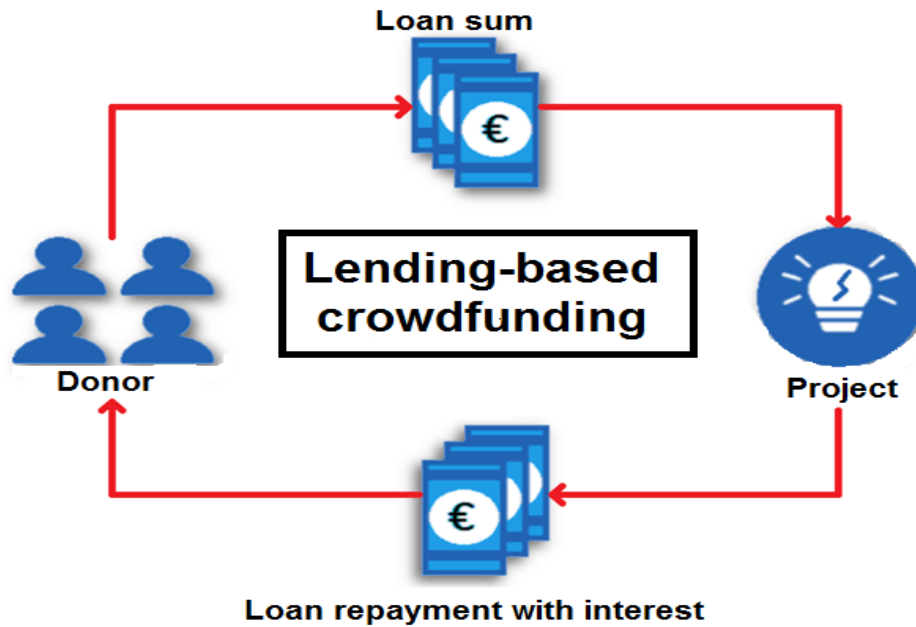


Figure 1.6: Lending-based crowdfunding [9]

#### Advantages:

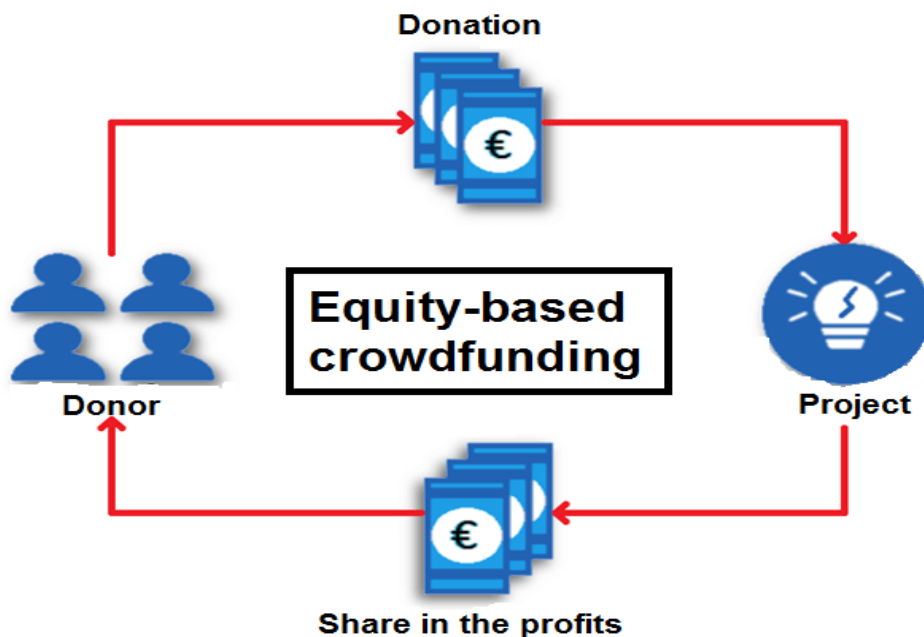
Crowd lending offers a viable option to traditional funding sources like bank loans. Crowdfunding platforms frequently feature lower interest rates, straightforward application processes, and online accessibility.

#### Disadvantages:

Despite the simplified application process, not all projects are accepted by crowdfunding platforms. Therefore, not every crowdfunding campaign can obtain crowd lending funds.

#### 1.5.4 Equity-based crowdfunding

Equity crowdfunding, also known as crowd investing, sets itself apart from other forms of crowdfunding. The goal of this model is to enable investors to gain a stake in a company's capital and receive shares or bonds in return for their contributions. By holding shares in the company, the investor is entitled to dividends and/or voting rights based on the terms agreed upon between the investor and the borrower of funds. Despite the large sums of money that can be raised through this financing model, it is still relatively weak due to the risks involved and the complex administrative procedures required. However, equity crowdfunding has the potential to be the most profitable form of crowdfunding, provided that the platform can instill confidence in potential investors. See example below.



**Figure 1.7:** Equity-based crowdfunding [9]

#### **Advantages:**

Equity crowdfunding enables project owners to acquire substantial amounts of capital without the pressure of immediate returns. Additionally, with a larger group of investors, there is less concentration of power among shareholders, allowing management more flexibility in decision-making.

#### **Disadvantages:**

Equity crowdfunding involves giving away a portion of the company in exchange for funds, which dilutes the ownership and decision-making control of the original owners. Furthermore, in some countries, it may be illegal to distribute shares of a non-public company, necessitating the verification of each country's specific regulations before organizing an equity crowdfunding campaign.

## **1.6 Functioning of crowdfunding**

Here are the basic steps of how crowdfunding works:

### **1.6.1 Choosing a crowdfunding platform**

Platform to host the campaign. There are several popular platforms available, including Kickstarter, Indie go go, Go Fund Me, crowd funder, and many others [10]. Each platform has

its own features, fees, and requirements, so it's important to choose the one that best suits your project and goals. See example below.

<b>Platform</b>	<b>Type</b>	<b>Funding model</b>	<b>Fees</b>	<b>Target audience</b>	<b>Project Improvement Process</b>
Kickstarter	Reward-based	All-or-nothing	5% of funds raised + payment processing fees	Creative projects	Yes, strict guidelines
Indie go go	Reward-based or Equity-based	Flexible (reward) or All-or-nothing (equity)	5% of funds raised + payment processing fees	Creative and entrepreneurial projects	Yes, but more flexible guidelines
Go Fund Me	Donation-based	Keep-what-you-raise	0% platform fee, 2.9% + \$0.30 per transaction for payment processing fees	Personal and charitable causes	No, but platform reviews and verifies campaigns.
Crowd funder	Equity-based	All-or-nothing	5% of funds raised + payment processing fees	Startups, businesses	Yes, strict Guidelines And vetting process

**Table 1.1:** Comparison of crowdfunding platforms

The table compares 4 popular crowdfunding platforms based on four criteria: type, funding model, project approval process, fees, and target audience.

- **Type:** The type of crowdfunding model used by the platform, such as donation-based, reward-based, equity-based, or microfinance.
- **Funding model:** This criterion refers to the type of funding model used by the platform, All-or-nothing funding means that a project must meet its funding goal in order to receive any funds, while keep-what-you-raise means that funds are received regardless of whether the project meets its funding goal.
- **Project approval process:** This criterion refers to the process by which a project is approved for crowdfunding on the platform. Some platforms have strict guidelines and vetting processes, while others are more flexible.
- **Fees:** This criterion refers to the fees charged by the platform for using their service. This can include a percentage of the funds raised, as well as payment processing fees.
- **Target audience:** This criterion refers to the types of projects or campaigns that are best suited for the platform. Some platforms are best suited for creative projects, while others are more focused on personal fundraising or equity crowdfunding.

By comparing these criteria, you can choose the platform that is best suited for your project or campaign, based on your specific needs and goals.

### **1.6.2 Creating a campaign**

Once you've chosen a platform, you'll need to create a campaign for your project. This involves writing a description of the project, setting a funding goal, and choosing a timeframe for the campaign. You'll also need to choose a reward or perk for backers who contribute to the campaign. Rewards can range from a simple thank-you note to a copy of the finished product or a special edition item.

### **1.6.3 Promoting the campaign**

Once the campaign is live, you'll need to promote it to attract backers. This involves sharing the campaign on social media, reaching out to friends and family, and networking with potential backers in your industry or niche. You may also want to offer early-bird discounts or other incentives to encourage people to contribute early in the campaign.

### **1.6.4 Managing the campaign**

As the campaign progresses, you'll need to manage it closely to ensure that it stays on track to reach its funding goal. This may involve updating the campaign with new information, answering questions from backers, and adjusting the rewards or perks as needed to attract more backers.

### **1.6.5 Reaching the funding goal**

If the campaign reaches its funding goal within the specified timeframe, the funds will be transferred to your account, minus any fees charged by the platform. You'll then need to fulfill the rewards or perks promised to backers, and use the remaining funds to complete the project or start the business.

### **1.6.6 Handling refunds**

If the campaign doesn't reach its funding goal, the funds will be returned to the backers, and you won't receive any money. You'll need to be prepared to handle refunds and communicate clearly with backers about why the campaign didn't succeed.

## **1.7 Advantages and disadvantages of crowdfunding**

If you are thinking about using crowdfunding as a way to raise funds for your business, project, or venture, there are several aspects that you should take into account [11].

