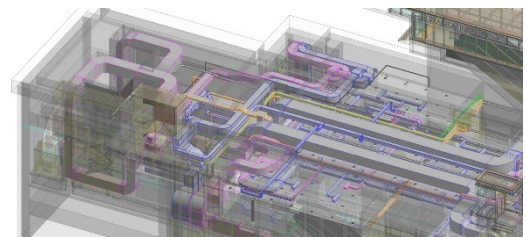
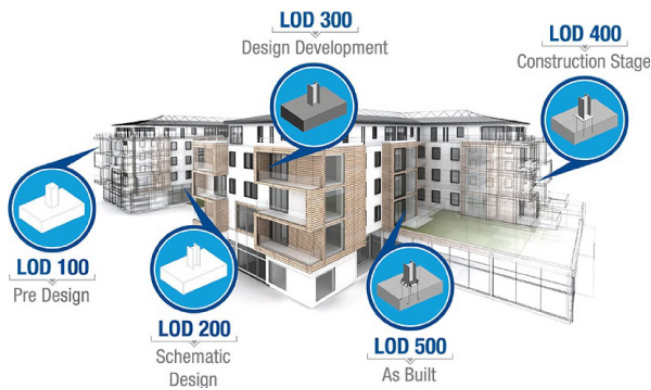
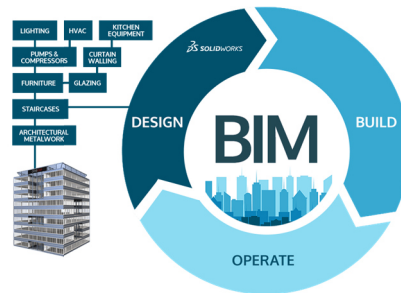
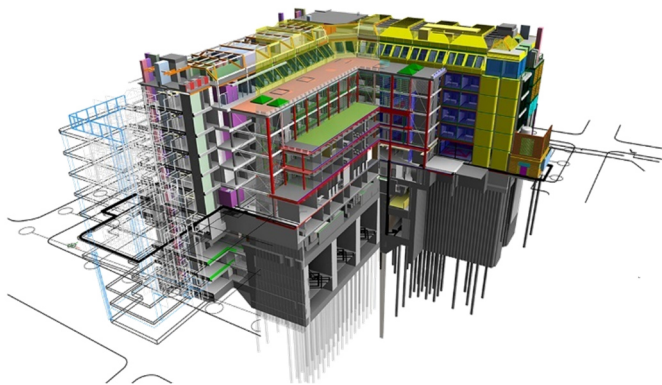


BBC&D - BARCELONA BIM CONSULTING & DELIVERY



Entrepreneurship

Master's degree on Numerical Methods in Engineering

Marcos Boniquet
Arcadi Sanmartin

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

INDICE / TABLE OF CONTENTS

1	INDUSTRY, COMPANY AND PRODUCT	3
1.1	Industry	3
1.2	Company	3
1.3	Products or services	3
2	MARKET RESEARCH AND ANALYSIS.....	4
2.1	Customers	4
2.2	Size and trends of the market.....	4
2.3	Competitors	6
2.4	Sales forecast and market share	6
2.5	Monitoring	8
3	MARKETING PLAN	8
3.1	General Marketing Strategy	8
3.2	Pricing policy	9
3.3	Organization of sales	9
3.4	Service and guarantee policy	10
3.5	Advertising and promotion	10
4	DESIGN AND DEVELOPMENT PLANS	10
4.1	Present situation and pending tasks.....	10
4.2	Expected problems	10
4.3	New designs	11
4.4	Budget.....	11
5	OPERATIONS PLAN	11
5.1	Geographical location	11
5.2	Facilities	12

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

5.3	Strategy	12
6	MANAGERIAL TEAM.....	12
6.1	Organization	12
6.2	Key managers	13
6.3	Management salaries and participation in Equity	13
6.4	Board of Directors	13
6.5	Professional support services.....	13
7	CALENDAR	13
8	RISKS AND CRITICAL PROBLEMS	14
9	FINANCIAL PLAN.....	15
9.1	Estimated Income Statement	15
9.2	Estimated Cost Statement	15
9.3	Estimated Cash management	16
9.4	Estimated Balance Sheet	19
9.5	Break-even analysis	19
9.6	Cost control system.....	21
10	REFERENCES.....	21

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

1 INDUSTRY, COMPANY AND PRODUCT

1.1 Industry

BIM (Building Information Modeling) industry is growing fast and steadily. Unlike other technologies like hand drafting being substituted by CAD, it is not just another change in the way we work, it is here to stay. BIM is an intelligent 3D model-based process that gives architecture, engineering, and construction (AEC) professionals the insight and tools to more efficiently plan, design, construct, and manage buildings and infrastructure (Autodesk, 2018).

In Europe the Directive 2014/24/EU of the European Parliament on public procurement states that all the 28 European Member States may encourage, specify or mandate the use of BIM for publicly funded construction and building projects in the European Union. Spain will introduce the mandatory use of BIM for all for public building projects by December 2018 and for all public works infrastructure projects by July 2019.

The biggest engineering companies have the resources and staff to make that change in the production chain, however smaller companies are struggling to adapt their reduced budgets and limited hiring power to these new requirements.

1.2 Company

Our company will provide engineering consultancy in the field of BIM technology to engineering and construction companies. We will help them streamlining the transition to BIM smoothly and supporting them not only with knowledge but also with key personnel that can be temporarily assigned either to a project or to a training program, based in the client's office. We will help manage the peaks with work force or the troughs with training and R+D programs.

As an independent BIM consultancy, our company is committed to helping clients save money and time, reduce risk and improve quality through a delivery strategy tailored to the specific needs of individual clients across project inception, design, construction and operation.

1.3 Products or services

Our services can be summarised in two key areas:

1- BIM Consultancy Services

Our services will focus on the main six main areas of improvement:



Figure 1 - BIM industry work and company processes (Autodesk, 2018)

Within each of these processes, our company will provide the expertise in the application of digital technology in the design using BIM technology. We will cover all the bases of digital design and build for any project from tender, basic or detailed design projects working alongside the project team to global management and overview of

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

project models. Our global vision will provide the clients with new skills that will be used to enhance the productivity, the project quality and the final client satisfaction.

Our consultancy services will include also tailored training programs based on specific projects when required, to provide lasting knowledge and expertise to our clients. With a dedicated program on the use of BIM for publicly funded construction and building projects in the European Union, our clients will be in the lead of the sector regarding BIM technology.

1- BIM Delivery Services

Our company will offer a BIM delivery service from management roles to production services, to ensure the proper delivery of any project. We will allocate our resources to ensure that the work from all team members is compliant with the project requirements and that the different disciplines unify the collaboration efforts to yield the best outcome. Our experience in BIM production and management will ensure that BIM technology will provide end-to-end significant efficiencies during the design process.

Our team will work based on our client's offices side by side with the rest of the project team, thus the collaboration and production will be seamless and will benefit engineers, designers, drafters, cost controllers or project managers.

2 MARKET RESEARCH AND ANALYSIS

2.1 Customers

Our company will not be just an outsourcing company but will be a partner that will work with the clients in-house, providing first the expertise as consultants, second the work force for any project with engineers and drafters, and finally product oriented training programs. This is a global solution for the BIM related problems. All this can be achieved while embedded within the client's working scheme, with high level of commitment and understanding of the company's culture.

2.2 Size and trends of the market

The 2016 report by Daedal Research, *Global BIM Market: Size, Trends and Forecasts (2016-2020)* reported that the global BIM market is expected to reach almost \$8 billion by 2020, at a compound annual growth rate of 13% between 2015 and 2020 (Daedal, 2016).

The implementation of BIM in the construction industry is accelerating globally. Back in 2014 McGraw Hill reported that contractors were using BIM globally on over 30% of their projects (McGraw Hill, 2014). More recently, a survey by National Building Specification (NBS) in the UK (2016) reported that BIM usage in the UK increased from 13% in 2011 to 54% in 2016 amongst all construction professions (NBS, 2016).

While it is recognised that implementation is increasing across many countries, the level of BIM use and the rate it is increasing varies between the different regions.

