POLITECNICO DI TORINO

Master's degree in Computer Engineering

Information Systems Project

RIEQUILIBRIUM WEB AGENCY

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1 Organization

1.1 Organizational factors

Riequilibrium is a company based in Cuneo that provides a complete consulting on Web Marketing strategies, from *Search Engine Optimization* (SEO) to the creation of websites and ecommerce platforms optimized for mobile devices. In addition, it plans and realizes advertising campaigns on the most popular social networks and search engines. For further information, see https://www.riequilibrium.com.

The company is composed of 12 employees:

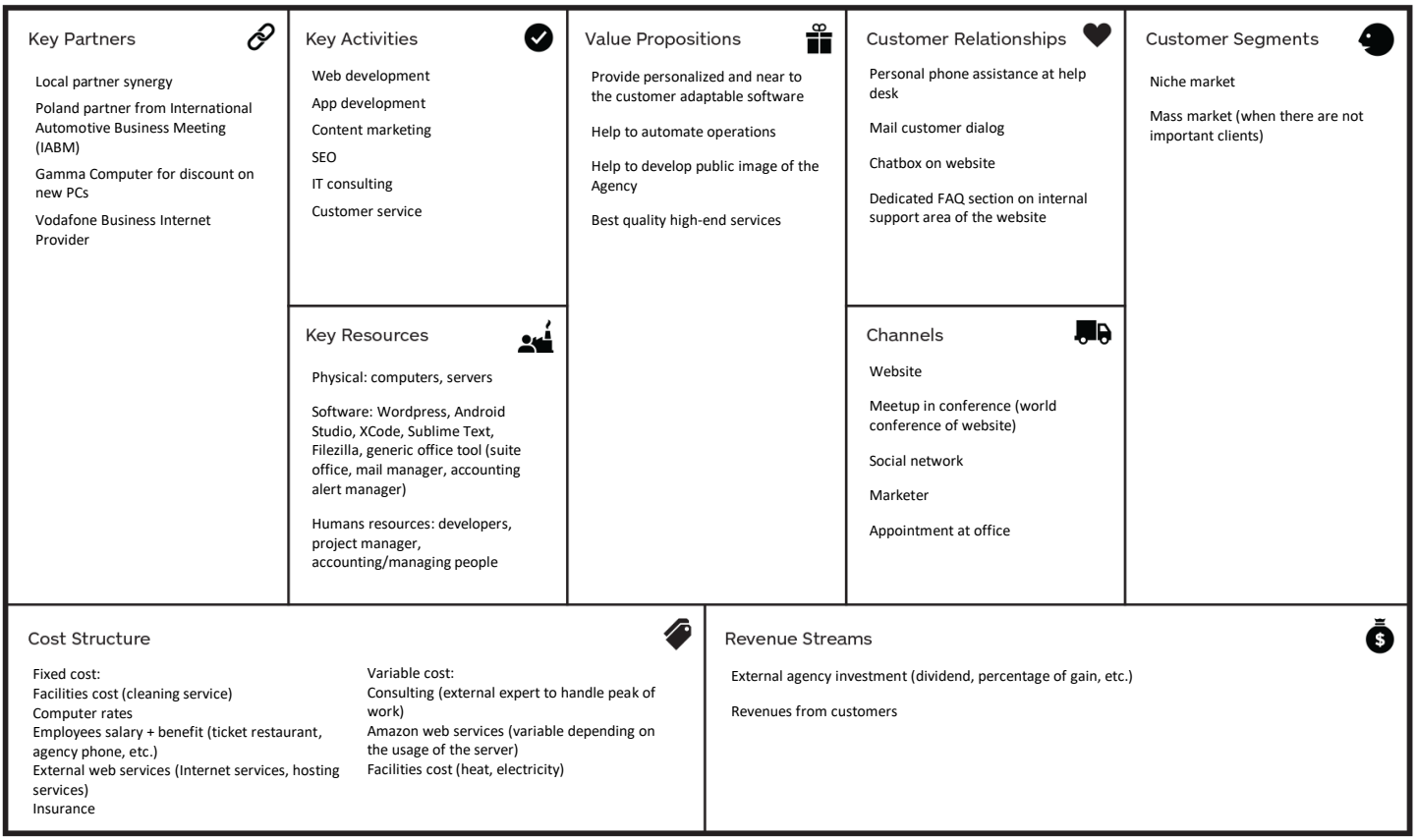
- 1 CEO
- 6 developers
- 1 secretary
- 1 marketing expert
- 2 accounting employees
- 1 credit recovery responsible

The physical resources include:

- Meeting room
- Developer rooms
- Accounting room
- Reception
- Server rooms
- 16 computers

The turnover of the last year has been about €550000.