### **1.7.1 Advantages**

#### **1.7.1.1 Founders Prospective**

Crowdfunding provides a valuable opportunity for studying entrepreneurial ventures by analyzing both successful and unsuccessful projects. This allows for comparisons and the study of all types of new ventures. The Matching Principle enables founders to connect with funders who are invested in their project, which is different from traditional financing methods that are dependent on the entrepreneur's location. Crowdfunding also serves as a source for feedback on project ideas, providing suggestions for improvements that can increase the value of a unique product, for instance.

#### **1.7.1 Funders Prospective:**

Funders have diverse motives for investing in projects through crowdfunding. Some may invest for humanitarian or political reasons, while others hope to receive rewards, stakes, or fixed returns. Equity crowdfunding allows funders to obtain ownership, while lending crowdfunding offers fixed interest rates. In reward-based crowdfunding, funders may receive

acknowledgments, credits, or the opportunity to meet producers. Philanthropy is also a significant factor in crowdfunding platforms, with some funders supporting projects without any expectation of monetary reward.

### **1.7.2 Platform Prospective:**

Crowdfunding platforms typically operate for profit and charge a service fee as a percentage of the funding amount. These platforms serve as intermediaries between entrepreneurs and funders, with the objective of increasing the number of successful projects. They also strive to provide innovative and viable projects to funders, offering investment opportunities and promoting philanthropy in society. These platforms contribute to the development of a smooth flow of money from funders to entrepreneurs and project initiators, while also benefiting disadvantaged sectors of society through patronage deeds.

### **1.7.3 Disadvantages**

#### **1.7.3.1 Funders Prospective:**

This passage discusses various issues that can arise when using crowdfunding as a source of capital for innovative ideas or entrepreneurial ventures. One of the problems is the disclosure of ideas, which becomes public when using crowdfunding, whereas other methods of raising capital such as from relatives or venture capitalists can keep ideas secret. Lack of professional support is also an issue, as non-professional fund providers cannot provide the same level of support as angel investors or venture capitalists. Additionally, crowdfunding can lead to an increased cost of investor management and may also attract incompetent founders who cannot successfully turn their ideas into reality. Finally, there is a risk of fraudulent projects, although this is relatively rare.

## **1.8 Crowdfunding success factors**

There are several key factors that contribute to the success of crowdfunding campaigns. Some of these factors are: [12]

- **Project quality:** Successful projects tend to have high-quality content, such as well-crafted videos, images, and written descriptions that clearly communicate the project's purpose and goals.
- **Funding goal:** Projects with lower funding goals tend to be more successful than those with higher goals. This may be because lower goals are more attainable and create a sense of urgency among potential backers.

- **Social networks:** Projects with a strong social network tend to be more successful. Social networks can help spread the word about a project, increase its visibility, and build trust among potential backers.
- **Early momentum:** Projects that quickly gain support in the early stages of the campaign tend to be more successful. This is because early support creates a sense of momentum and social proof that can attract more backers.
- **Updates and communication:** Successful projects tend to provide regular updates and communicate with their backers throughout the campaign. This helps build trust and keep backers engaged and excited about the project.
- **Rewards:** Projects with enticing rewards tend to be more successful. Rewards should be creative and offer backers something unique and valuable in exchange for their support.

Overall, these factors suggest that successful crowdfunding campaigns require a well-crafted project, a clear and attainable funding goal, a strong social network, early momentum, effective communication, and enticing rewards.

## 1.9 Ethics of crowdfunding

The intention of our discussion of ethical concerns related to crowdfunding is not to criticize or focus solely on negative aspects, but rather to present a fair and comprehensive view of this concept, taking into account its four different models [13].

### 1.9.1 Donation-based crowdfunding

Carries the least amount of risk among the four crowdfunding models, with funders typically motivated by philanthropy and social responsibility. However, there are moral obligations and a need for transparent handling of funds. Any misuse of funds can negatively affect donors' morale. Unfortunately, this type of crowdfunding is largely unregulated, leading to abuses of the system by some individuals and groups. It has also been criticized for enabling people to fund their personal leisure activities, which may compete with more deserving causes for the same pool of donors. Medical campaigns have also been known to exploit the system through fraudulent means. Crowdfunding platforms may be hesitant to intervene in such cases, as their revenue depends on successful fundraising.

### 1.9.2 The reward-based crowdfunding

Carries a moderate level of risk and is less complex than other models. Funders are promised non-financial rewards in exchange for monetary contributions. However, the hazards of reward-based crowdfunding include delays in receiving the promised product, misrepresentation, and

infringement of intellectual property rights (IPRs). For instance, some crowd funders have misled supporters with poorly-conceived initiatives, while others have failed to fulfill their promises or misused the funds raised.

### **1.9.3 Equity-based crowdfunding**

Is associated with several ethical issues, including the pricing of equity, moral obligations, unskilled investors, recapitalization problems, realignment, and the potential for creating a new economic bubble. Entrepreneurs may use behavior-based price discrimination, leading them to compromise the quality of their offerings in pursuit of profits. Additionally, equity-based crowdfunding combines investment risk with unsophisticated investors, which can be challenging for resource-constrained ventures to manage. Exempting equity crowdfunding from registration with the U.S. Securities and Exchange Commission (SEC) could potentially open the door to a new financial bubble. Fraudulent equity offerings are also a significant risk, as evidenced by the case of an energy company, which raised approximately \$5 million in fraudulent equity through crowdfunding. Including antifraud provisions in crowdfunding legislation and creating an insurance system to identify fraudulent and overpriced offerings could help mitigate these risks. Regulatory agencies are also working to protect the rights of funders.

### **1.9.4 Lending-based crowdfunding**

One concern is the potential for broken promises, as funders finance an initiative in the expectation of receiving the money back with interest. The lack of credible, reliable information about borrowers also poses serious challenges to lenders. The moral hazard associated with lending-based crowdfunding is multifaceted, as even well intentioned enterprises may be forced to collapse or default on their payments. Unscrupulous individuals can intentionally bankrupt their enterprises and default on their loans, robbing the funders of their capital and depriving the greater society of the benefits.

Based on our discussion of crowdfunding, it can be concluded that there are various ethical considerations that need to be taken into account when engaging in crowdfunding activities:

- **Honesty and transparency:** Project creators must be honest about their intentions and transparent about how they will use the funds raised. Any risks associated with the project should also be disclosed.
- **Fairness:** All backers should be treated fairly and receive the rewards promised to them. Project creators should also avoid favoritism or discrimination.

- **Privacy:** Backers' personal information should be kept confidential and not shared with third parties without their consent.
- **Responsibility:** Project creators should take responsibility for delivering on their promises and providing updates on the progress of the project.
- **Intellectual property:** Project creators should respect the intellectual property of others and avoid infringing on patents, trademarks, or copyrights.
- **Social impact:** Project creators should consider the potential social impact of their project and ensure that it aligns with ethical and social values.

Overall, ethical considerations in crowdfunding require project creators to be honest, fair, responsible, and respectful of backers and the broader community. They should also consider the potential social impact of their project and ensure that it aligns with ethical and social values.

## 1.10 Conclusion

This chapter has provided an overview of the various aspects of crowdfunding. We began with a brief history of crowdfunding and then discussed the different types of crowdfunding, including their actors and functioning. We then examined the advantages and disadvantages of crowdfunding, as well as the success factors that contribute to a successful crowdfunding campaign. Finally, we delved into the ethics of crowdfunding, highlighting the ethical considerations that need to be taken into account when engaging in crowdfunding activities. Overall, this chapter has provided a comprehensive understanding of crowdfunding and its various aspects

## **CHAPTER 2**

# **ANALYSIS AND CONCEPTION**

## **2.1 Introduction**

After reviewing the relevant theoretical framework and existing studies in this research area, it became feasible to conduct an analysis of system requirements. In this analysis, diagrams based on the Unified Modeling Language (UML) were employed to visually represent the processes carried out by the creators, investors, and administrators.

## **2.2 Modelling language**

Knowing that the unified process requires the use of UML, our modelling of the solution would be use UML diagrams.

### **2.2.1 Unified Modelling Language (UML)**

UML Unified Modelling Language, is a standardized modelling language consisting of an integrated set of diagrams, developed to help system and software developers for specifying, visualizing, constructing, and documenting the artefacts of software systems, as well as for business modelling and other non-software systems [14].

### **2.2.2 Definition**

A UML diagram is a diagram based on the UML (Unified Modelling Language) with the purpose of visually representing a system along with its main actors, roles, actions, artefacts or classes, in order to better understand, alter, maintain, or document information about the system [15].

### **2.2.3 UML diagrams used**

See example below.

Diagrams	Objectives	Type
Use case diagram	<ul style="list-style-type: none"><li>-Capture system requirements and to present to others what the system should do.</li><li>- Identify the tests to be performed for the system.</li><li>-Model a company, so that all project participants have a good view of the company's workers, customers and activities.</li></ul>	Functional.
Sequence diagram	<ul style="list-style-type: none"><li>-Represent the details of a UML use case.</li><li>-Model the logical flow of a complex procedure, function or operation.</li></ul>	Dynamic.
Class diagram	<ul style="list-style-type: none"><li>-Model the components of a system.</li><li>- Define the relationships between classes and classifiers.</li><li>- Show an inheritance hierarchy between classes and classifiers</li></ul>	Static.

**Table 2.1:** Description of UML diagrams

## 2.3 Identification of needs

This part of the chapter focuses on user requirements from inscription to success and financing of the project, by detailing functionalities and performance necessary to create a quality web application that meets customer expectations.