According to the BICP Global BIM Study (McAuley, 2017), the BIM adoption internationally is reaching market maturity. Many countries are adopting mandatory BIM policies as summarised in the following figure:

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

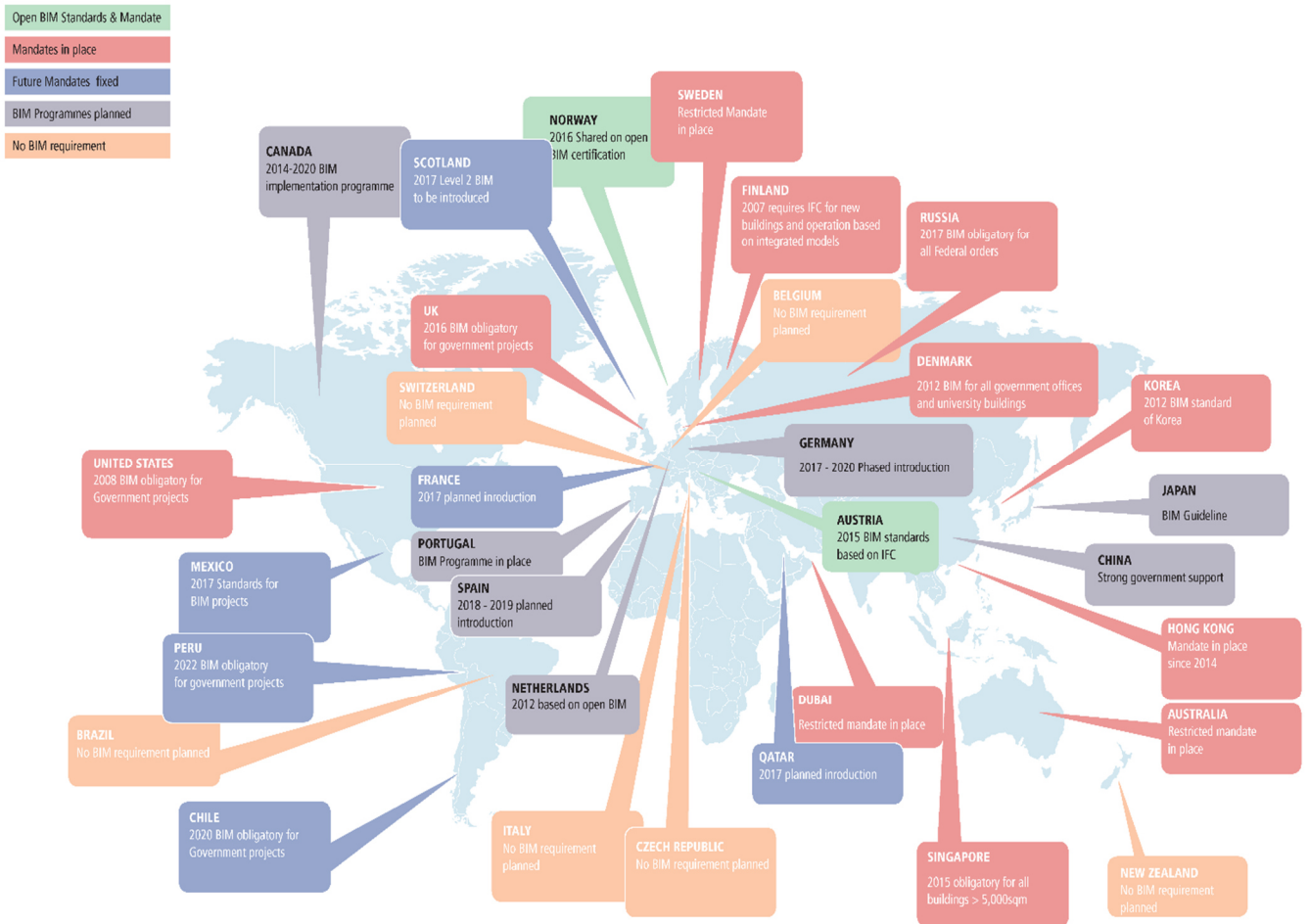


Figure 2 - Overview of Global BIM Adoption (McAuley, 2017)

In Spain, according to the Spanish public sector tendering system (Ministerio de Fomento, 2018), more tender projects with BIM requirements have been issued in the first quarter of 2018 than all of 2017. 50% of these includes BIM uses, not only the submission of the model that is already required in the 64% of the cases. The 27% of these tender projects include mandatory BIM methodology, even though the Regulation deadline has not yet been reached.

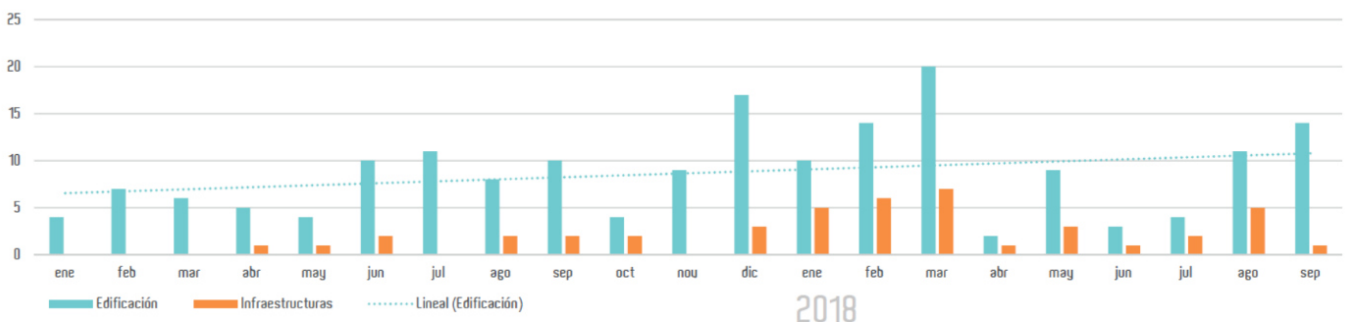


Figure 3 - Monthly evolution of the number of BIM tenders in Spain in 2017 and 2018 (Ministerio de Fomento, 2018)

The engineering market in Spain scored a total turnover of 10.7 billion euros in 2017, growing a 1.7% with respect 2016. In 2016 the growth was a 3.8% and for 2018 the predictions say about 2.8%. However the implementation of BIM in Spain is still far from being accomplished. The implementation level is low as the surveys show, so there is still a long way to go:

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

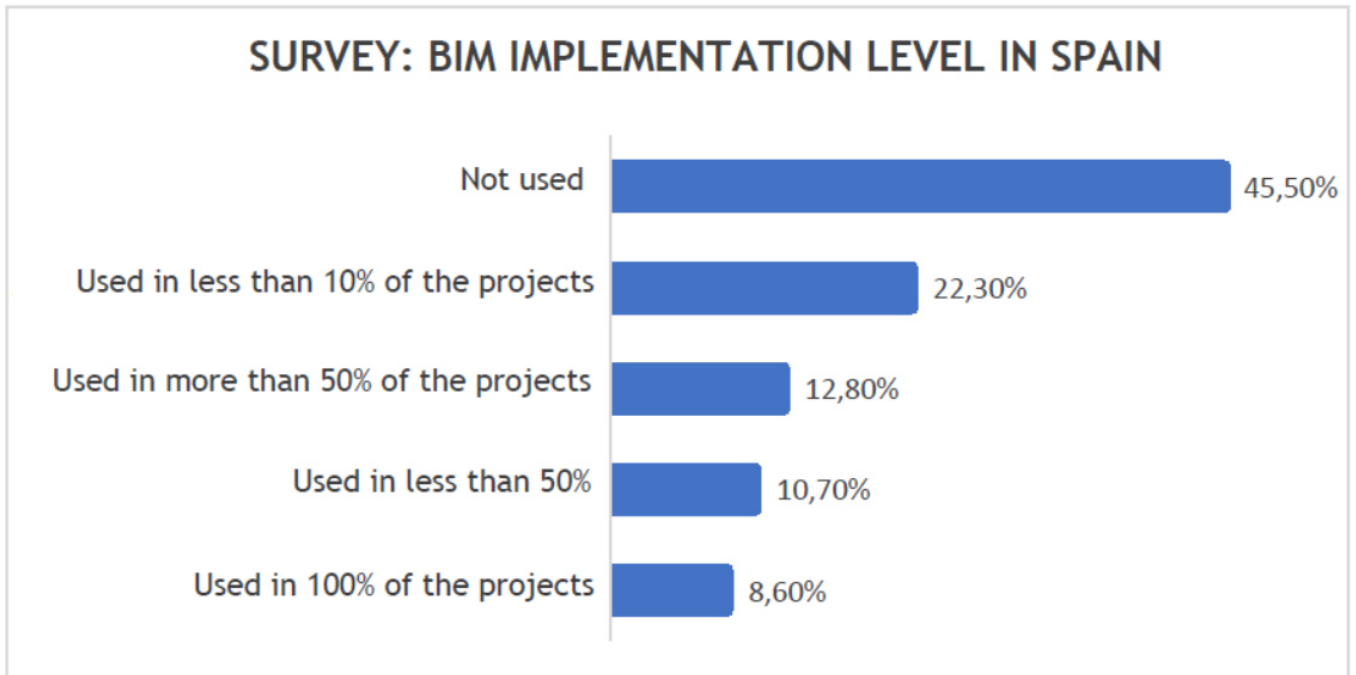


Figure 4 - BIM implementation level in Spain's engineering and architecture companies (Muñoz, 2017)

