



ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΕΙΡΑΙΩΣ

UNIVERSITY OF PIRAEUS

*Feasibility Analysis and Appraisal of a
new Industrial Internet of Things
Application and Service Provider*

Master Thesis by Executive MBA Student

George Apostolopoulos

Student ID: EMBA 1507

Supervising Professor:
Mr. Dimitrios Georgakellos

Athens, August 2018



ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΕΙΡΑΙΩΣ
ΣΧΟΛΗ ΟΙΚΟΝΟΜΙΚΩΝ ΕΠΙΧΕΙΡΗΜΑΤΙΚΩΝ ΚΑΙ ΔΙΕΘΝΩΝ ΣΠΟΥΔΩΝ
ΤΜΗΜΑ ΟΡΓΑΝΩΣΗΣ ΚΑΙ ΔΙΟΙΚΗΣΗΣ ΕΠΙΧΕΙΡΗΣΕΩΝ
ΠΡΟΓΡΑΜΜΑ ΜΕΤΑΠΤΥΧΙΑΚΩΝ ΣΠΟΥΔΩΝ
ΣΤΗ ΔΙΟΙΚΗΣΗ ΕΠΙΧΕΙΡΗΣΕΩΝ ΓΙΑ ΣΤΕΛΕΧΗ

ΒΕΒΑΙΩΣΗ ΕΚΠΟΝΗΣΗΣ ΔΙΠΛΩΜΑΤΙΚΗΣ ΕΡΓΑΣΙΑΣ

«Δηλώνω υπεύθυνα ότι η διπλωματική εργασία για τη λήψη του μεταπτυχιακού τίτλου σπουδών, του Πανεπιστημίου Πειραιώς, στη Διοίκηση Επιχειρήσεων για Στελέχη : E-MBA» με τίτλο

“Feasibility Analysis and Appraisal of a new IIoT Application and Service Provider”,

έχει συγγραφεί από εμένα αποκλειστικά και στο σύνολό της. Δεν έχει υποβληθεί ούτε έχει εγκριθεί στο πλαίσιο κάποιου άλλου μεταπτυχιακού προγράμματος ή προπτυχιακού τίτλου σπουδών, στην Ελλάδα ή στο εξωτερικό, ούτε είναι εργασία ή τμήμα εργασίας ακαδημαϊκού ή επαγγελματικού χαρακτήρα.

Δηλώνω επίσης υπεύθυνα ότι οι πηγές στις οποίες ανέτρεξα για την εκπόνηση της συγκεκριμένης εργασίας, αναφέρονται στο σύνολό τους, κάνοντας πλήρη αναφορά στους συγγραφείς, τον εκδοτικό οίκο ή το περιοδικό, συμπεριλαμβανομένων και των πηγών που ενδεχομένως χρησιμοποιήθηκαν από το διαδίκτυο. Παράβαση της ανωτέρω ακαδημαϊκής μου ευθύνης αποτελεί ουσιώδη λόγο για την ανάκληση του πτυχίου μου».

Υπογραφή Μεταπτυχιακού Φοιτητή/ τριας

A handwritten signature in black ink, appearing to read 'ΓΑ', with a long horizontal stroke extending to the left and a vertical stroke extending downwards.

Όνοματεπώνυμο: Αποστολόπουλος Γεώργιος

Ημερομηνία: 21/08/2018

Title:**Feasibility Study and Appraisal Analysis of a new Industrial Internet of Things
Application and Service Provider****Writer:**

George Apostolopoulos

Student ID: EMBA 1507

Abstract:

The term Internet of Things (IoT) is rapidly growing as an important aspect of our everyday lives. IoT is all about the networking of physical devices, such as machinery, home appliances, wearables etc. in such a way, which enables these devices to connect with each other, exchange data and produce meaningful insights out of it.

This new technology concept has introduced new disruptive business models in all industries and is gradually shaping the future of global business.

The Industrial IoT (IIoT) is the IoT focused on Industry, either manufacturing or service sector, providing powerful financial and operational performance improvements.

This diploma thesis focuses on the financial viability of investing in a Small-Medium Enterprise (SME), providing IIoT applications and services in the Greek market, specialized in providing solutions for the Plastics & Rubber Manufacturing Industry.

Chapter 1 of the study begins with the executive summary of the project, providing the major insights about the firm and its overall feasibility, along with the socio-economic impact on the Greek economy.

Chapter 2 presents the introduction and the background of the feasibility study, along with its scope, objectives and limitations.

Chapter 3 presents the market feasibility of the project along with the methodology used to conduct it.

Chapter 4 presents the technical feasibility of the project, covering main issues such as raw materials, engineering and technology used, organizational structure, human resources, location and project management.

Chapter 5 presents the financial feasibility of the project, through the use of financial ratios, sources of financing and financial statements. Additionally, the financial assessment of the project is presented, though the use of proven methods. Finally, the chapter closes with the final appraisal of the project and its impact on national economy and society.

Table of Contents

CHAPTER 1	12
EXECUTIVE SUMMARY	12
1.1 Introduction and Background of the Study.....	12
1.2 Marketing Study.....	13
1.3 Technical Study	14
1.4 Financial Study	17
1.5 Appraisal	18
CHAPTER 2	19
INTRODUCTION AND BACKGROUND OF THE STUDY	19
2.1 IoT Introduction	19
2.2 IIoT Introduction	21
2.2.1 IIoT definition and relation to CPS	21
2.2.2 Smart Factory and Industry 4.0.....	22
2.2.3 Applications of IIoT and key factors for their success.....	24
2.2.4 Challenges to the implementation of IIoT	26
2.3 IoT Current State in Greece	27
2.4 IIoT Current State in Greece	30
2.5 Company Name and Entity and Investors' Background	30
2.6 Background of the Study.....	31
2.7 Scope and Limitations of the Study	31
CHAPTER 3	33
MARKETING STUDY	33
3.1 Objective of the Marketing Study.....	33
3.2 Market Definition and Structure.....	33
3.2.1 Products / Services.....	34
3.2.2 Clients.....	34
3.2.3 Competitors	35
3.2.4 Suppliers.....	37
3.2.5 Distribution Channels.....	38
3.3 Market Analysis.....	39
3.3.1 Determinants of Demand	39

3.3.2 Future Demand Estimation	39
3.3.3 IIoT Market Size	48
3.3.4 IIoT Market Share.....	51
3.4 SWOT Analysis.....	52
3.4.1 Introduction to Environmental Scanning.....	52
3.4.2 Societal Environment – PEST Analysis	54
3.4.2.1 Political.....	54
3.4.2.2 Economic - Legal	55
3.4.2.3 Social	57
3.4.2.4 Technological	58
3.4.3 Task Environment – Porter’s Five Forces Analysis.....	60
3.4.3.1 Task Environment – Threat of New Entrants.....	62
3.4.3.2 Task Environment – Buyers’ Bargaining Power	63
3.4.3.3 Task Environment – Threat of Substitutes.....	64
3.4.3.4 Task Environment – Suppliers’ Bargaining Power	65
3.4.3.5 Task Environment – Rivalry among Existing Competitors	66
3.4.3.6 Task Environment – Conclusions	67
3.4.4 SWOT Analysis Conclusions	68
3.5 Outline of Project Strategy.....	70
3.5.1 Corporate Strategy.....	71
3.5.2 Business Strategy	71
3.6 Marketing Strategy	73
3.6.1 Marketing Scope & Objectives of “Smart Amplify”	73
3.6.2 Market Segmentation	73
3.6.3 Market Targeting	75
3.6.4 Market Positioning.....	76
3.6.5 Smart Amplify’s Trademark	76
3.7 Tactical Marketing.....	77
3.7.1 Marketing Mix – Product	77
3.7.1.1 Predict® Platform	77
3.7.1.2 Consulting Services – Plant Modernization Audits	80
3.7.1.3 Consulting Services – Business Intelligence and Data Analytics.....	82
3.7.2 Marketing Mix – Price	83
3.7.3 Marketing Mix – Place	84

3.7.4 Marketing Mix – Promotion.....	85
3.7.5 Marketing Mix – People.....	86
3.7.6 Marketing Mix – Process.....	87
3.7.7 Marketing Mix – Physical Evidence.....	87
3.8 Projected Sales and Market Share	88
3.9 Projected Cost of Marketing	88
CHAPTER 4	89
TECHNICAL STUDY.....	89
4.1 Objective of the Technical Study	89
4.2 Raw Materials and Various Consumables.....	89
4.3 Engineering and Technology.....	90
4.3.1 Operational Capacity	90
4.3.2 Technology Selection	90
4.3.2.1 IIoT Platforms Elements.....	91
4.3.2.2 Comparison of IIoT PaaS Solutions	92
4.3.3 Main & Auxiliary Operations’ Equipment	98
4.3.4 Equipment and Technology Acquirement and Transfer.....	99
4.3.5 Equipment and Infrastructure Maintenance	100
4.3.6 Management Systems.....	101
4.3.6.1 Cost of Management Systems	102
4.3.7 Total Cost of Engineering and Technology	103
4.4 Organizational Structure & Overhead Expenses.....	104
4.4.1 Organizational Structure.....	104
4.4.2 Identification of Cost Centers	107
4.4.3 General and Administrative Expenses	109
4.5 Human Resources	111
4.5.1 Introduction	111
4.5.2 Determination of human resources requirements.....	111
4.5.2.1 General Manager	112
4.5.2.2 Executive Assistance	113
4.5.2.3 OHS Officer.....	114
4.5.2.4 HR Department	115
4.5.2.5 Financial Management.....	116
4.5.2.6 Sales & MKT Management.....	118

4.5.2.7 Operations Management.....	120
4.5.3 Human Resources Planning	126
4.5.4 Personnel Recruitment	127
4.5.4.1 Candidate Attraction.....	127
4.5.4.2 Candidate Selection	127
4.5.5 Personnel Training	129
4.5.6 Estimation of Personnel Cost.....	130
4.6 Location – Establishment – Environment	131
4.6.1 Company Establishment Requirements.....	131
4.6.2 Alternatives for Company Location	132
4.6.3 Selection of Company Location	133
4.6.4 Environmental Impact.....	135
4.7 Project Planning and Execution	135
4.7.1 Objective of Project Planning and Execution.....	135
4.7.2 Project Planning of “Smart Amplify”	136
4.7.3 Cost of Project Planning and Execution	139
CHAPTER 5	140
FINANCIAL STUDY	140
5.1 Objective of the Financial Study	140
5.2 Total Cost of Investment Analysis.....	140
5.2.1 Fixed Assets.....	141
5.2.2 Net Working Capital.....	141
5.2.3 Total Cost of Investment.....	145
5.3 Project Financing.....	145
5.4 Financial Statements.....	146
5.4.1 P&L Statement	146
5.4.2 Cash Flow Statement	147
5.4.3 Balance Sheet.....	149
5.5 Financial Feasibility Assessment	151
5.5.1 Simple Payback Period.....	151
5.5.2 Return on Investment and Return on Equity.....	152
5.5.3 Net Present Value	153
5.5.4 Internal Rate of Return	154
5.5.5 Break-even Analysis	155

5.5.6 Sensitivity Analysis	158
5.6 Impact on National Economy and Final Appraisal	162
Bibliography	163

List of Figures

Figure 2.1: Elements Comprising the Internet of Things.	19
Figure 2.2: The IoT Ecosystem.	20
Figure 2.3: The Evolution of Embedded Systems into IoT	22
Figure 2.4: The Industry 4.0 Smart Factory Pipeline	23
Figure 2.5: The Evolution of Industry – From Steam to CPS	24
Figure 2.6: Three IIoT Capabilities to Master.....	25
Figure 2.7: Challenges to the Defense and Resilience of the IIoT.....	26
Figure 2.8: Europe’s DESI Index for 2017.....	28
Figure 2.9: Greece’s Relative DESI Performance by Dimension	28
Figure 2.10: Greece’s DESI Evolution over time versus EU28.....	29
Figure 2.11: Contribution of Digital Economy on Greek GDP	29
Figure 3.1: ICT Industry – Greek DECI Breakdown.....	41
Figure 3.2: Greek enterprises’ broadband connection speed	42
Figure 3.3: Use of Cloud Computing services by Greek Companies	43
Figure 3.4: Greek Telecommunications Sector Turnover Historical Quarterly Performance.....	44
Figure 3.5: Greek Computer Programming and Consultancy Sector Turnover Historical Quarterly Performance.	45
Figure 3.6: Greek Information Services Sector Turnover Historical Quarterly Performance.	45
Figure 3.7: Projected Revenue and Profit related to IoT by 2020.	46
Figure 3.8: Influence over the choice of IoT Products and Solutions	47
Figure 3.9: IoT Impact on Global Economy by 2020.	47
Figure 3.10: EU’s IoT Market Size and Forecast – Baseline Scenario by Vertical Market.....	49
Figure 3.11: Greece’s Plastics & Rubber IIoT Revenues Forecast.....	50
Figure 3.12: Business Environment Variables.....	53
Figure 3.13: Porter’s Five Forces driving Industry Competition	61
Figure 3.14: Hierarchy of Strategy	70
Figure 3.15: Corporate Strategy of “Smart Amplify”.	71
Figure 3.16: Business Strategy of “Smart Amplify”	72
Figure 3.17: VRIO framework.....	72
Figure 3.18: Example of “Smart Amplify”’s multi-segment targeting strategy.	75
Figure 4.1: Organizational Chart of “Smart Amplify”	105
Figure 4.2: Gantt Chart of “Smart Amplify” Project Planning.....	138
Figure 5.1: Break-even Analysis Chart of “Smart Amplify” for 2018.	158

List of Tables

Table 1.1: Projected Annual Revenues and MKT Expenses of “Smart Amplify”	14
Table 1.2: Annual Cost of Engineering and Technology of “Smart Amplify”	15
Table 1.3: Annual General and Administrative Expenses of “Smart Amplify”	15
Table 1.4: Annual Personnel Cost of “Smart Amplify”	16
Table 1.5: Annual Business Space Rental Cost of “Smart Amplify”	16
Table 1.6: P&L Statement of “Smart Amplify”	17
Table 3.1: Greece’s Macro-economic Indicators.	40
Table 3.2: Plastics & Rubber Manufacturing Indices for 2015-2016.	43
Table 3.3: Turnover Indices for ICT Services Sector.....	44
Table 3.4: IoT Global Spending by Category.	47
Table 3.5: EU’s IoT Market Size and Forecast – Baseline Scenario by Vertical Market (in € million)...	49
Table 3.6: Central Eastern Europe’s IoT Installed Base and Revenues Forecast.	50
Table 3.7: Projected annual revenues and market share of “Smart Amplify”	88
Table 3.8: Projected annual marketing expenses of “Smart Amplify”	88
Table 4.1: Projected Annual Consumables’ Expenses of “Smart Amplify”	89
Table 4.2: Technical Features’ Comparison of Available IIoT Platforms.....	94
Table 4.3: Analytical Cost Comparison of the 3 Dominant IIoT Platforms.....	95
Table 4.4: Total Cost Comparison of the 3 Dominant IIoT Platforms.	96
Table 4.5: Annual Cost of IIoT PaaS Licensing.....	96
Table 4.6: Software Development Toolkit Cost Comparison.....	97
Table 4.7: Annual Cost of Software Development Toolkit Licensing.....	97
Table 4.8: Cost Breakdown of ERP Software Solutions.....	98
Table 4.9: Cost Breakdown of Main Operations’ Equipment.	98
Table 4.10: Cost Breakdown of Auxiliary Operations’ Equipment.....	99
Table 4.11: Cost Breakdown of Annual Maintenance.	100
Table 4.12: Cost Breakdown of Management Systems’ Development.	102
Table 4.13: Cost Breakdown of Management Systems’ Annual Maintenance.....	103
Table 4.14: Annual Cost of Engineering and Technology of “Smart Amplify”	103
Table 4.15: Annual General and Administrative Expenses of “Smart Amplify”	110
Table 4.16: Aggregated Table of “Smart Amplify”’s Personnel.	126
Table 4.17: Personnel Cost Breakdown of “Smart Amplify”	130
Table 4.18: Annual Personnel Cost of “Smart Amplify”	131
Table 4.19: Location Evaluation for “Smart Amplify”	134

Table 4.20: Annual Business Space Rental Cost of “Smart Amplify” .	134
Table 4.21: Cost of Project Planning and Execution of “Smart Amplify” .	139
Table 5.1: Fixed Assets of “Smart Amplify” .	141
Table 5.2: Annual Depreciation of “Smart Amplify”'s Fixed Assets.	142
Table 5.3: Total Production Cost of “Smart Amplify” .	142
Table 5.4: Net Working Capital Calculation Method.	143
Table 5.5: Net Working Capital of “Smart Amplify” .	144
Table 5.6: Annual Net Working Capital Needs of “Smart Amplify” .	144
Table 5.7: Total Cost of Investment of “Smart Amplify” .	145
Table 5.8: Funding Sources of “Smart Amplify” .	145
Table 5.9: Loan Repayment Plan of “Smart Amplify” .	146
Table 5.10: P&L Statement of “Smart Amplify” .	147
Table 5.11: Cash Flow Statement of “Smart Amplify” .	148
Table 5.12: Balance Sheet of “Smart Amplify” .	150
Table 5.13: Simple Payback Period of “Smart Amplify” .	152
Table 5.14: RoI and RoE KPIs of “Smart Amplify” .	153
Table 5.15: NPV of “Smart Amplify” .	154
Table 5.16: IRR of “Smart Amplify” .	155
Table 5.17: Calculation of “Modified” SaaS Unit Price of “Smart Amplify” .	156
Table 5.18: Total Cost Breakdown of “Smart Amplify” .	157
Table 5.19: Break-even Point of “Smart Amplify” .	157
Table 5.20: Sensitivity Analysis on Sales Price Changes.	159
Table 5.21: Sensitivity Analysis on FC and VC changes.	159
Table 5.22: Sensitivity Analysis on a Combination of Variables’ Changes.	159
Table 5.23: Sensitivity Analysis based on the Study’s Projections.	160
Table 5.24: Sensitivity Analysis – Impact of Independent Variables on Profit.	160

List of Abbreviations

Abbreviation	Definition
ACS	Average Cost of Service
ADSL	Asymmetric Digital Subscriber Line
AHPI	Association of Hellenic Plastic Industries
AI	Artificial Intelligence
API	Application Programming Interface
B2B	Business to Business
BEP	Break–Even Point
CAGR	Compound Annual Growth Rate
CAPEX	Capital Expenditure
CPS	Cyber–Physical System
CRM	Customer Relationship Management
CTQ	Critical to Quality
DAP	Delivery at Place (Incoterm)
DESI	Digital Economy and Society Index
ERP	Enterprise Resource Planning
ESIF	European Structural and Investment Funds
ESP	Enterprise Service Provider
EXW	Ex–Works (Incoterm)
FMEA	Failure Mode and Effect Analysis
FTTH	Fiber to the Home
GDPR	General Data Protection Regulation
GIoT	Government Internet of Things
ICT	Information and Communications Technology
IERC	Internet of Things European Research Cluster
IIC	Industrial Internet of Things Consortium
IoT	Internet of Things
IIoT	Industrial Internet of Things
IT	Information Technology
ITU	International Telecommunications Union
M2M	Machine to Machine
MES	Manufacturing Execution System
OEE	Overall Equipment Effectiveness
OHS	Occupational Health and Safety
OPEX	Operational Expenses

PBT	Profit before Taxes
PaaS	Platform as a Service
PDCA	Plan – Do – Check – Act
QoS	Quality of Service
RoI	Return on Investment
RoE / RoNW	Return on Equity / Return on Net Worth
SaaS	Software as a Service
SEV	Hellenic Federation of Enterprises
SI	System Integrator
SLA	Service Level Agreement
SME	Small and Medium-sized Enterprise
SOP	Standard Operating Procedure
SPC	Statistical Process Control
STEM	Science, Technology, Engineering and Mathematics
VDSL	Very-high-bit-rate Digital Subscriber Line

Acknowledgement

At this point, I would like to warmly thank all the people who contributed to the completion of my diploma thesis.

First of all, my professor and director of E-MBA Department of the University of Piraeus, for his unobtrusive support and his patience regarding the timeframe of the thesis completion.

Secondly, I would like to express my gratitude to Mr. Lysseos and Mr. Dimitropoulos, who enabled me to participate in the E-MBA course; without their support this whole feat would be impossible.

Finally and most importantly, I would like to devote this thesis to the people I care the most; my family, who has been truly supporting me during my whole life; my girlfriend and my best friends, for all their patience and encouragement during my E-MBA course.

CHAPTER 1

EXECUTIVE SUMMARY

1.1 Introduction and Background of the Study

The current feasibility study is conducted in order to evaluate and analyze the potential and feasibility of a new Industrial Internet of Things (IIoT) application and service provider. This company shall be named “Smart Amplify Ltd.” and shall be established and situated in north Athens, at the municipality of Amaroussion.

The concept of IIoT is generally a worldwide innovative concept and involves the networking of heterogeneous devices, the collection, exchange and analysis of data and the seamless integration into an industry’s information network. The main applications of IIoT are:

- *Asset Performance Management.*
- *Logistics and Transportations Operations.*
- *Manufacturing Operations.*
- *Field Service Operations (Remote Assistance).*
- *Energy and Utilities Operations (Smart Grids and Oil)*

“Smart Amplify” shall specialize in manufacturing operations and it will specifically aim to serve the niche subsector of Plastics & Rubber Manufacturing. The main challenges of IIoT widespread implementation in manufacturing are cybersecurity concerns, lack of standardization, old equipment, requirement for CAPEX and lack of skilled workers.

Further to the above, the situation in Greece is not ideal, since the country’s economy remains in recession and its digital performance is weak against the other members of EU. Nevertheless, Greece has developed its national digital strategy roadmap, which aims for the acceleration of digital transformation of Greece until 2020.

The founders of the company shall be Mr. Dimitropoulos and Mr. Theodorou, with each of them possessing 50% equity. The two founders have expressed their interest in July 2017 and the feasibility study was taken over by Mr. Apostolopoulos (the author) in

cooperation with the Department of Business Administration of University of Piraeus. The agreed date of delivery was set at the end of February 2018.

1.2 Marketing Study

The IIoT application and services sector is a niche subsector of ICT, where no company currently exists in Greece. The sector is B2B and the products/services offered are either software related (platform or end-user software solution) or consulting services. The main demand determinants of IIoT are CAPEX requirements, RoI, the technological readiness of the customer, market structure, domestic economy, banking system state, legal and tax policy.

Based on the above, both the ICT sector as well as the Plastics & Rubber Manufacturing show a steady annual growth rate, which is optimistic for the project and IIoT in general. The estimated CAGR of Plastics & Manufacturing IIoT market is at 8,87%, thus making this market very attractive.

Further to the above, “Smart Amplify” shall be the first to offer cutting edge IIoT technology solutions to its market, thus enjoying the advantages of the first mover.

To that end, the company shall develop and deploy a growth oriented corporate strategy and a differentiation business strategy.

Regarding its marketing strategy, the company shall develop it with a long-term, forward looking approach. The company shall offer value adding, customer-tailored SaaS solutions and consulting services. It shall segment its market into high usage buyers and low usage buyers; the first shall be the main source of revenue for the company and are also expected to prefer its most advanced SaaS solutions and Big Data consulting services. The second shall mostly be approached with basic SaaS solutions and Lean Six Sigma based consulting services.

The market positioning of the company for the first segment shall be value pricing, while for the second segment it shall be customized benefit oriented.

Regarding its marketing mix, the company shall base it on its customer-centric philosophy, which compliments its differentiation business strategy and is expected to gain the trust of its customers in the short to medium term.