### 2.3.1 functional need

- Admin can manage the platform by confirming, editing, update and delete the creators and their projects, he can also verify the donation of investor.
- The application designed will have to operate in 4- third parties (Creator, Investor, data server, application server).
- Have a database for project storage.
- An online participation system for investors.
- An interactive list so that investors can see the project complains and their total amount needs, as well as all information, photos, video...
- A management system for the creator and their operations (creating, Editing, updating and delete) to make it easier for work.
- A management system for the investors to support and participate in the project that he chooses.
- Customer registration (inscription): the creation of creators accounts to be able to switch to a more rigorous stadium, it must register, it is done only for the first order but afterwards, our client can authenticate with their username and password.

### 2.3.2 Non-functional requirement

A non-functional requirement is an attribute that dictates how a system operates. It makes applications or software run more efficiently and illustrates the system's quality.

Here is some requirement non-functional that must be in our application web:

- **The ergonomics of the interfaces**
- the future software must be easy to use. Indeed, the

user interfaces must be user-friendly, simple, ergonomic and adapted to the user.

- **Security:** To protect sensitive data, you may consider developing non-functional security features. The security on their databases may include firewalls to prevent unauthorized access.
- **Capacity:** the application server must have a large processing capacity that allows it to allow several user requests to be processed at the same time in order to guarantee minimal response time.
  - **Speed and Reliability:**
    - Access to the database must be flexible and fast.
    - The application must always be functional.
  - **Portability:** Portability means how effectively a system performs in one environment compared to another.

## 2.4 Realization of Use case diagrams

### 2.4.1 Definition

A use case diagram is a way to summarize details of a system and the users within that system. It is generally shown as a graphic depiction of interactions among different elements in a system. Use case diagrams will specify the events in a system and how those events flow, however, use case diagram does not describe how those events are implemented [16].

2.4.2 use case diagram of Admin

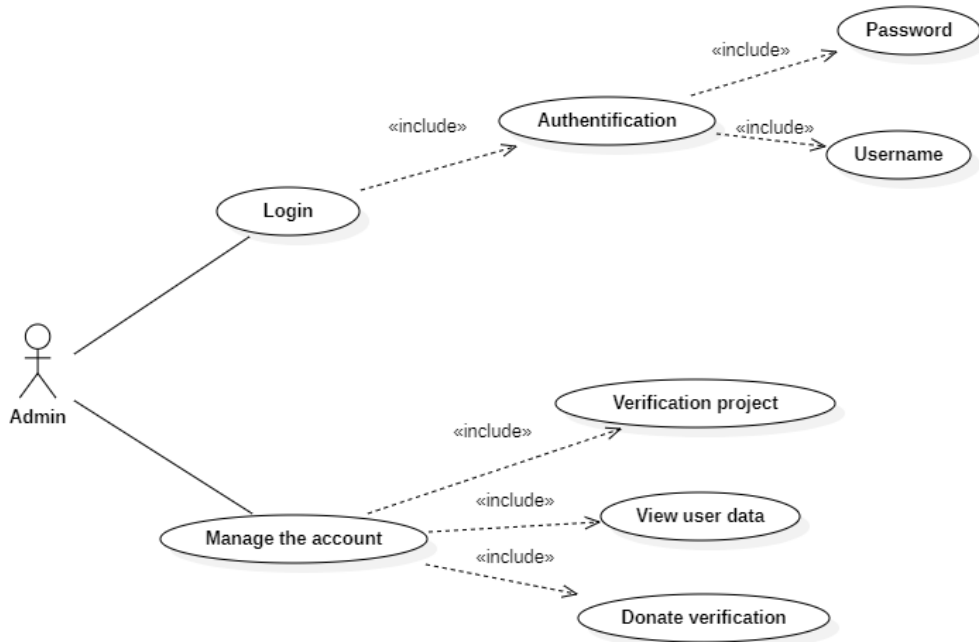


Figure 2.1: use case diagram Admin

<b>Use case name</b>	Operations of admin
<b>Actor</b>	Admin
<b>Pre-condition</b>	Authentication.
<b>Action</b>	-Authenticate before accessing the application home page. -Check the details of the project proposal created by the creator if the data is acceptable. -Admin update the amount of incoming funds and assigns user as project supporter.
<b>Port condition</b>	Admin manage the platform.

Table 2.2: Description of the admin use cases

## 2.4.3 use case diagram of Creator

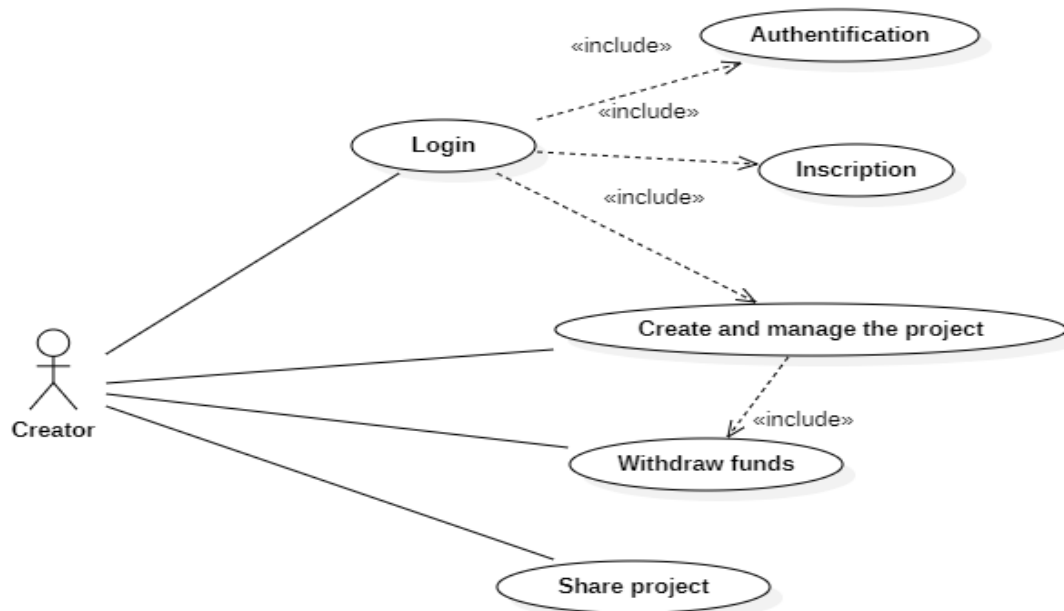


Figure 2.2: use case diagram creator

<b>Use case Name</b>	Create a project
<b>Actor</b>	Creator
<b>Pre-condition</b>	Authentication
<b>Action</b>	-Fill out the project form (make the project proposal) with details of word, photos video. And fill out the required funding and target fundraising.
<b>Port condition</b>	Creator successfully create project.

Table 2.3: Description of creation project use cases

## 2.4.4 use case diagram of Investor

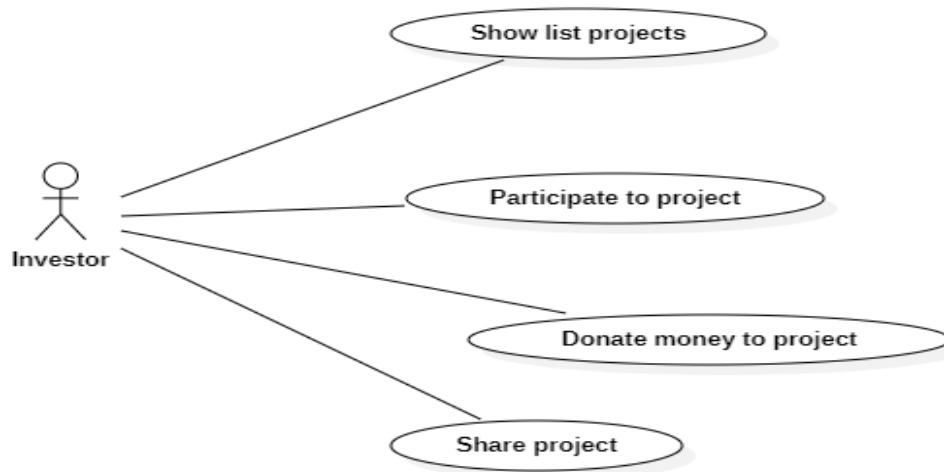


Figure 2.3: use case diagram investor

<b>Use case Name</b>	Operations of the investor
<b>Actor</b>	Investor
<b>Action</b>	<ul style="list-style-type: none"> <li>-See the list of all projects.</li> <li>-Participate in support and donation funds for creative or social project by transferring funds through web site account.</li> <li>-Share project in their surrounding and social media.</li> </ul>
<b>Port condition</b>	Supporters successfully rode the grant.