2.3 Competitors

Several companies in Spain are providing services of BIM consultancy and BIM delivery services. The summary of companies, services and size is presented in the following table:

Table 1 - Summary of competitors

Company	BIM Consultancy Services	BIM Delivery Services	Headquarters	Number of employees
BIM6D	X	X	Barcelona	1 to 9
A3D	X	X	Barcelona	20 to 49
MODELICAL	X	X	Madrid	20 to 49
CONSTRUSOFT	X	---	Barcelona	20 to 49
AEC-ON	X	---	Madrid	1 to 9

2.4 Sales forecast and market share

In 2018 93.485 companies dedicated to "Architectural and engineering technical services and other activities related to technical consultancy" formed the market, according to the Statistics National Institute (INE).

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

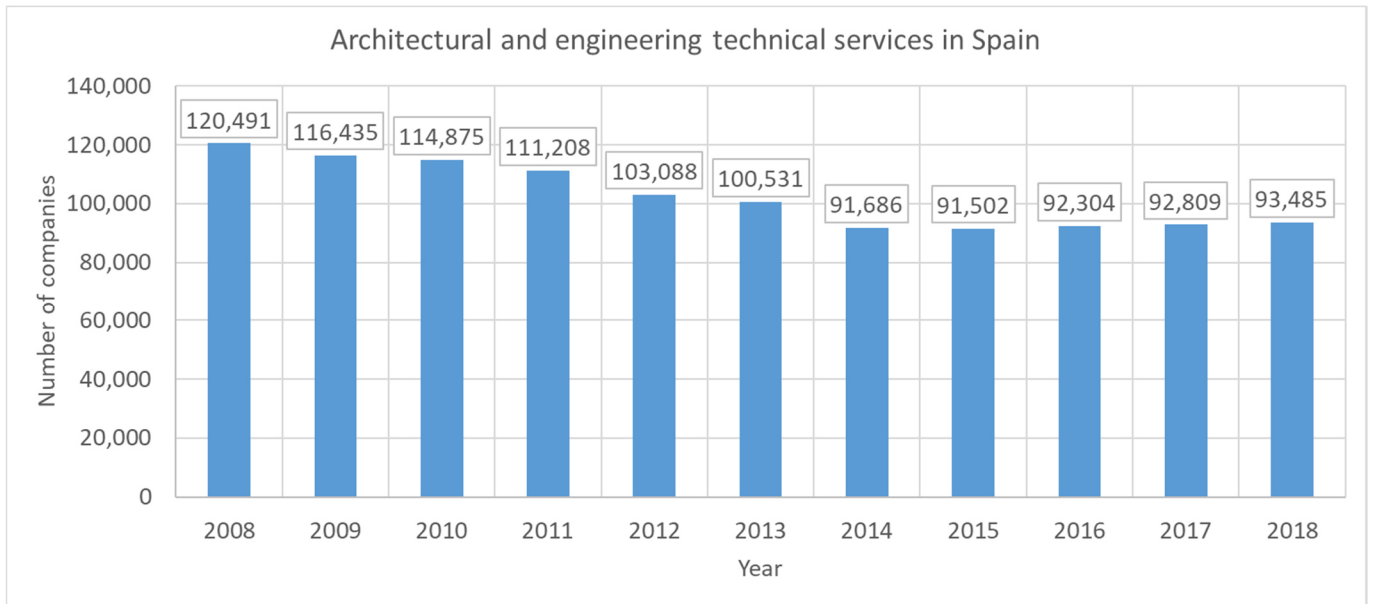


Figure 5 - Evolution of architectural and engineering services companies in Spain from 2008 (INE, 2018)

As it can be seen the sector is beginning to recover from the crisis tough years, with three years in a row increasing the number of companies.

The Mediterranean coast and more specifically Catalonia that is our closer working area concentrate a high number of companies dedicated to architectural and engineering technical services:

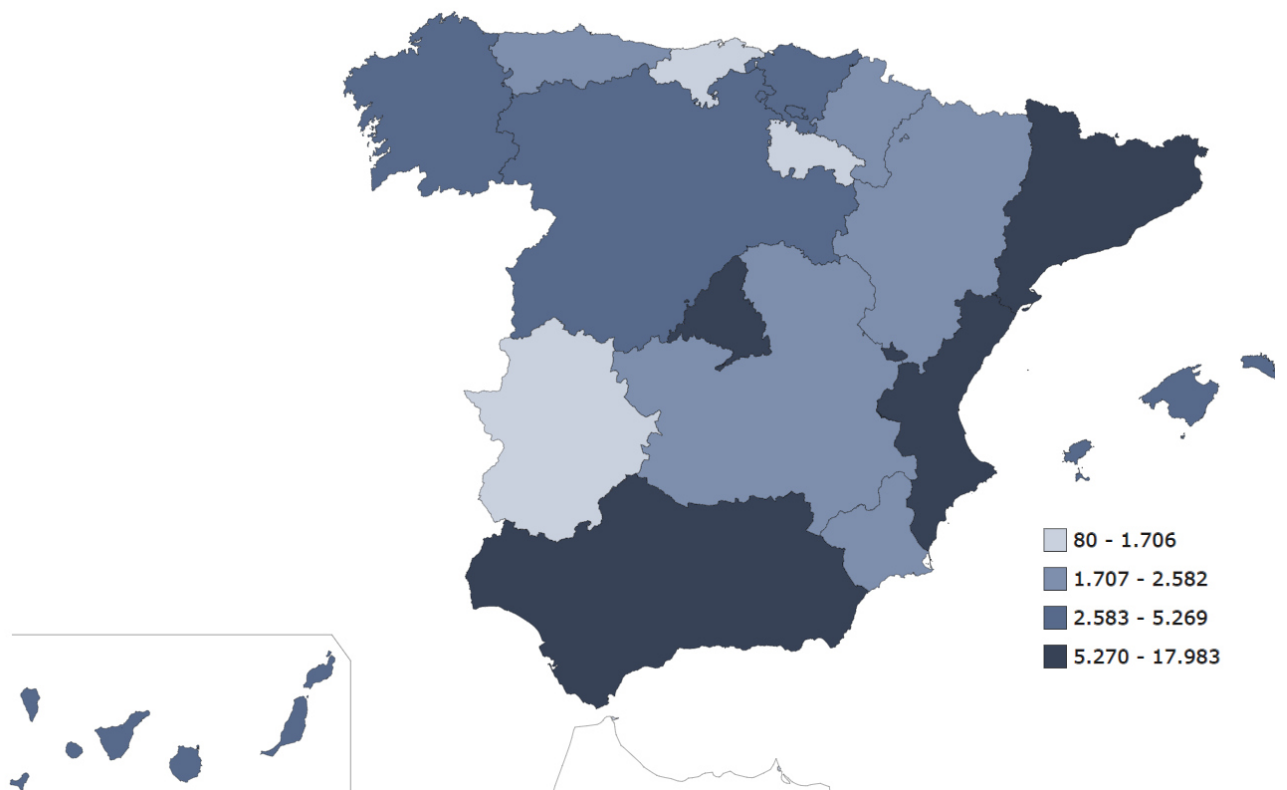


Figure 6 - Range of architectural and engineering services companies by region in 2018 (INE, 2018)

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

The initial sales forecast is calculated for the first years with some assumptions:

Projects are divided in High-medium-low budgets:

- HB=Nr of projects of High Budget estimated at: 0,1/month (10 months duration)
- MB=Nr of projects of Medium Budget estimated at: 0,2/month (5 months duration)
- LB=Nr of projects of Low Budget estimated at: 2/month (one month duration)

The income from each type of project is estimated as:

- Low Budget: 3.000€-7.000€
- Medium Budget: 7.000€-30.000€
- High Budget: 30.000€-200.000€

Our forecast is based in a number of projects which is estimated as a range between a single Low Budget project the first month to a maximum of 6 active projects the eleventh month. This can be seen in the following figure:

MONTH	LB	MB	HB	AV. INCOME
1	0	0	0	0.00
2	1	0	0	5,000.00
3	2	1	0	13,700.00
4	2	1	1	25,200.00
5	2	1	1	25,200.00
6	3	1	1	30,200.00
7	1	2	1	23,900.00
8	2	1	1	25,200.00
9	3	2	1	33,900.00
10	2	2	1	28,900.00
11	4	2	2	50,400.00
12	2	2	2	40,400.00
TOTAL				302,000.00



Figure 7 - Sales forecast

2.5 Monitoring

The monitoring will be performed on three main areas:

- Financial monitoring: To be able to monitor the performance of the company a quarterly analysis will be done to check the forecast versus the actual behaviour.
- Customer monitoring: Follow up meetings with our clients will be scheduled with focus on any improvements on the services and suggestions from our final clients.
- Employee monitoring: Performance reviews will be done on our employees on a semester basis, to provide support, fix goals and also to receive feedback.