Finally the projected revenues and marketing expenses are presented in the following table:

	2018	2019	2020	2021	2022
Total Revenues (in € thousand)	786,4	906,0	1.106,4	1.349,4	1.612,4
Total Marketing Expenses (in € thousand)	235,9	271,8	243,4	242,9	290,2
Marketing Expenses / Total Revenues (%)	30	30	22	18	18
Market Share (%)	45	49	55	60	63

Table 1.1: Projected Annual Revenues and MKT Expenses of “Smart Amplify”.

1.3 Technical Study

Beginning with raw materials, is essentially a non-manufacturing company; therefore its relevant costs include various consumables, whose total cost ranges from €1,3 to €1,8 thousand from year to year.

Regarding engineering and technology, the operational capacity of the company cannot be truly identified, yet it is budgeted according to the marketing plan. In the technology section, the basis for the company’s products are IIoT PaaS solutions, where there is currently fierce competition among various companies with global presence. According to the technical and financial assessment of the alternatives, the IIoT platform of Microsoft has been selected, along with Microsoft Visual Studio for software development. Furthermore, the company shall require an ERP software solution, in order to support its business functions in the most optimal way. Following the relevant assessment, the ERP solution of Entersoft was selected, as the most cost efficient solution.

Regarding the equipment needs of “Smart Amplify”, these are not very demanding, since the company shall host its main operations in the cloud, through Microsoft Azure. Therefore, the main equipment comprises a server and various portable or desktop computers and the auxiliary equipment comprises the operations’ support equipment and of course, occupational health and safety equipment.

Further to the above, the company shall also develop, implement and sustain all the necessary Management Systems (i.e. ISO 9001, ISO 14001), in cooperation with consulting experts.

Finally, the projected cost of engineering and technology is presented below:

Total Cost of Engineering and Technology (in € thousand)					
Description	2018	2019	2020	2021	2022
Microsoft Azure IoT	125,5	144,6	176,6	215,4	257,3
Microsoft Visual Studio	1,1	1,1	1,1	1,1	1,1
Entersoft Business Suite	6,0	1,2	1,2	1,2	1,2
Main Operations' Equipment	46,8	1,1	1,1	1,1	1,1
Auxiliary Operations' Equipment	35,4	0,9	0,9	0,9	0,9
Annual Maintenance	0,6	0,6	0,6	0,6	0,6
Management Systems	17,0	3,7	3,7	3,7	3,7
Total:	232,4	153,2	185,2	223,9	265,9

Table 1.2: Annual Cost of Engineering and Technology of “Smart Amplify”.

Regarding organizational structure, “Smart Amplify” shall be organized based on functional structure, with distinct departments and specialization. The selected structure and organizational chart are expected to maximize the efficient and effective utilization of the available resources. Moreover, the company shall allocate its costs to specific cost centers, which will be relevant with each functional department.

Nevertheless, there are also overhead expenses, which cannot be easily identified with a cost center. These costs are divided into production overhead, general administrative overhead and general selling overhead and are presented below:

General and Administrative Expenses (in € thousand)					
Description	2018	2019	2020	2021	2022
Production Overhead	65,6	66,4	67,3	68,5	69,7
General Administrative Overhead	8,2	8,3	8,4	8,5	8,7
General Selling Overhead	13,7	13,8	14,0	14,3	14,5
Total:	87,5	88,5	89,8	91,3	92,9

Table 1.3: Annual General and Administrative Expenses of “Smart Amplify”.

Regarding human resources, the company’s future founders understand their critical importance towards the sustainable competitive advantage and overall success of the company. The human resources requirements have been specified based on the company’s structure and scope, along with its founders’ philosophy.

The company shall focus heavily on recruiting the right people for each job position and invest on each of them in the long-term. This shall be achieved through continuous training and by providing a working environment of openness, cooperation and financial security.

Based on the above, “Smart Amplify” shall employ 16 people in total, with the following projected cost:

Total Personnel Cost (in € thousand)					
Description	2018	2019	2020	2021	2022
General Administration	68,3	92,8	94,7	96,6	98,5
Financial Management	52,5	71,4	72,8	74,3	75,8
Sales & MKT Management	108,9	148,2	151,1	154,1	157,2
Operations Management	144,4	196,4	200,3	204,3	208,4
Total:	374,1	508,7	518,9	529,3	539,9

Table 1.4: Annual Personnel Cost of “Smart Amplify”.

Regarding the location of “Smart Amplify”, the selection of the optimal location shall be based on the investigation, analysis and assessment of specific requirements, which are critical for the company’s functions.

Based on the relevant criteria, the municipality of Amaroussion has been selected, which is located in the northern part of Athens. Moreover, the business space requirements of “Smart Amplify” were calculated at approximately 220 m² and the relevant projected cost is presented below:

Business Space Rental Cost (in € thousand)					
Description	2018	2019	2020	2021	2022
Rental Rate	17,4	17,6	17,9	18,2	18,5

Table 1.5: Annual Business Space Rental Cost of “Smart Amplify”.

Regarding project planning, its scope is to determine the duration required in order to realize the project, starting from the decision to proceed with the project, up to the first day of commercial activity. In order to properly plan and manage the execution of the project, a realistic action plan has to be thoroughly prepared, which shall define the

various execution stages and their correlation, thus providing a clear guideline on each stage's implementation.

Based on the project's execution plan, the pre-production phase of the project shall have a duration of 5,5 months, starting from 01/03/2018 until 17/08/2018 and the relevant one-time cost is estimated at €17,5 thousand.

1.4 Financial Study

The scope of the financial feasibility study is to analyze and evaluate the viability of this project. It provides an overall view of the project and an assessment whether and to what extent it is advisable to develop and implement the project and how viable its operation is, during the first 5 years of operation.

The total cost of investment is calculated at €190,9 thousand, comprising €105,7 thousand for fixed assets and €85,2 thousand for net working capital needs. The project shall be financed through owners' equity (60%) and long-term bank loan (40%).

Aside the above, the total production cost is an important factor towards the project's success. For the first 2 years of operation, the total production cost is higher than total revenues, which is anticipated for a new business; even more for a first mover.

The complete financial performance of the company can be observed through its financial statements, which verify the fact the following the third year of operation, the company shall generate profits following a geometric progression, as presented below:

Profit & Loss Statement (in € thousand)					
Description	2018	2019	2020	2021	2022
Total Revenues / Sales	786,4	906,0	1.106,4	1.349,4	1.612,4
Minus					
Production Cost	873,5	1.058,1	1.072,4	1.121,7	1.222,2
Profit before Taxes (PBT)	-87,0	-152,1	34,0	227,7	390,2
PBT (%)	-11,1	-16,8	3,1	16,9	24,2
Minus					
Taxes (29%)	-25,2	-44,1	9,9	66,0	113,2
Net Profit	-61,8	-108,0	24,2	161,7	277,0
Net Profit Margin (%)	-7,9	-11,9	2,2	12,0	17,2

Table 1.6: P&L Statement of "Smart Amplify".

Furthermore, the financial assessment of the project has been conducted through the use of various proven evaluation methods, such as RoI, RoE, NPV, IRR, Break-even

and Sensitivity analyses, which have verified the financial feasibility and attractiveness of the project.

Finally, this project, which shall be the first in the Greek industrial manufacturing sector, is expected to have a highly positive impact on the Greek economy and is expected to open the path to innovative revenue streams and other IIoT related projects.

1.5 Appraisal

The assessment of all the aforementioned market, technical and financial elements is that the project presents high potential and should be undertaken.

CHAPTER 2

INTRODUCTION AND BACKGROUND OF THE STUDY

2.1 IoT Introduction

The Internet of Things (IoT) is defined by ITU (International Telecommunication Union) and IERC (Internet of Things European Research Cluster), as a dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols, where physical and virtual "things" have identities, physical attributes and virtual personalities and use intelligent interfaces and are seamlessly integrated into the information network.¹

The basic elements comprising the IoT are the following:

- i. *Network Infrastructure.*
- ii. *"Things"*, which can be sensors, actuators, machinery, home appliances, wearables and practically any device that has processing, sensing and communication capabilities.
- iii. *Data*, which is exchanged by the "things" connected in the network.
- iv. *Service platform*, which provides the intelligent interfaces and seamless integration into the information network.



Figure 2.1: Elements Comprising the Internet of Things.

Further to the above, a more detailed approach to the IoT definition points to an emerging and very complex digital ecosystem, which is characterized by dynamic interactions between users and suppliers. The suppliers of IoT are hardware suppliers and Information and Communications Technology (ICT) firms, who provide novelty business applications and services to their customers.

¹ Source: "Benchmark study for Large Scale Pilots in the area of the Internet of Things", conducted by PWC for the European Commission.

Additionally, cloud service providers, as well as Big Data enterprises are playing an increasing role in shaping the IoT ecosystem.

A more clear view of the evolving IoT ecosystem is presented below:

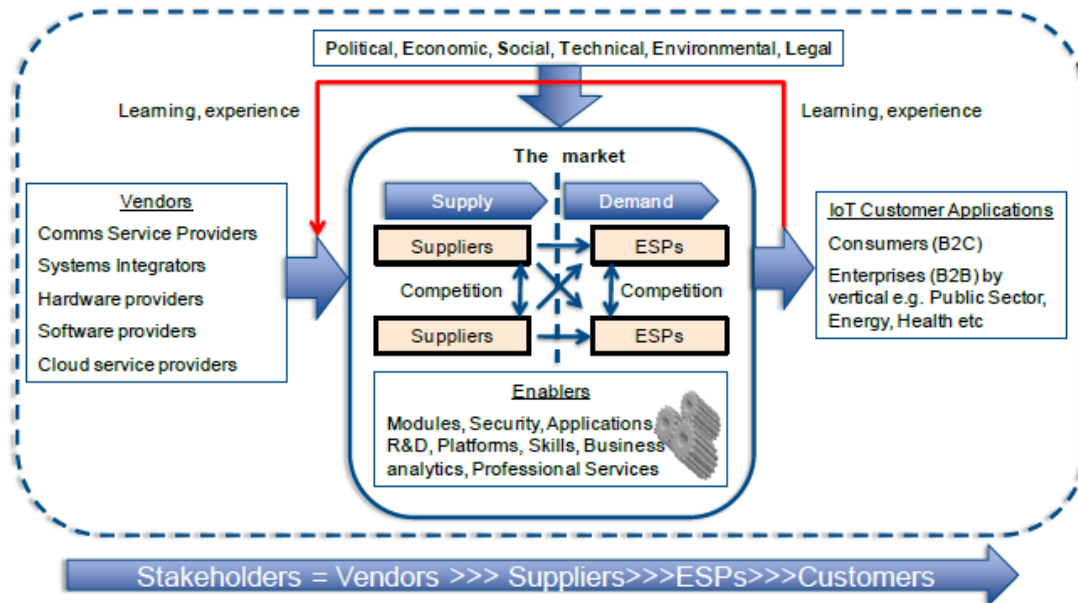


Figure 2.2: The IoT Ecosystem².

The IoT ecosystem, as presented above, is populated by various stakeholders, the main of them being:

- *Vendors who provide hardware and software solutions to solution suppliers.* Examples of these vendors are system integrators (SIs), embedded solutions providers, edge and cloud service providers, whose range ranges from small and medium sized enterprises (SMEs) to large multinational enterprises.
- *Solution suppliers creating solutions and services for their business customers.* Examples of these vendors are Microsoft, General Electric, IBM, Telenor and Amdocs, who design, implement and operate IoT solutions on behalf of their company customers.
- *Customers/End users using the solutions provided by the Enterprise Service Providers (ESPs).*

² Source: IDC 2014.

2.2 IIoT Introduction

2.2.1 IIoT definition and relation to CPS

The Industrial Internet of Things (IIoT), also referred as the Industrial Internet and Industry 4.0, is the application of IoT to the manufacturing industry, hence it is essentially a specialized aspect of IoT.

The main philosophy of IIoT is the same as IoT, consisting of a network of multitude heterogeneous devices, connected by Information and Communications Technologies (ICT), thus enabling the monitoring, collection, exchange and analysis of data from the network.

Therefore, the IIoT essentially brings together “smart” machines, advanced analytics and the people at work, in order to provide meaningful insights that can drive smarter and faster business decision for industrial companies.

The aforementioned “smart” machines are the result of the technical evolution from embedded systems to Cyber-Physical Systems (CPS).

The US National Science Foundation defines a CPS as a mechanism that is controlled or monitored by computer based algorithms, tightly integrated with the Internet and its users. In cyber-physical systems, physical and software components are deeply intertwined, each operating on different spatial and temporal scales, exhibiting multiple and distinct behavioral modalities, and interacting with each other in a myriad of ways that change with context.³

Therefore, the cyber-physical systems provide the basis for the implementation of IIoT. Together with the Internet and the available online services, they are enabling the creation of innovative solutions, which “blur” the boundaries between the physical and virtual world.

Overall, the CPS and most importantly, the IIoT, are disrupting the existing business models and enable the generation of revolutionary market models, customer engagement structures, revenue streams, applications, services and value chains.

Nevertheless, in order to realize these opportunities, the industry has to prioritize on IoT and M2M related technologies and consider critical aspects regarding the design of an IIoT system. These complex aspects are flexibility, scalability and agility, which are currently very challenging to navigate through, due to the challenges of current IIoT

³ Source: <https://www.nsf.gov/pubs/2010/nsf10515/nsf10515.htm>.

systems, such as the lack of standardization, cybersecurity concerns, lack of skills and expertise, uncertain ROI and immature IIoT platforms.

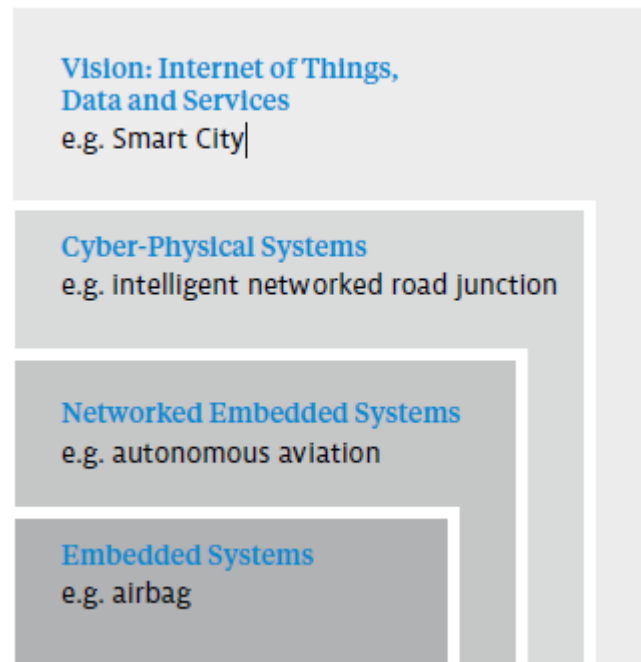


Figure 2.3: The Evolution of Embedded Systems into IoT⁴.

2.2.2 Smart Factory and Industry 4.0

The deployment of cyber-physical systems in production systems is the heart of the “smart factory”. A smart factory is an entity whose products, resources and processes are characterized by CPS, thus providing real-time process and quality monitoring, resources and cost optimizations and even improved safety at the production floor.

The above advantages are obtained through a high level of automation, providing flexibility in production, independent communication between the CPS, self-tuning of the production equipment through Statistical Process Control (SPC) and tailored adjustments to the human workforce, in order to maximize the adaptation of the production equipment to the human work cycles.

It is important to note that the smart factory is not about smart production equipment, but also about smart raw materials and smart products. This represents a revolutionary approach in the conception and creation of a new “bottom-up” production value creation model, which in its turn enables new market opportunities and innovative product-service hybrids.

⁴ Source: Acatech 2011.

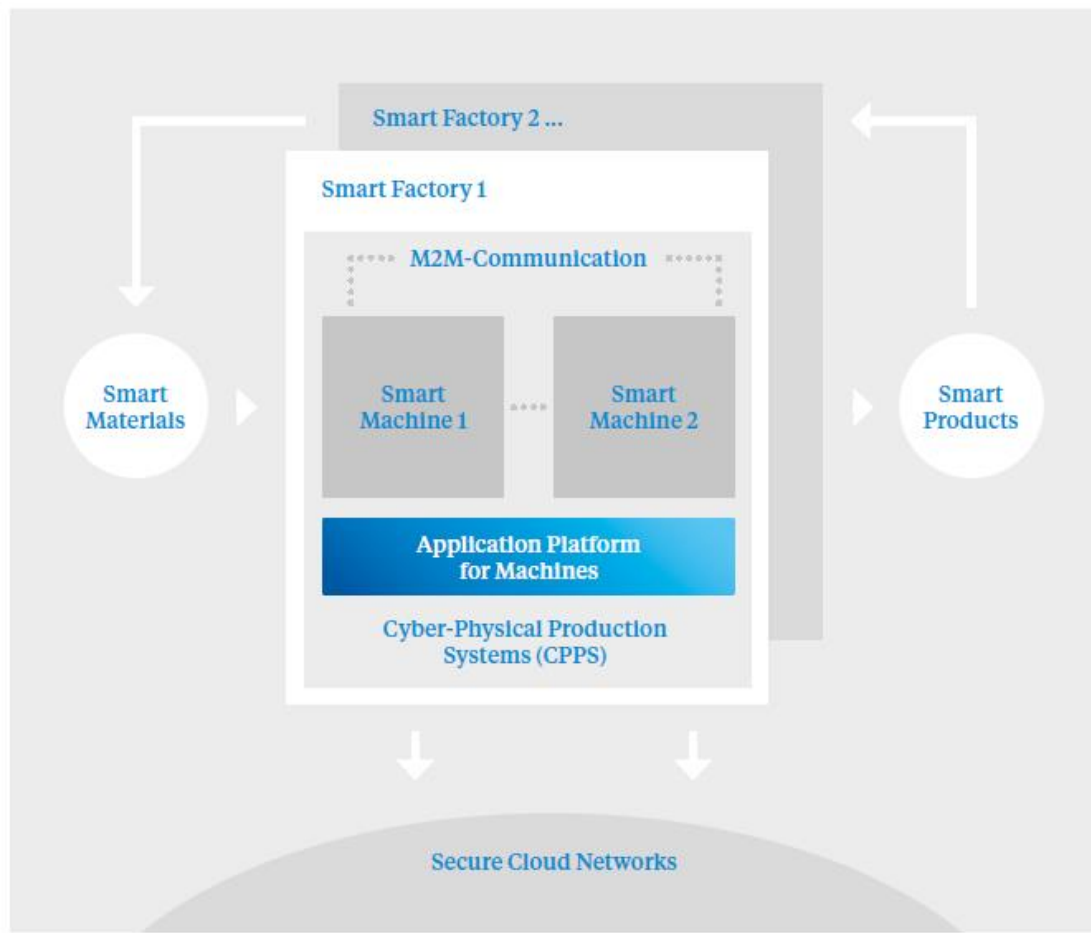


Figure 2.4: The Industry 4.0 Smart Factory Pipeline⁵.

The smart factory marks the beginning of the so-called “fourth industrial revolution”, or Industry 4.0. This broad term is deriving from the German strategic initiative to take a leading role in pioneering the manufacturing engineering sector.

The Industry 4.0 can serve as a model which encompasses the vertical integration of smart machines, products and production resources into flexible manufacturing systems and their horizontal integration into cross-industry value networks that can be optimized on the basis of different criteria such as cost, availability and resource consumption. Industry 4.0 is not only about the connection of one organization’s parts and functions, but also about the connection of the organization with its suppliers, customers and clients.

⁵ Source: DFKI 2012.

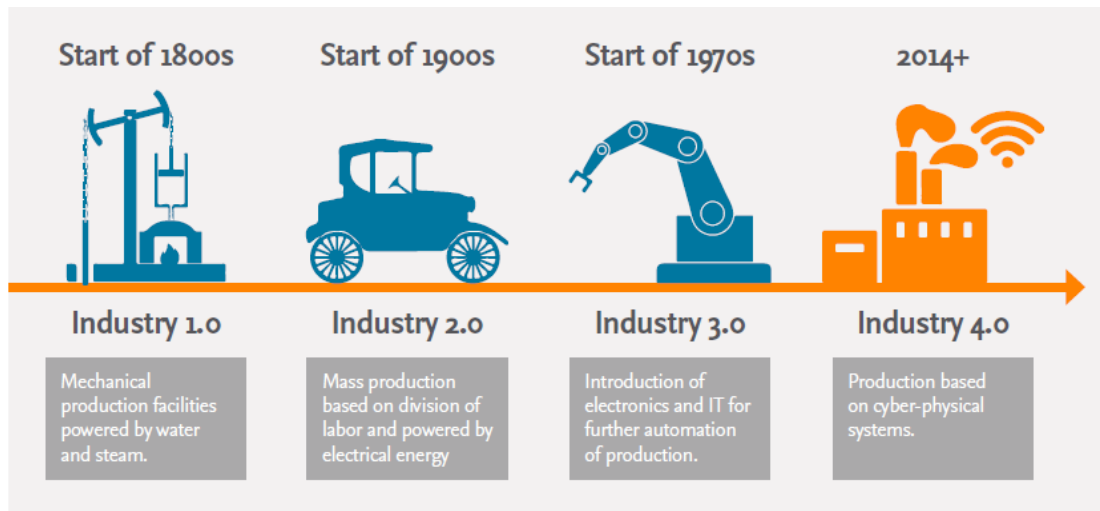


Figure 2.5: The Evolution of Industry – From Steam to CPS⁶.

2.2.3 Applications of IIoT and key factors for their success

The most common applications of IIoT are the following:

- Asset Performance Management, mainly focused on Predictive Maintenance and Asset Tracking.
- Logistics and Transportations Operations, mainly focused on Freight Monitoring and Fleet Management.
- Manufacturing Operations, mainly focused on Process Performance Monitoring and Self-Tuning of production equipment.
- Field Service Improvements, in terms of improving Remote Assistance.
- Energy and Utilities Sector, mainly focused in smart grids, oil and gas facilities' effectiveness and efficiency improvement.

In order to create meaningful and innovative product-service hybrids with IIoT, it is critical to exploit three key technology capabilities:

- i. Sensor-driven Computing
- ii. Industrial Analytics
- iii. Intelligent Machine Applications

By combining the above three capabilities with an IIoT platform, either third party or in-house, the end result is an interoperable platform that is a fusion of Information and Communications Technology (ICT) and Operational Technology (OT).

⁶ Source: "Industry 4.0 – Top challenges for chemical manufacturing", Elsevier, March 2017.

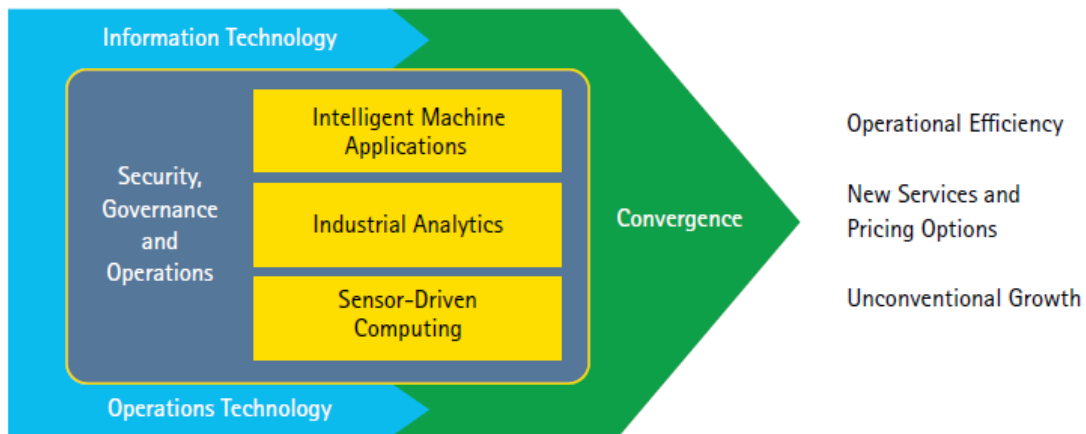


Figure 2.6: Three IIoT Capabilities to Master⁷.