Table 2.4 : Description of investor use case

## 2.5 Realization of sequence diagrams

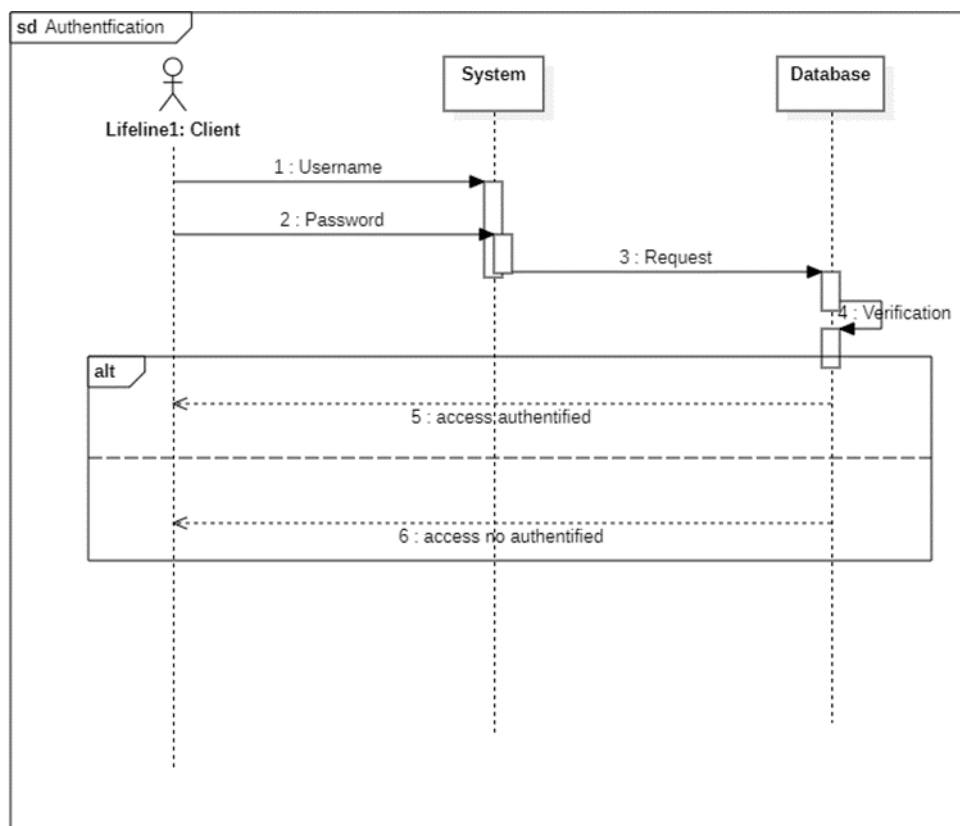
### 2.5.1 Definition:

UML Sequence Diagrams are interaction diagrams that detail how operations are carried out. They capture the interaction between objects in the context of a collaboration. Sequence Diagrams are time focus and they show the order of the interaction visually by using the vertical axis of the diagram to represent time what messages are sent and when [17].

### 2.5.2 Sequence diagram Authentication

when the user wants to access our web Application he will be required to authenticate himself before accessing it by entering his username and password, after entering the system send a request to the server (database) to process the information sent.

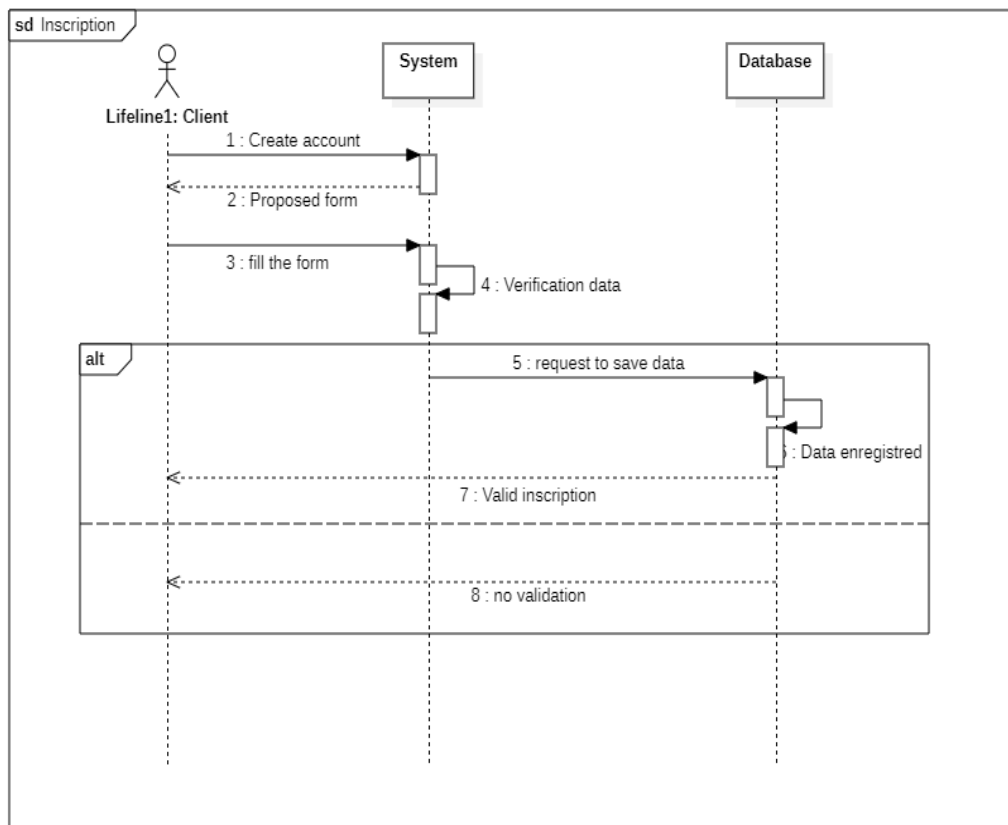
If the information is correct the user will access his section, otherwise an error message will be displayed and will lead the user back to the authentication page.



**Figure 2.4:** Séquence diagramme (Authentication)

### 2.5.3 Séquence diagram Inscription

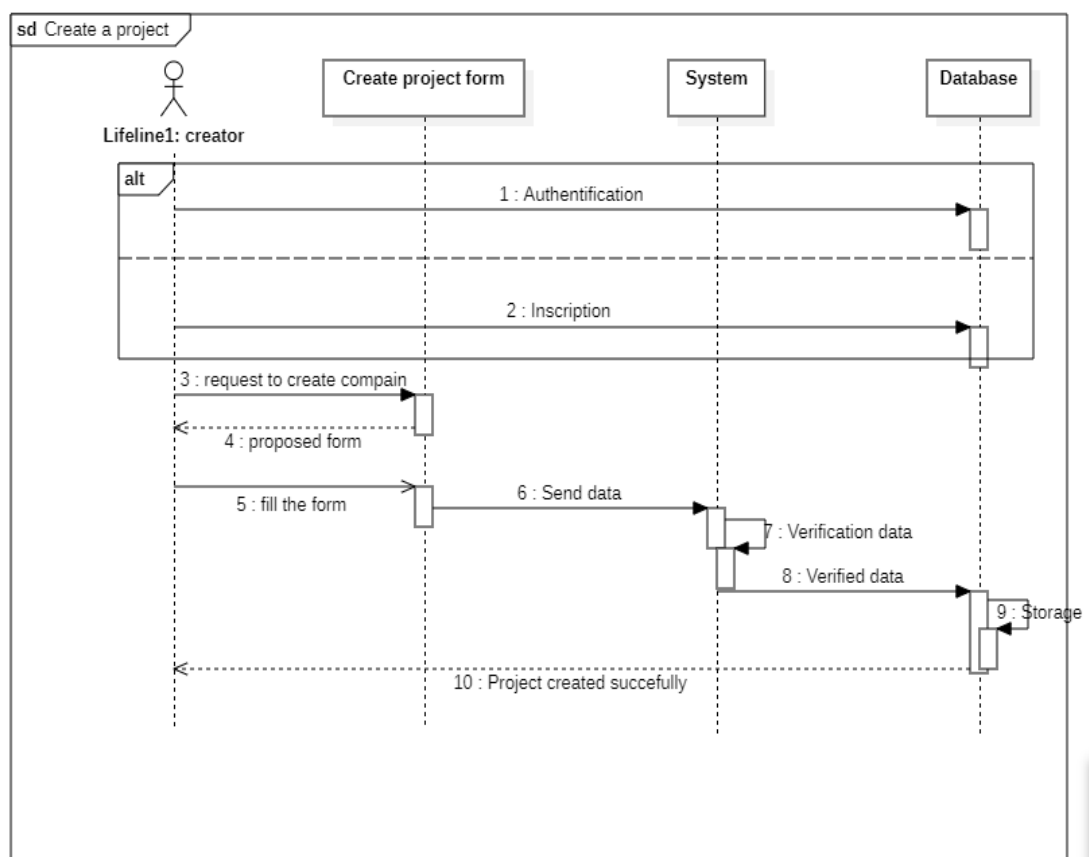
When a client (user) wants to registered and create an account, our web application will be required to the inscription page that propose a form, the creator must fil the form, then the system registered the data of the form and send a request to the database to registered. If the form is all fill and correct the access sent to the user by a validation message, if not the access failed and the user will lead a gun to the form page.



**Figure 2.5:** Séquence diagram (Registration)

### 2.5.4 Sequence diagram Create project

When a creator wants to create a project, first he must be authenticating if not he must unscripted, second the creator sends a request to the create project by clicking in bottom of creation, the applications propose a form that must contained all the details of the project, he fill the form and send it to the system for the verification of data, then to the database to registered in storage, with that the creation of the project is done.



**Figure 2.6:** Séquence diagram (Create a Project)

### 2.5.5 Sequence diagram of the investor

When an investor wants to participate and support a project, the first step he do is request for the project list that it will send it from the database and the server, then he choose a project and also request for her details, second he click on support project button and the server send a form page, after he fill out the form, if the form is all full and correct the server send the validating information to the database then the transfer is done, if not the transfer is failed the investor will lead a gun to the form page.