Corrective actions will be taken based on these three monitoring areas.

3 MARKETING PLAN

3.1 General Marketing Strategy

The general marketing strategy will be based on:

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

- **Social media marketing:** Being active in LinkedIn with direct approach to key industry actors, future and actual customers, maintaining a YouTube account with educational videos for training of engineers, drafters and students and explaining projects and BIM ideas and tips on Twitter.
- **Earned media:** Preparation of papers, participation in congresses and conferences, memberships in working groups (buildingsmart, ITeC, es.BIM...).
- **Networking events:** Participation on events that encourage face-to-face interactions and relationship building. These are typically well attended and allow businesses of every size access to the same audience and information.

3.2 Pricing policy

The pricing policy will be based on estimations for each proposal and a hourly rates for each type of service, depending on the category of the asset. The rates will be:

Table 2 - Unit rates considered for pricing

Item n°	Description	Unit Rates
1	Senior Expert (More than 20 years)	135
2	Senior Engineer (8-20 years)	120
3	Engineer (5-8 years)	95
4	Junior Engineer (0-5 years)	75
5	Drafter	60
6	Auxiliary personnel	55

3.3 Organization of sales

The sales forecast in section 2.4 shows the estimation of projects we will work on, assuming a first period with small low budget projects, but the goal is to reach a steady zone between 20 and 40k €/month after the first year:

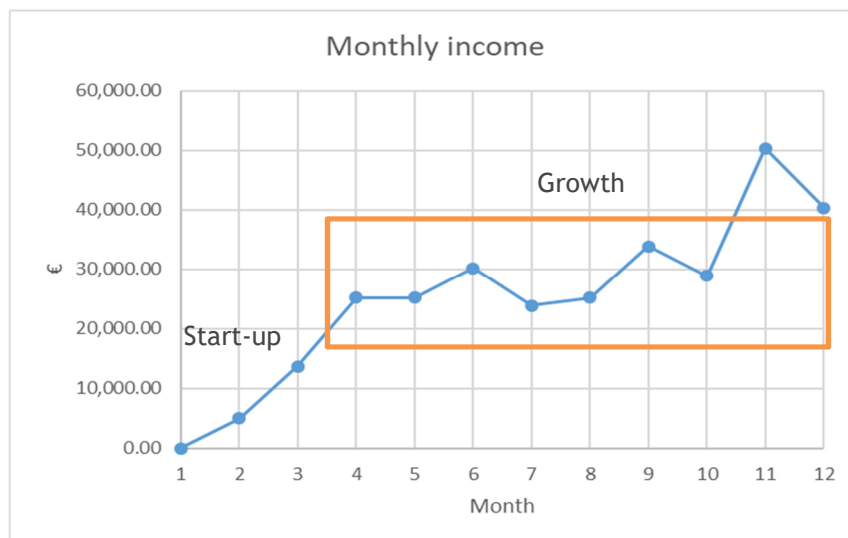


Figure 8 - Sales forecast with start-up and growth zones

To be able to maintain a positive cashflow the sales invoicing and payment schedule will be:

- An advance payment of 20% at the commencement of the works.
- Draft deliverables. This will contain an initial version of the contents and is subject to modifications and/or revisions by the Client. Invoice of 70% of the related amount
- Final deliverable. Final version approved by the Client. Invoice of 10% of the related amount

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

- The invoice will be sent to the Client before five working days after confirmation of receipt of the deliverables.
- Payments shall be done during the first thirty days from the invoice date.

3.4 Service and guarantee policy

Being a consultancy service, the service and guarantee policy will be based on the following points that will be stated in the contract with all the Clients:

- Errors in the Services: BBC&D will have no further responsibility than to act with reasonable skill, attention and diligence in the fulfilment of its obligations under his Contract with the Clients. In the event of any defects, errors or omissions in the Services, BBC&D will be exclusively responsible for correcting and/or redoing with reasonable speed, all those parts of Services that are proved to be defective.
- Errors in the baseline information: BBC&D shall not be responsible nor assume any liability whatsoever under any circumstances in the performance of the services to the Clients for errors or inadequacies in the documentation, information and instructions provided by the Clients, or for defects or errors that may exist on the documents provided by the Clients.
- Submission delays: Any penalties or liquidated damages for delays, or for any other reasons, will be limited to an aggregate total amount of five percent of the total (net) fees for the services provided under the contract of Services.
- Liability limitation: In any event, the maximum quantitative and accumulated liability of BBC&D will not be more than an amount equal to 20% of the contract price.

3.5 Advertising and promotion

The advertising and promotion should be focused on specific customers and media, and the basic steps will be:

1. Identify the ideal new customers
2. Contact key personnel within the companies to offer our services
3. Use social media to spread the company's brand
4. Offer initial discounts for new customers or free trial services
5. Collaborate in conferences and working groups to reach more audience

Once our potential clients get to know about our existence a first project with good results will be our presentation letter.

4 DESIGN AND DEVELOPMENT PLANS

4.1 Present situation and pending tasks

The present situation is the start-up of the company, therefore the immediate pending tasks are:

- Look for a location: The company will start renting an office at *Wework Glories Luxa C/Tànger-Badajoz* (Barcelona). The office will provide internet access, phone and a private office with flexible space, thus the number of seats and space can increase with the business volume.
- Acquire the hardware: Workstations, personal computers and mobile phones. Printers and landlines are provided by the office rent.
- Acquire the software: Revit and AutoCAD. The MS Office suit (Word, Excel, Power Point...) will not be needed since we will work with open software as much as possible.
- Start advertising and promotion program: The basic steps as explained in section 3.5 will be to identify new customers and contact key personnel, use social media offering initial discounts and collaborate in technical conferences and groups.

4.2 Expected problems

We will face problems related to starting a company that are common to any new business and problems related to the technical side:

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

- Similar companies sharing same market: Our competitors that are already working on the same field are ahead of us so we will need to stand out following our strategy defined in section 3 that is the marketing plan.
- Lack of experience in corporate governance: Being our first company we will need to define a proper governance strategy to avoid poor decision taking, such as definition of Key Performance Indicators with a system to measure them, establish a strategic direction and convey it to all the company and record everything on the process.
- Intellectual property management: Since we will work with different clients and different projects we need to set a plan to make sure that both our clients' and our company's intellectual property is protected. This will avoid future legal issues and possible litigations.

4.3 New designs

In our company, our new designs will be prepared for each client so we will be producing them tailoring our solution to the needs of the customer. We will have a portfolio of previous designs that can be used as base of our new designs. The potential uses are:

- New REVIT families, with parametric definition of features.
- New project templates to enhance project delivery.
- Additional courses on specific areas within the BIM world.

4.4 Budget

Our initial budget is 80.000€ borrowed from familiars and friends. Exempt from taxation, 50.000€ without returning deadline and 30.000€ due to be returned in 2 years.

5 OPERATIONS PLAN

5.1 Geographical location

It is considered the renting of an office at Wework Glories Luxa C/Tànger-Badajoz Barcelona B 08018. This office is at the 22@ district, a district that since year 2000 has been transformed into a compact area, from which start-up firms collaborate with universities, investigation centres and state-of-the-art technology centres.



Figure 9 - Office location

22@ offers green areas and has been developing the last decade. The fact that Glories square, the biggest square in Barcelona, is being refurbished will revitalize even more the adjoining areas. However, it is probable that this is a double edge sword, given that rent prices could get even higher because of this same reason.

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

Four different main sectors are settled in this area: Media, IT, Energy, Design & Medical Technologies. A correct location of our facilities is key to the work atmosphere. 22@ might empower creativity, attraction and retention of talent, while encourage innovation and access to technology.