Sensors give devices the power of perception into operational conditions, such as temperature, pressure, force, torque, voltage and frequency, current, motion etc. Sensor-driven computing, with the use of industrial analytics, transforms the perception to useful insight, which can be utilized by the human workforce, ranging from operators to production managers and executives.

Industrial analytics is the driving force enabling real-time decision making, by providing information, such as equipment health, anticipation of problems, process performance and Overall Equipment Effectiveness (OEE), to the corresponding decision makers.

Intelligent machine applications is the concept of manufacturing machinery with inherent intelligence. This intelligence is enabled through the applications accompanying the machines, which actually transform them into product-service hybrids, thus enabling new revenue streams and possibilities.

Examples of such applications are product and lifecycle management tools, connected products applications, such as Google’s Nest and Apple’s Home Kit and applications that serve as the medium for machine to machine interaction (M2M), such as Volvo’s CareTrack.

It is important to note that the intelligent applications may not be limited to equipment; almost anything can be converted to an intelligent “thing”. For instance, Qualcomm has been researching and developing an electric vehicle, capable of being recharged by travelling on “intelligent” road, embedded with traffic sensors and materials that can inductively recharge electric vehicles.

⁷ Source: “Driving Unconventional Growth through IIoT” – Accenture, 2017.

Summing up, the convergence of the above three capabilities can only be realized through the use of robust IIoT platforms. Unfortunately, until now, there is no common architecture and interoperability mindset from the key players in the market, which is why several consortia of technology, such as the IIoT Consortium (IIC), are working in order to alleviate this problem.

2.2.4 Challenges to the implementation of IIoT

Despite the highly promising potential of IIoT, there are still various challenges concerning its adoption by the industrial sector, presented below:

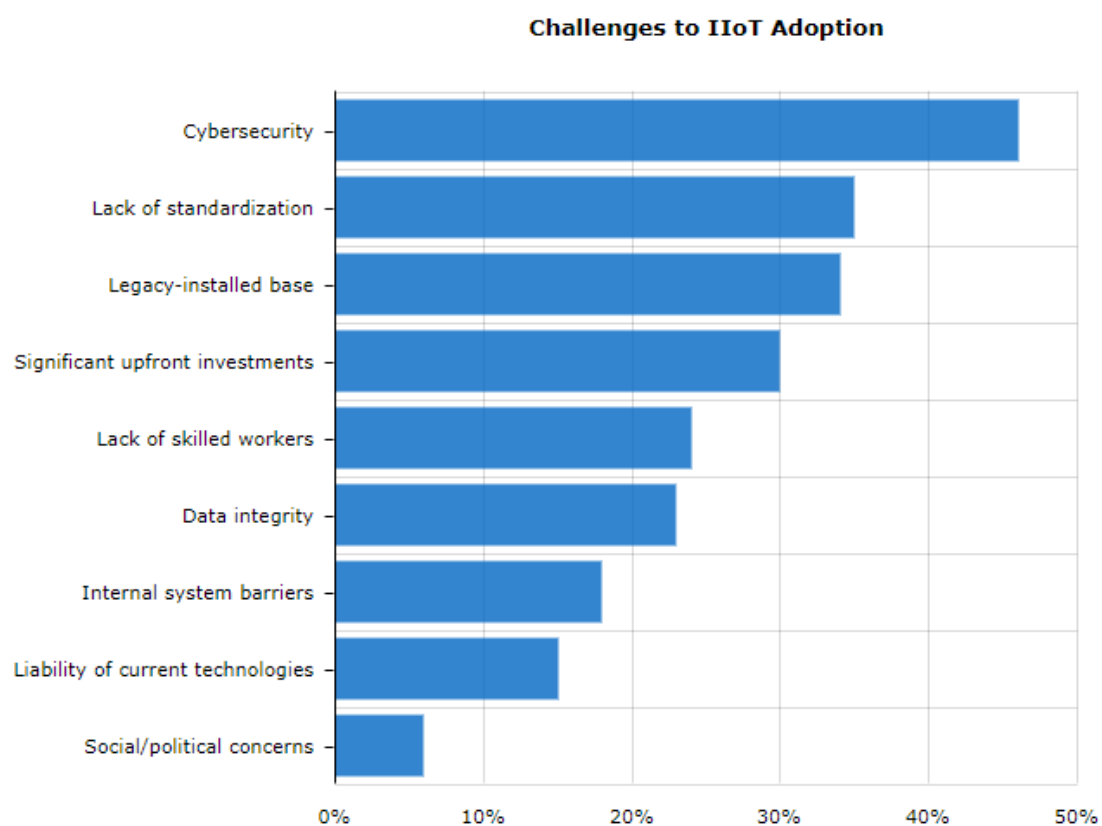


Figure 2.7: Challenges to the Defense and Resilience of the IIoT⁸.

It is evident that the most serious adoption barrier is cybersecurity. In order to alleviate this concern, IIoT providers must develop custom solutions, including stringent account management, layered authentication of devices and incident responsive systems.

Another major concern is the current lack of standardization, which shall remain at least until 2020 and poses the threat of specific vendor and technological lock-in, especially

⁸ Source: “Morgan Stanley-Automation World Industrial Automation Survey”, AlphaWise.

for small and medium sized enterprises (SMEs), who would highly benefit from interoperable platforms and open standards.

Other major concerns are the legacy-installed equipment, whose upgrade to “smart things” requires significant upfront investments and the lack of skilled workers, with the knowledge and skill set to adapt to a new environment of digital interaction within the production floor.

Last but not least, there are internal system barriers, deriving mostly from the lack of awareness of high level executives and IT engineers, along with social and political concerns regarding data privacy and lack of regulatory standards for data brokers.

2.3 IoT Current State in Greece

Greece’s response to IoT and the digital transformation of the state and its institutions (also referred as Government Internet of Things – GIoT) has been quite lackluster until now. This fact is directly connected with the 9 year financial recession that Greece has been suffering from, as well as the lack of innovation and digital immaturity of the country and its business sectors.

The low digital performance of Greece is presented by the European Commission’s Digital Economy and Society Index (DESI), which is a composite index that summarizes relevant indicators on Europe’s digital performance and tracks the evolution of EU member states in digital competitiveness.

There are 5 score categories which comprise the DESI index for each country:

- i. *Connectivity*, which measures the deployment of broadband infrastructure and its quality.
- ii. *Human Capital*, which measures the required skills in order to capitalize on the possibilities offered by a digital society.
- iii. *Use of Internet*, by the citizens of a country.
- iv. *Integration of Digital Technology by Businesses*, which measure the digitization of the business and their exploitation of the online sales channel.
- v. *Digital Public Services*, which measures the digitization of public services and primarily focuses on e-Government.

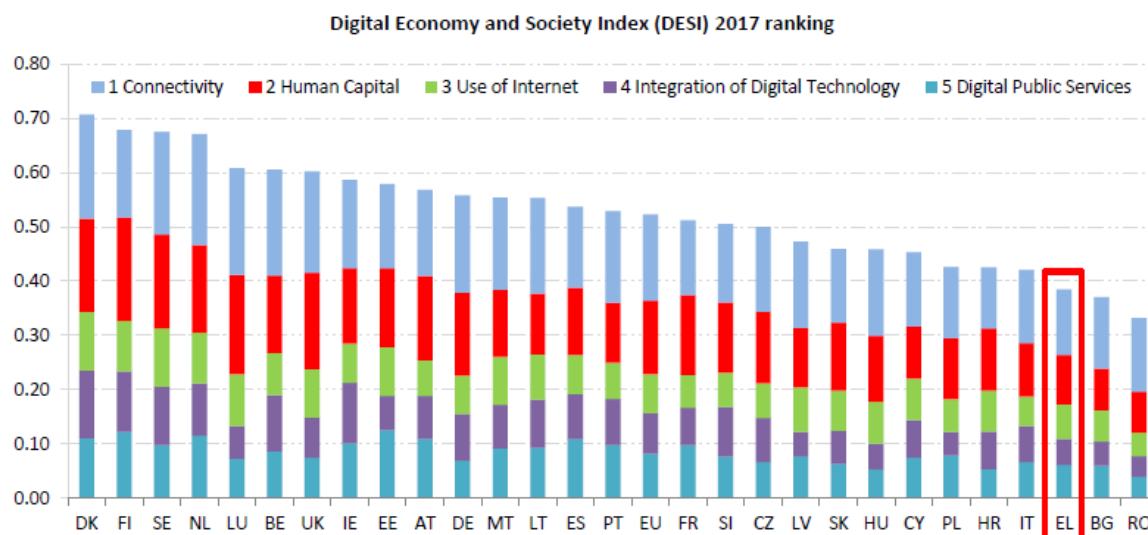


Figure 2.8: Europe's DESI Index for 2017⁹.

As shown in the above figure, Greece sits at the third worst place in digitization among the EU members. The only “optimistic” element is the slow relative performance increase on year over year basis, along with the similar evolution curve of Greece's digitization versus that of EU28, as presented in the following figures.

	Greece		Cluster	EU
	rank	score	score	score
DESI 2017	26	0.38	0.41	0.52
DESI 2016 ¹	26	0.35	0.38	0.49

Figure 2.9: Greece's Relative DESI Performance by Dimension¹⁰.

⁹ Source: <https://ec.europa.eu/digital-single-market/en/desi>

¹⁰ Source: <https://ec.europa.eu/digital-single-market/en/scoreboard/greece>

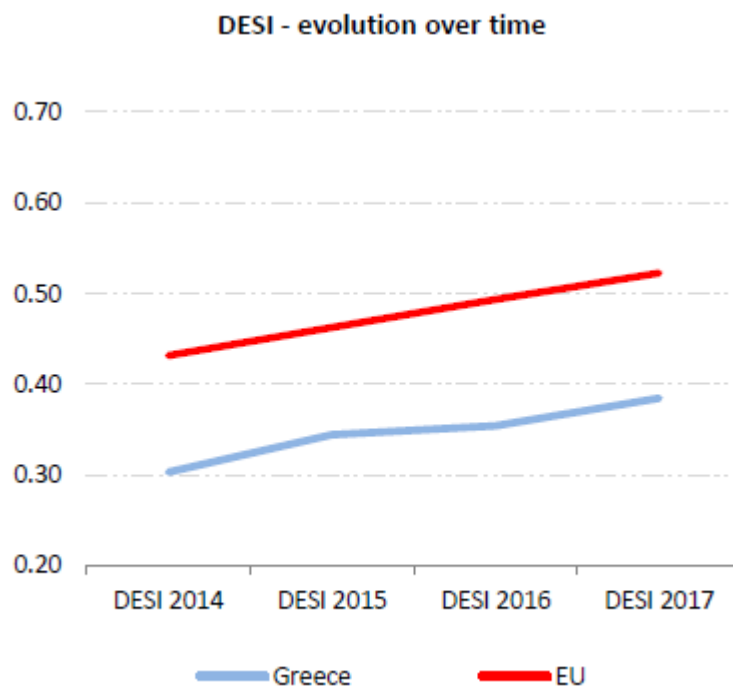
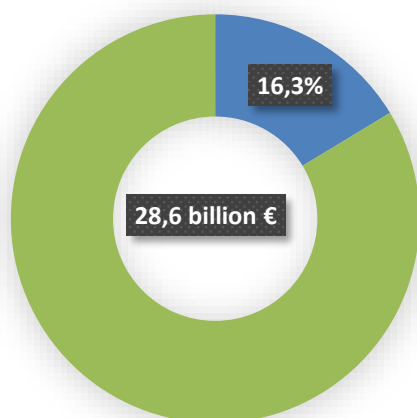


Figure 2.10: Greece's DESI Evolution over time versus EU28¹¹.

The above findings are verified by the poor contribution of the digital economy to the country's GDP, which was approximately at 16% of GDP for 2016.

The digital economy is defined as the income produced by “digital inputs”, such as digital skills, technology (both hardware and software) and digital products and services that are consumed by either consumers or enterprises.



In 2016, the digital economy reached 28,6 billion €, out of the total 175,1 billion € of GDP, or 16,3%.

Figure 2.11: Contribution of Digital Economy on Greek GDP¹².

¹¹ Source: <https://ec.europa.eu/digital-single-market/en/scoreboard/greece>

¹² Source: “Digital Greece – The way towards Growth”, Accenture, 2017.

2.4 IIoT Current State in Greece

Based on the principles presented regarding IoT, it is evident that the key industry for this digital transformation is Information and Communications Technology.

Focusing on the Greek ICT industry, digitization is already a part of its strategy since 2015, with the executives having ambitious five-year expectations, regarding the high adoption of leading practices across their operations. Of course, this five-year plan includes major organizational changes, which might induce some delay in that transformational process.

With regards to Big Data, the Greek ICT sector has invested on this technology, in order to improve their operations and gain a better understanding of their customers' needs and wants.

Nevertheless, the number of companies offering IIoT solutions Greece is very small, summing at approximately 15 companies, most of them being SMEs.

Additionally, none of them is aiming at the manufacturing sector, but rather focus on the energy sector, smart agriculture and smart cities.

It is evident that the lack of smart manufacturing IIoT application and service providers is the result of the challenges already presented at chapter 2.2.6, combined with the lagging digital performance in Greece, both for ICT as well as the manufacturing sector. This "absence" of IIoT providers can be viewed either as a great opportunity or great risk from potential investors, who are willing to invest in the challenging and very troubled market of Greece.

2.5 Company Name and Entity and Investors' Background

The name of the company to be founded is "Smart Amplify Ltd.". The scope of the company is to design, implement and offer highly advanced IIoT applications and services to the Plastics and Rubber Manufacturing Sector. The company is a Limited Liability Company, with its separate legal identity and its assets being unlinked from the personal wealth of its founders.

Founders of the company are two electrical and computer engineers, specialized in data communication systems and plastics industry, Mr. Panos Theodorou and Dimitrios Dimitropoulos. Each of them possesses 50% of the company's shares and the funding comes from the founders' personal wealth.

The founders of the company have ample experience on their respective fields.

Mr. Theodorou has over 10 years' experience in large multinational enterprises, as a full stack developer in IBM Switzerland and Microsoft Hellas. He also holds a MBA (Master in Business Administration) title.

Mr. Dimitropoulos has 12 years of experience in the plastic pipes manufacturing sector, serving in many positions, such as Head of Production and Plant Manager in multinational enterprises, such as Pipelife Hellas (member of the Wienerberger group of companies) and Eurodrip Hellas (member of the Rivulis Eurodrip group of companies). He also holds a MBA title and is a certified Lean Six Sigma Black Belt.

Mr. Dimitropoulos has also been an active member of the Association of Hellenic Plastic Industries (AHPI)¹³, which can also prove to be very beneficial for the company under study, due to the respective lobbying benefits and interpersonal relations with many executives of the Greek plastics industry.

2.6 Background of the Study

The investors' interest in setting up an IIoT application and service provider was expressed in November 2017, when the initial contact with the author of this study took place.

Following that, further exploratory and procedural meeting places took place during August 2017 and at the beginning of September 2017, the study was officially commissioned. The agreed date of delivery was the 28th of February 2018.

For the preparation of this study, a few interviews have taken place with key persons from the Plastics Industry and relevant stakeholders (mostly banks, government actors), as well as some of the IoT companies that are already established and operating in the Greek market.

2.7 Scope and Limitations of the Study

The scope of this study is to evaluate and analyze the potential and feasibility of the proposed project, based on extensive investigation and research of the available alternatives, in order to provide the potential investors with full comfort in taking their investment decision.

¹³ <http://www.ahpi.gr>.

The limitations of the study are the following:

- **Marketing Feasibility:** Unfortunately until this day, there are no IIoT companies in Greece specialized in the industrial sector. Therefore, there is no IIoT sector in Greece at all, resulting in less robust market data availability, such as market studies.
Moreover, the digitization status of Greece is very low. This fact, combined with the continued economic recession will most probably affect the potential customers' willingness to embrace this new approach to cost saving and operation performance improvement.
Therefore, there may be an offset between the suggested year of company start-up and the most optimal one, based on the IoT development in Greece during the next two years.
- **Technical Feasibility:** Unfortunately the worldwide situation regarding the lack of standardization in all IIoT aspects, such as the network layer, the service and application layer and all the underlying technology basis, is a potential risk factor that this study cannot fully cover.
Therefore, it is highly recommended to conduct a supplementary technical study, which describes the available and near-future technological options in detail, in order to provide the potential investors with the best possible information for their decision making in technology acquisition.
- **Legal Feasibility:** Unfortunately this study does not cover the legal compliance of the project with the national and international legislations. There are many legal aspects relevant to this project, such as the full enforcement of EU's General Data Protection Regulation¹⁴ (GDPR), dispute resolution, intellectual property and legislation related to the granting of ownership/control of assets, which may impact the project in unseen ways by the author of this study.
Therefore, a supplementary legal feasibility study is highly suggested to be conducted, containing elements such as investment laws, legal framework of the project and total cost of legal investment registration.

¹⁴ Source: <https://www.eugdpr.org>

CHAPTER 3

MARKETING STUDY

3.1 Objective of the Marketing Study

This part of the feasibility study covers all the market-related elements of the project, such as:

- *IIoT Market Definition and Structure.*
- *IIoT Market Analysis.*
- *SWOT Analysis of the Project.*
- *Outline of Project Strategy.*
- *Marketing Strategy.*
- *Tactical Marketing.*
- *Projected Sales and Market Share.*
- *Projected Cost of Marketing.*

3.2 Market Definition and Structure

The company, “Smart Amplify Ltd.”, shall be active in the IIoT application and services sector, which is a subsector of the Information and Communications Technology business sector. The IIoT is a niche subsector, providing customized solutions for specific companies.

In order to proceed with the marketing analysis, the following ICT market structural factors shall be investigated:

- Products / Services.
- Clients.
- Competition.
- Suppliers.
- Distribution Channels.

3.2.1 Products / Services

The B2B (Business to Business) solutions offered by IIoT application and service providers are neither products nor services, but instead are product-service hybrid products, with the two concepts being inseparably connected. The hybrid solutions offered are the following solutions:

- i. Platform as a Service Solutions (PaaS), which offer a complete development and deployment environment in the cloud for creating IIoT applications.
- ii. Software as a Service Solutions (SaaS), in the form of flexible and customizable web-based applications, providing IIoT insights and interfaces for optimized assets monitoring, process control and decision making.
- iii. Consulting services, regarding process improvement and savings opportunities identification.

3.2.2 Clients

“Smart Amplify” is a company that shall offer specialized solutions to its customers, which offer outstanding value and focus directly on their specific needs and wants. The customers of the company belong to the plastics industry and more precisely, to the subsector known as Plastics & Rubber Manufacturing.

This market is quite fragmented, comprising a vast number of SMEs and a few large companies, totaling at around 1.500 companies. Their annual production volume reaches up to 700.000 tones, equaling to almost €2 billion in Revenues.

The market is distinguished in three major subsections:

- i. Plastic Packaging
- ii. Plastic Pipes
- iii. Plastic Building Materials

For the above 3 sections, the Pareto principle is valid, or “the law of the vital few”, which means that 80% of total production volume is produced by 20% of the total companies of the market sector.

These large companies are the main focus of “Smart Amplify”, since they are relatively technologically advanced and are periodically renewing their production equipment, in order to remain competitive both in the domestic as well as the global market. Therefore, these companies already have or plan to have the baseline infrastructure which is capable of digital transformation.

The product – service solutions of “Smart Amplify” are meant for these companies and are key value enablers, ensuring the sustainable competitiveness of their products, both domestic and global.

Finally, there are solutions for the other 20% of Plastics companies, which are not so technologically advanced, such as the consulting services and data driven solutions offered by “Smart Amplify”.

Therefore, it is evident that “Smart Amplify”‘s solutions’ portfolio can fully cover the niche market of Plastics & Rubber Manufacturing.

3.2.3 Competitors

“Smart Amplify” shall be the first IIoT service and application provider for the Industrial Manufacturing sector in Greece and of course the first and only in the niche Plastics & Rubber Manufacturing subsector.

This means that “Smart Amplify” shall enjoy all the advantages and disadvantages of the “first mover”, such as:

- *Advantages*
 - Establishment of solutions as industry standard.
 - Based on the initial success, the achievement of brand recognition and loyalty.
 - Ability to control resources, such as key suppliers and talented personnel, which are considered to be scarce assets on the IIoT field.
 - Technology and expertise leadership.
 - Economies of scale, in terms of software development learning curve and cost efficiency.
- *Disadvantages*
 - Economic burden of developing a new market that future new entrants can exploit “for free”.
 - Increased risk coming from the mistakes during the learning curve of the first mover, which is severely reduced for the future followers.
 - Heavy investments in developing solutions, which can be easily copied to an extent by followers.
 - Risk of products/services introduction to a market that is not yet ready to accept and utilize them.

Nevertheless, there are companies which could theoretically attempt to develop and offer their IIoT solutions in the future, following the successful entry of “Smart Amplify”. These companies have been established in their respective fields and are the following:

- *Future Intelligence*: Established in 2009 in Athens, this SME focuses on Smart City and Smart Agriculture applications (SaaS).
- *Intracom Telecom*: Established in 1977 in Athens, this large enterprise is a global telecommunication and systems vendor. Intracom Telecom has been offering IoT solutions for Smart City and Smart Grids applications since 2017 (SaaS).
- *Plegma Labs*: Established in 2013 in Athens, this SME develops customer tailored Smart Building applications (SaaS). As of lately the company is also developing solutions for Smart Water Management and Smart Agriculture.
- *Ex Machina*: Established in 2015 in Athens, this SME develops Smart Grids applications, focusing mainly on energy, natural gas and environmental IoT (SaaS).
- *Meazon*: Established in 2013 in Athens, this SME specializes in developing Smart Grid applications and energy management analytics in general (SaaS). The company also designs and offers energy meters and sensors utilizing mesh network connectivity, as a compliment to its IoT value proposition.

Nevertheless, the probability of one of the above companies entering the Smart Factory IIoT sector and even more, offering solutions for the niche Plastics & Rubber Manufacturing industry is considered to be very low, taking into consideration other factors, such as the macroeconomic situation of the industrial sector in Greece during the last decade.

Other than the above domestic potential competitors, there are also a few potential global competitors, which are the plastics machinery manufacturers, such as Krauss–Maffei Berstorff and Battenfeld – Cincinnati Extrusion Holding GmbH. These companies possess vast experience and technical expertise and have started developing solutions, which are mostly preventive maintenance oriented.

As of 2017, they have started offering smarter Statistical Process Control solutions and self – tuning equipment (e.g. die heads). Nevertheless, these solutions are still far away from being deemed as Industry 4.0 solutions, since they do not utilize edge and/or cloud

computing and thus are limited to preconfigured models utilizing only real-time process data. The only feature that is closer to IIoT is the ability for remote technical support, which is limited to machinery crafted by the same manufacturer.

Further to the above, the strongest disadvantage of such solutions is that they are only limited to the equipment of the same manufacturer. This means that in order to apply such an IIoT solution in the future, the customer should replace all their upstream and downstream equipment with equipment only manufactured from or compatible with the same vendor (e.g. Krauss–Maffei) and then proceed with either retro-fitting or renewing parts of it.

The above feat is considered impossible, due to the capital intensive nature of a plastics manufacturing plant, as well as other implications such as vendor lock-in, book value of existing equipment of plastics producers and their willingness to invest on such a value lackluster option.

Finally, such vendors do not offer solutions such as plant modernization audits and offer rather generic solutions. Additionally, the fees that these companies charge for technical visits, e.g. for equipment retrofit inspection, are very hefty and this adds up as another reprobative factor for deeming these solutions as not attractive.

Therefore, based on the above, it is safe to assume that “Smart Amplify” will enjoy the first mover advantage for a relatively long time, estimated at more than 3 years, which is adequate in order to establish its brand as the industry standard.