1.2 Business Model Canvas



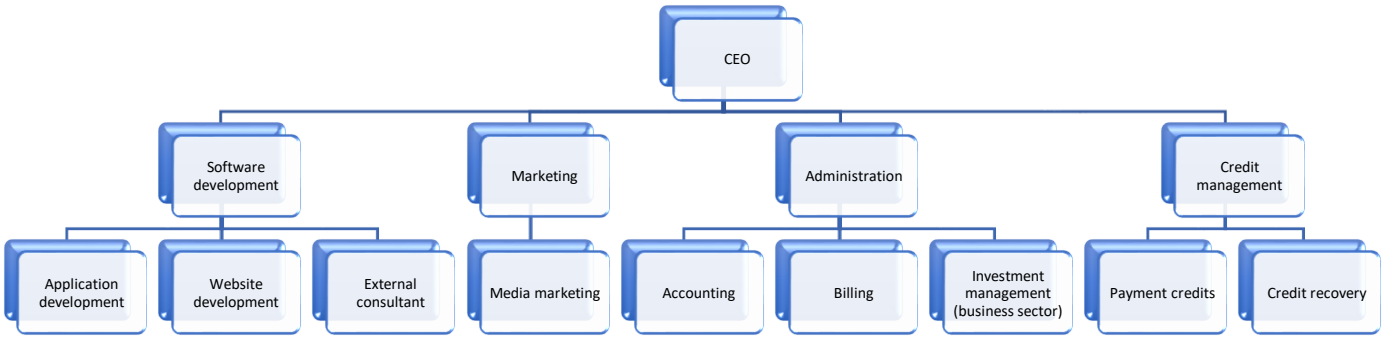
1.3 Critical Success Factors

Considering the company strategy, the CSFs are:

- Customer satisfaction (referred in the following as CSF1).
- Reduction of the process cost (referred in the following as CSF2).
- Software quality (referred in the following as CSF3).
- Top skills of employees (referred in the following as CSF4).

1.4 AS IS

1.4.1 Organizational chart



The company has a mainly horizontal organization and the structure is functional because the employees are divided in groups depending on their responsibilities. Moreover, the employees are not specialized in a specific technology and there is a low level of formalization.

1.4.2 Linear Responsibility Chart

Processes	Organization's structures							External actors	
	CEO	Application development	Website development	Media marketing	Payment credits	Credit recovery	Administration	Customer	External consultant
Application development	P	P						C	P
Website development	P		P					C	P
Payment procedure	P				P		P		
Customer service	P							C	
Credit recovery						P			
Marketing and advertising				P					

1.5 TO BE

1.5.1 Improvements in the organization view

Observing the LSR (see paragraph 1.4.2), it is clear that the CEO participates in too many processes and so there is an overload. As a consequence, in the AS IS situation, some customer requests have to be rejected for lack of time of the CEO and developers have a lot of downtime waiting for new projects.

The proposed improvement is to lighten the workload of the CEO by delegating some activities (see paragraph 1.5.5 and 2.2.1) and, in particular, by hiring a software analyst for the requirement analysis and the quality assurance. In this way, the CEO can focus on meeting with customers and on acquiring new ones and developers do not waste time. In addition to this, the requirements are understood better by a skilled person (software analyst), reducing misunderstandings.

1.5.2 Improvements in the functional view (process)

To increase the customer satisfaction and reduce the cost of the process, a further activity is added to check if the customer is trusted (regular customer or agency with a good reputation). If so, the deployment starts without waiting for the initial payment (30%) with the result of increasing parallelism and reducing lead time (see paragraph 2.2.1).

1.5.3 Improvements in the technological view

Another change involves the standardization of the bill generation according to the current law regulations (see section 2.5).

1.5.4 Organizational chart

The modification with respect to the AS IS situation is the addition of the software analyst, a role dedicated to requirement analysis and quality assurance.