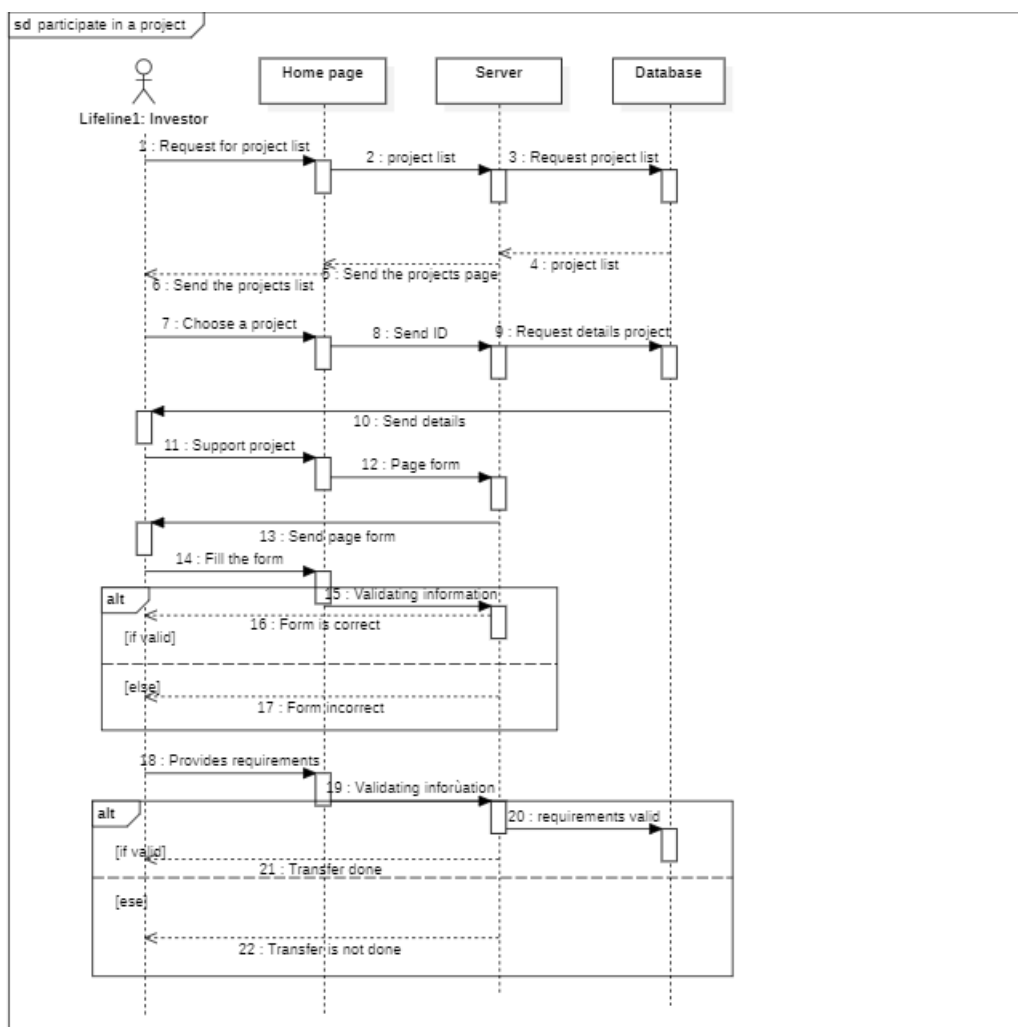
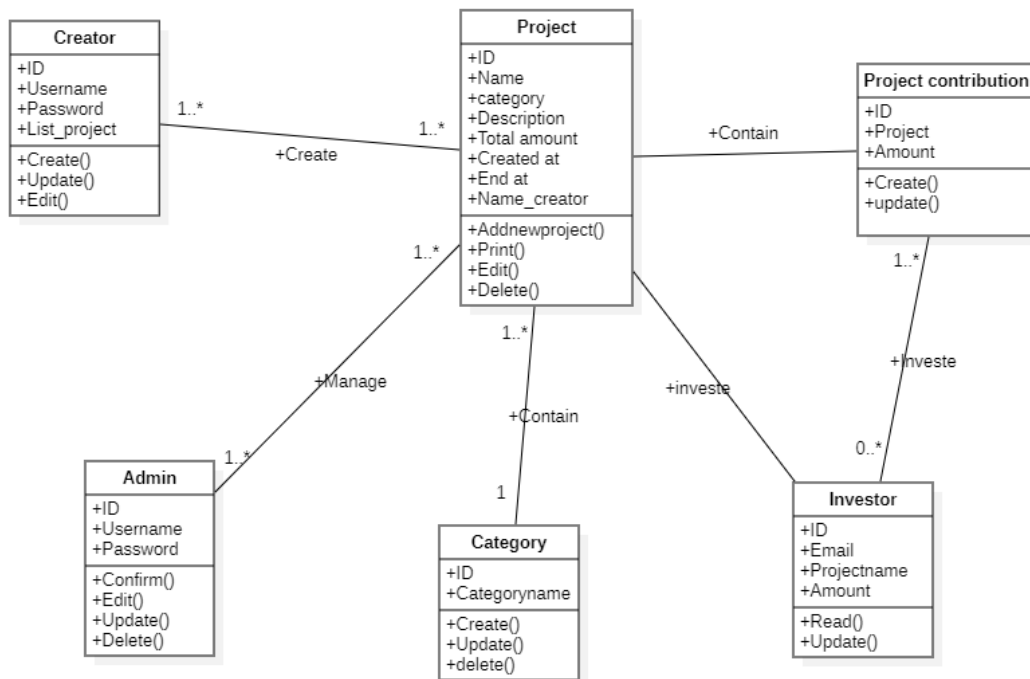


Figure 2.7: séquence diagram participate in a project

## 2.6 Realization of the class diagram

### 2.6.1 class diagram

class diagram is a type of diagram and part of a unified modelling language (UML) that defines and provides the overview and structure of a system in terms of classes, attributes and methods, and the relationships between different classes, it is used to illustrate and create a functional diagram of the system classes and serves as a system development resource within the software development life cycle [16].



**Figure 2.8:** Class diagram

### 2.6.2 Dictionary of data

<b>Class</b>	<b>Attributes</b>	<b>Description</b>	<b>Type</b>
<b>Admin</b>	-Id -UserName -Password	-Identification -Name of user -Pass word	-int -varchar (100) -varchar (100)
<b>Creator</b>	-Id -Username -Password -List_project	-Identification -Name of Creator -Pass Word List of Project	-int -varchar (100) -varchar (100) -varchar (100)
<b>Investor</b>	-Id -Email -Project_name  -Amount	-Identification -Email of investor -Name of project -Value of - participating amount	-int -varchar (100) -varchar (100)  -double
<b>Project</b>	-Id -Name -Category -Description -Total amount  -Created_at -End_at -Name_creator	-Identification -Name of project -Category of project -Description -Total amount of project -Date of creation -Date of ends -Name of creator	-int -varchar (100) -varchar (100) -varchar (100) -double  -date -date -varchar (100)
<b>Category</b>	-Id -Categoryname	-Identification -Name of category	-int -varchar (100)
<b>Project contribution</b>	-Id -Project -Amount	-Identification -Name of Project -Amount of the Project	

**Table 2.4:** Dictionary of data

## 2.7 Conclusion

This chapter introduced the modelling and design of our application. We can model there in the form of use case diagrams then sequence, then design our application in the form of class diagrams and relational diagrams, remains to design and create our application

## **CHAPTER 3**

# **TECHNICAL STUDY AND IMPLEMENTATION**

### **3.1 Introduction**

In this chapter, we present the realization of our network application, which involved the utilization of diverse technologies and programming languages. We begin by outlining the available options in the subsequent paragraphs, providing an overview of the choices made during the development process. Furthermore, we delve into the various functions offered by the system to its users, emphasizing their significance. To illustrate these functions effectively, we will also showcase the user interfaces through demonstrations.

### **3.2 Database implementation tools**

For our application's database implementation, we chose as tools: MySQL server, phpMyAdmin manager.

#### **3.2.1 Presentation of the MySQL-Server**

MySQL is a relational database management system (RDBMS) developed by Oracle that is based on structured query language (SQL). A database is a structured collection of data. It may be anything from a simple shopping list to a picture gallery or a place to hold the vast amounts of information in a corporate network. In particular, a relational database is a digital store collecting data and organizing it according to the relational model [19].

#### **3.2.2 Presentation of the phpMyAdmin**

PhpMyAdmin is a popular and free open source tool used for administering MySQL with a web browser. Typical operations such as the management of databases, tables, indexes, permissions, and so on are executed with the user interface. Administrators can also use phpMyAdmin to directly execute any SQL statement [20].

### **3.3 Platform development tools**

For our application we have chosen the following tools:

#### **3.3.1 React js**

React is a free and open-source front-end JavaScript library for building user interfaces based on components. It is maintained by Meta (formerly Facebook) and a community of individual developers and companies [21].

### **3.3.2 Visual studio code**

Visual Studio Code is a free, lightweight but powerful source code editor that runs on your desktop and on the web and is available for Windows, mac OS, Linux, and Raspberry Pi OS. It comes with built-in support for JavaScript, Type Script, and Node.js and has a rich ecosystem of extensions for other programming languages (such as C++, C#, Java, Python, PHP, and Go), runtimes (such as .NET and Unity), environments (such as Docker and Kubernetes), and clouds (such as Amazon Web Services, Microsoft Azure, and Google Cloud Platform) [22].