3.2.4 Suppliers

The suppliers of IIoT application and service providers are predominantly software development programs’ and platforms’ providers, such as Microsoft. To a much lesser extent, IIoT hardware suppliers are also supplying IIoT application and service providers with their products (e.g. sensors and network hubs), which are used during the development and quality testing of the software solutions of the company. The origin of the above hardware and software solutions is global, originating mainly from USA and the EU.

Finally, miscellaneous networking consumables (e.g. network cables) and computer hardware are also used by, which are supplied by the domestic B2B suppliers.

The major criteria used for the software and hardware vendors' selection are:

- Price.
- Availability.
- Credit Policy.
- Customer Case Service.
- Distribution Points.
- Flexibility and responsiveness to orders.
- Willingness to cooperate and establish long-term partnership.
- Financial state and credit capacity.
- Warranty Policy.
- Technological Prowess aligned with open architecture philosophy.
- Strong and proven R&D department.
- Brand awareness and market establishment.
- Environmental Sustainability Policies and Social Responsibility.

3.2.5 Distribution Channels

The customers of ICT companies specialized in IIoT are companies themselves. The typical distribution channels used in B2B offerings are e-mails, newsletters, direct communication via telephone or teleconference and visits to the customers' premises. The same distribution channels shall be utilized by "Smart Amplify" with a strong focus on periodical visits to the customers, aimed at the development of an "always besides you" relationship with them.

3.3 Market Analysis

3.3.1 Determinants of Demand

There are many interrelated demand determinants for IIoT solutions, which are generally considered as market-agnostic and common among the IT solutions' providers.

One major factor is the size of investment, also known as Capital Expenditure (CAPEX) and the RoI (Return on Investment), which have to be appealing to the customers and aligned with their business strategies and objectives.

Another major factor is the technological and organizational readiness of the customers, in terms of infrastructure, culture, change management adaptability and human workforce (from high level executives to middle-senior team leaders).

Additionally, general macro-economic factors are directly impacting demand, such as the domestic economy state (i.e. in recession, Balance of Payments, GDP growth and unemployment rate), the market structure and size, the global and domestic technological evolution; leading to reduced cost of technology and hardware, the state of banking system and other sources of funding, the state's industrial, tax and labor policies, as well as the legal framework businesses in general.

Finally, there are other micro-economic factors affecting IIoT solutions demand, such as the pricing schemes of the solutions, the credit policy, the quality of service (QoS), the competitiveness of substitutes and the state of competition in the market.

3.3.2 Future Demand Estimation

Taking into account the data already presented, the future demand for IIoT solutions by the Plastic & Rubber Manufacturing Sector will be estimated based on quantitative and qualitative information.

- *Major insights of the Greek economy*

Year	2010	2011	2012	2013	2014	2015	2016
Domestic Economy (% change)							
GDP at constant prices of 2010	-5,5	-9,1	-7,3	-3,2	0,7	-0,3	-0,2
Total domestic demand (contribution)	-7,4	-12,0	-10,5	-4,4	0,9	-1,2	0,4
Private consumption	-6,5	-9,7	-8,0	-2,6	0,6	-0,5	0,0
Public consumption	-4,2	-7,0	-6,0	-6,4	-1,4	1,2	-1,5
Exports of goods and services	4,9	0,0	1,2	1,5	7,7	3,1	-1,8
Imports of goods and services	-3,4	-9,4	-9,1	-2,4	7,7	0,4	0,3
Balance of Payments (as % of GDP)							
Current account balance	-11,4	-10,0	-3,8	-2,0	-1,6	-0,2	-1,1
Trade and services balance	-8,1	-6,1	-3,8	-2,0	-1,6	-0,2	-0,7
Exports of goods and services	21,9	25,3	28,6	30,4	32,4	29,9	28,4
Imports of goods and services	30,0	31,5	32,4	33,2	34,6	30,1	29,1
Interest Rates and Credit (% change)							
Lending Rate	6,5	7,6	7,2	6,9	6,1	5,8	5,4
Credit to private sector	0,0	-3,1	-4,0	-3,9	-3,1	-2,0	-1,5
Gross Domestic Product (% annual volume change)							
Industry, including energy and construction	-	-	-6,2	-4,9	-5,6	-0,2	7,9
Services	-	-	-7,2	-2,0	1,4	-0,4	-2,6

Table 3.1: Greece's Macro-economic Indicators¹⁵.

Based on the above data, it is evident that the Greek economy remains in recession. Nevertheless, a strong improvement trend is shown in all major economy aspects, which holds promises for the near future, both macro and micro economic-wise.

¹⁵ Source: "Greece in Figures", Hellenic Statistical Authority, 2017.

- *Greece's Digital Economic Opportunity Index (DESI) breakdown*

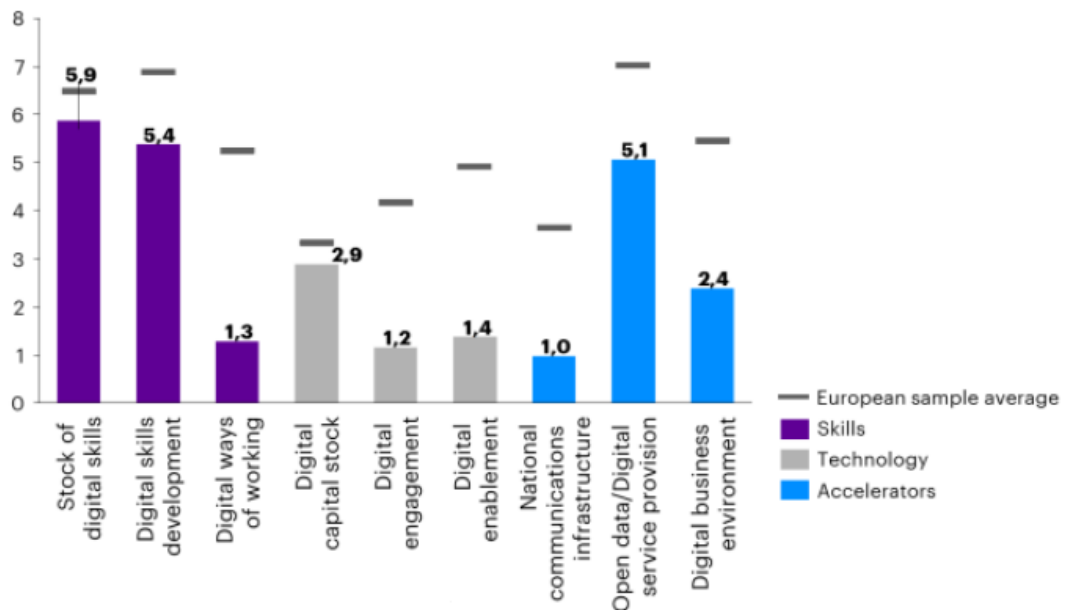


Figure 3.1: ICT Industry – Greek DECI Breakdown¹⁶.

The above figure provides a more granular view of the elements affecting the lackluster performance of the Greek ICT sector versus the average score of EU. Based on the score of digital business environment, the digital ways of working and the digital engagement, a two to three years delay should be expected regarding the development of the IoT market in general, driven by a similar low demand for advanced IoT solutions.

On the other hand, the open digital service provision as well as the stock and development of digital skills scores could potentially moderate the impact of negative scores and reduce the lag of IoT market development and demand, by up to an estimate of one year.

¹⁶ Source: "Digital Greece – The Path to Growth", Accenture, 2017.

- *Use of ICT solutions by Greek enterprises*

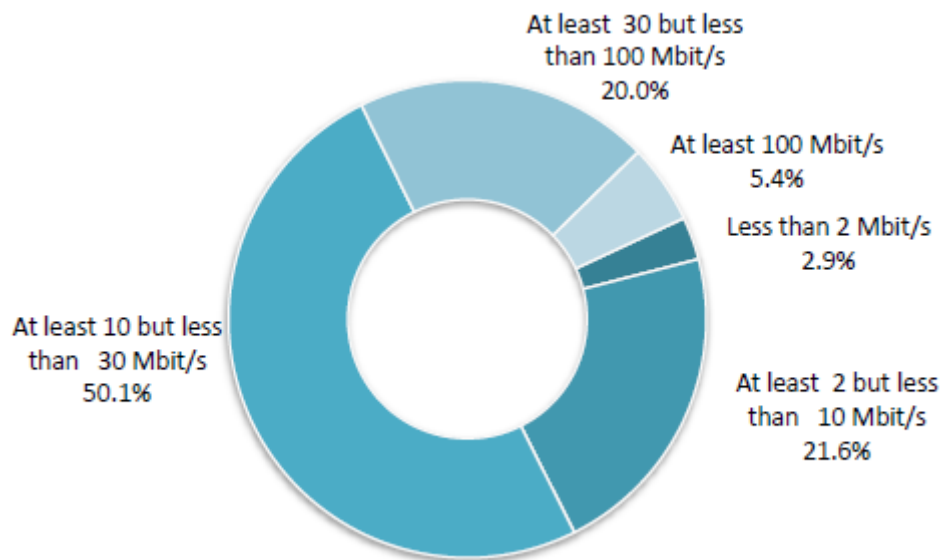


Figure 3.2: Greek enterprises' broadband connection speed¹⁷.

Out of 22.701 companies reporting having access to the Internet, 22.211 companies use fixed broadband connections (i.e. ADSL, VDSL, FTTH) representing 97,8% of the total number of companies, while 12.396 companies additionally use mobile broadband connections (3G or 4G).

Based on the above, the vast majority of the Greek companies are not using broadband connections capable of bi-directionally transferring large amounts of datum to the cloud. Nevertheless, 25,4% of the sample population uses Fiber to the Home (FTTH) broadband connections that can be easily augmented via software adjustments and without any need for infrastructure changes. Therefore, these companies are considered IIoT ready regarding their broadband connection capabilities.

Additionally, 50,1% of the sample population that uses a connection between 10Mbps and 30Mbps, should prioritize on utilizing edge computing solutions for their future IIoT implementations, in case the upgrade of their broadband connection is not possible (i.e. the cost of switching to fiber infrastructure is too high).

¹⁷ Source: "Survey on the use of Information and Communication Technologies and E-Commerce in Enterprises", Hellenic Statistical Authority, 2017.

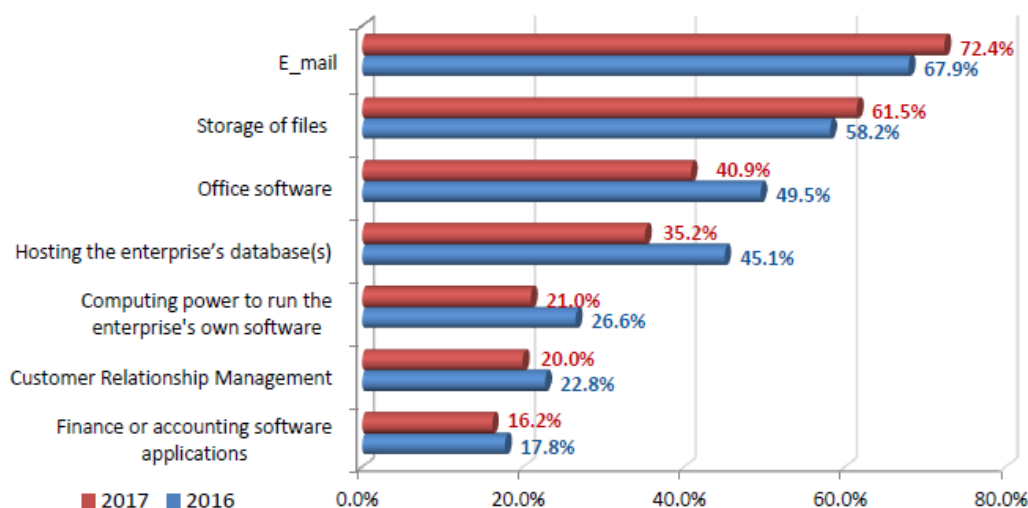


Figure 3.3: Use of Cloud Computing services by Greek Companies¹⁸.

Out of 22.701 companies reporting having access to the Internet, 2.890 companies, or 12.7%, reported having bought cloud computing services.

Regarding the distribution of cloud computing services used by the companies (free services are excluded), there is a good mixture of digital transformation indicators, such as the transition of CRM and ERP software to the cloud, as well as the leasing of computational power for the day-to-day IT needs of the companies.

- *Plastic & Rubber Manufacturing Indices*

Year	Number of Companies		Value of Sales (€ million)		Contribution to Growth of Manufacturing Industry (%)
	2015	2016	2015	2016	2015-2016
Manufacture of plastic and rubber products	354	360	1.347,96	1.440,96	0,2

Table 3.2: Plastics & Rubber Manufacturing Indices for 2015-2016¹⁹.

Based on the previous table, the Plastic & Rubber manufacturing sector shows an annual turnover increase of 4,9% and a contribution of 0,2% to the whole manufacturing industry turnover. Additionally, the number of the sector's enterprises has slightly increased, which is an optimistic sign for the relevant market, despite the current macro-economic situation in Greece.

¹⁸ Source: "Survey on the use of Information and Communication Technologies and E-Commerce in Enterprises", Hellenic Statistical Authority, 2017.

¹⁹ Source: "Production and Sales of Manufactured Products", Hellenic Statistical Authority, 2016.

- *ICT Sector Indices*

Year (Base: 2010=100,0)	2012	2013	2014	2015	2016	2017	CAGR
Telecommunications	86,5	76,4	73,0	72,1	72,5	72,5	-3,47%
Computer programming, consultancy and related activities	77,0	75,3	75,6	81,4	88,5	91,7	3,56%
Information service activities	96,1	76,7	74,3	108,9	91,4	90,4	-1,22%

Table 3.3: Turnover Indices for ICT Services Sector²⁰.

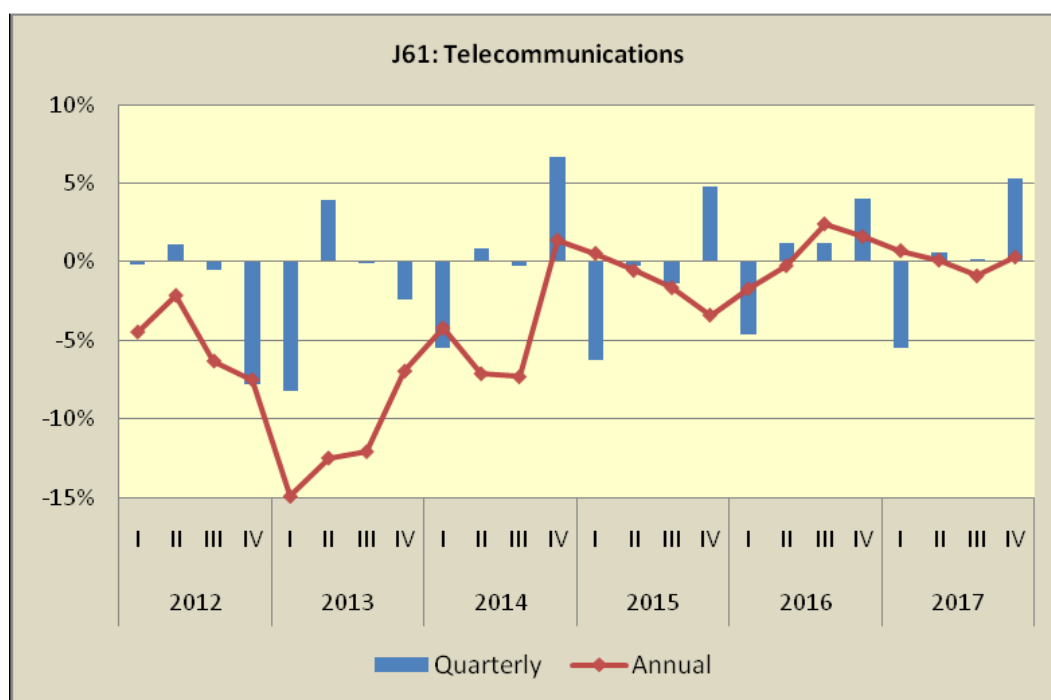


Figure 3.4: Greek Telecommunications Sector Turnover Historical Quarterly Performance.

²⁰ Source: "Turnover Indices for Specific Activities of the Services Sector", Hellenic Statistical Authority, 2018.

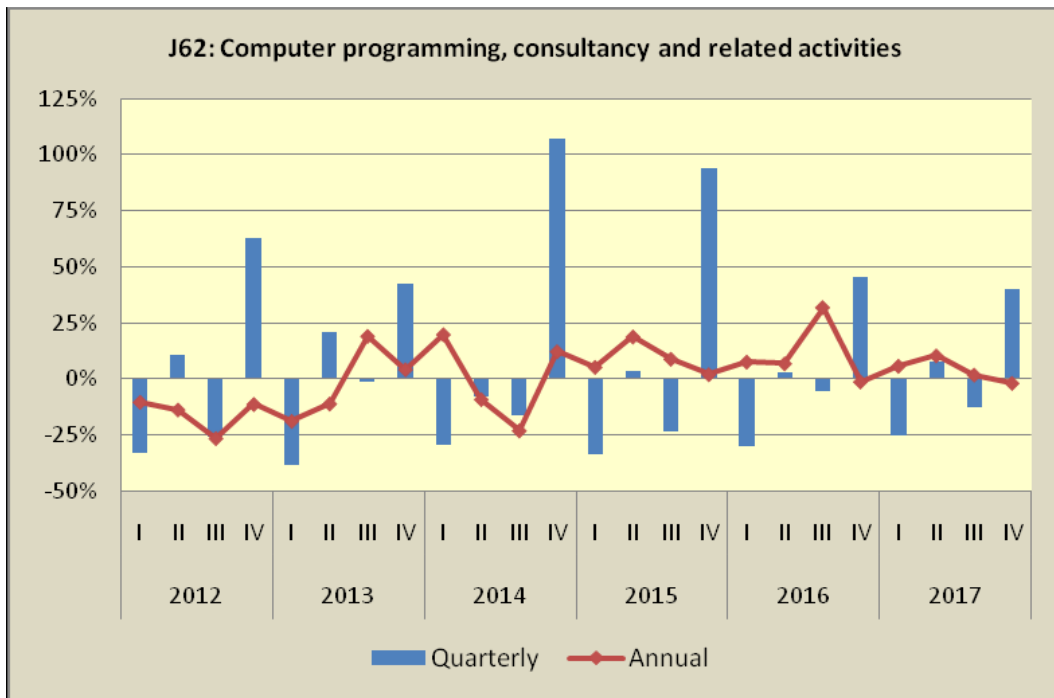


Figure 3.5: Greek Computer Programming and Consultancy Sector Turnover Historical Quarterly Performance.

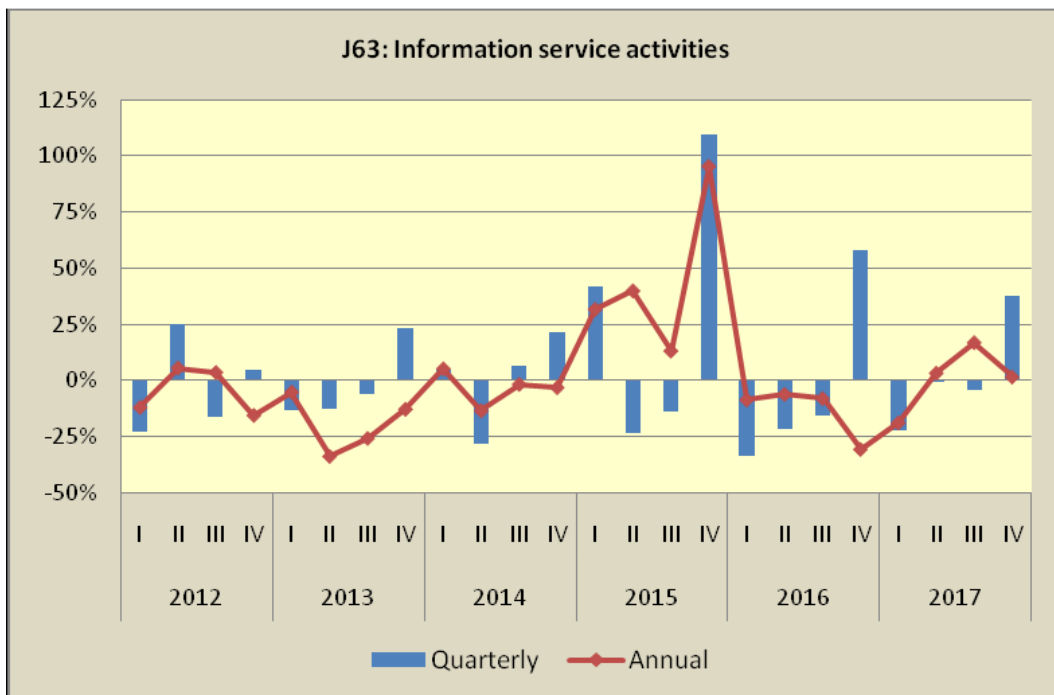


Figure 3.6: Greek Information Services Sector Turnover Historical Quarterly Performance.

Based on the above data, the information services sector demonstrates a slightly negative CAGR and seems to stabilize at about the 90% performance of 2010; the first year of major Greek recession.

The computer programming and consultancy services sector demonstrates a strong turnover growth trend, which generates optimistic expectations regarding the demand of IIoT solutions in the near future.

Lastly, the communications sector demonstrates a declining turnover rate, which shows a tendency to stabilize at about 72,5% of 2010 performance. This is evident of the price pressure among the competitors in that market, coupled with the repercussions of the 9 year economic recession.

Overall, the IIoT market, which is a combination of Computer programming and Information services, is expected to show an increasing growth rate, which will gradually achieve higher annual increase.

- *Global IoT Revenue, Profit and Impact Forecast*

According to Forbes²¹, the projected profits of IoT applications and services shall be disproportionately higher than those generated by other IoT aspects, such as hardware producers, networking solutions and system integrators.

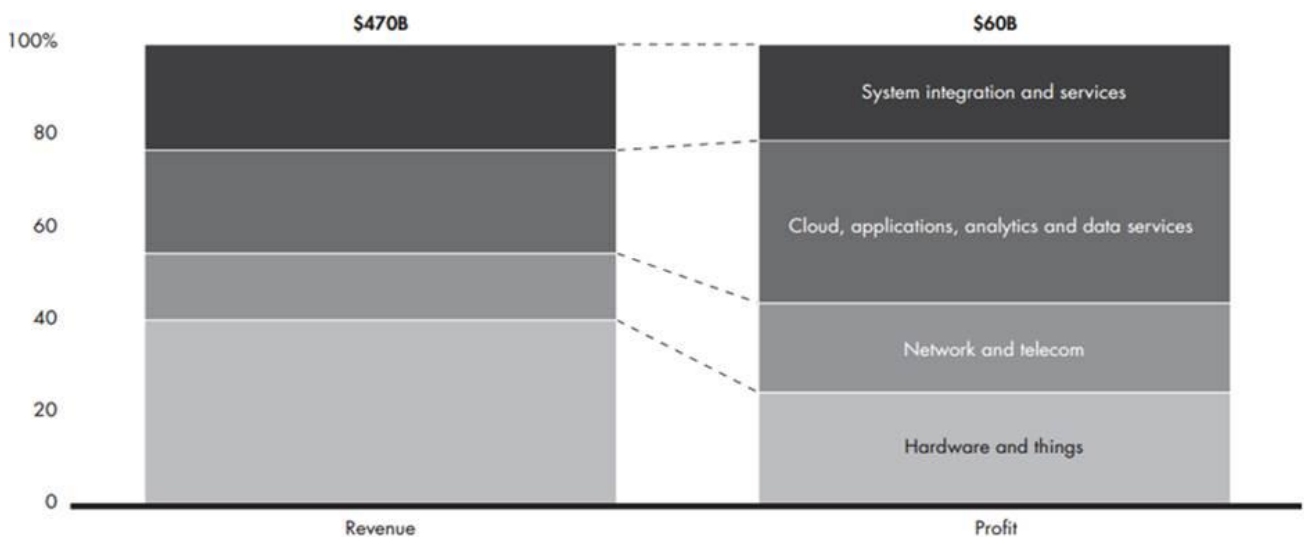


Figure 3.7: Projected Revenue and Profit related to IoT by 2020.