1.5.5 Linear Responsibility Chart

Processes	Organization's structures								External actors	
	CEO	Software analyst	Application development	Website development	Media marketing	Payment credits	Credit recovery	Administration	Customer	External consultant
Application development	C	P	P						C	P
Website development	C	P		P					C	P
Payment procedure	C					P		P		
Customer service	P								C	
Credit recovery							P			
Marketing and advertising					P					

As you can see, some activities have been delegated to other people. As a result, the CEO participates in less processes and has more time for meeting customers and acquiring new ones.

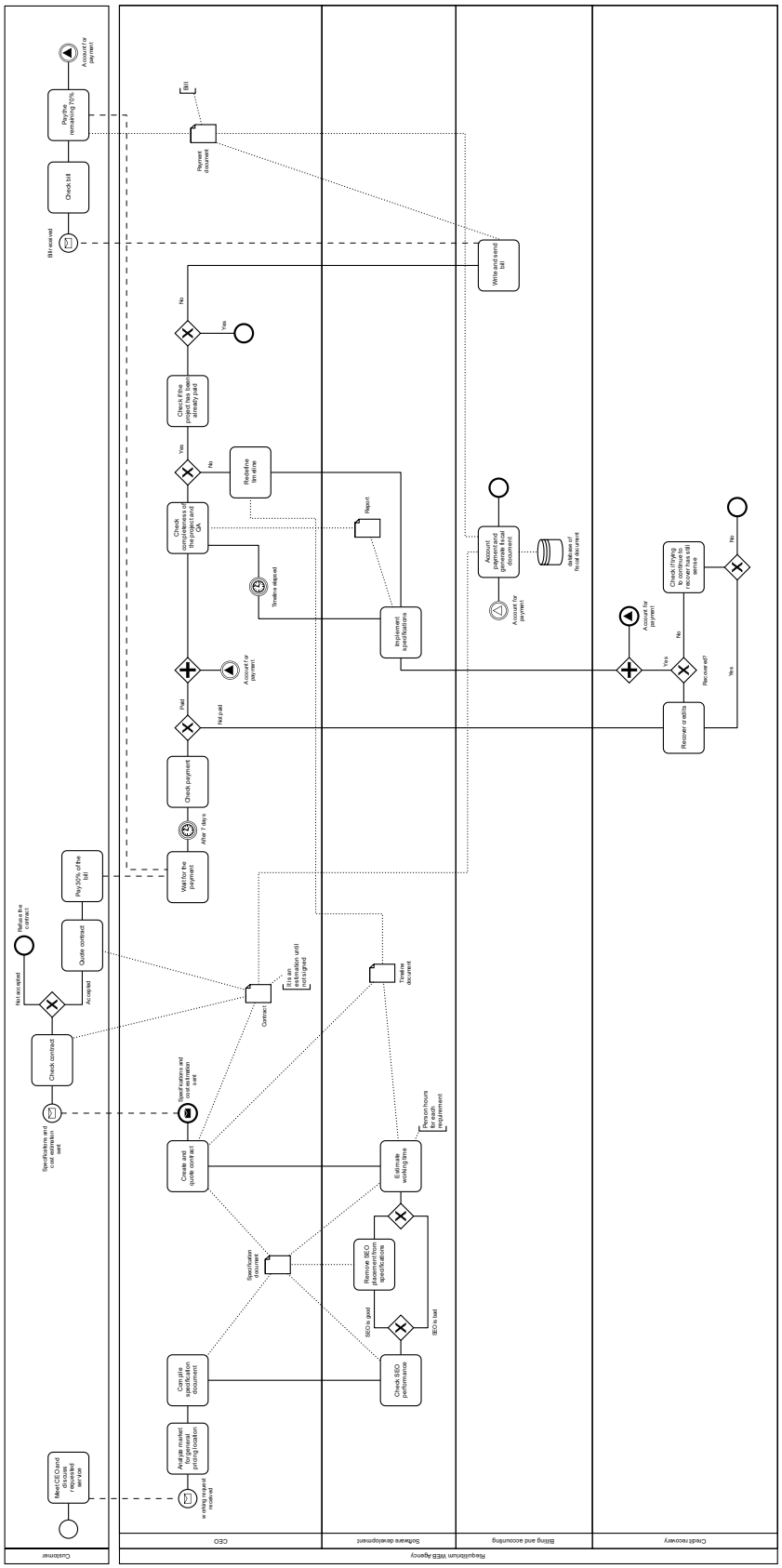
1.6 Process selection

Among the processes listed in the LRC (see paragraph 1.4.2), the development (app/website) process has been chosen for the analysis, considering its potential improvement. Notice that, despite the name, this process goes from the customer request to the delivery of the service. Also, the focus is not on the software lifecycle, since it is not objective of this course.