### **3.3.3 Node js**

Node.js is an open source, cross-platform runtime environment for developing server-side and networking applications. Node.js applications are written in JavaScript, and can be run within the Node.js runtime on OS X, Microsoft Windows, and Linux is also providing a rich library of various JavaScript modules which simplifies the development of web applications using Node.js to a great extent [23].

### **3.3.4 Express**

Express is a node js web application framework that provides broad features for building web and mobile applications. It is used to build a single page, multipage, and hybrid web application [24].

### **3.3.5 Sequelize**

Sequelize is a promise-based, Node.js ORM (Object-relational mapping) for postgres, MySQL, Maria DB, SQLite and Microsoft SQL Server. It features solid transaction support, relations, eager and lazy loading, read replication, and more [25].

### **3.3.6 Cors**

Cross-Origin Resource Sharing is referred to as CORS. Web browsers provide a feature called cross-domain resource sharing that enables resources (such web fonts, JavaScript, or photos) on a web page to be accessed from a domain other than the one from which the page itself originated [26].

### **3.3.7 Bcrypt js**

Bcrypt turns a simple password into fixed-length characters called a hash. Before hashing a password, bcrypt applies a salt — a unique random string that makes the hash unpredictable. [27].

### **3.3.8 JSON Web Token**

JSON Web Tokens (JWT) are an open standard, which is defined in JSON Web Token (JWT) Specification RFC 7519. They securely represent claims between two parties. Claims can be related to any business process, but are typically used to represent an identity and its associations: for example, that the user, whose identity the JWT represents, belongs to an administrator role, or group [28].

### **3.3.9 Postmen**

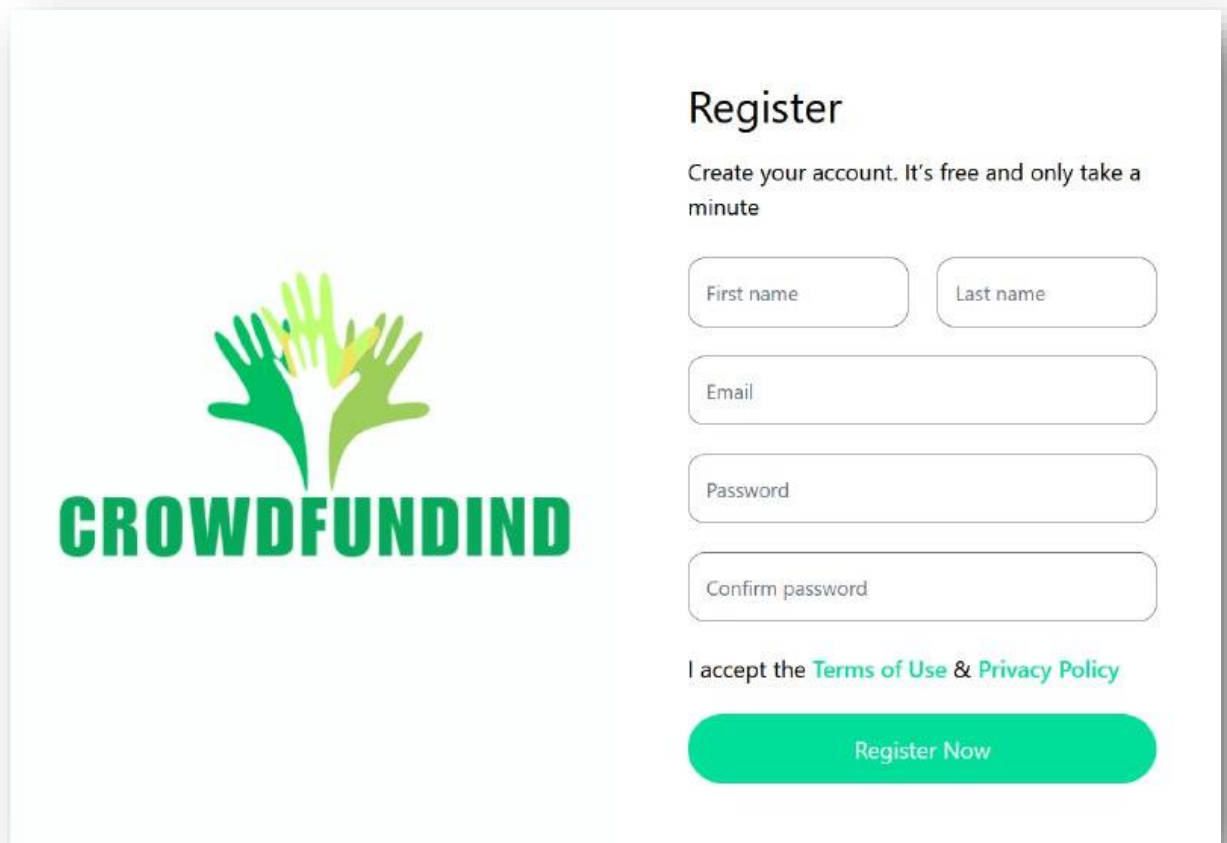
In simple words, Postman is a computer application used for API testing. Postman sends an API request to the web server and receives the response, whatever it is. No extra work or setting up of a framework is required while sending and receiving requests in Postman. Extensively used by Testers and Developers for better testing of applications. Easy to integrate with your Continuous Integration (CI) & Continuous Development Pipeline [29].

## **3.4 Presentation of application interfaces**

In this part we will present the application realized through screenshots of some interfaces which illustrate the main functionalities of the system.

### 3.4.1 Registration interface

This page shows the form of new member registration interface.

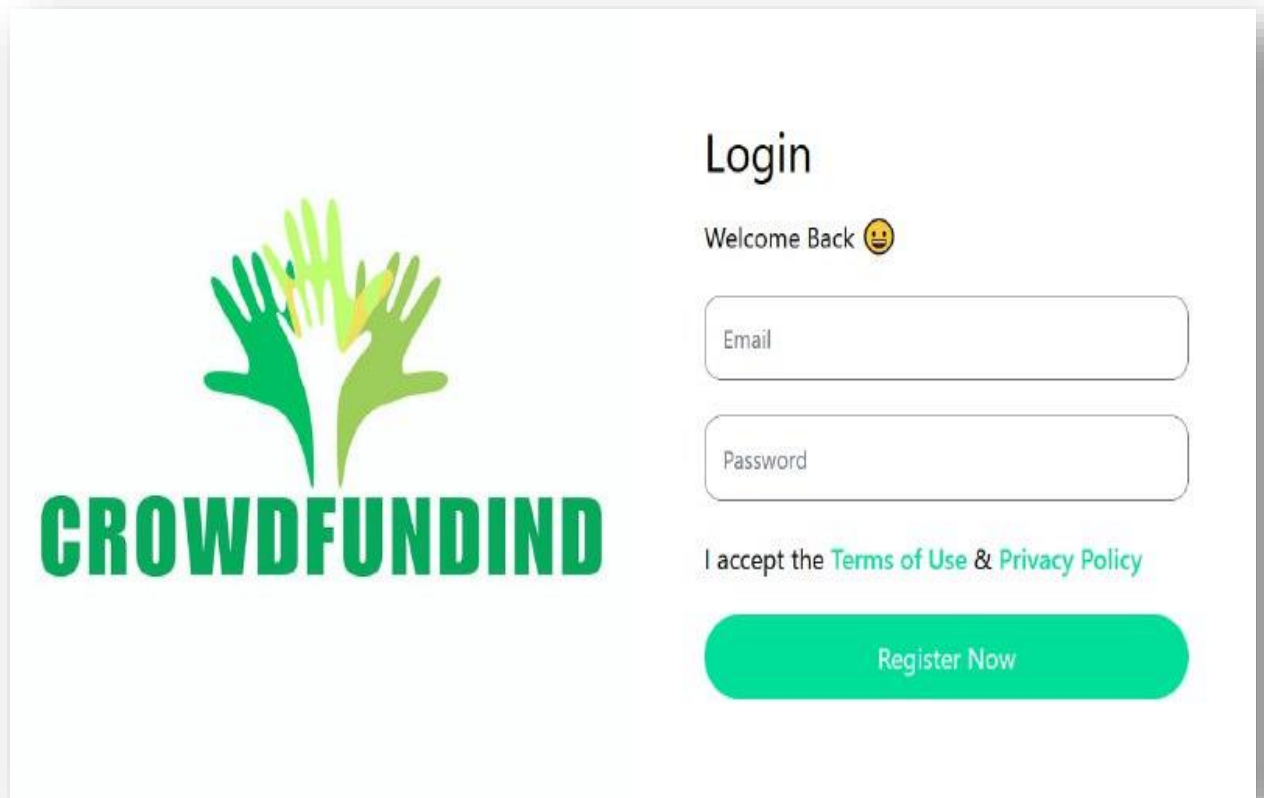


The image shows a registration form for 'Crowdfundind'. On the left is the logo, which consists of three stylized hands in shades of green and yellow, with the word 'CROWDFUNDIND' in bold green capital letters below them. On the right, the heading 'Register' is followed by the text 'Create your account. It's free and only take a minute'. The form includes five input fields: 'First name', 'Last name', 'Email', 'Password', and 'Confirm password'. Below these fields is a checkbox area with the text 'I accept the [Terms of Use](#) & [Privacy Policy](#)'. At the bottom is a large green button labeled 'Register Now'.