²¹ Source: <https://www.forbes.com/sites/louiscolombus/2017/12/10/2017-roundup-of-internet-of-things-forecasts/#4f0e4fee1480>

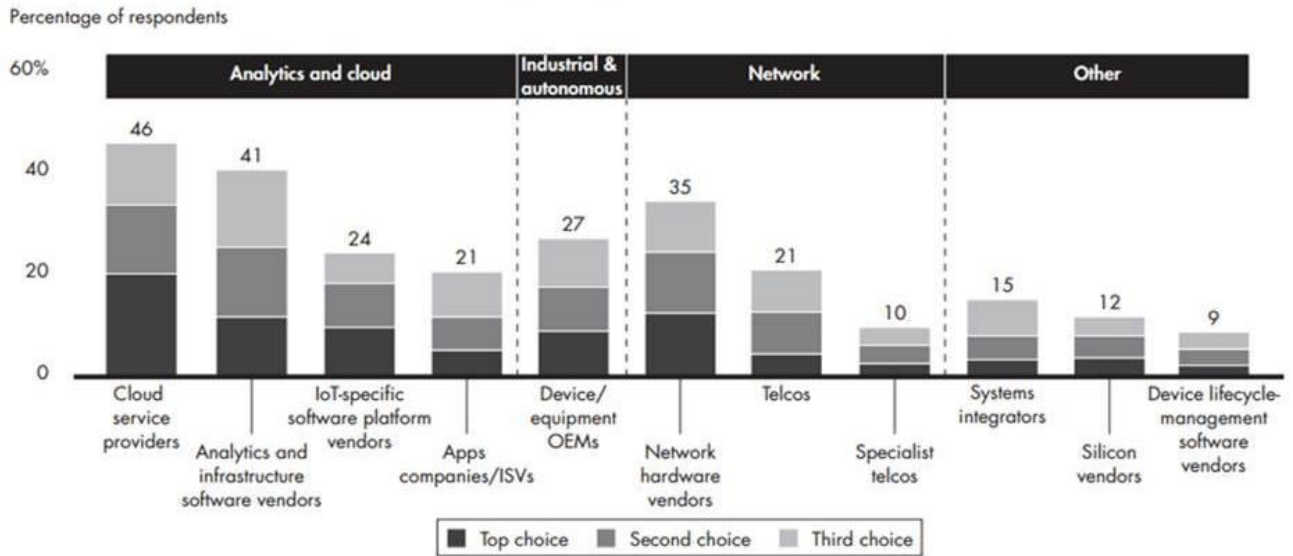


Figure 3.8: Influence over the choice of IoT Products and Solutions

IoT Endpoint Spending Category (\$ billion)	2014	2015	2016	2020
Consumer	257	416	546	1.534
Business, Cross – Industry	115	155	201	566
Business, Vertical – Specific	567	612	667	911
Grand Total	939	1.183	1.414	3.010

Table 3.4: IoT Global Spending by Category²².

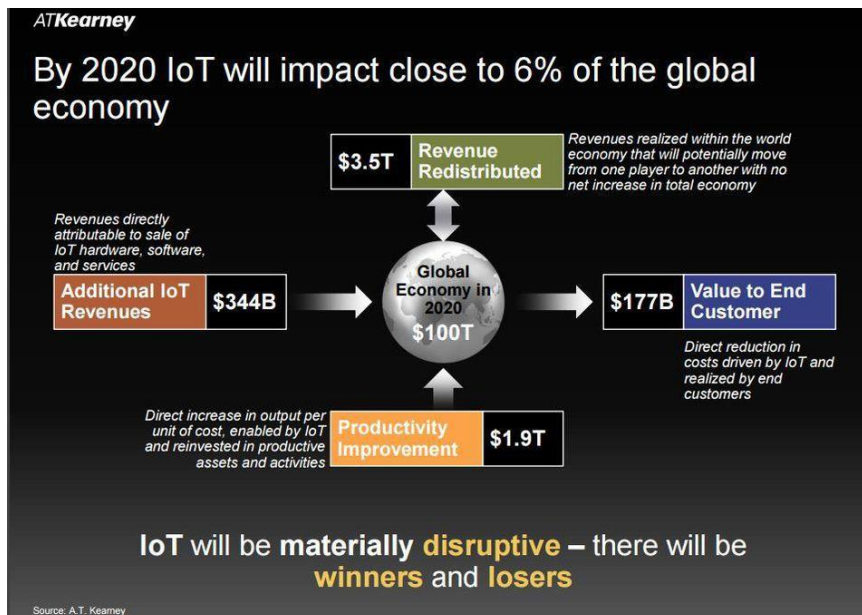


Figure 3.9: IoT Impact on Global Economy by 2020.

²² Source: Gartner, November 2015.

Based on the presented insights, the future of IIoT application and service providers appears to be very promising and their impact on customers' perception of value is very strong. Moreover, the analytics and data services are projected to deliver high profits, which combined with the projected spending for vertical – specific industry solutions, make for a very appealing new business sector.

Additionally, the expected productivity increase and value to end customer are generally positive signs for the future demand of IIoT application and service solutions demand.

3.3.3 IIoT Market Size

Since the Greek IIoT market is in a very premature and experimental state, there are no solid estimations or actual track record of the relevant market size. Therefore, the IIoT market size will be estimated as the proportion of the full ICT market in Greece.

The Greek ICT market is calculated at approximately €6,203 billion in 2017²³. The information technology (IT) sector accounts for 30% of the total ICT market, while telecommunications accounts for the remaining 70%.

Furthermore, the IT sector breaks down in 3 subsectors, namely the IT hardware, services and business software. The IIoT market is a part of the IT services subsector, which based on the above data accounted for approximately €929 million in 2017.

Furthermore, according to IDC's IoT report, which was prepared for the European Commission in 2014, the baseline scenario by vertical market predicts that IIoT represents accounts for 24% of total IoT market in the EU, as presented onwards:

²³ Source: <https://www.export.gov/article?id=Greece-Information-and-Communications-Technology>.

Vertical Sector	2014	2020
Agriculture, construction, and mining	€ 7.311	€ 23.193
Business services	€ 28.334	€ 90.218
Communications	€ 37.388	€ 119.975
Education & Health	€ 22.060	€ 66.925
Finance	€ 73.709	€ 242.222
Local & Central Government	€ 49.742	€ 153.707
Manufacturing	€ 87.805	€ 286.539
Retail & Wholesale	€ 38.024	€ 124.412
Transport	€ 8.659	€ 27.728
Utilities	€ 10.630	€ 39.668
Others	€ 2.330	€ 7.017
Total	€ 365.992	€ 1.181.603

Table 3.5: EU's IoT Market Size and Forecast – Baseline Scenario by Vertical Market (in € million)²⁴.

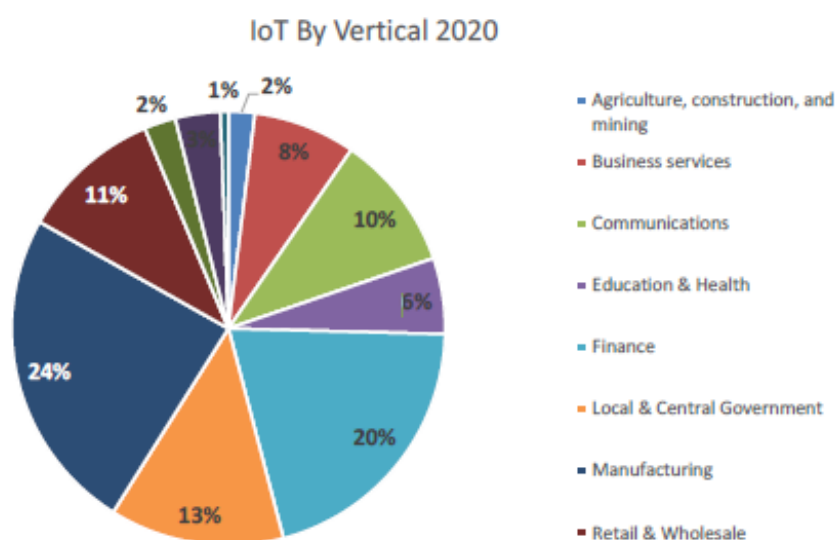


Figure 3.10: EU's IoT Market Size and Forecast – Baseline Scenario by Vertical Market²⁵.

Finally, the IoT market proportion with respect to IT services sector has been globally reported to be equal to 17,5% and simultaneously demonstrates a steady Compound Annual Growth Rate (CAGR) of 18%, between 2015 and 2020²⁶.

²⁴ Source: IDC 2014.

²⁵ Source: IDC 2014.

²⁶ Source: "How innovation accelerators will drive global ICT growth", David H Deans, Cloudtech, 2017

Therefore, the estimated Greek IIoT market size is close to 39 € million. Of course, this figure represents the hidden opportunity regarding serving the whole industrial manufacturing sector of Greece.

Taking into consideration the fact that the Plastics & Rubber Manufacturing sector accounts for approximately 4,38% of the total industrial sector's revenues²⁷, it is safe and conservative to assume that the size of the niche Plastics & Rubber Manufacturing IIoT market sums up to 1,7 € million.

Finally, based on IDC's market size forecast for Central Eastern Europe (CEE), the projected IoT revenues of IIoT can be calculated, which are presented below:

CEE	2013	2014	2015	2016	2017	2018	2019	2020	CAGR
IoT Installed Base (billion devices)	0,3	0,3	0,4	0,5	0,6	0,7	0,8	0,8	15,0%
IoT Revenues (€ million)	57,9	69,0	81,9	96,4	115,0	140,0	172,9	217,1	20,8%

Table 3.6: Central Eastern Europe's IoT Installed Base and Revenues Forecast²⁸.

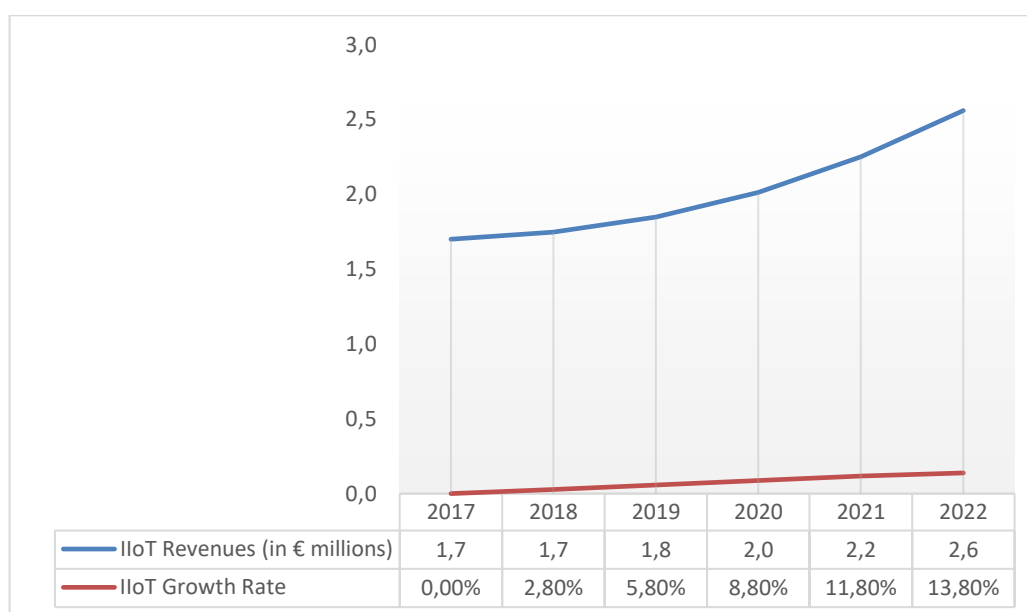


Figure 3.11: Greece's Plastics & Rubber IIoT Revenues Forecast.

²⁷ Source: "Manufacturing products survey 2016", Hellenic Statistical Authority, 2016.

²⁸ Source: IDC 2014.

Figure 3.11 calculations have been made by taking into consideration the following assumptions:

- i. Estimated CAGR is 8,87%, reduced by 57,4% from IDC's estimate of 20,8%. This is based on the lagging adoption of IIoT by the whole Greek Industrial sector.
- ii. During 2018, minimal adoption of IIoT technology is expected, hence the growth rate is restrained at a conservative 2,8%.
- iii. The growth curve is gradually increasing for the next 4 years, based on the assumption that Greece shall proceed with the necessary digital transformation steps, according to SEV's (Hellenic Federation of Enterprises) Special Report on National Digital Strategy²⁹

3.3.4 IIoT Market Share

As already mentioned in the previous sections, there are no companies competing for the manufacturing industry IIoT market, therefore theoretically a first mover could take up to 100% market share.

Moreover, a first mover in the niche Plastics & Rubber manufacturing subsector would most certainly achieve taking 40% to 60% of market share and establish itself as the industry standard.

²⁹ Source: "Digital Greece – The way towards Growth", Accenture, 2017.

3.4 SWOT Analysis

3.4.1 Introduction to Environmental Scanning

Every organization develops and operates inside a complex political, economic, societal, technological, legal and natural environment. This complex entity practically defines the operational framework of each organization, thus shaping their corporate and business strategies.

This external environment comprises variables (Opportunities and Threats) that are outside of the organization and most often out of its control.

Moreover, the *external environment* consists of three discrete components:

- i. *Natural Environment*: It includes the physical resources, the wildlife, the climate and everything that comprises the ecological system of interrelated life.
- ii. *Societal Environment*: It includes the general forces that do not directly affect an organization's short-run activities, but influence its long-term strategic decisions. These main forces are the following:
 - Political and Legal forces that allocate power and provide the regulatory framework.
 - Economic forces that regulate the exchange of money, materials, energy and information.
 - Sociocultural forces that regulate the ethical values and customs of society.
 - Technological forces that generate problem-solving inventions, aimed at improving the welfare of society.
- iii. *Task Environment*: It includes all the factors that are directly affecting and are affected by an organization. These factors, commonly referred as stakeholders, are the government, the local community, employees and labor unions, competitors, suppliers, special-interest groups, clients, creditors and shareholders.

Further to the external environment of an organization (in our case an company), there is also its internal environment, which consists of variables (Strengths and Weaknesses) that are within the organization and are not usually with its short-run control.

The *internal environment* consist of three discrete components:

- i. *Corporate Structure*: It describes the basic organization structure, by defining the chain of command from top to bottom.
- ii. *Corporate Culture*: It includes the beliefs, expectations and values shared by the organization's members.
- iii. *Corporate Resources*: It includes the organization's assets, whether tangible, intangible or human.

By analyzing the complex and multidimensional external and internal environments, an organization can identify key strategic factors that will assist in taking the correct strategic decisions and shape its strategy formulation, implementation and evaluation. This process is called environmental scanning and a simple way to conduct is through SWOT analysis, which combines the information from the external and internal environment and summarizes it in a simple chart of Strengths, Weaknesses, Opportunities and Threat.

In the following sessions the SWOT analysis of “Smart Amplify” shall be presented.

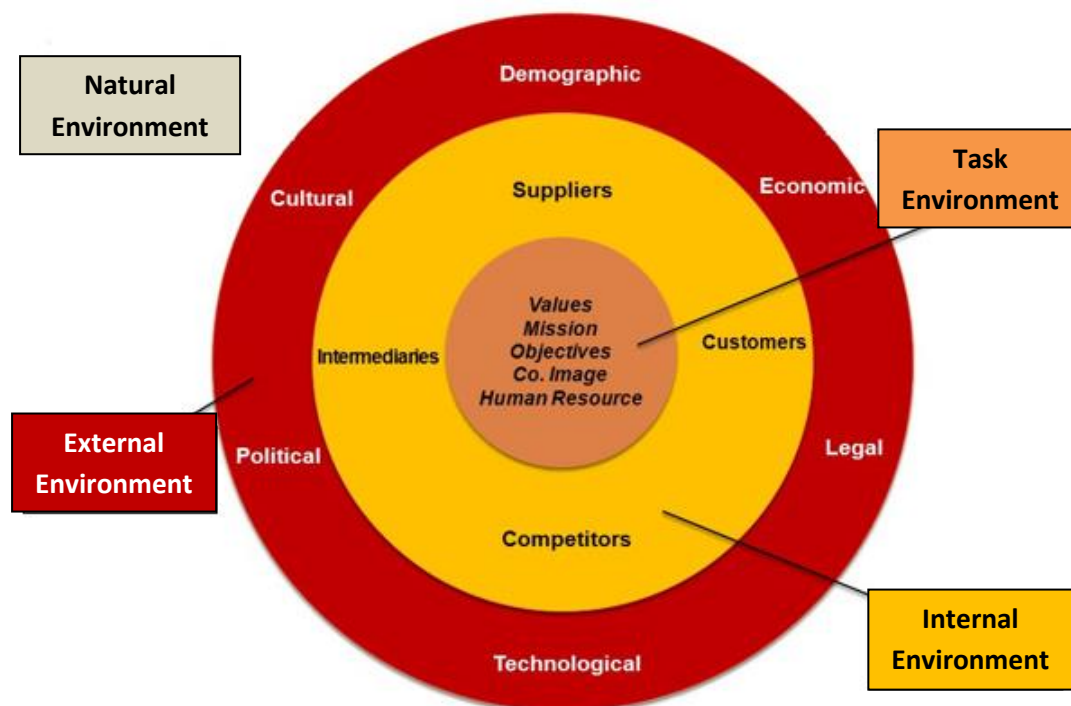


Figure 3.12: Business Environment Variables.

3.4.2 Societal Environment – PEST Analysis

The scope of a PEST analysis is to identify the key macro-economic strategic factors that influence the long-term strategic decisions of an organization. The analysis of the societal environment of “Smart Amplify” is presented onwards.

3.4.2.1 Political

The political situation in Greece remains almost the same during the past 9 years of recession. The current government enjoys only a marginal parliament majority and the signing of the third Memorandum with its lenders in 2015 has increased the general dissatisfaction of the Greek citizens towards the political system and its representatives. On the other hand, the current government has managed to accelerate the so-called “Adjustment Program Evaluations” during the past two years, thus gradually regaining the trust of its lenders, following the recent crisis of the referendum and capital controls imposition in 2015.

In any case, the current government has shown signs of fatigue, from voting and implementing legislation which suppresses the private and public income and other important state functions, such as public healthcare and academic education.

Aside from the above, the third Memorandum is officially ending in August, which shall mark a new era for the country, by returning to a state of “normality”; even though the superintendence by the EU shall remain, for at least 4 years.

Another important issue is the timing of the next elections in Greece, which is something that the current government is pondering. The reason is that the government has signed an agreement to further reduce the pensions by a significant margin, starting from January 2019 and thus is considering the possibility of the elections taking place during fall 2018, instead of the September of 2019.

Moreover, the government has agreed and signed for sustaining a primary surplus of 3,5% GDP until 2022, which might impose further austerity measures, mostly targeted at the middle class.

The above facts are a destabilizing factor, which the main opposition is taking advantage of, by blaming the government for inefficiency in all sectors and asking for elections as soon as possible.

The main opposition party, New Democracy, has been steadily ahead of the current Government party (Syriza) in the recent opinion polls and thus presses for imminent elections, in order to capitalize on the current momentum.

Nevertheless, historically the elections' preparation periods have proven to negatively impact the private business sector, due to the still strong connection between the Greek economy and public projects that historically go hand-to-hand with each government. Overall, the current political situation can be characterized as quite stable, especially with regard to previous years (i.e. from 2012 to 2015) and this is expected to have a proportionate positive impact in major economic aspects, such as private consumption and foreign investments. Consequently, the expectations of the ICT business sector are quite optimistic for the following years, despite the concerns of short-term demand and current fiscal policy for companies.

3.4.2.2 Economic - Legal

The Greek economy is the fourteenth largest in the world and the seventeenth largest in the EU, as of 2017. Greece is a developed country whose economy is based on the Services and Industrial sectors, accounting for 82,8% and 13,3% respectively³⁰.

The Greek economy has suffered due to the Greek public debt crisis, which has led the economy to a sharp downturn, which started from 2008 and resulted in a cumulative GDP decline of -29,5%, up to 2016.

The consequences of this long lasting recession were tremendous and multidimensional, such as:

- Reduction of private and public consumption.
- Increased taxation.
- Reduction of per capita income and deterioration of the standard of living.
- Shrinkage of the industrial sector, partly due to increased taxation, but also from the lag in modernization initiatives and the lack of liquidity, as a result of the severe damage that the banking sector received during the recession period.
- Reduced revenues for public funded insurance and healthcare, due to the vastly increased unemployment rates, combined with the steep salary reduction for both public and private sectors.

³⁰ Source: [https://en.wikipedia.org/wiki/Economy_of_Greece#cite_note-World_Bank_GDP_\(nominal\)-4](https://en.wikipedia.org/wiki/Economy_of_Greece#cite_note-World_Bank_GDP_(nominal)-4)

- The country and its banking system have been several times demoted in the credit rating systems of the Big Three credit agencies (Moody's, S&P and Fitch), which resulted in increased suspicion from the country's lenders and had a negative impact on potential investors.
- Severe reduction of banking business loans, due to the increase in "Red" loans, which severely impacted the liquidity of the banking sector and due to the increased risk of the loaned companies' inability to cover their debt obligations.

Regarding other macro-economic indices, the Greek inflation rate (based on Consumer Price Index) was on average 1,12% in 2017 and is forecasted at around 0,4% for 2018 year-to-date³¹.

Another important component is the current business loan interest rates, which fluctuate in a range from 5,85% to 6,45% (Nominal Annual Interest Rate)³² and are vastly higher than the average value of 1,82% in EU³³ (2017).

Nevertheless, following the actions that were performed during these years, either political, austerity, legal and fiscal, as of 2018, the general climate seems to be getting slightly more optimistic.

The reforming of the banking system, along with the capital support it has received, has been playing a significant role towards the restoration of trust regarding the future of the Greek economy.

Moreover, the commitment of the Greek governments to continue achieving positive primary surpluses until 2022 makes the country more attractive to potential investors. Finally, all the legal measures that are interrelated with economic ones, are also contributing to a new era of financial stability and slight growth for the country; yet the legal framework is still severely lacking in terms of enabling the digital transformation of the state and private sector.

One thing that remains to be seen is the country's exit to the global markets once again, following the end of the third Memorandum and how its reception will be. In any case, the current economic situation is considered to be steadily recovering and the current stability is expected to have a positive impact for the growth of ICT services and IIoT applications and services in specific, during the next 2 -3 years.

³¹ Source: <https://tradingeconomics.com/greece/inflation-cpi>

³² Source: <https://www.nbg.gr/en/corporate/short-term-lending#>

³³ <https://www.ecb.europa.eu/press/pdf/mfi/mir1704.pdf>

3.4.2.3 Social

The Greek debt crisis has severely impacted the society on many aspects. The long crisis combined with an ineffective social protection systems resulted in a surge of poverty, especially for families with children, young people and unemployed. In-work poverty has also increased, as a result of the vast salary cuts that were imposed especially in the private sector, leading to an income inequality between the private and public sector.

Moreover, the surge of unemployment, from 12,7% in 2010 to 23,5% in 2016, has further impacted the general social “feeling”, by building up economic and psychological pressure, which in turn has increased the pessimism of the people towards their future and has cultivated a general distaste and mistrust towards the Greek governments, the country’s lenders and EU in general.

To this end, the “brain drain” effect was created, in which a lot of well-educated youngsters decided to emigrate abroad for economic purposes, which are estimated to be from 350.000 to 427.000 between January 2008 and June 2016³⁴.