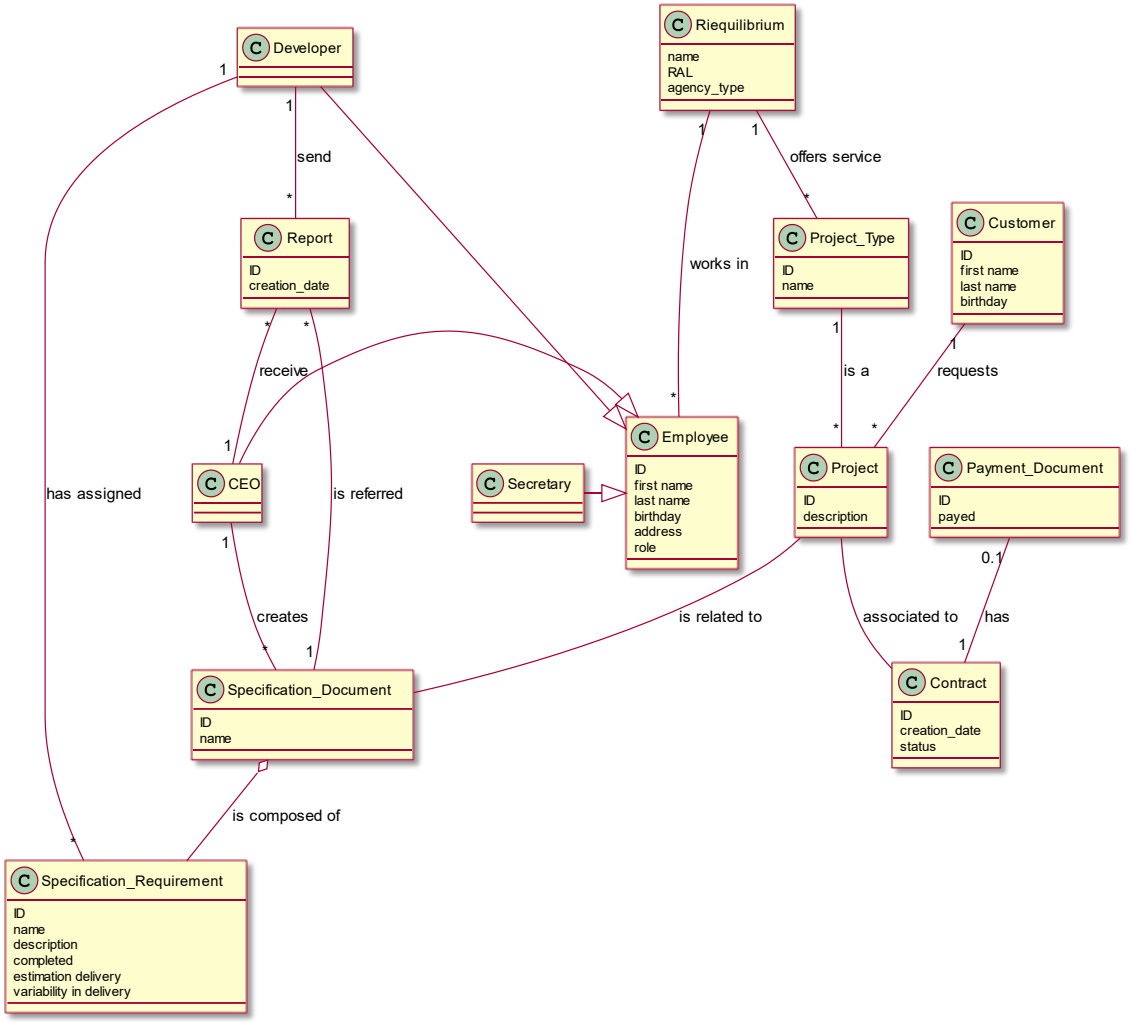
2 Process

2.1 AS IS

2.1.1 BPMN



2.1.2 UML

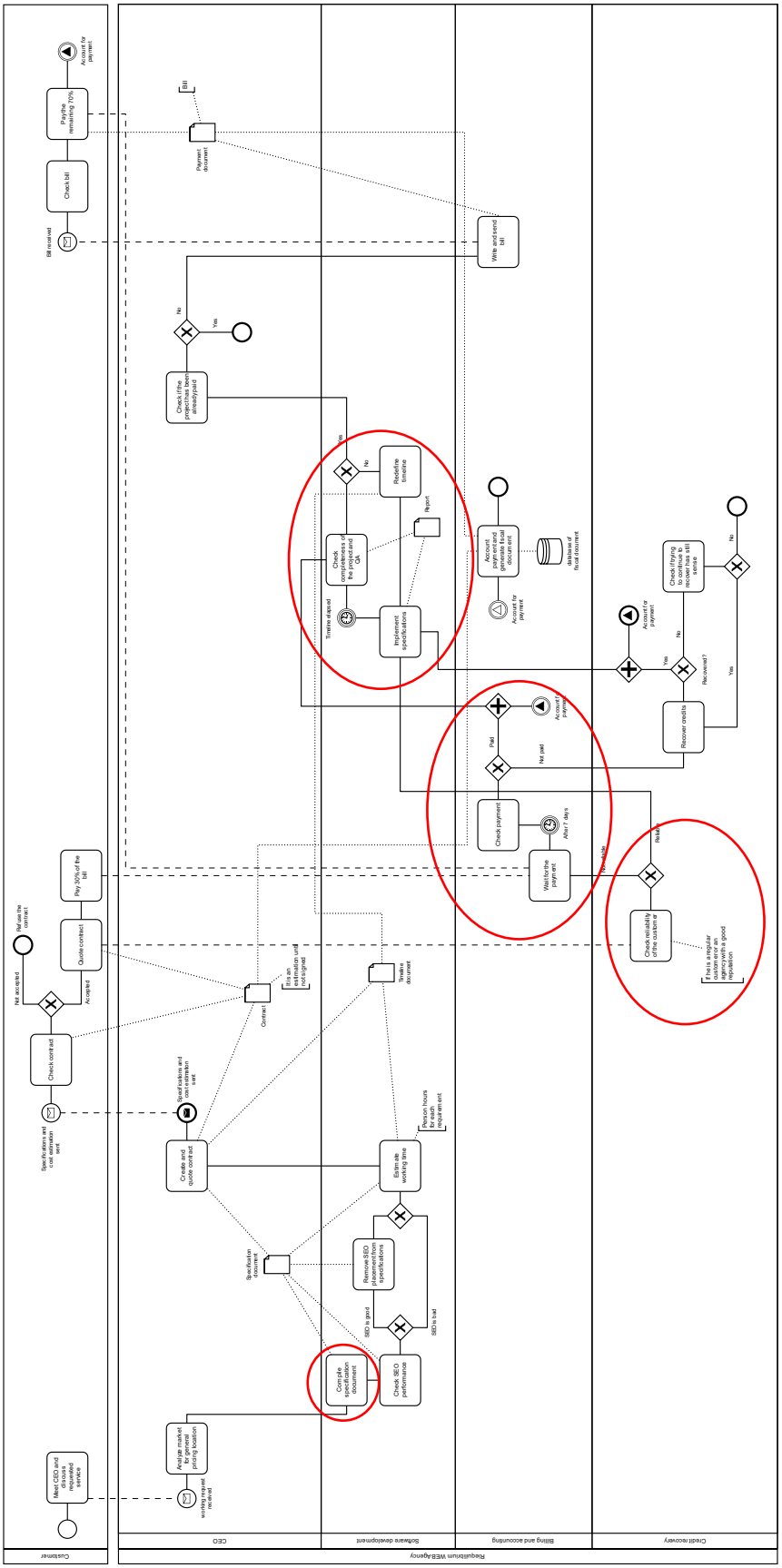

Developer
Riequilibrium
name
RAL
agency_type
send
offers service
Report
ID
creation_date
works in
Project_Type
ID
name
Customer
ID
first name
last name
birthday
receive
is a
requests
has assigned
CEO
is referred
Secretary
Employee
ID
first name
last name
birthday
address
role
Project
ID
description
Payment_Document
ID
payed
creates
is related to
associated to
has
Specification_Document
ID
name
Contract
ID
creation_date
status
is composed of
Specification_Requirement
ID
name
description
completed
estimation delivery
variability in delivery

```
@startuml
class Riequilibrium {
    name
    RAL
    agency_type
}