**Figure 3.1:** Sign Up (registration)

### 3.4.2 Authentication interface

This page displays the authentication form of our platform when the users wants to connect their session.



**Figure 3.2:** Sign In (authentication)

### 3.4.3 Hero section interface

This page Shows the hero section of our platform, that contain all the operations in the navbar.

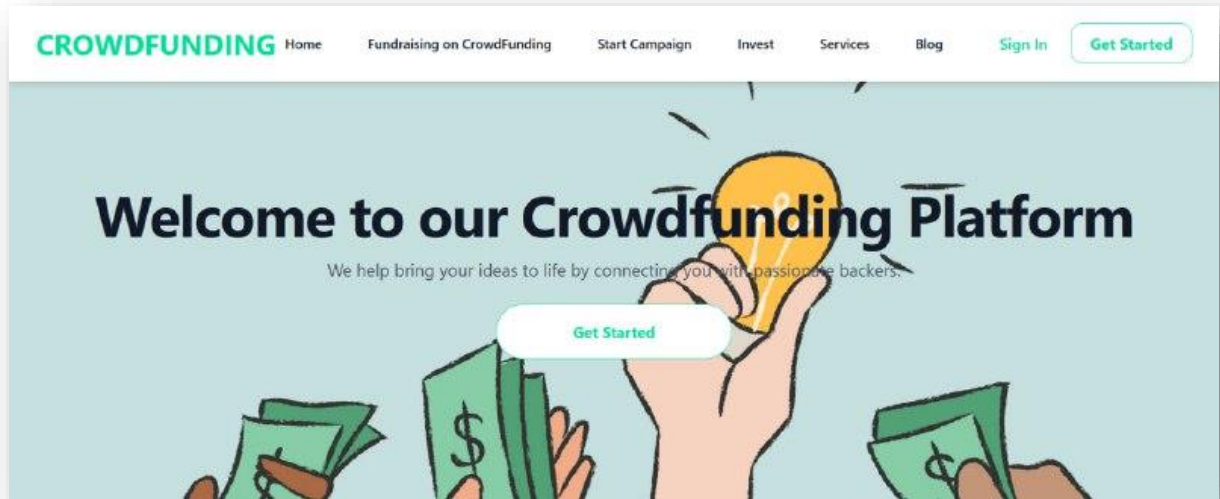
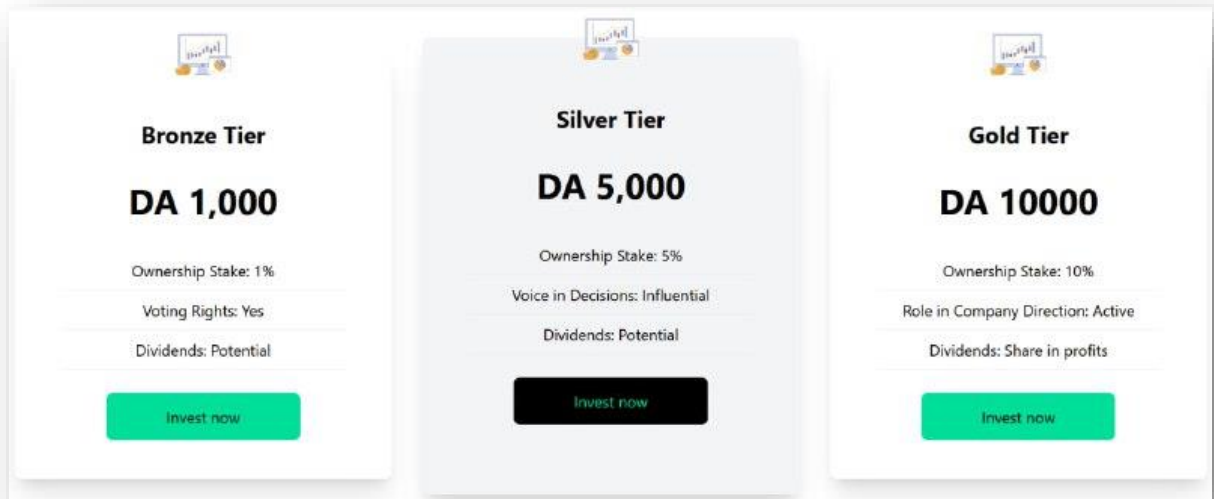


Figure 3.3: Hero Section



### 3.4.4 Filter of projects by category interface

This page shows the projects by category of our platform.



Figure 3.4: Filter of projects by category

### 3.4.5 Projects cards interface

This page shows all the projects cards that we have in our platform, each card has some project-specific information (category, days left for the ending) if he clicks on one of them he will pass to details project page.

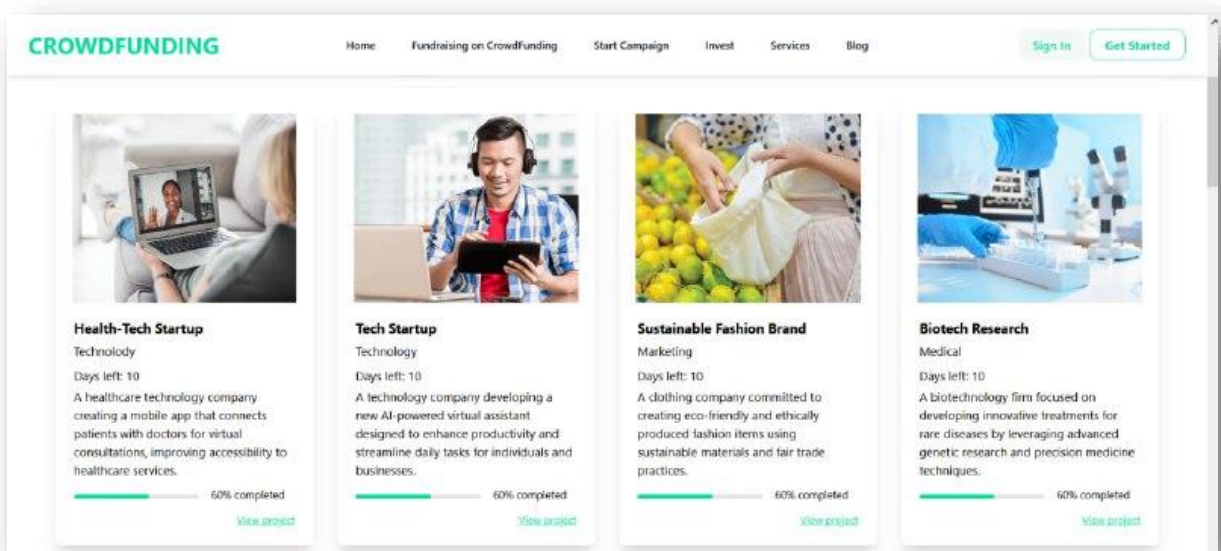


Figure 3.5: Projects Cards

### 3.4.6 Project details interface

This page shows the details of each project that contain all the information.



Figure 3.6: Projects details.

### 3.4.7 Investor form interface

This screenshot displays the form page shown to the investor when he chooses the campaign which he wants to support. This page contains the information that must fill by the investor, then he has to enter the amount donated and the card used information, also he can choose the expiration date.