The above developments had a serious impact on the country’s demographics. More specifically, the ratio of births versus deaths in Greece has deteriorated, from -13.97% in 2012, to -21.78% in 2016. In addition, the number of divorces has been gradually increasing since 2010, which is also partly affected by the Greek debt crisis and the reduced income of married couples.

During the past 10 years, the social cost of fiscal measures was tremendous, especially regarding the standard of living and welfare of the Greeks. The access to public healthcare has been reduced, due to government spending reductions and the decrease of operational staff in healthcare staff.

The same is true for education, with many children not being able to study in their scientific field of preference, in places other than their home city, due to economic reasons.

Nevertheless, the young Greek personnel, of age up to 45 years old, is well educated and highly skilled in various business sectors, such as ICT and Finance. Provided that the Greek state manages to push forward with the digital transformation of the country and create the proper conditions for the private sector to grow and modernize, most of

³⁴ Source: “Greece’s Economic and Social Transformation 2008-2017”, Published by MDPI, January 2018

this valuable personnel is expected to return to Greece and contribute their skills, expertise and experience into the creation of highly competitive and innovative SMEs, that shall offer new value streams for the traditional industrial and commercial enterprises.

3.4.2.4 Technological

As already mentioned in section 2.3, Greece belongs to the low performing countries of EU, being at the 26th spot out of 28 EU Member States. Regarding broadband connectivity, there is wide availability from ICT companies, yet the utilization of high technology solutions is rather slow. A major factor impacting this transition is the relatively high cost of these solutions.

In 2016, in the context of the ex-ante Conditionalities of the European Structural and Investment Funds (ESIF), the Greek Government set up in May a General Secretariat for Digital Policy, responsible for policy-making, design, overall coordination and monitoring of implementation of the ICT investments in the country. This triggered the creation of a new Ministry for Digital Policy, Telecommunications, and Media in November 2016. Greece has also updated its National Digital Strategy, set up a new governance structure, and developed a new framework for the development and implementation of ICT projects. As such, Greece is at a very early stage in implementing the roughly EUR one billion investments planned for ICT investment under ESIF for the period 2014-2020.

Regarding Human Capital and especially ICT specialists, the country remains below the average of EU, but is slowly progressing. A promising sign towards progress is that the number of Science, Technology, Engineering and Math (STEM) graduates remains relatively high. If Greece manages to address the “brain drain”, from which it suffers for the past 9 years, then the theoretical technological gap can be shortened and the digital transformation of Greece will develop faster. Moreover, Greece must prioritize on building digital skills capacity with industrial relevance, which will be critical for the competency and innovation generation of the Greek industrial sector.

Regarding the National Digital Strategy of Greece³⁵, it is based on four main pylons:

- i. *Implementation of the basic prerequisites*
 - Development and implementation of a Digital Governance model.
 - Update of the legal framework regarding open data, e-privacy and cybersecurity.
 - Further development of national communications infrastructure.
 - Strengthening of digital skills provided through all the gradients of educational system.
- ii. *Digital Governance – State 2.0*
 - Digitization of public services to citizens and enterprises.
 - Reengineering and simplification of public sector’s internal processes.
 - Upgrade of the state’s project specifications modeling programs.
 - Training of public services’ personnel in digital technology.
- iii. *National sectoral specific actions towards the creation of competitive advantage*
 - Actions and initiatives towards the digital transformation of the four main sectors:
 - i. Traditional sector (Mining and Quarry).
 - ii. Oil and Natural Resources.
 - iii. Customer facing industry (FMCG and Tourism).
 - iv. Digital Accelerators (Banking, Business and ICT services).
- iv. *Creation of a Greek Digital Hub with an international presence*
 - Reformation and update of the required legal framework.
 - Introduction of a structured model for governance and cooperation with the Hub members.
 - Design and implementation of a strategy focused on digital talent acquisition and development.

³⁵ Source: “Special Report – Digital Strategy”, Published by SEV, 2017.

Supposing that the National Digital Strategy will be implemented without significant delays, the DESI of Greece is expected to increase from 17,8 to a range of 22,8 to 25,8, until 2021. Additionally, the expected increase of GDP is ranging from 2,6% to 4,0% (€4,9 billion to € 7,6 billion).

Finally, the Greek ICT technological sector is expected to follow the global trend, which focuses on the development of new companies providing solutions, such as mobile applications, cloud computing, social media and Big Data analytics. These companies are representing the new philosophy in business management, where the high level executives have realized that it is more efficient and effective to outsource functions that do not offer them any competitive advantage and additionally allow them to save precious company resources.

Regarding the Greek manufacturing sector, it is expected to take the next step towards IIoT technology, such as asset tracking, asset management and predictive maintenance and take advantage of the new possibilities and financial benefits of these emerging technology solutions, in the medium term (1 to 3 years from 2017).

3.4.3 Task Environment – Porter’s Five Forces Analysis

The scope of a Porter’s competitive analysis is to identify the key micro-economic elements within an industry or strategic group, which determine the overall attractiveness of this industry or group, in terms of long-term profitability.

The tool was created by Michael Porter, an authority on competitive strategy and is based on assessing the 5 forces which are impacting the industry under consideration. The Porter competitive analysis of the task environment of “Smart Amplify” is presented onwards.



Figure 3.13: Porter's Five Forces driving Industry Competition³⁶.

³⁶ Source: <https://www.business2community.com/marketing/use-porters-five-forces-widen-view-competitive-forces-01010538>

3.4.3.1 Task Environment – Threat of New Entrants

New entrants to an industry bring to it additional resources, increased capacity and desire for market share. Therefore, the new entrants are considered a threat to already established companies in the industry. In order to proceed with the relevant analysis, the most important entry barriers have to be investigated:

- *Economies of Scale*

In the IIoT application and service industry, there are high economies of scale, which are realized by aggregating the customers onto a uniform structure. Therefore, a well-established player in the industry with a strong customer base can theoretically enjoy a lower Average Cost of Service (ACS), which in turn allows for higher profits or discounts to selected customers. Therefore, the economies of scale pose a strong entry barrier to new entrants.

- *Capital Requirements*

The capital required in order to enter the IIoT industry is not significant, since an IIoT application and service provider is a company that does not require any manufacturing facilities, but relies on its human workforce in order to generate and deliver value to its customers. Therefore, the capital requirements do not pose an entry barrier to new entrants.

- *Product/Service Differentiation*

The core competency of an IIoT application and service provider is the differentiation of its solutions, through which they are delivering added value to their customers. The fact that the differentiation of products/services in the industry is very high, combined with long-term relationships with customers (most usually committed by medium term Service Level Agreements – SLAs), serve as a major entry barrier to new entrants.

- *Access to Distribution Channels*

The common distribution channels of the industry are the human workforce (sales personnel) and advertising through the internet, hence they are not exclusive to already established industry players. Therefore the access to distribution channels is not considered an entry barrier to new entrants.

- *Cost disadvantages independent of size*

The already established industry players enjoy the advantage of having mastered the learning curve of developing customer – tailored solutions, therefore they can achieve economies of scale and establish strong customer relationships. Therefore, this category is considered as a strong entry barrier to new entrants.

- *Government Policy*

At the time, there is no specific government policy restricting access to the IIoT industry and none is scheduled for the future. Therefore, this category does not serve as an entry barrier to new entrants.

Overall, based on the above analysis, the threat of new entrants is considered to be low in the IIoT industry.

3.4.3.2 Task Environment – Buyers’ Bargaining Power

Buyers affect an industry through their ability to force down prices, bargain for price discounts or better quality of service and indirectly force their suppliers into price competition. In order to proceed with the relevant analysis, the most important buyers’ related factors have to be investigated:

- *Customer Concentration*

The customer base is highly concentrated, as already mention in section 3.1.2. Each one of these few companies in the Plastics & Rubber manufacturing market shall invest (CAPEX) and spend (OPEX) a lot of money for IIoT solutions, therefore they have sufficient power over their suppliers and service providers.

- *Product/Service Differentiation*

The IIoT product/service hybrid solutions are heavily differentiated and customized, therefore this weakness the position of buyers against their suppliers and service providers.

- *Product/Service Differentiation*
The IIoT product/service hybrid solutions are heavily differentiated and customized, therefore this weakens the position of buyers against their suppliers and service providers.
- *Switching Cost*
Since the provided IIoT solutions are customer-tailored, the bargaining power of buyers is weakened.
- *Customer Profits*
The potential direct or indirect financial savings of IIoT solutions are significant, thus providing modest to high profits for the buyers and even their customers, depending on the scale of IIoT integration in their daily operations. Therefore the buyers' bargaining power is weakened.
- *Buyers' Backwards Vertical Integration Capability*
The IIoT solutions are enveloping cutting edge technology, brilliant software developers and industrial process experts. This high-end mixture is very difficult for a Plastics & Rubber manufacturer to accomplish and is normally out of its capabilities and scope of existence. Therefore, the very low probability of backwards vertical integration capability weakens the buyers' bargaining power.

Overall, based on the above analysis, the buyers' bargaining power is considered to be low in the IIoT industry.

3.4.3.3 Task Environment – Threat of Substitutes

A substitute is a product that is considered different by the eyes of the customer, yet fulfills the same needs as another product. The main threat of substitute products is that they can limit the profitability of other competing products by indirectly imposing a sales price cap.

Traditional technology industrial systems can be considered as substitutes of IIoT applications and services, such as SPC software, inline measuring systems and ERP integration into production KPIs. Nevertheless, these traditional solutions do not pose a significant threat to smart connected solutions, since they are not able to offer the

superior performance, functionality, customization and value that IIoT solutions offer. Therefore, the threat of substitutes is considered to be very low.

3.4.3.4 Task Environment – Suppliers’ Bargaining Power

Suppliers affect an industry through their ability to increase prices or reduce the quality of their products/services or even through forward vertical integration. In order to proceed with the relevant analysis, the most important buyers’ related factors have to be investigated:

- *Supplier Concentration*

The suppliers’ market of IIoT hardware and software (PaaS) is highly concentrated and populated by large multinational enterprises, such as IBM, General Electric, Intel, Siemens, Microsoft and Amazon, who are the pioneers of the global digital transformation. Therefore, the suppliers have a strong position against their customers.

- *Product/Service Differentiation*

The IIoT hardware and software (PaaS) solutions are moderately differentiated and customized, mostly in terms of background supported technology, network protocols and billing schemes. Therefore this element is not a strong bargaining factor.

- *Switching Cost*

Most of the IIoT hardware solutions do not embrace an open architecture, therefore they can easily lead to a vendor lock-in.

Regarding software platforms (PaaS) solutions, most of them can be easily switched (i.e. Microsoft’s Azure, Amazon Web Services and IBM Cloud), since they are fully open by design. There are other less flexible cases, such as the Predix Platform of General Electric.

On the other hand, the PaaS solutions are moderately differentiated in various aspects, such as storage, payment plans and security technology, which impacts the easiness of switching.

- *Suppliers' Forward Vertical Integration Capability*

The IIoT hardware providers already offer industry-agnostic solutions, which can at the same time cover all possible customer specific applications. Entering the SaaS market would be very difficult and most probably inefficient, since it requires special software development workforce and people with high expertise on the specific field of Plastics & Rubber Manufacturing.

The IIoT PaaS solution providers do possess the programming knowledge, infrastructure and personnel, yet they lack the expertise on the specific field. It is highly improbable for them to specialize on the specific sector, due to its relative size and potentiality and is generally considered to be out of their scope. Therefore, the IIoT service solution' suppliers are theoretically considered capable of forward vertical integration, yet not interested in doing so, due to major inefficiencies and uncertain Return on Investment (RoI) behind that feat.

- *Customer Importance to Supplier*

The IIoT application and service providers of Plastics & Rubber manufacturing are only a marginal portion of the total IIoT goods and services offered by the suppliers, thus they are quite unimportant to them.

Overall, based on the above analysis, the suppliers' bargaining power is considered to be high in the IIoT industry.

3.4.3.5 Task Environment – Rivalry among Existing Competitors

In almost any industry, the enterprises are mutually dependent, whereas one's competitive action is expected to have a noticeable effect on its competitors. In order to proceed with the relevant analysis, the most important buyers' related factors have to be investigated:

- *Number of Competitors*

The number of competitors is practically zero, as already mentioned in section 3.1.3. Thus, the niche Plastics & Rubber Manufacturing IIoT market is not a field of fierce competition.

- *Market growth rate*

The estimated growth of the Plastics & Rubber Manufacturing IIoT market is at 8,87% (CAGR), which is considered high enough and increases the overall attractiveness of this niche market.
- *Amount of Fixed Costs*

The fixed costs of the IIoT industry in general are considered moderately high, due to the relatively high personnel cost.
- *Diversity of Competitors*

The diversity of the overall IIoT market competitors is moderate to high, based on their offered solutions, especially for smart energy and waste management. Regarding the Plastics & Manufacturing market, there are no competitors, hence this factor is deemed irrelevant.
- *Switching Costs*

Even though currently the IIoT market is quite small, the differentiation among the offered solutions results in increased switching costs. The same is expected for the niche Plastics & Rubber Manufacturing market in the middle to distant future.
- *Exit Barriers*

The exit barriers of an IIoT application and service provider are considered low, since they usually cooperate with their major suppliers (PaaS providers) on a “pay-as-you-go” basis. Therefore the only major exit barrier is the usually medium-term SLAs that they contract with their customers.

Overall, the rivalry among for IIoT application and service providers is considered low to moderate.

3.4.3.6 Task Environment – Conclusions

Based on the aforementioned analysis, the Plastics & Rubber Manufacturing IIoT industry is considered to be attractive and highly promising for the first companies who enter it and manage to establish themselves.

3.4.4 SWOT Analysis Conclusions

Based on the PEST and Porter's five forces analyses, the relevant potential Threats and Opportunities have been identified. Additionally, based on the profile of "Smart Amplify"'s founding members profile, the relevant Strengths and Weaknesses of the project can be extrapolated.

The results are presented onwards:

- *Strengths*
 - i. Use of cutting edge technology, thus providing high added value to its customers, while at the same time being difficult to imitate.
 - ii. Extended expertise in the field of Plastics & Rubber Manufacturing, which aids in the development of on-point customer tailored services.
 - iii. Knowledge of the customers' market, since one of the founding member has over 2 years in the Plastics & Rubber Manufacturing market and is a member of AHPI, thus helping with the company's introduction and marketing boosting of its solutions to the customers.
 - iv. The offering of a wide product/service gamut, covering all the production and maintenance functions of a Plastics & Rubber manufacturing plant, which can also be heavily customized according to the needs and wants of each customer.
 - v. The corporate culture of the founding members, focused on innovation, socialization and motivation of its people and the facilitation of coordination and control.
 - vi. Knowledge and experience with Lean Six Sigma, providing the ability to create a leaner working environment and procedures and reduce potential sources of waste.
- *Weaknesses*
 - i. Initially steep learning curve of developing the offered solutions.
 - ii. High training cost of its personnel, due to the need for continuous follow-up of the IoT technologies and platforms.
 - iii. Lack of external funding sources, such as European Partnership Agreement 2014-2020.
 - iv. No marketing experience of the founding members.

- *Opportunities*
 - i. New market opportunities, though the introduction of disruptive business models.
 - ii. Market gap in the industrial manufacturing sector in general, regarding IIoT application and service providers.
 - iii. Expected skyrocketing of IoT hardware availability with reduced prices until 2020.
 - iv. Integration of digital technologies by businesses is gradually increasing, as proven by the historical development of DESI.
 - v. Realization of Greek National Digital Strategy, which will favor those already in IIoT business.
 - vi. Growing government support of digital transformation.

- *Threats*
 - i. Lack of IoT “ready” software developers in Greece.
 - ii. No distinct regulatory framework as of yet.
 - iii. Lack of global IoT standardization.
 - iv. Greece remains as one of the worst performers in digital transformation in the EU.
 - v. Cybersecurity concerns are not yet resolved by the global IIoT industry.
 - vi. Governmental signs of fatigue, due to continuous fiscal measures, which may impact the medium term support to the IIoT market.
 - vii. High taxation for companies, combined with high bureaucracy.
 - viii. Greek economy is still in a stalled state, which suppresses private business initiatives.
 - ix. Plastics & Rubber manufacturing companies remain in a continuous spiral of market shrinkage, which may impact their willingness to invest as well as their payment credibility.

3.5 Outline of Project Strategy

Following the SWOT analysis, the next step is to determine the project's strategy. The process of strategy formulation includes the investigation, analysis and decision making that provides the company with the criteria for attaining a competitive advantage. The strategy is a master approach that determines how the company will achieve its mission, objectives and policies of the company in order to maximize its competitive advantage and minimize its competitive disadvantage.

There are three layers of strategy:

- i. *Corporate Strategy:* It determines the overall direction in terms of general attitude towards growth and management of the various functions and/ business units. The main categories are stability, growth and retrenchment.
- ii. *Business Strategy:* It occurs at business unit or product/service level and emphasizes on the improvement of the company's solutions' competitive advantage, in a specific industry or market segment which is served by the business unit of the company. It is also referred to as competitive strategy.
- iii. *Functional Strategy:* It determines the approach that a functional area of a business takes in order to achieve its corporate and business objectives and strategy, by maximizing the available resources' productivity. It involves the development and nurturing of a distinctive competency which can potentially evolve into a competitive advantage.

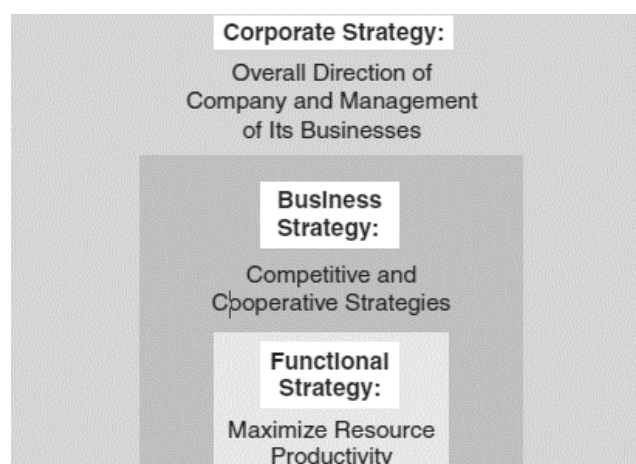


Figure 3.14: Hierarchy of Strategy³⁷.

³⁷ Source: "Concepts in Strategic Management and Business Policy", Published by Pearson, 2015.

In the following sessions the corporate and business strategies of “Smart Amplify” will be presented. The functional strategy and especially the Marketing strategy will be analyzed in a separate section of this study.

3.5.1 Corporate Strategy

Based on the SWOT analysis, the attractiveness of the IIoT market and the competitiveness of “Smart Amplify”, granted by its first mover advantage, the corporate strategy to be followed will be growth oriented.

		Competitive Position of Company		
		High	Medium	Low
IIoT Market Attractiveness				
	High	X		
	Medium			
	Low			

Figure 3.15: Corporate Strategy of “Smart Amplify”.

The growth strategy shall be implemented through the relevant investments in expert software development personnel, in marketing plans and other key factors that will aid in the establishment of “Smart Amplify”’s solutions as the industry standard.

3.5.2 Business Strategy

The company’s business strategy shall be focused on the niche market of Plastics & Rubber Manufacturing IIoT applications and services, with its competitive advantage coming from the differentiation of its services, thus providing unique and superior value to its customers.

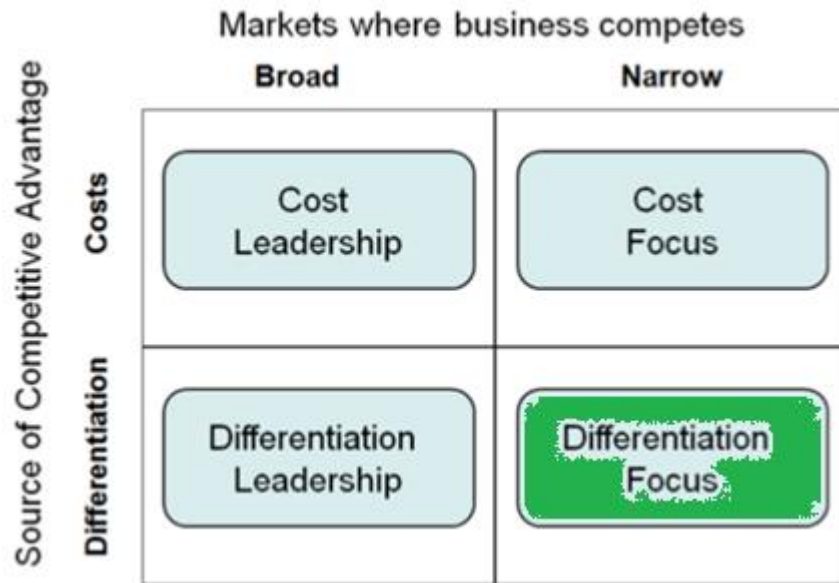


Figure 3.16: Business Strategy of “Smart Amplify”.

In order to achieve a successful differentiation strategy, “Smart Amplify” requires strong marketing potential, customers with high purchasing power and open to disruptive changes in their operations function and good cooperation with their customers and distribution channels.

Further to the above, “Smart Amplify” shall have to identify and promote the right core competencies of its solutions, in order to transform them into potential sustainable competitive advantages, according to the VRIO framework.

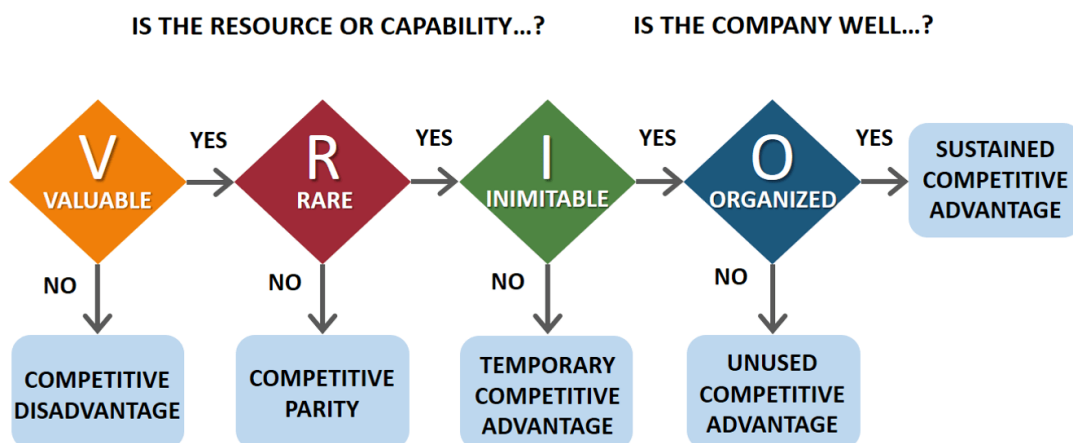


Figure 3.17: VRIO framework³⁸.

³⁸ Source: <https://www.business-to-you.com/vrio-from-firm-resources-to-competitive-advantage>.

3.6 Marketing Strategy

Marketing strategy is a long-term, forward looking approach, which deals with pricing, selling and distributing a product or service and aims to achieve a sustainable competitive advantage. Another definition of marketing strategy refers to the initial planning and organization of a company that aims to penetrate a specific market. In the following sessions, the marketing strategy of “Smart Amplify” shall be presented.

3.6.1 Marketing Scope & Objectives of “Smart Amplify”

The company’s scope is to offer customer-tailored industrial IIoT application and services in the niche market of Plastics & Rubber manufacturing. One of its core objectives is to be the first company to offer such solutions and therefore gain a vast market share and establish its brand as the “de facto” solution provider of the relevant niche market.