class Employee {
    ID
    first name
    last name
    birthday
    address
    role
}

class CEO {
}

class Specification_Document {
    ID
    name
}

class Specification_Requirement {
    ID
    name
    description
    completed
    estimation delivery
    variability in delivery
}

class Report {
     ID
     creation_date
}

class Project {
    ID
    description
}

class Contract {
    ID
    creation_date
    status
}

class Developer {
}

class Secretary {
}

class Customer {
    ID
    first name
    last name
    birthday
}

class Project_Type {
    ID
    name
}

class Payment_Document {
    ID
    payed
}

Riequilibrium"1" -- "*"Project_Type : offers service
Project_Type"1" -- "*"Project : is a
Project -- Contract : associated to
Project -- Specification_Document : is related to
Specification_Document o-- Specification_Requirement : is composed of
Riequilibrium"1" -- "*"Employee : works in
Secretary -|> Employee
Developer -|> Employee
Developer"1"-- "*"Specification_Requirement : has assigned
Developer"1" --"*" Report : send
Report"*" -- "1"CEO : receive
Report"*" -- "1"Specification_Document : is referred
CEO -|> Employee
Customer"1" -- "*"Project :requests
Payment_Document"0.1" --"1" Contract : has
CEO"1" -- "*"Specification_Document : creates
@enduml
```

Figure 1: Code to generate UML

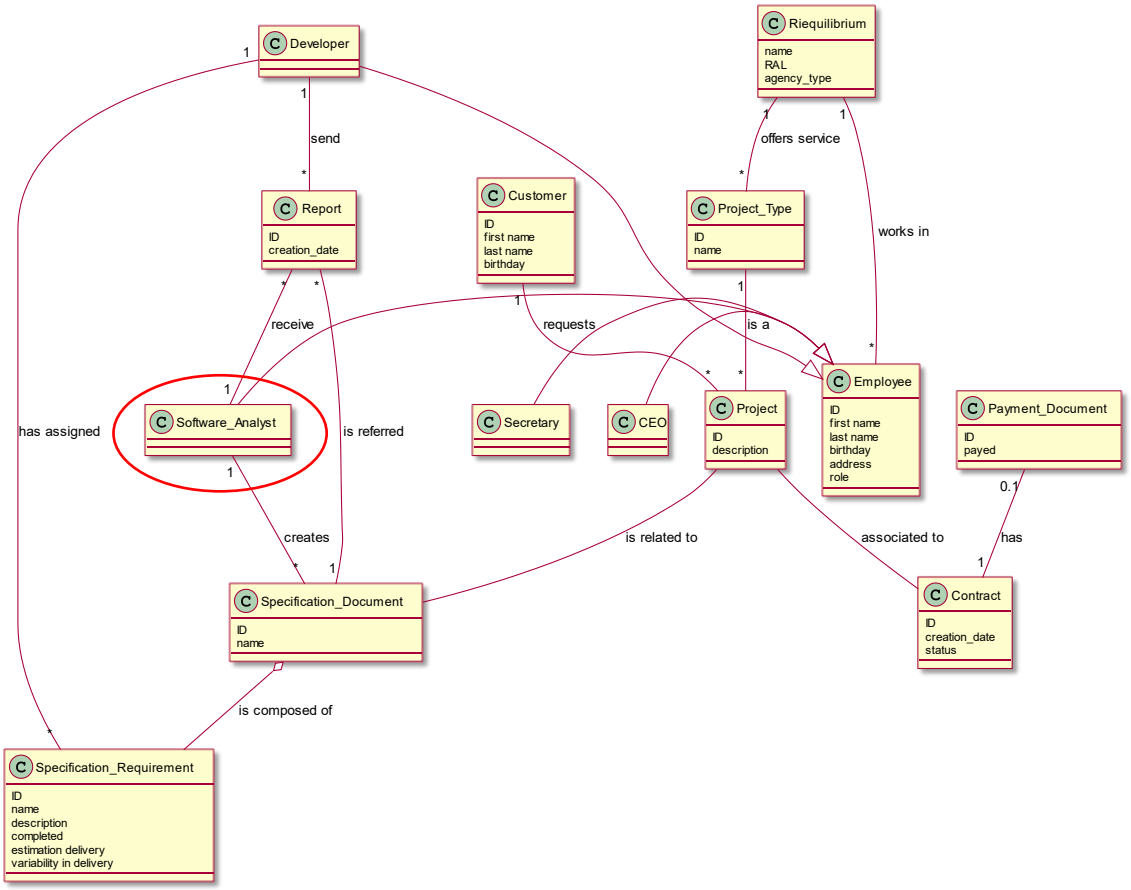
2.2 TO BE

2.2.1 BPMN



Some activities have been moved from the CEO to other people (delegated) and the customer reliability check is introduced.