5.2 Facilities

Wework facilities enable onsite parking and a mere three-minute walk to both the 6 and 7 buses and Metro Glòries. A well-connected location is essential to improve quality of employees.

There is a kitchen to be shared with the other firms, and the company provides its workers with free coffee and snacks.

The closets, tables, chairs etc are provided by Wework. Also the plotter and the printer are provided by Wework.

The personnel of BBC&D will require either a workstation, or a conventional laptop. All personal, except from Salesman and Manager will use workstations, which have to be replaced periodically according to the obsolescence and the graphical power requirements.

The workstations are the tool which enable BIM work. Revit is the software chosen, a standard in this industry, while Autocad is considered a must as a secondary software and complementary to Revit.

5.3 Strategy

Before introducing our strategy, is worth noticeable that our prices of the BIM consultancy or BIM Delivery are under the standards of the market, for the three project levels and roughly 50% lower. This enables us to reach a wide variety of customer sizes while competing with the bigger competitors.

However, the strategy is focused not only on expanding our possible range of customers, but to grow up with little firms and hand to hand. This would provide fidelity.

Assuming a certain amount of this smaller collaborators achieve success, the higher budget possibilities they would have once reached success, and the fidelity would enable a progressive increase in price of our projects, converging with the standards of the market.

6 MANAGERIAL TEAM

6.1 Organization

The structure of the company is one manager (L3), a team leader (L2) managing three collaborators (L1), plus a salesman with car, phone and laptop (L2).

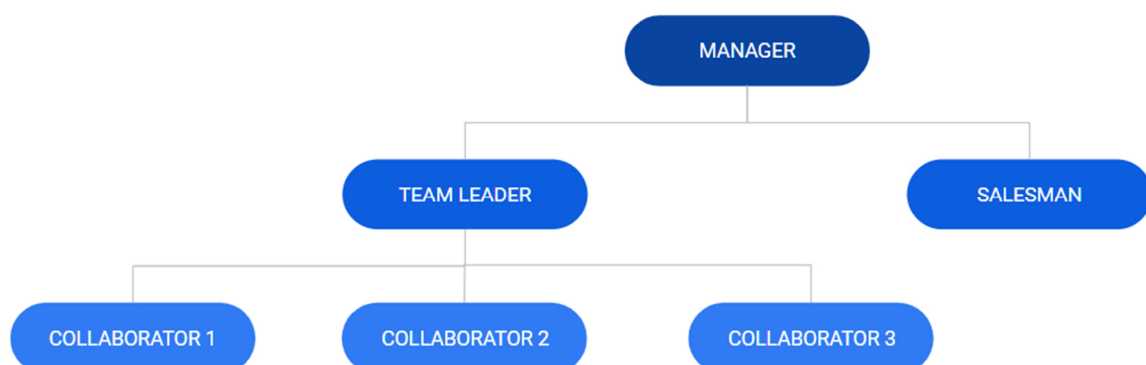


Figure 10 - Organisation chart

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

6.2 Key managers

The manager supervises the job of the Team Leader and the Salesman, with the scope of improving the overall efficiency and advise on technical and design matters. All the important decisions of a project must be approved by the Manager. As an inside director, its internal job finishes with this work, but beyond, certain responsibilities are to be taken as the unique member of the Board of directors.

The salesman has complete independence from the technical department and is in charge of recruiting new customers and projects for the firm. However, sometimes needs to talk to the technical the department to know the viability of the project.

There is a Team Leader in charge of the three collaborators, which all of them form the Technical Department. This person usually is the one who travels and assists to the construction. It is also they key contact with the customer, which participates in meetings to decide whether the design must be one way or other. Its decisions must be supported by the manager and a periodic feedback to him is compulsory.

6.3 Management salaries and participation in Equity

There are three salary levels estimated:

- L1=1400 euros per person per month: Entry level (N1=3 people)
- L2=2800 euros per person per month: Junior (N2=2 people)
- L3=4300 euros per person per month: Senior and Manager (N3=1 person)

All of them 50% more in December because of salary bonuses.*

*Bonus only if target achieved. Target is invoice average from January to December>25000€/month. (total estimated/month).

6.4 Board of Directors

The board of directors is exclusively formed by the Manager, which is an inside director. Its duties comprise from governing the organization by establishing policies and setting out strategic objectives to the account responsibilities, such as ensuring the availability of adequate customers/projects, approving annual budgets, and setting the salaries, bonuses and benefits of the whole organisation.

6.5 Professional support services

In order to be capable of covering a BIM consultancy within all the aspects of a project, some of our services need to be outsourced, such as specific BIM aspects in the MEP fields (Mechanical, Electrical, Plumbing):

LIGHTING: ANOCHE will provide specific BIM light designs. This firm delivers light design, which is quite subtle, and has experience with big projects, such as Sagrada Familia or Camp Nou. They are located in Barcelona and prices match ours'.

INSTALATIONS: SENER is a global consulting firm of engineers and designers, with more than 2500 professionals all over the globe. It will offer technical solutions in construction and urbanistic planning, prioritizing energetic sustainability. It is the biggest privately owned engineering firm in Spain and has an office in Cerdanyola del Vallès (Barcelona).

7 CALENDAR

Start of the works is set at the beginning of 2020. A quasi-steady state is considered to be achieved after the first year, however, the budget of the present work is set to be for the first three years given that some payments are biannual and the first year is clearly a year of transition:

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

Before the kick off:

- Register the company at the 'Registro Mercantil' and Social security. An expedition of denomination, with founders' name and name of the firm must be materialized within six months. Once granted the constitutive document, it must be delivered before two months at the 'Registro Mercantil'.
- Bank account associated to NIF created. Loan form familiars and friends must be done.
- Recruitment plus contracts to the employees, according to the three salary levels.
- Payment of the renting, software, pc's and workstations.

First year:

- **Beginning January 2020:** Start of normal business. Focus in creating new customers.
- **End First quarter 2020:** Review of number of projects expected Vs nr. obtained.
- **End Second quarter 2020:** Review of cash-flow expected. Possible *price adjustment* according to results.
- **End Third quarter 2020:** Bonus payment according objectives achieved.
- **End of year 2020:** Comparison on objectives Vs achievements. Organisation review, budget review.

Second year:

- **Beginning First quarter 2021:** Renewal of licenses.
- **End Second quarter 2021:** Review of cash-flow expected. Possible price adjustment according to results.
- **End Third quarter 2021:** Bonus payment according objectives achieved.
- **End of year 2021:** Loan must have been returned.

Third year:

- **Beginning First quarter 2022:** Renewal of workstations. Renewal of licenses.
- **End Second quarter 2022:** Review of cash-flow expected. Possible price adjustment according to results.
- **End Third quarter 2022:** Bonus payment according objectives achieved.
- **End Fourth quarter 2022:** Refoundation of the firm. A complete steady-state status should have been achieved, and the objectives, structure, facilities, and values are set to be restated.

8 RISKS AND CRITICAL PROBLEMS

Our strengths are deep knowledge of the BIM technology and the market, experience in the engineering business, training, skilled staff, global solution and wide network of contacts.

The weaknesses of the idea are the competition against well established companies, the need to retain our specialised work power within an evolving market with low initial budget and the initial expenditure in hardware and software.

Clearly the risks are the lack of commitment of our collaborators, which can be mitigated with salary, benefits or shares, and the sudden increase of competitors.

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

9 FINANCIAL PLAN

9.1 Estimated Income Statement

It is assumed a constant number of new projects per each year, with a deviation for each month following a normal distribution law with 95% of confidence. While the number of low budget active projects is constant from the beginning, medium and high budget, with 5 and 10 months duration respectively, are only stabilized once the first year is finished.

The total active projects reach a steady number of around five projects on average.