In order to achieve the above, “Smart Amplify” shall provide solutions (SaaS and consulting services) that offer added value to their customer, through the use of cutting edge IIoT technology and the company’s expertise and proven experience on the Plastics & Rubber manufacturing. The key enabler for this to work is the strong relationships and cooperation with its customers, in order to develop applications and offer services that unlock the previously unseen and unutilized potential they possess. During the first two years of existence, the company aims to create and develop the market and a healthy customer base that will allow it to absorb the initial investment cost and serve as the main foothold for its further expansion and solutions’ development.

3.6.2 Market Segmentation

The people behind “Smart Amplify” are well aware that their IIoT solutions cannot be “all things” to all their customers. Therefore, the right course of action is to identify the different subgroups of customers inside the Plastic & Rubber Manufacturing industry and approach them with a different marketing mix that will satisfy their needs in a better way (Segment Marketing.).

The market segmentation shall take place based on behavioral and non-behavioral characteristics. The non-behavioral criteria will be demographic, such as the yearly turnover of the customer, its market share, its capital expenditure profile and its manufacturing capacity.

The behavioral criteria shall be loyalty and usage rare related. Regarding the usage rate, the market shall be divided into high buyers and low buyers. As for the loyalty status, the market shall be divided into relationship seekers and non-relationship seekers.

Overall, the Plastics & Rubber Manufacturing IIoT market shall be segmented into two main categories:

- i. Expected high usage buyers, with an annual turnover over €15 million, with a CAPEX proportion greater than 10% of annual turnover and a market share higher than 20% in their respective submarkets. The above profiled customers are also considered as relationship seekers. Their total turnover is at €643 million out of a total of €787³⁹ million and the segment comprises 16 companies.
- ii. Expected low usage buyers, at least initially, with an annual turnover below €15 million, with a CAPEX proportion lower than 10% of annual turnover and a market share lower than 20% in their respective submarkets. The above profiled customers are also considered as non-relationship seekers and improbable to proceed with high investments in IIoT solutions. Their total turnover is at €144 million out of a total of €787 million and the segment comprises 59 companies.

The above market segmentation follows the basic criteria of being Measurable, Accessible, Substantial, Differential and Actionable, therefore it considered to be well established.

³⁹ Source: <http://www.inr.gr/?p=pet>, Data used from 2015.

3.6.3 Market Targeting

Following the market segmentation, “Smart Amplify” shall proceed with market targeting strategy. The most optimal strategy is differentiated or multi-segment strategy, as presented in the below figure:

Differentiated Market Targeting Strategy		
	Segment Nr.1 – High Usage	Segment Nr.2 – Low Usage
Product/Service Nr.1	X	
Product/Service Nr.2	X	
Product/Service Nr.3		X

Figure 3.18: Example of “Smart Amplify”’s multi-segment targeting strategy.

Based on the presented information, “Smart Amplify” shall deploy the following targeting strategy:

- *Segment Nr.1 – High Usage:* This is the main potential customer segment of “Smart Amplify”, where depending on each customer’s needs, the company shall promote its most advanced SaaS solutions. Moreover, the various SaaS modules may be implemented altogether or separately and be fully customized according to the needs of the customer.

Moreover, consulting services shall be promoted, with special emphasis on plant modernization audits and big data analytics pilot projects.

- *Segment Nr.2 – Low Usage:* This is the supplementary potential customer segment of “Smart Amplify”, where the company shall promote more basic solutions depending on the customer’s needs, such as small pilot project for asset tracking or predictive maintenance.

Moreover, consulting services shall be promoted, with special emphasis on small Lean Six Sigma projects, intended to deliver fast and meaningful results.

3.6.4 Market Positioning

Following the market segmentation and targeting, the next step is to define the marketing positioning, in order to create the right “image” in the customers’ minds that will incline them to purchase “Smart Amplify”’s offerings.

The scope of positioning is to clearly present the added value that their solutions provide and to that end, the proper positioning strategy is customer based (since “Smart Amplify” is the first mover in the market), focused on:

- i. Price & Quality of services offered, mainly for segment Nr.1.
- ii. Customer benefits and product attributes, mainly for segment Nr.2.

The underlined claim of the first position approach is the value for money, which will allow “Smart Amplify” to charge high prices for highly sophisticated and effective services.

The underlined claim of the second position approach is the customized benefit for each customer, which will potentially convince them to try out “Smart Amplify”’s solutions and reap the benefits of its SaaS solutions or consulting services.

The customer-centric philosophy of “Smart Amplify” shall complement its positioning strategy, in order to create and sustain a competitive advantage over its potential future competitors.

3.6.5 Smart Amplify’s Trademark

The trademark of the company shall unmistakably denote the identity of the product/service solutions and the organization behind them. Since the company is new, for the sake of corporate identity and brand awareness development, the trade mark chosen is “Powered by Smart Amplify®”. This trademark is short, identifies the provider and is connected with the nature of smart connected products and services.

This trademark refers to the SaaS solutions provided by the company, whereas for its consulting services the service mark will also contain the same text, “Powered by Smart AmplifySM”.

3.7 Tactical Marketing

Tactical marketing is a set of ongoing set of activities that an organization performs in order to achieve its marketing strategy objectives. These activities are part of a broader marketing framework, called the marketing mix, which aims at putting the right product/service at the right place, at the right time and at the right price.

The marketing mix for services comprises 7 dimensions, namely product, price, place, promotion, physical evidence, people and process and is referred to as the expanded 7Ps model. In the following sessions the 7Ps of “Smart Amplify” shall be presented.

3.7.1 Marketing Mix – Product

The company offers the following B2B solutions:

- i. Software as a Service Solutions (SaaS), in the form of flexible and customizable web-based applications, providing IIoT insights and interfaces for optimized assets monitoring, process control and decision making of plastics manufacturing plants.
- ii. Consulting services, consisting of conducting plant modernization audits and data analytics services to its customers.

A more detailed description of the abovementioned solutions is presented in the following sessions.

3.7.1.1 Predict® Platform

The Predict® Platform, is an end-to-end distributed application platform, optimized for high volume, low latency and analytics-driven outcomes. This highly sophisticated solution opens new revolutionary paths towards operational excellence, through the asset tracking and management, adaptive process control (APC), predictive maintenance, analytics and machine learning algorithms, while simultaneously ensuring the security, availability and integrity of the data in use.

The Predict® Platform is based on Microsoft’s Azure® IoT Platform (PaaS or Platform as a Service), which provides the most agile, comprehensive, secure and future-proof platform for developing IoT applications.

The Predict® Platform comprises different modules, which can be offered separately, based on customers’ needs and wants:

- *Asset Tracking*: This module, named Networx®, provides a better visibility of devices, assets and sensors inside the production shop floor. By offering the user a customized preconfigured remote monitoring solution, the latter can monitor the condition and location of each connected asset. This function, combined with automatic event-driven alerts and actions, provides the user with a high visibility of the manufacturing equipment and its status, thus providing insights for improved decision making and Overall Equipment Effectiveness (OEE) improvements.

The Asset Tracking serves as the basic and foundational module, on which all the other ones can build upon and provide more specialized solutions.

- *Adaptive Process Control*: This module, named APC+®, provides the capability of self-tuning production process, both for extrusion and injection molding. The module utilizes cutting edge technologies, such as sensor data, edge and cloud computing, big data analytics and machine learning model management, in order to continuously monitor the production process on each production line, almost in real time (latency of up to 4 seconds) and provide machine-tailored feedback and suggestions for OEE improvement to production supervisors and executives.

In case the production line possesses the required process automation technology, the module can even automatically adjust the process parameters, such as die head and barrel temperatures, extrusion speed and load, haul-off speed, socketing machine cycles and injection extrusion cycle times. The APC module is the most advanced offering of “Smart Amplify”, built to be a world leading solution and offering unrepresented value to the end user.

- *Predictive Maintenance*: This module, named CBM+®, provides all the necessary visibility and useful insights to maintenance departments of plastics manufacturing sites. Through the use of sensor data, cloud computing and advanced data analytics, the module can predict maintenance issues, provide useful repair information to maintenance personnel (i.e. disassembly instructions, bearing type and code, etc.) through a tablet or smartphone (Windows 10, Android or iOS powered devices) and reduce unplanned equipment downtime, thus improving OEE of a manufacturing plant.

The Predictive Maintenance module, when combined with Adaptive Process Control module, can provide the best possible insights regarding the optimization of maintenance works, against the real-time production order execution, thus providing the most optimal downtime periods and duration.

Another major advantage of the Predict® platform is that it can be “linked” to the existing ERP (Enterprise Resource Planning) and/or MES (Manufacturing Execution System) solution of the customer, thus allowing the best possible high level visibility and enabling a more horizontal approach to interactions among the various departments (i.e. production, sales, logistics, general administration).

All the above solutions provide their benefits, while at the same time securing the IIoT infrastructure from end-to-end, essentially from the physical devices to the service layer and the cloud. This is achieved through the proven expertise and solutions of Microsoft which involves three major security areas:

- Device security, through secure device provisioning and authentication.
- Connection security, through the use of TLS 1.2 standard; the most advanced and backwards compatible standard.
- Cloud security, through the use of security tokens’ generation, access control policies and data encryption.

Finally, the company offers a 24-hour service guarantee, which means that in case the customer has an issue with the platform that is not resolved within the first 24 hours, it is compensated with two times the relevant subscription amount of the time lapsed with no service.

Moreover, Smart Amplify is committed to resolve any issue within 72 hours, excluding circumstances of Force Majeure, otherwise the customer has the possibility to deposition “Smart Amplify” and not pay any “open” invoices.

3.7.1.2 Consulting Services – Plant Modernization Audits

The people behind “Smart Amplify” understand the challenges that a Plastics & Rubber manufacturing company is facing, regarding the understanding and adoption of highly advanced IIoT solutions in its day-to-day business. Moreover the macroeconomic situation of Greece is not enabling the faster progression of the Plastics & Rubber industry towards such transformative technologies.

To that end, they are offering consulting services, in order to aid the high level executives with the task of creating a clear strategy towards the digital transformation of their production facilities.

The first step in the approach to the connected factory is to present the main benefits of the digitally-enabled manufacturing plant. Following that, a plant modernization audit has to be organized and scheduled, in order to evaluate the level of automation and readiness towards the digital transformation. Depending on the customer’s “digital readiness”, a phased approach is recommended for the deployment of IIoT architecture at the production shop floor, comprising the following steps:

- i. *Plant-wide digital sensor network*: In this step, the existing sensory system and infrastructure is examined, in order to suggest the best networking solutions for the next steps.
- ii. *Digital transformation of assets*: In this step, the audit focuses on identifying opportunities towards plant operations’ improvements, such as operability and maintenance. The insights and challenges are provided by each department, such as inability to predict equipment failure, prioritize maintenance works, energy overconsumption, leaks etc.

Based on the above needs and yet-unresolved problems, the required sensors to be deployed are determined, in order to transform the production equipment into “smart things”.

- iii. *Presentation of findings to Top Management*: In this step, a high level presentation of the current situation takes place, which aims to highlight the key areas where significant improvements can occur through the use of Predict® Platform.

The goal of this presentation is to line up the executive sponsorship and commitment, as well as the stakeholders’ support, before moving into solution development, in order to reduce the risk of stalled projects.

- iv. *Defining business and digitization objectives:* In this step, the top management, decides the target business processes that require improvement. Following that, the consulting team suggests the introduction of a small pilot IIoT project that will showcase the possibilities of the digital transformation with minimal cost and high yield. A high level discussion takes place presenting a rough estimation about the expected timetable, savings and RoI of this small but effective project.
- v. *Design of pilot project:* In this step, the assets involved in the project are profiled, via an end-to-end business process analysis. This kind of analysis also indicates the additional components which are required and the general requirements of the solution as a whole.
Deployment of pilot project: In this step, the assets are connected with each other via IIoT hubs, which depending on the case and the customer needs, connect to the edge, or directly to the cloud, using the existing infrastructure and networking solutions (i.e. Fieldbus). In cases where the existing physical network (i.e. Fieldbus, Modbus) is poor, the use of wireless sensors is advised (e.g. WirelessHART, LoRaWAN or LPWAN based sensors), which offer low installation costs with regard to physical connection and proven reliability in industrial environments.
- vi. *Contextualization and visualization of manufacturing performance:* In this step, massive quantities of sensor and device generated data are analyzed, through the use of advanced analytics and edge or cloud computing. The outcome of the analyses produces meaningful insights regarding the improvement of equipment OEE, which allows for more flexible, faster and more efficient production processes.
- vii. *Operational changes based on insights:* In this step, operational changes are made based on the provided data analysis insights. The most common benefits of such changes are the following:
 - Improved visibility of the production process.
 - Improved utilization, which equals maximum assets performance.
 - Reduction of waste, based on key process metrics.
 - Targeted cost savings.
 - Improved product quality.

viii. *Proof of improvement and further expansion:* In this step, the end result is benchmarked against the target objectives of the project, as a proof of value adding for the business. Provided that the actual yield is in line with the budgeted one, the consulting team advises the top management team about the next steps of scaling up the digital transformation to other areas and/or production lines.

3.7.1.3 Consulting Services – Business Intelligence and Data Analytics

“Smart Amplify”, with its vast expertise and experience on data analytics and Lean Six Sigma (L6S) , offers help to companies that want to address great challenges in their daily business, by leveraging the transformative power of data, either structured, unstructured, visual or vocal. Through advanced data analytics, they can deliver useful insights, which can empower their customers in decision making, process reengineering and capture growth.

This consulting service relies on data that can is already obtainable from the customer’s site and existing infrastructure and is mainly focused on companies who have not yet taken the first steps into their digital transformation.

The goal of this service is to aid the customer in addressing a known, complex and troublesome issue, across any of its business functions, for which they do not have a solution and are not aware of the root causes behind it.

In practice, the Business Intelligence and Data Analytics service is based on the L6S methodology, which consists of the following steps:

- i. *Define:* Identification of a core business issue, with the aid of the customer and creation of a realistic project charter, with clear targets and timetable definition.
- ii. *Measure:* Development and deployment of an effective measuring system, which objectively measures the potential inputs that may be correlated with the output (defined by L6S as Critical to Quality – CTQ). On this stage, the experts of “Smart Amplify” provide their vast knowledge with sampling frequency and size, based on the type of data that is to be measured (discrete or continuous) and the required accuracy of measurement. This step is very important, as it serves as the basis of analysis and further improvement.
- iii. *Analyze:* Analysis of the measured data in order to identify, validate and select the root causes behind the undesired current process performance. The root

cause analysis is performed in steps, by using statistical tools in order to check and prove the correlation between certain inputs (called Xs) and process output (called Y), through Ishikawa - fishbone diagrams, through brainstorming sessions and other tools, such as Failure Mode Effect Analysis (FMEA) analysis.

At the end of this step, there is a clear hierarchical list of root causes to address in the next step.

- iv. *Improve*: Identification, selection and testing of a solutions' plan, addressing the root causes from the Analyze phase. On this step, the simplest and fastest solutions are usually selected for implementation, as long as they can achieve the target CTQ improvement. The improvement solutions are also implemented through small Plan – Do – Check – Act (PDCA) cycles and new data measurement takes place, in order to compare the new process against the old one's performance.
- v. *Control*: Creation of a control plan, aiming at the sustainable gains achieved during the Improve phase. This final step ends with the creation of a periodic audit plan that will measure and ensure the effectiveness of the control plan.

3.7.2 Marketing Mix – Price

“Smart Amplify” offers various pricing options and tiers for its SaaS solutions, depending on various factors, such as:

- Number of Predict® Platform modules used.
- Number of connected devices.
- Use of machine learning cloud algorithms.
- Usage rate of edge and/or cloud computing.
- Computing force required.

Additionally, the company offers 3 different billing options:

- i. *Pay-as-you-go*, which allows for more flexibility but does not include any discount.
- ii. *One year Reserved Instances (RIs)*, which is practically a one year SLA and may include a low to moderate discount.
- iii. *Three year Reserved Instances (RIs)*, which is practically a three year SLA and may include a moderate to high discount.

Regarding payment terms, “Smart Amplify” offers the following options:

- i. *Pay-as-you-go*: Net 15 is the standard invoicing policy, which means that the payment is required to be made within 15 days from the invoice’s date of issue. The invoice issuing period is 1 month.
- ii. *One year Reserved Instances (RIs)*: In this case, the whole amount is divided and invoiced every quarter of year, with 3/10 Net 30 being the common policy. This means that there is also the option to pay within the first 10 days for the invoice issue date and gain a 3% discount.
Additionally, since this SLA is mutually committing the 2 parties for 1 year, an overall discount from 10% to 20% is offered, based on the size of the project, which is equally discounted on a quarterly basis.
- iii. *Three year Reserved Instances (RIs)*: In this case, the whole amount is divided and invoiced every quarter of year, with 3/10 Net 30 being the common policy. Additionally, since this SLA is mutually committing the 2 parties for 3 years, an overall discount from 15% to 30% is offered, based on the size of the project, which is equally discounted on a quarterly basis.

Regarding its services, “Smart Amplify” offers the following payment terms:

- i. 30% down payment with customer order.
- ii. 70% payment on receipt of the invoice, following the project completion.

Finally, “Smart Amplify” utilizes a value pricing strategy, where the price of its solutions is set in accordance with the value perception of the customer, combined with the scale and difficulty of the project.

3.7.3 Marketing Mix – Place

The place strategy of “Smart Amplify” involves serving the two Plastics & Rubber Manufacturing segments, which are mainly established in the areas of Attica and Voiotia. There are other major market players, such as “Plastika Kritis” and “Thrace Plastics”, located in Crete and Xanthi, which shall also be fully covered by the company and its representatives.

The company’s location shall be chosen taking into consideration the ease of accessibility to the customers and the proximity to technology hubs, like NCSR

Demokritos⁴⁰, which is additionally expected to boost the company's public relations, candidate attraction and awareness in the wider IT industry.

Regarding delivery times, these cannot be predetermined, since every potential customer shall have different needs. Moreover, since the services of the "Smart Amplify" are by nature not repetitive and reproducible, each case shall be treated differently and produce a broad variation of delivery times.

Finally, the distribution channels to be used are physical visits to the customers, followed up by e-mail or telephone communications. To that end, each customer shall have their key account manager who shall support them and handle all their requests.

3.7.4 Marketing Mix – Promotion

The promotion strategy of "Smart Amplify" involves many different promotion solutions such as:

- The creation of an interactive and informative web page, where the SaaS offerings – modules of the company shall be presented. There shall also be available demos that will showcase the flexibility, speed and potential of the company's solutions.

Additionally, the consulting services shall be promoted, with major projects being showcased (i.e. problem description, project impact and savings).

Finally, there will be a link to "Smart Amplify"'s blog, where everyone interested in the company will be able to know its people, projects and general IIoT developments.

- The use of web advertising through segment-important web sites, such as the web portals of SEV⁴¹ and AHPI⁴².
- The active participation and co-sponsorship of events, such as conferences and exhibitions of the Plastics & Rubber industrial sector or IoT related events.
- The use of personal selling method, through the frequent periodical visits to customers, in order to showcase the company's solutions and benefits and investigate the possibility of launching a small pilot project or plant modernization audit, based on the customers' needs.

⁴⁰ <http://www.demokritos.gr>.

⁴¹ <http://www.sev.org.gr/o-sev/sev-hellenic-federation-of-enterprises>.

⁴² <http://www.ahpi.gr>.

3.7.5 Marketing Mix – People

The people of “Smart Amplify” are its most valuable asset. This stands both for the software developers of the company, which define the identity and performance of the SaaS solutions, as well as the employees providing consulting services.

Additionally, the salesforce and key account managers are the people who are to an extent, the “product” itself. They are the people who are initially promoting the services, receiving customer complaints and managing delivery times and projects in general.

Therefore, “Smart Amplify” gives special attention in the recruitment process as well as personnel development and corporate culture. The company strategy on people resolves around the following pillars:

- Building a marketing team who possesses critical skills, such as being technology-savvy and interested in staying up-to-date with technology trends, being analytics driven, being experienced with buyer persona research and targeting and being familiar with automation.
- Providing attractive working conditions and salaries, in order to boost company loyalty and motivation.
- Training of personnel in interpersonal skills and customer service, with special focus towards customer satisfaction.
- Continuous training of software developers in the new IIoT developments.
- Establishment of common policies and broad messaging strategies, thus creating a uniform approach and communication code both internally and externally.

With the above, “Smart Amplify” desires its working force to be highly motivated in order to present to their customers company unique selling points and value added propositions.

3.7.6 Marketing Mix – Process

The offerings of “Smart Amplify” are almost entirely intangible, thus it is crucial to establish and meet certain and common standards. A process refers to a set of activities which delivers a desired result. “Smart Amplify” shall develop its entire management system and processes based on quality of service and lean philosophy, in order to achieve a relatively simple and standardized flow of activities. The company shall periodically perform a value stream analysis of its processes, in order to reduce as much waste as possible and at the same time ensure key customer satisfaction components, such as first-time-right, complaint addressing mean times, responsiveness to customer request, etc.

3.7.7 Marketing Mix – Physical Evidence

The physical evidence is a very important concept for a service provider. To that end, the company shall put special focus on concepts, such as the uniform dress code of its personnel, the signage of its personnel transportation equipment, its company profile presentations, its reports, brochures, business cards and other onsite tangible commodities, such as the equipment used by its personnel.

Moreover, “Smart Amplify” shall develop its processes in a way that increases the visibility line of the customer. Some of the key factors in increasing the service visibility line are:

- Showcasing the methodology behind the SaaS modules.
- Showcasing the philosophy behind the AI models and machine learning algorithms.
- The active involvement of the customer during plant modernization audits.
- Inviting the customers into visiting the facilities of the company.
- Presenting them with the company’s approach towards important issues, such as cyber security and risk analysis of their activities.

“Smart Amplify” shall develop, implement and sustain the above level of physical evidence, in order to persuade the potential customers about the value of its propositions and increase their commitment to the company’s brand name.

3.8 Projected Sales and Market Share

The total revenues of “Smart Amplify” shall exclusively be generated through their service offerings for the Plastics & Rubber Manufacturing Industry. The company is expected to achieve a modest market development in the first 3 years, which will accelerate in the following 2 years. Additionally, even though the company will be the first mover, it is not expected to gain the full potential market share.

The total projected revenues and market share of “Smart Amplify” during its first 5 years of existence are presented below:

	2018	2019	2020	2021	2022
Revenues from SaaS (in € thousand)	597,7	688,6	840,9	1.025,6	1225,4
Revenues from Consulting Services (in € thousand)	188,7	217,4	265,5	323,9	387,0
Total Revenues (in € thousand)	786,4	906,0	1.106,4	1.349,4	1.612,4
Market Share (%)	45	49	55	60	63

Table 3.7: Projected annual revenues and market share of “Smart Amplify”.

3.9 Projected Cost of Marketing

“Smart Amplify” is required to invest a large portion of its annual turnover in order to achieve its service IIoT portfolio market development. During the first 2 years the marketing expenses will be accounting for 30% of annual turnover, while for the next 3 years they are expected to be at the range of 20%.

	2018	2019	2020	2021	2022
Total Revenues (in € thousand)	786,4	906,0	1.106,4	1.349,4	1.612,4
Total Marketing Expenses (in € thousand)	235,9	271,8	243,4	242,9	290,2
Marketing Expenses / Total Revenues (%)	30	30	22	18	18

Table 3.8: Projected annual marketing expenses of “Smart Amplify”.

CHAPTER 4

TECHNICAL STUDY

4.1 Objective of the Technical Study

This part of the feasibility study covers all the technical and organizational elements of “Smart Amplify”, such as:

- *Raw materials and Various Consumables.*
- *Engineering and Technology.*
- *Organizational Structure and Overhead Expenses.*
- *Human Resources.*
- *Physical Location and environmental responsibility of the company.*
- *Project Planning & Execution.*

4.2 Raw Materials and Various Consumables

“Smart Amplify” is essentially a non-manufacturing company. Moreover, as it will be presented in the following sessions, it shall produce its applications and services based entirely on cloud technology.