2.2.2 UML



You can notice that a new class Software_Analyst has been added.

2.3 KPIs

CSF	KPI			
	Category	Description		Unit of measure
	GENERAL	Input volume	# service requests # customer	
		Output volume	# services accepted	
		Human resources	# full-time employees # part-time employees	
		Non-human resources	Documents (specification document, timeline documents, software report, contract) # Computer and supplies	
CSF2	EFFICIENCY	Cost per unit	Total cost / # services accepted Total cost = salary of employees + infrastructure and resources	Euros (€)
CSF2 CSF4		Productivity (volume/resource)	# services accepted / # employees	
CSF2 CSF3 CSF4		Utilization	# effective hours worked / total payed hours	
CSF1 CSF2 CSF3	QUALITY	Conformity	# services with defects / # services delivered Defects caused by incomplete/wrong requirements	
CSF1		Customer satisfaction	Complaints/feedback from customers (website/call center)	
CSF1	SERVICE	Lead time	Time from customer request to service delivered	Days or months
CSF1		Flexibility	# changes in requirements from customers / # total requirements	

KPI		AS IS	TO BE
Category	Description		
GENERAL	# service requests # customers		May increase because the customer satisfaction rises and the CEO has more time dedicated to find/meet customers.
	# services accepted		Increases because the work is more distributed among different employees.
	# full-time employees # part-time employees		Number of full-time employees increases (new software analyst).
	Documents (specification document, timeline documents, software report, contract) # computer and supplies		No changes.
EFFICIENCY	Total cost / # services accepted Total cost = salary of employees + infrastructure and resources		Total cost increases because of new employee and software changes (see paragraph 2.5), but also the number of services accepted increases. Overall, the cost per service decreases.
	# services accepted / # employees		Increased, no overload because the employees have less wasted time.
	# effective hours worked / total payed hours		Improved, less wasted time.
QUALITY	# services with defects / # services delivered defects caused by incomplete/wrong requirements		Improved because the requirement analysis and the QA are done by the software analyst (skilled).
	complaints/feedbacks from customers (website/call center)		Almost the same.
SERVICE	Lead time (from customer request to service delivered)		Slightly improved because the response time between the appointment request and the meeting date is reduced.
	# changes in requirements from customers / # total requirements		No changes.

2.4 IT technological model

The used architecture is 2-tiers client-server:

- The server hosts the administrative website, the APIs and the database containing the core information about applications and employees.
- Clients interact with it through a browser.

2.5 Evaluation

2.5.1 TCO

The development of the website extension module for electronic billing is done internally because, beyond using it inside the company, the purpose is to sell it as a service to customers (as a plug-in inserted in e-commerce to autogenerate the bill without manual interaction). In addition to this, it treats sensible data and it is an upgrade of a legacy software developed in the same agency (most of the code was already written, so the cost of extending it is lower than outsourcing).

Phase	Cost
Construction	Requirement, design and development of the extension of the existing IT application
Deployment	Deployment of the application, training of employees
Operation + maintenance	Hardware infrastructure operation and maintenance, application operation and maintenance
Dismissal	Uninstall and data porting to new application

2.5.2 ROI

Internal management software:

Year / cost or saving	Year 1	Year 2	Year 3	Year 4	Year 5
Cost	C + D				
Cost	O + M	O + M	O + M	O + M	O + M + D
Saving	S	S	S	S	S

Assuming dismissal after 5 year:

- # hours required to develop: ~300
- total cost = average salary per house (gross) * # hours
- income = average income per project * # projects
- saving = income – total cost

Unfortunately, it is extremely difficult to estimate the saving due to the high range of variation on number of projects and employee salary (external consultants) in a middle-sized company. The only factor easy to evaluate is the number of hours required to develop the module.

3 Conclusion

Considering the saving defined in the paragraph 2.5.2, we can suppose that it will have a negative value in the first year (the agency cannot recover all the money spent for the website plugin and for hiring the software analysis). However, starting from the second or, in the worst case, the third year, the significant increase in the number of accepted projects influences the income making the saving positive.

In addition to this, since the lead time is reduced and the conformity is increased thanks to the introduction of a software analyst, the customer satisfaction is improved.

Overall, the investment is surely worth.