YOU ARE CONTRIBUTING TO

## Name of the campaign

First name

Last name


Email

Phone number

Figure 3.7: Investor form

### SECURE PAYMENT INFO

Your contribution

VISA  mastercard  AMERICAN EXPRESS  DISCOVER NETWORK  PayPal  

Name on card

Card number

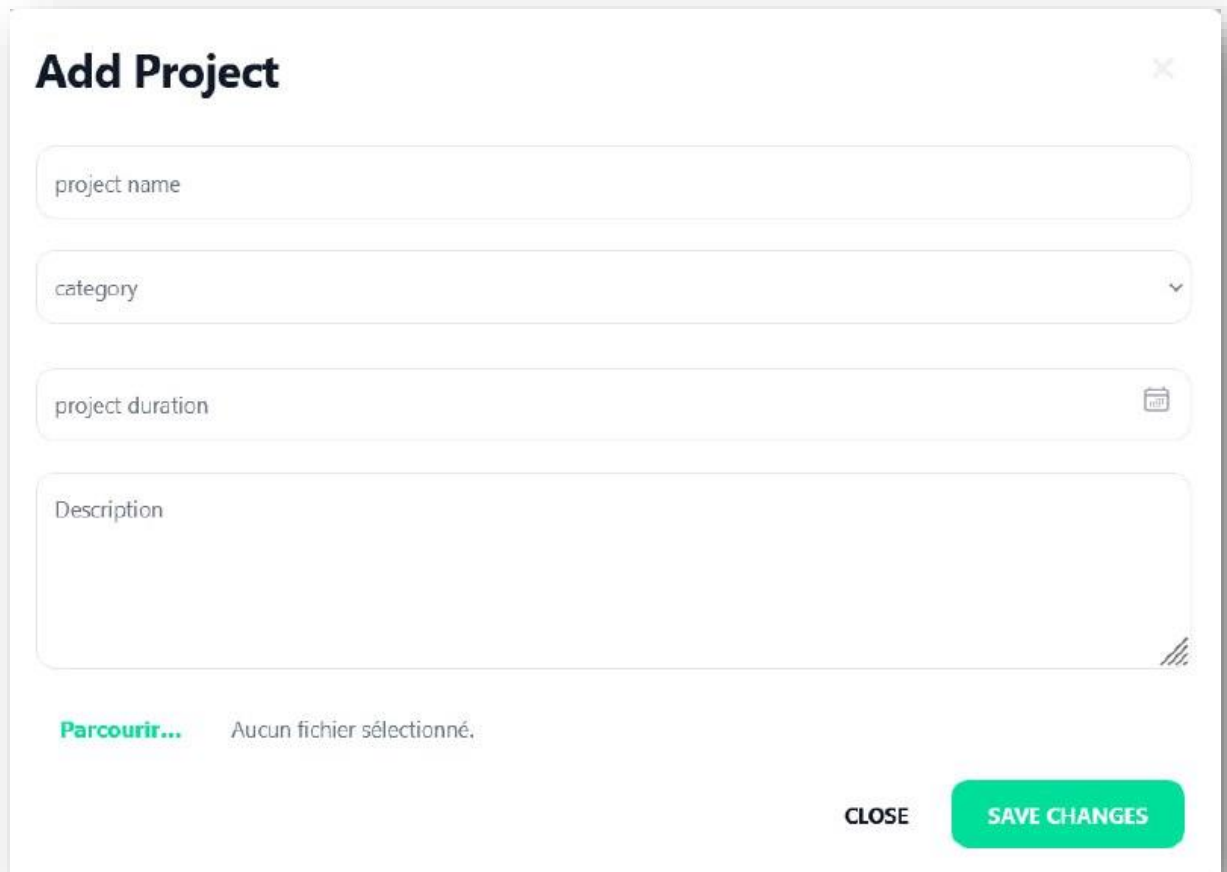
Expiration date

Security code

By selecting this, you agree to our [privacy policy](#).

### 3.4.8 Add project form interface

This screenshot displays the form page that shown to the user who wants to create a new project, and he must enter all the information of this project.



The screenshot shows a modal window titled "Add Project" with a close button (X) in the top right corner. The form contains the following fields:

- A text input field labeled "project name".
- A dropdown menu labeled "category".
- A date input field labeled "project duration" with a calendar icon.
- A large text area labeled "Description".

At the bottom left, there is a file upload section with a green link "Parcourir..." and the text "Aucun fichier sélectionné." At the bottom right, there are two buttons: a "CLOSE" button and a green "SAVE CHANGES" button.

**Figure 3.8:** Add project form

### 3.4.9 Admin interface

This interface shown the admin page of the platform, it contains all the details and statistics of this platform which he can manage it.

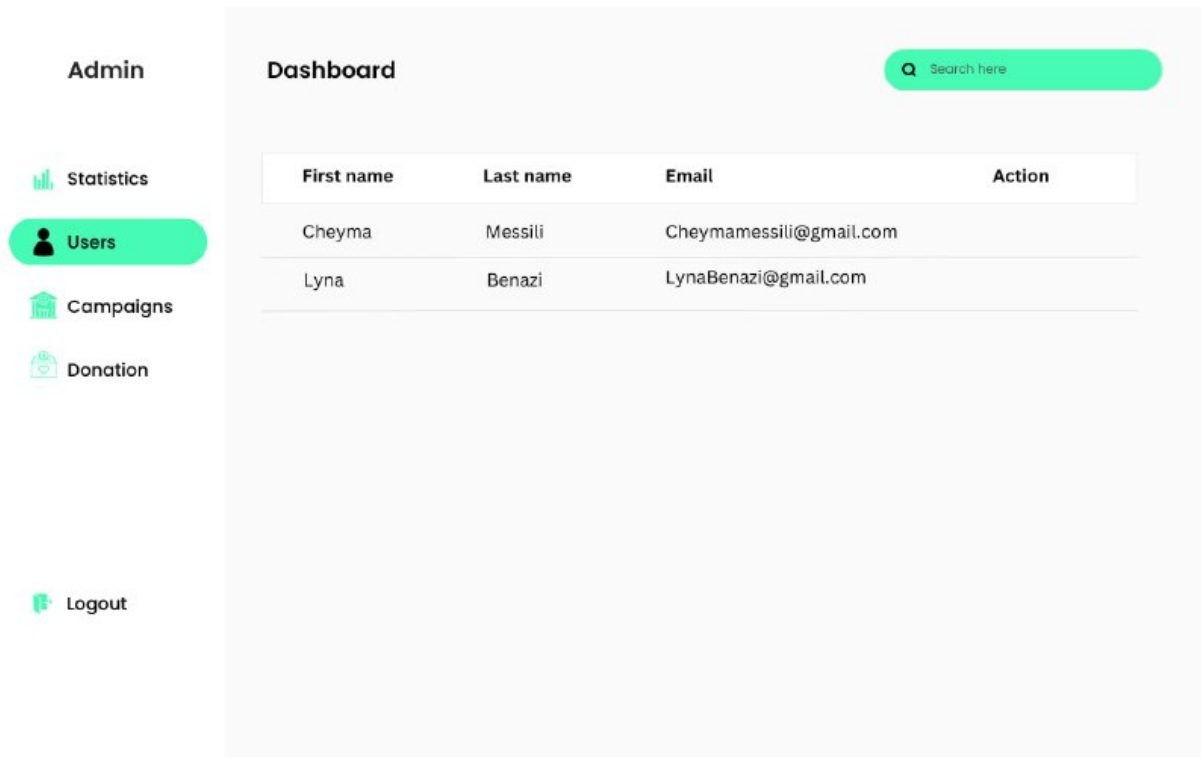


Figure 3.9: Admin interface.

## 3.5 Conclusion

In the life cycle of an application, the construction phase holds significant importance as it lays the foundation for its successful implementation. Throughout this chapter, our primary objective has been to outline the essential tools and window-based functions that enable the execution of our application.

## **General conclusion**

In conclusion, our research has highlighted the tremendous potential of crowdfunding as an effective means for start-ups and organizations to gain funding and support for their ideas. Through the exploration of various crowdfunding models and platforms, we have identified equity crowdfunding as a compelling solution for connecting entrepreneurs with investors.

As a result, we have developed a web application specifically tailored to facilitate equity crowdfunding for start-ups and organizations. This platform serves as a Launchpad for innovative ideas, providing a space where entrepreneurs can showcase their projects and connect with potential investors interested in acquiring equity in their ventures.

While our current focus is on equity crowdfunding, we acknowledge the importance of incorporating other types of crowdfunding into our platform in the future. By expanding our offerings to include reward-based, donation-based, or debt-based crowdfunding, we can cater to a broader range of projects and campaigns, fostering an inclusive and diverse crowdfunding ecosystem.

Our vision is to create a comprehensive crowdfunding platform that becomes a go-to resource for entrepreneurs and investors alike. By providing a user-friendly interface, robust security measures, and a supportive community, we aim to empower individuals and organizations to turn their dreams into reality.

We are excited about the future possibilities for our crowdfunding platform, and we welcome feedback and suggestions from users and stakeholders to continuously improve and expand our services. Together, we can cultivate a vibrant crowdfunding environment that fuels innovation, entrepreneurship, and positive societal impact.

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## ملخص

في الوقت الحاضر ، شهدت الحوسبة تطورات تقنية كبيرة في مختلف المجالات ، مثل شبكات الكمبيوتر وقواعد البيانات والويب. لعب هذا التقدم دورًا مهمًا في حل المشكلات التي نواجهها في حياتنا اليومية. هدفنا هو تصميم وتطوير تطبيق ويب مخصص يعمل كمنصة اتصال بين رواد الأعمال والمستثمرين الذين يسعون إلى المشاركة في رأس المال لتنفيذ الوظائف ولغة PHP والمشاريع الواعدة. لتحقيق ذلك، استخدمنا مجموعة من اللغات وأدوات التطوير، بما في ذلك MySQL. يعتمد تنفيذ تطبيقنا على بنية ثلاثية المستويات، مع قاعدة بيانات مطورة باستخدام UML. استخدمنا Xampp لمشروعنا بيئة تطوير.

الكلمات الرئيسية : Xampp ، MySQL ، UML ، PHP

## Abstract

Nowadays, computing has undergone significant technological advancements in various fields, such as computer networks, databases, and the web. This progress has played a crucial role in solving the problems we encounter in our daily lives. Our objective is to design and develop a dedicated web application that serves as a connection platform between entrepreneurs and investors seeking equity participation in promising projects. To accomplish this, we utilized a combination of languages and development tools, including PHP for implementing functionalities and the UML modeling language. The implementation of our application is based on a three-tier architecture, with a database developed using MySQL. We utilized the Xampp development environment for our project.

**Keywords:** PHP, UML, MySQL, Xampp.

## Résumé

De nos jours, l'informatique a connu des avancées technologiques importantes dans divers domaines, tels que les réseaux informatiques, les bases de données et le Web. Ces progrès ont joué un rôle crucial dans la résolution des problèmes que nous rencontrons dans notre vie quotidienne. Notre objectif est de concevoir et de développer une application web dédiée servant de plateforme de mise en relation entre entrepreneurs et investisseurs en quête de prise de participation dans des projets prometteurs. Pour ce faire, nous avons utilisé une combinaison de langages et d'outils de développement, dont PHP pour la mise en œuvre des fonctionnalités et le langage de modélisation UML. L'implémentation de notre application est basée sur une architecture à trois niveaux, avec une base de données développée à l'aide de MySQL. Nous avons utilisé l'environnement de développement Xampp pour notre projet.

**Mots clés :** PHP, UML, MySQL, Xampp.