Table 3 - Estimation of new and active projects per month

	LB	MB	HB	Total
New projects/month	2	0,2	0,1	2,3
Active projects/month	2±0,3	1,25 ±0,2	0,9±0,2	4,15±0,7
	2±0,3	1,9 ±0,2	1,6+-0,1	5,5±0,5
	2±0,3	1,4±0,2	1,6+-0,1	5±0,6

INCOME/MONTH

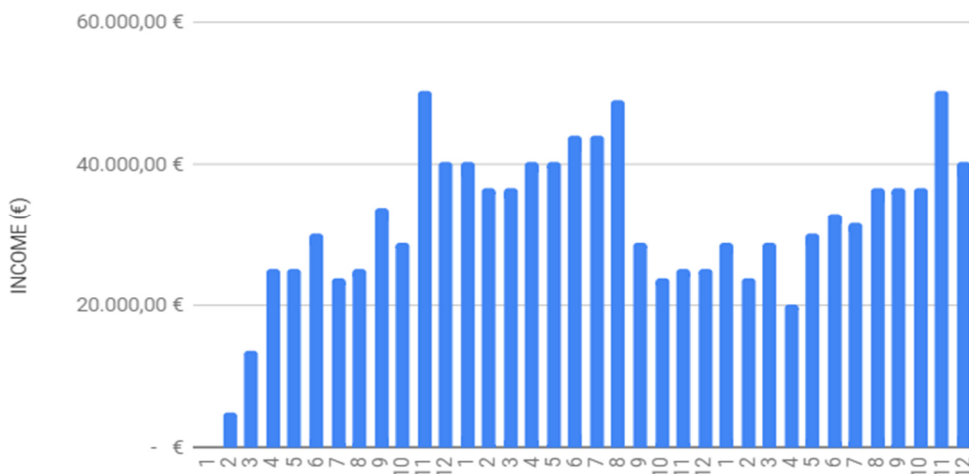


Figure 11 - Income estimated

9.2 Estimated Cost Statement

- PAYROLL AND SOCIAL SECURITY

Assuming BONUS ACHIEVED:

Cost/year=(L1*N1+L2*N2+L3*N3)*12,5=176250€/year

- WORKSTATIONS, PERSONAL COMPUTERS

Cost of a DELL Workstation: 2450 € to be replaced every two years, 1225 €/year/person.

Cost of a laptop for non REVIT use: 900€ to be replaced every three years, 300 €/year/person.

All personal, except from Salesman and Manager will use workstations.

Cost/year= 4*1225+2*300€ = 5500 €/year.

- BIM SOFTWARE LICENSES

Cost REVIT license 2970,55 €/year/person.

Autocad license is also a must, being 2975,15 €/year/person.

Totalling 5945,70€ per year per person. All personal, except from Salesman and Manager require both licenses.

Licenses must be paid on January.

Cost/year=4*5945,70€ = 23.782,80 €/year

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

- OFFICE RENTING
 - 2 seats=960 €/month
 - 3 seats=1350 €/month
 - 4 seats=1700 €/month
 - 5 seats=2200 €/month
 - 6 seats=2800 €/month

Cost/year=2800€/month*12months=33600€/year

The office cost includes high speed internet and phones. The mobile phone for the salesman is included in his cost.

- CAR RENTING
1 car/month 400€/month, dedicated to salesman.
Cost/year=400€/month*12=4800€/year

9.3 Estimated Cash management

In this section, the estimated cash management for the first three years is shown:

FIRST FISCAL YEAR Cash management:

MONTH		1	2	3	4	5	6	7	8	9	10	11	12
EARNINGS		- €	5.000,00 €	13.700,00 €	25.200,00 €	25.200,00 €	30.200,00 €	23.900,00 €	25.200,00 €	33.900,00 €	28.900,00 €	50.400,00 €	40.400,00 €
COSTS	LICENSES	23.782,80 €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €
	OFFICE RENTING	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €
	GEN.+PAYROLL+S. S.	14.100,00 €	14.100,00 €	14.100,00 €	14.100,00 €	14.100,00 €	14.100,00 €	14.100,00 €	14.100,00 €	21.150,00 €	14.100,00 €	14.100,00 €	14.100,00 €
	CAR RENTING	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €
	WORKSTATIONS	4.900,00 €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €
	PERSONAL COMPUTERS	600,00 €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €
	LOAN TO BE RETURNED	1.250,00 €	1.250,00 €	1.250,00 €	1.250,00 €	1.250,00 €	1.250,00 €	1.250,00 €	1.250,00 €	1.250,00 €	1.250,00 €	1.250,00 €	1.250,00 €
	TOTAL COSTS	47.832,80 €	18.550,00 €	18.550,00 €	18.550,00 €	18.550,00 €	18.550,00 €	18.550,00 €	18.550,00 €	18.550,00 €	25.600,00 €	18.550,00 €	18.550,00 €
CASH FLOW		-47.832,80 €	-13.550,00 €	-4.850,00 €	6.650,00 €	6.650,00 €	11.650,00 €	5.350,00 €	6.650,00 €	8.300,00 €	10.350,00 €	31.850,00 €	21.850,00 €
INITIAL CASH POSITION		80.000,00 €	32.167,20 €	18.617,20 €	13.767,20 €	20.417,20 €	27.067,20 €	38.717,20 €	44.067,20 €	50.717,20 €	59.017,20 €	69.367,20 €	101.217,20 €
FINAL CASH POSITION		32.167,20 €	18.617,20 €	13.767,20 €	20.417,20 €	27.067,20 €	38.717,20 €	44.067,20 €	50.717,20 €	59.017,20 €	69.367,20 €	101.217,20 €	123.067,20 €

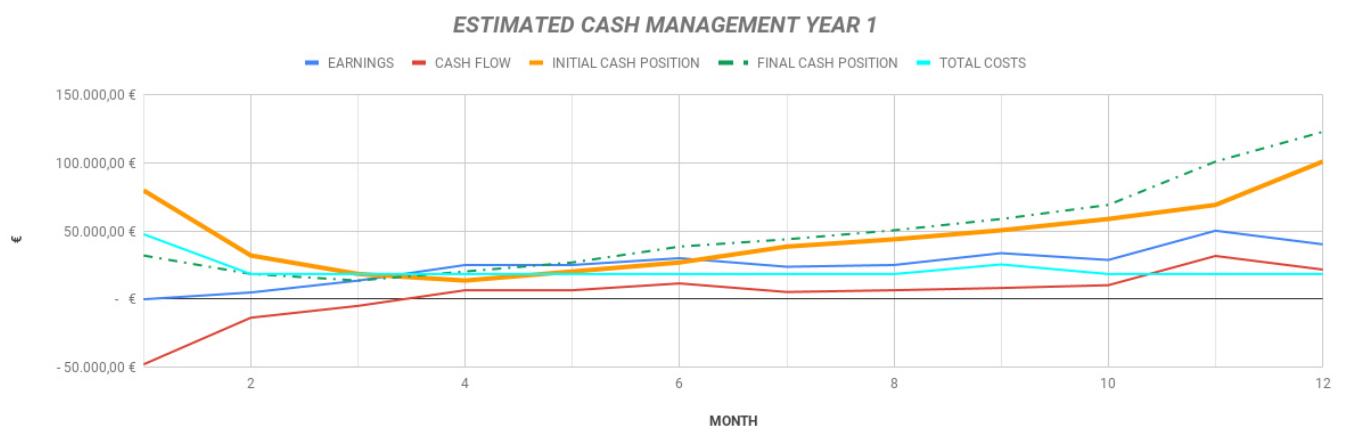


Figure 11 - Estimated cash Management Year 1

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

SECOND FISCAL YEAR Cash management

MONTH		1	2	3	4	5	6	7	8	9	10	11	12
EARNINGS		40.400,00 €	36.700,00 €	36.700,00 €	40.400,00 €	40.400,00 €	44.100,00 €	44.100,00 €	49.100,00 €	28.900,00 €	23.900,00 €	25.200,00 €	25.200,00 €
COSTS	LICENSES	23.782,80 €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €
	OFFICE RENTING	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €
	GEN.+PAYROLL+S.S.	14.100,00 €	14.100,00 €	14.100,00 €	14.100,00 €	14.100,00 €	14.100,00 €	14.100,00 €	14.100,00 €	21.150,00 €	14.100,00 €	14.100,00 €	14.100,00 €
	CAR RENTING	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €
	WORKSTATIONS	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €
	PERSONAL COMPUTERS	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €
	LOAN TO BE RETURNED	1.250,00 €	1.250,00 €	1.250,00 €	1.250,00 €	1.250,00 €	1.250,00 €	1.250,00 €	1.250,00 €	1.250,00 €	1.250,00 €	1.250,00 €	1.250,00 €
	TOTAL COSTS	42.332,80 €	18.550,00 €	18.550,00 €	18.550,00 €	18.550,00 €	18.550,00 €	18.550,00 €	18.550,00 €	25.600,00 €	18.550,00 €	18.550,00 €	18.550,00 €
CASH FLOW		- 1.932,80 €	18.150,00 €	18.150,00 €	21.850,00 €	21.850,00 €	25.350,00 €	25.550,00 €	30.550,00 €	3.300,00 €	3.350,00 €	6.650,00 €	6.650,00 €
INITIAL CASH POSITION		123.067,20 €	121.134,40 €	139.284,40 €	157.434,40 €	179.284,40 €	201.134,40 €	226.684,40 €	252.234,40 €	282.784,40 €	286.084,40 €	291.434,40 €	298.084,40 €
FINAL CASH POSITION		121.134,40 €	139.284,40 €	157.434,40 €	179.284,40 €	201.134,40 €	226.684,40 €	252.234,40 €	282.784,40 €	286.084,40 €	291.434,40 €	298.084,40 €	304.734,40 €

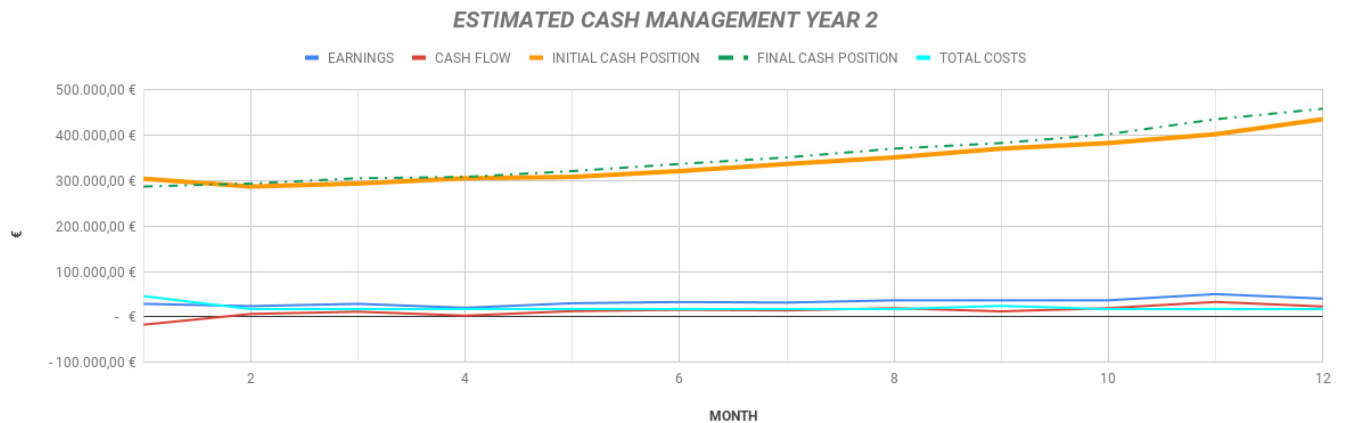


Figure 12 - Estimated cash Management Year 2

THIRD FISCAL YEAR Cash management

MONTH		1	2	3	4	5	6	7	8	9	10	11	12
EARNINGS		28.900,00 €	23.900,00 €	28.900,00 €	20.200,00 €	30.200,00 €	33.000,00 €	31.700,00 €	36.700,00 €	36.700,00 €	36.700,00 €	50.400,00 €	40.400,00 €
COSTS	LICENSES	23.782,80 €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €
	OFFICE RENTING	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €	2.800,00 €
	GEN.+PAYROLL+S.S.	14.100,00 €	14.100,00 €	14.100,00 €	14.100,00 €	14.100,00 €	14.100,00 €	14.100,00 €	14.100,00 €	21.150,00 €	14.100,00 €	14.100,00 €	14.100,00 €
	CAR RENTING	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €	400,00 €
	WORKSTATIONS	4.900,00 €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €
	PERSONAL COMPUTERS	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €
	LOAN TO BE RETURNED	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €
	TOTAL COSTS	45.982,80 €	17.300,00 €	17.300,00 €	17.300,00 €	17.300,00 €	17.300,00 €	17.300,00 €	17.300,00 €	17.300,00 €	24.350,00 €	17.300,00 €	17.300,00 €
CASH FLOW		- 17.082,80 €	6.600,00 €	11.600,00 €	2.900,00 €	12.900,00 €	15.700,00 €	14.400,00 €	19.400,00 €	12.350,00 €	19.400,00 €	33.100,00 €	23.100,00 €
INITIAL CASH POSITION		304.734,40 €	287.651,60 €	294.251,60 €	305.851,60 €	308.751,60 €	321.651,60 €	337.351,60 €	351.751,60 €	371.151,60 €	383.501,60 €	402.901,60 €	436.001,60 €
FINAL CASH POSITION		287.651,60 €	294.251,60 €	305.851,60 €	308.751,60 €	321.651,60 €	337.351,60 €	351.751,60 €	371.151,60 €	383.501,60 €	402.901,60 €	436.001,60 €	459.101,60 €

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

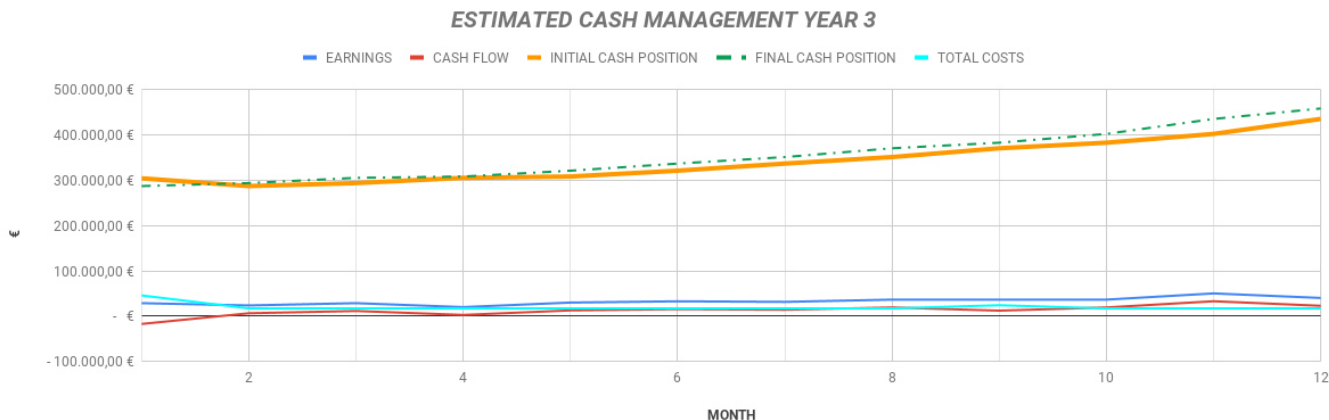


Figure 13 - Estimated cash Management Year 3

TOTAL CASH MANAGEMENT

MONTH		YEAR1	YEAR2	YEAR3	TOTAL
EARNINGS		302.000,00 €	435.100,00 €	397.700,00 €	1.134.800,00 €
COSTS	LICENSES	23.782,80 €	23.782,80 €	23.782,80 €	71.348,40 €
	OFFICE RENTING	33.600,00 €	33.600,00 €	33.600,00 €	100.800,00 €
	GEN.+PAYROLL+S. S.	176.250,00 €	176.250,00 €	176.250,00 €	528.750,00 €
	CAR RENTING	4.800,00 €	4.800,00 €	4.800,00 €	14.400,00 €
	WORKSTATIONS	4.900,00 €	- €	4.900,00 €	9.800,00 €
	PERSONAL COMPUTERS	600,00 €	- €	- €	600,00 €
	LOAN TO BE RETURNED	15.000,00 €	15.000,00 €	- €	30.000,00 €
	TOTAL COSTS	258.932,80 €	253.432,80 €	243.332,80 €	755.698,40 €
CASH FLOW		43.067,20 €	181.667,20 €	154.367,20 €	379.101,60 €
INITIAL CASH POSITION		80.000,00 €	123.067,20 €	304.734,40 €	80.000,00 €
FINAL CASH POSITION		123.067,20 €	304.734,40 €	459.101,60 €	459.101,60 €

Figure 14 - Estimated cash Management for the first three years

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

9.4 Estimated Balance Sheet

The balance sheet exposed is for the 12th month of the first year.

BALANCE SHEET					
<small>BBC&D - BARCELONA BIM CONSULTING AND DELIVERY MONTH 12</small>					
ASSETS				LIABILITIES	
VARIABLE ASSETS				CURRENT LIABILITIES	
CASH IN HAND	101.217,20 €			PAYROLL	14.100,00 €
ACCOUNTS RECEIVABLE	40.400,00 €			CAR RENTING	400,00 €
BANK ACCOUNT	- €			OFFICE RENTING	2.800,00 €
				SHORT TERM LOAN	1.250,00 €
TOTAL	141.617,20 €	RELATION	7,63	TOTAL	18.550,00 €
FIXED				NOT CURRENT LIABILITIES	
PC'S AND WORKSTATIONS	5.500,00 €			LONG TERM LOAN	65.000,00 €
LICENSES	23.782,80 €				
BUILDING	- €				
TOTAL	29.282,80 €			TOTAL	65.000,00 €
				OWNERSHIP	
				CAPITAL	65.500,00 €
				CASH FLOW	21.850,00 €
				TOTAL	87.350,00 €
TOTAL ASSETS	170.900,00 €			TOTAL LIABILITIES	170.900,00 €

Figure 15 - Estimated balance sheet

Noticeable that 15000€ of the long-term loan would have been already returned. The relation between variable assets and current liabilities is frankly quite high by that time.

9.5 Break-even analysis

We take as a reference regular operations in a year different than the first one, in this case year 2.

The break-even point is the number of projects that equals fixed costs and total contribution margin.

$$\text{Fixed costs} = \text{Nr. of projects} * (\text{Price/project} - \text{Cost/project})$$

$$\text{Price/project} - \text{Cost/project} = \text{Contribution Margin}$$

By classifying costs between variable and fixed, where fixed costs include only the depreciation part of the investment -not the total amount-, and contribution margin is the difference between average price per project and average cost per project, is obtained the Break-even point.

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

These fixed costs are thus equal to the final cash flow-initial cash flow of year 2, recalling that the beginning of the year starts with an initial cash flow accumulated. This fixed cost is a total of 181.667,20€.

The variable unit cost is 0, given that there is no associated marginal cost to a project. So Fixed costs must equal Nr. of projects*Price/project. This nr. of projects is the BEP.

Recall:

Type	LB	MB	HB
Av. income/month	5000€	3700€	11500€

where LB,HB,MB are the cost of the projects per month of each type respectively.

Year 2:

Being:

NL: Average number of projects o Low Budget per month

ML: Average number of projects o Medium Budget per month

HL: Average number of projects o High Budget per month

The BEP can be found by:

$$12*(NL *5000€+NM *3700€+NH *11500€)=181.667,2€$$

Technically, we do not have a BEP point, but a plane, this happens because there is a combination of types of projects. On this plane the income obtained by the projects equals the balance of the year.

This "BEP plane" is: $NL*5000+NM *3700+NH *11500=15138,93$

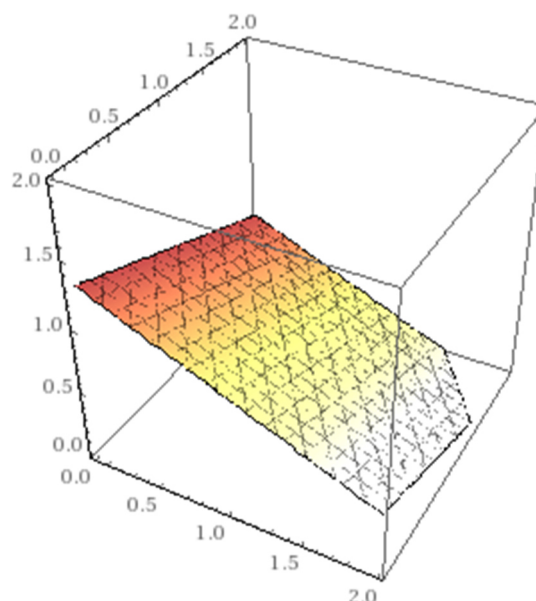


Figure 16 - BEP plane

To find an estimation of the number of projects to reach the BEP we can use a weighting system. Assigning a weight to each type of project representing the approximate number of projects of each type respect the whole

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

number we will find a solution. Assigning a weight of 2, 0.2 and 0.1 respectively, as estimated in previous sections, the number of projects that we need is then:

$$(2P*5000+0.2P*3700+0.1P*11500)/2.3=15138,93$$

$$P=2.93 \rightarrow 3 \text{ projects}$$

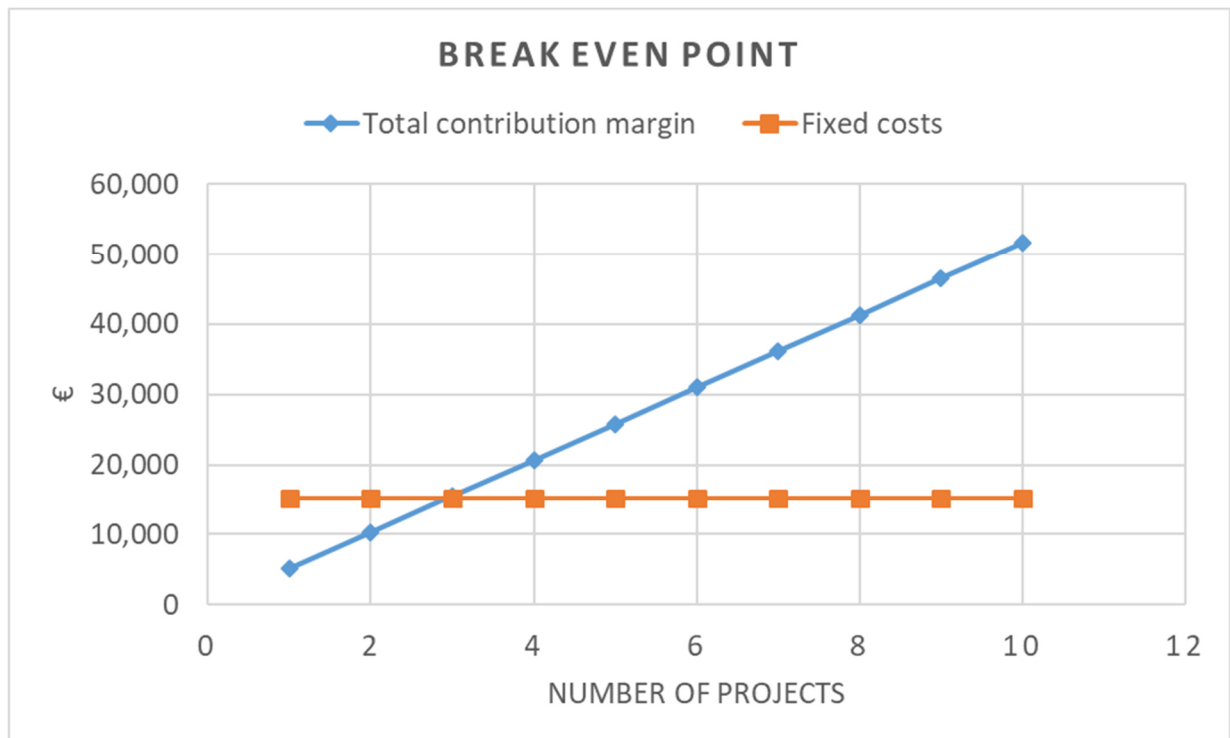


Figure 17 - BEP analysis

9.6 Cost control system

The cost control system for a company like ours with negligible variable costs is to follow a clear strategy:

- Detailed scheduling of hardware renovation (workstations, computers, mobile phone)
- Detailed scheduling of software licenses renewal (REVIT, AutoCAD)
- Provision of funds for probable expenses (success fees, increase of rented space)

Also any possible liability involving any economic cost will be prevented with proper contracts and client's management.

10 References

Autodesk. 2018. BIM AND THE FUTURE OF AEC. [Online] Autodesk, 2018. <https://www.autodesk.com/solutions/bim>.

Daedal. 2016. *Global BIM Market: Size, trends and Forecasts (2016-2020)*. s.l. : Daedal Publications, 2016.

INE. 2018. INEbase (Instituto Nacional de Estadística). *Instituto Nacional de Estadística*. [Online] Ministerio de Economía y Empresa, 12 2018. <http://www.ine.es/jaxiT3/Datos.htm?t=298>.

BBC&D - BARCELONA BIM CONSULTING AND DELIVERY

McAuley, B., Hore, A. and West, R. 2017. *BICP Global BIM Study - Lessons for Ireland's BIM Programme*. Dublin : Construction IT Alliance (CitA) Limited, 2017. 10.21427/D7M049.

McGraw Hill. 2014. *The Business Value of BIM for Construction in Global Markets*. Bedford MA : McGraw Hill Construction, 2014.

Ministerio de Fomento. 2018. *Quinto informe del Observatorio es.BIM de Licitaciones*. Madrid : Ministerio de Fomento, 2018.

Muñoz, Gloria Gómez. 2017. *Resultados Encuesta BIM Estado actual - Profesionales*. Madrid : Ministerio de Fomento, 2017.

NBS. 2016. *National BIM Report*. London : NBS, 2016.