Therefore, there are only some minor consumables that the company shall be mostly using at its R&D (Research and Development) department, which are presented below:

Cost of Various Consumables (in € thousand)	2018	2019	2020	2021	2022
Networking Consumables (Cables, splitters etc.)	0,23	0,10	0,11	0,11	0,11
Various Spare Parts	0,36	0,36	0,36	0,36	0,36
Computer Storage Portable Devices	0,50	0,12	0,12	0,12	0,12
Maintenance Consumables (i.e. Lubricants)	0,75	0,75	0,75	0,75	0,75
Total	1,84	1,33	1,34	1,34	1,34

Table 4.1: Projected Annual Consumables’ Expenses of “Smart Amplify”.

The scope of the R&D department is to perform and test small pilot projects, which are simulating real life customer projects. To that end, there is a need for the

aforementioned consumables, in order to fulfill the development and testing requirements.

The only consumables category that will be universally used by the company employees are the computer storage portable devices.

4.3 Engineering and Technology

4.3.1 Operational Capacity

The success of this project and its long-term performance heavily depends on the quality of the offered solutions, combined with timely execution and market availability. The above requirements can be ensured by the appropriate selection of engineering equipment and technology.

The proper selection of engineering equipment and technology affects the quality of services and operational capacity of “Smart Amplify”, which have to be in line with the Marketing plan and strategy of the company. Moreover, it determines the requirements in human personnel capacity in order to realize its customers’ projects.

Since “Smart Amplify” is mostly offering service solutions, which are customer-tailored, its capacity cannot be clearly defined or measured on a per unit basis. Nevertheless, the company shall utilize the flexibility offered by today’s cutting-edge technology, in order to adapt its operational capacity needs based on the respective projects requirements.

At the same time, it shall achieve a lean, cost efficient and effective operational scheme, which is essential for the long-term success of the company and ideal regarding the proper risk management of the company’s operations.

4.3.2 Technology Selection

The selected technology is critical to the competitiveness of any company. In the case of “Smart Amplify”, the main issue lies with the level of maturity of the available options and the lack of standardization, in terms of common software architecture and hardware support. These facts increase the risk of vendor lock-in, which can have a tremendous effect on the long-term performance and strategic decisions of the company, in case the selected technology becomes obsolete or is excluded from a common framework in the future.

In this session, the major existing PaaS solutions will be covered along with the selection of the most optimal one for the project. Firstly though, a short introduction of the minimum design requirements of an IIoT platform will take place, in order to provide a more clear understanding of the platform selection for “Smart Amplify”.

4.3.2.1 IIoT Platforms Elements

IIoT platforms are a generalized layer of intelligence and user interfaces, which allow for the connection and interoperability among heterogeneous devices and web-based services. An IIoT platform, from an architectural point of view, should be designed with a horizontal approach, in order to avoid the existing vertical fragmentation. Moreover, the platform should be efficient and effective in collecting and processing large amounts of data, which are generated from the heterogeneous devices.

Therefore, the platform should be designed with scalability and portability in mind. Moreover, in order to avoid the risky vendor lock-in, the platform should be developed on an open-source architecture, which reduces the application development costs, while at the same time encouraging the various IoT stakeholders to collaborate and integrate their solutions with the platform.

Overall, a successful and future-proof IIoT platform should incorporate the following elements:

- *Abstraction Layer*: The platform should allow for the abstraction of physical IoT devices into virtual ones, thus enabling interoperability through the uniform access to heterogeneous devices over various communication protocols (i.e MQTT, Modbus, PLCBus and Z-Wave).
- *Virtualization Layer*: The platform should provide look-up mechanisms that bridge the physical network boundaries of the heterogeneous entities on a production site.
- *Data Management Framework*: The platform should enable the scalable caching, storage, querying and fusion of the collected data.
- *Semantic Representation Framework*: The platform should provide tools for modelling and management of semantic information.
- *Security and Policy Framework*: The platform should provide Access Control mechanisms, which allow for the implementation of authentication and authorization policies.

- *Networking Framework*: The platform should enable communication with and across other platforms and provide means for self-management (i.e. self-optimization).
- *Open Interfaces*: The platform should support open Application Programming Interfaces (APIs), thus boosting the ease of tools/extensions development by software developers.
- *Data Analytics Services*: The platform should provide advanced real-time event processing, through the ability to create rules for querying reporting, fusing, correlating and visualizing streams of data.
- *Machine Learning Data Analytics*: The platform should incorporate a set of complex machine learning algorithms, thus providing the Cyber Physical Systems (self-management) and the platform users with real-time decision capabilities.
- *Development Tools and Standardized Toolkits*: The platform should provide the tools for the development of IIoT based solutions, which can be easily integrated by the developing companies.

Based on the above, the development of a fully capable IIoT platform requires the collaboration of an entire ecosystem of stakeholders, in order to cover the complete value chain of IIoT and offer maximum value and flexibility to application providers and their customers.

4.3.2.2 Comparison of IIoT PaaS Solutions

The following alternative PaaS solutions are currently available:

- *PTC ThingWorx*: The IIoT platform of PTC provides all the tools and support for the development of end-to-end IIoT applications and process- related AR experiences. ThingWorx is a fully capable and overly mature platform, which enables the developing of applications, connection of smart things and Big Data real-time analysis⁴³.
- *SAP HANA*: The IIoT platform of SAP is an end-to-end cloud platform, which aside from the application development tools, it can also extend its functionality

⁴³ Source: <https://www.ptc.com/en/products/iiot>.

through extension modules for logistics, predictive maintenance and connected manufacturing⁴⁴.

- *Microsoft Azure IoT Suite*: Microsoft offers both SaaS and PaaS solutions, which fulfill different customer target groups. Regarding this project, the PaaS solution, called Azure IoT Hub and Azure IoT Solution Accelerators allows for the development of applications with maximum flexibility, with the downside of requiring medium-to-high skills in programming languages, in order to customize the created solutions⁴⁵.
- *Ayla Agile IoT Platform*: Ayla's solution provides a complete end-to-end solution that mostly focuses on companies that develop consumer IoT applications. One major disadvantage of this platform for IIoT application development, is the lack of customization on very important fields, such as end-to-end security, cloud infrastructure and networking stack development⁴⁶.
- *IBM Watson IoT*: IBM's solution provides a complete end-to-end cloud solution, with its highlights being advanced natural language processing, image and text analytics. This already proven platform focuses mainly on asset management, facilities management and product development and offers relevant extension modules⁴⁷.
- *Amazon Web Services IoT Core*: Amazon's AWS IoT Core is a managed cloud platform that enables the easy connection of devices and the secure interaction with cloud applications and other devices. The platform employs various extension modules for machine learning, database services, storage options, cloud resource monitoring and even risk auditing of the developed cloud solutions⁴⁸.
- *General Electric Predix Platform*: General Electric's solution is a comprehensive and secure cloud application platform to run, scale, and extend digital industrial solutions. The platform delivers shared capabilities that industrial applications require: asset connectivity, edge technologies, analytics and machine learning, big data processing, and asset-centric digital twins.⁴⁹

⁴⁴ Source: <https://www.sap.com/products/iot-platform-cloud.html>.

⁴⁵ Source: <https://azure.microsoft.com/en-us/overview/iot>.

⁴⁶ Source: <https://www.aylanetworks.com/products/iot-platform>.

⁴⁷ Source: <https://www.ibm.com/internet-of-things/industries/iot-manufacturing>.

⁴⁸ Source: https://aws.amazon.com/iot-core/?nc2=h_iot.

⁴⁹ Source: <https://www.ge.com/digital/predix-platform-foundation-digital-industrial-applications>.

Following the brief presentation of the available solutions, a “first-pass” comparison shall be made, based on their technical compatibility with the project, in order to select the 3 best alternatives. The comparison results are presented below:

Platform Features	Thing Worx	HANA	Azure IoT	Agile IoT	Watson IoT	AWS IoT	Predix
Compute							
Maximum Processors in VM	36	128	128	N/A	56	128	56
Maximum Memory in VM	4000	3800	3800	N/A	242	3904	3800
Operating Systems Supported	9	8	11	N/A	8	12	8
Automatic Scalability	√	√	√	√	√	√	√
Virtual Servers	√	√	√	X	√	√	√
Container Instances	√	√	√	X	√	√	√
Batch Computing	X	√	√	X	√	√	√
Storage							
Hybrid Storage	√	X	√	√	X	√	X
Backup	√	√	√	√	X	X	X
Disaster Recovery	√	√	√	X	X	√	X
Shared File Storage	√	√	√	√	√	√	√
IoT							
AI Algorithms Support	√	X	√	√	√	X	X
Machine Learning	√	√	√	√	√	√	√
Edge Computing Support	X	√	√	X	X	√	√
Text to Speech Support	X	X	√	X	√	√	X
Security							
DDoS Protection	X	X	√	X	X	√	X
Access Management	√	√	√	√	√	√	√
Blockchain Support	X	√	√	X	√	X	√
Developer Tools							
Scheduling Support	√	X	√	√	√	X	√
App Testing	X	X	√	X	X	√	X
Open Architecture	√	√	√	√	√	√	X
Web App Development	√	√	√	√	√	√	√
Enterprise Integration							
Application Services (i.e. Microsoft SharePoint)	X	√	√	√	X	√	X
ERP Integration	√	√	√	√	X	X	√

Table 4.2: Technical Features’ Comparison of Available IIoT Platforms.

Based on the features compared above, the 3 best alternatives are Microsoft Azure IoT, IBM Watson IoT and Amazon AWS IoT. Microsoft's solution seems to enjoy a slight advantage over the other two, since it is the only one that supports all of the aforementioned features.

Nevertheless, prior to the selection, the cost of technology acquirement should be investigated, since it is the most significant variable cost of this project. The annual cost of a typical IIoT application scenario is presented below, for each of the 3 dominant alternatives:

IIoT PaaS Licensing Cost Estimation (per instance)				
		Microsoft Azure IoT	IBM Watson IoT	Amazon AWS IoT
Service Type	Description	Estimated Cost (in €)		
IoT Core Services	Paid Application, 50 Additional devices, 500 MB Traffic coverage	21,08	198,00	85,00
IoT Hub	Standard Tier, S1: Unlimited devices, 400,000 msgs/day, \$25.00/mo, 1 Units	0,00	26,60	24,50
IoT Edge Computing	Fee per transaction	455,09	485,00	294,00
Time Series Insights	S1 tier: 1 unit(s)	126,49	139,00	144,00
Geospatial Services	1,000 Maps transactions, 1,000 Other Services transactions	0	0	0
Functions	128 MB memory, 8 sec execution time, 10,000,000 executions/month	131,05	236,00	262,09
Event Handling	50,000,000 operations/month	25,25	0	24,00
Machine Learning Services	Standard tier, 3 seats	125,23	137,20	129,40
Machine Learning Tools	Web API: s1 tier, 0 overage transactions, 30 overage hours	135,04	115,02	97,40
Data Stream Analytics	1 unit(s), 730 Hours	73,87	80,00	100,00
Logic Applications	3 Enterprise Connector Executions x 1 day(s); 0 GB Data Retention.	0	31,00	47,92
Notifications Hub	Basic tier, 11 million additional pushes	9,28	22,50	51,29
Database Services	1000 GB storage, 6 x100 RUs	240,37	320,00	278,80
API Management	Basic tier, 1 units(s), 730 Hours	124,11	42,40	216,00
Support	Platform Support	843,30	500,00	518,92

Table 4.3: Analytical Cost Comparison of the 3 Dominant IIoT Platforms.

The total monthly and annual cost per platform is calculated and presented below:

IIoT PaaS Licensing Cost Estimation (per instance)			
PaaS Type	Monthly Cost (in €)	Annual Cost (in €)	Delta Azure IoT vs others (%)
Microsoft Azure IoT	2.310,16	27.721,92	-
IBM Watson IoT	2.332,72	27.992,64	0,98%
Amazon AWS IoT	2.273,32	27.279,84	-1,59%

Table 4.4: Total Cost Comparison of the 3 Dominant IIoT Platforms⁵⁰.

Overall, the cost differences per platform are minor and therefore cost is not the definitive factor behind the technology selection. Since Azure IoT gathers the best score regarding technical features, it has been decided that “Smart Amplify” shall be using this technology for its operations.

Moreover, there are side advantages for using Microsoft’s PaaS, such as the cross-usage of its other software solutions, namely Office 365 for Business and Visual Studio, which are also Azure-cloud based products, thus adding homogeneity in the software toolkit used by the company and offering better technical support and troubleshooting by the same vendor.

Based on the estimated annual revenues from SaaS, the total licensing cost can be calculated on annual basis:

Annual Cost of IIoT PaaS Licensing					
Description	2018	2019	2020	2021	2022
Number of required instances	5	5	6	8	9
Microsoft Azure IoT Average Cost per instance (in € thousand)	25,1	28,9	29,4	26,9	28,6
Total Licensing Cost (in € thousand)	125,5	144,6	176,6	215,4	257,3

Table 4.5: Annual Cost of IIoT PaaS Licensing.

⁵⁰ Source: <https://azure.microsoft.com/en-us/pricing/calculator>.
<https://www.ibm.com/products>.
https://aws.amazon.com/pricing/?nc2=h_ql_pr&awsm=ql-3.

Further on, the software development toolkit which shall be used by “Smart Amplify” is Microsoft Visual Studio. There are 2 alternative options regarding the license acquisition, which are presented in the following table:

Microsoft Visual Studio Licensing Cost per User			
License Type	Monthly Cost (in €)	Annual Cost (in €)	Subscriber Benefits (exclusive to annual subscriptions)
Standard	Not available	1199 for 1 st year	Free training & education courses (6 months)
		Renewal at 799 / year	
Cloud	45 / month	539 / year	Free training & education courses (6 months)

Table 4.6: Software Development Toolkit Cost Comparison⁵¹.

Based on the above information, the cloud subscription shall be selected for the project, as the most cost efficient solution. According to the sales revenue projections and the projected number of PaaS instances, it is calculated that two Visual Studio licenses are required in order to support the operational capacity of “Smart Amplify”.

Therefore, the total licensing cost of Visual Studio can be calculated on annual basis:

Annual Cost of Software Development Toolkit Licensing					
Description	2018	2019	2020	2021	2022
Number of required licenses	2	2	2	2	2
Microsoft Visual Studio cost per license (in € thousand)	0,5	0,5	0,5	0,5	0,5
Total Licensing Cost (in € thousand)	1,1	1,1	1,1	1,1	1,1

Table 4.7: Annual Cost of Software Development Toolkit Licensing.

Aside from the technology used for IIoT application development, the company has to invest in supporting technology solutions, such as an ERP software. There are various suppliers in the Greek market, such as SoftOne Technologies, SAP Hellas, Nubis, Singular Logic and Entersoft.

⁵¹ Source: <https://visualstudio.microsoft.com/vs/pricing>.

Following the quotations from the respective suppliers, the various alternatives are presented in the following table:

ERP Software Cost Estimation			
Description	Supplier	Initial Cost (in € thousand)	Annual Maintenance Cost (in € thousand)
ERP system with CRM Module	Entersoft	6,0	1,2
ERP system with CRM Module	SoftOne Technologies	6,1	1,2
ERP system with CRM Module	Singular Logic	7,3	1,4
ERP system with CRM Module	SAP Hellas	12,0	1,9
ERP system with CRM Module	Nubis	6,3	1,2

Table 4.8: Cost Breakdown of ERP Software Solutions.

Based on the presented cost analysis, the ERP of Entersoft shall be selected, as it offers the most cost efficient solution. Other than that, Entersoft is a financially healthy company, with vast experience in customized solutions and presence in 19 countries worldwide. Therefore, the selection is considered as well-suited and future-proof.

4.3.3 Main & Auxiliary Operations' Equipment

The company's operations equipment has been selected based on the project's requirements and process compatibility. Moreover, it is aligned with the company's capacity. The relevant equipment comprises mostly electronic computers and is presented in the following table:

Main Operations' Equipment			
Description	Supplier	Quantity (pcs.)	Cost (in € thousand)
Blade Server PowerEdge M1000	Dell	1	12,5
Hardware Firewall CloudGen	Barracuda	1	2,5
Ethernet Switch PowerConnect	Dell	3	4,8
Laptop Latitude 5500 Series	Dell	8	12,4
Desktop PC OptiPlex 3050	Dell	6	3,0
iMac Pro 5K Intel Xeon 10 core	Apple	2	11,6
Total:			46,8

Table 4.9: Cost Breakdown of Main Operations' Equipment.

The above costs have been calculated based on suppliers' quotations and e-shop pricing catalogs. The same source of information has been used for the calculation of auxiliary equipment, which is presented below:

Auxiliary Operations' Equipment			
Description	Supplier	Quantity (pcs.)	Cost (in € thousand)
UPS 9SX 6000i RT3U	Eaton	4	11,2
Furniture	-	-	10,0
Network Scanners & Printers	Xerox	2	2,6
Projector	Epson	1	1,0
Indoors Lighting	-	-	1,5
Safety Lighting	Olympia Electronics	10	0,3
Fire Safety Equipment	Mobiak	-	2,0
Other Safety Equipment	-	-	1,3
R&D Testing Equipment	-	-	5,5
Total:			35,4

Table 4.10: Cost Breakdown of Auxiliary Operations' Equipment.

4.3.4 Equipment and Technology Acquisition and Transfer

The selected equipment and technology will be acquired in steps, according to the project's execution timetable. Regarding cash flow towards the various suppliers, it will take place according to the following scheme:

- *Microsoft Azure IoT*: 100% upfront payment, with no other option available.
- *Microsoft Visual Studio*: 100% upfront payment, with no other option available.
- *ERP Software*: 70% upfront payment, rest 30% net 30.
- *Main Operations' Equipment*: 50% upfront payment, rest 50% net 30.
- *Auxiliary Operations' Equipment*: 80% upfront payment, rest 20% net 45.

The transfer of the equipment shall be mostly on CIF Incoterms (Cost, Insurance and Freight), for all electronic equipment. The furniture shall be transferred on DAP (Delivered At Place) terms and the rest auxiliary equipment on EXW (Ex-Works) terms.

The commissioning and setup of the main equipment shall take place on "Smart Amplify"'s premises, by appropriate technical personnel of the supplier. The same

personnel shall conduct the initial training to key people of “Smart Amplify”. The warranty period of the equipment is baseline 2 years and the relevant suppliers’ are obliged to offer spare parts for 4 years.

Finally, the transfer of technology shall be realized via internet for all Microsoft related solutions. The technical support is also internet based, yet there is also the option of a physical representative, in case the solution cannot be achieved remotely.

Regarding ERP software from Entersoft, the company shall perform all the necessary actions at the premises of “Smart Amplify” There is also the option of remote troubleshooting, yet the company generally prefers the physical appearance of its representatives.

4.3.5 Equipment and Infrastructure Maintenance

The entire infrastructure’s maintenance shall be performed based on the instructions and maintenance manuals of each supplier, mostly by specialized outsourced personnel. Regarding consumables and spare parts, a safety stock shall be maintained, following the Kanban principle.

The overall cost of maintenance is presented in the following table:

Annual Cost of Maintenance		
Description	Supplier	Cost (in € thousand)
Main Equipment	50% In-house 50% Outsourced	1,1
Auxiliary Equipment	Outsourced	0,9
Building Infrastructure	Outsourced	0,6
Total:		2,6

Table 4.11: Cost Breakdown of Annual Maintenance.

The above cost of maintenance is considered to be 100% fixed. The variable cost of maintenance (consumables and spare parts) is already included in the RM and various consumables cost, at approximately €0,75 thousand, which equals to 28,8% of the annual maintenance budget.

4.3.6 Management Systems

Aside from technology and equipment acquirement, a decisive factor in the success of any company is the development and implementation of its Management Systems. The aim of such systems is to define and manage all the procedures of the company, in order to achieve reproducibility, repeatability, fidelity and quality in their execution, as well as long-term, person-agnostic sustainability of know-how. Additionally, these generic systems assist in ensuring the level of quality that is required by the customers as well as compliance with regulatory framework (environmental, safety, cybersecurity etc.). Regarding “Smart Amplify”, the company shall develop and manage the following management systems:

- Quality Management System, according to ISO 9001:2015 and ISO 90003:2014.
- Environmental Management System, according to ISO 14001:2015.
- Information Technology – Service Management System, according to ISO 20000-1:2018.
- Information Security Management System, according to ISO 27001:2013.
- Risk Management System, according to ISO 31000:2018.
- Software and Systems Engineering Management System, according to ISO 24773:2008.

The development of the above management systems shall be realized through the cooperation of the company’s competent executives along with external consulting experts.

The development phase is divided into the following stages:

- i. Presentation of the framework behind each ISO standard and its general requirements.
- ii. Development of each System’s manual, which can be also universal, where the main and auxiliary processes of the company are presented, along with the company’s scope, mission and objectives.
- iii. Development of the System (barebone structure).
- iv. Development of the System’s procedures.
- v. Development of SOPs (Standard Operating Procedures), as a means of embodying the procedures into day-to-day operations.

- vi. Development of support literature, such as forms, records, technical specifications and master lists.
- vii. Completion of the Management System and certification by certified third-body inspector, according to relevant ISO standard.
- viii. Development and implementation of personnel continuous training program, in order to properly implement the System and establish the desired company culture.

Following the certification of the Management Systems, the company shall monitor its performance through various KPIs and amend or create procedures, instructions and forms, in order to properly manage the Management of Change and achieve its annual objectives, thus improving its overall performance across the board.

4.3.6.1 Cost of Management Systems

The cost of the Systems' initial development is presented below:

Management Systems' Cost of Development	
Description	Cost (in € thousand)
Quality Management System (ISO 90003, 9001)	4,0
Environmental Management System (ISO 14001)	2,5
IT Service Management System (ISO 20000-1)	4,0
Information Security Management System (ISO 27001)	3,0
Risk Management System (ISO 31000)	2,0
Software and Systems Engineering Management System (ISO 24773)	1,5
Total:	17,0

Table 4.12: Cost Breakdown of Management Systems' Development.

Following up, the annual cost of the Management Systems' maintenance and continuous improvement is presented in the following table:

Management Systems' Annual Cost of Maintenance	
Description	Cost (in € thousand)
Quality Management System (ISO 90003, 9001)	0,8
Environmental Management System (ISO 14001)	0,7
IT Service Management System (ISO 20000-1)	0,7
Information Security Management System (ISO 27001)	0,5
Risk Management System (ISO 31000)	0,5
Software and Systems Engineering Management System (ISO 24773)	0,5
Total:	3,7

Table 4.13: Cost Breakdown of Management Systems' Annual Maintenance.

4.3.7 Total Cost of Engineering and Technology

Based on the previously presented information, the total cost of engineering and technology is presented in the following table, containing the initial costs of acquisition / development as well as the annual maintenance costs per category:

Total Cost of Engineering and Technology (in € thousand)					
Description	2018	2019	2020	2021	2022
Microsoft Azure IoT	125,5	144,6	176,6	215,4	257,3
Microsoft Visual Studio	1,1	1,1	1,1	1,1	1,1
Entersoft Business Suite	6,0	1,2	1,2	1,2	1,2
Main Operations' Equipment	46,8	1,1	1,1	1,1	1,1
Auxiliary Operations' Equipment	35,4	0,9	0,9	0,9	0,9
Annual Maintenance	0,6	0,6	0,6	0,6	0,6
Management Systems	17,0	3,7	3,7	3,7	3,7
Total:	232,4	153,2	185,2	223,9	265,9

Table 4.14: Annual Cost of Engineering and Technology of "Smart Amplify".

4.4 Organizational Structure & Overhead Expenses

4.4.1 Organizational Structure

The organizational structure is a key success factor for any company in order to be efficient, flexible and overall successful against its competitors. It defines how activities (i.e. task delegation, coordination, supervision, control) are directed towards the achievement of the company's strategic goals⁵². It is essentially a defined hierarchy of rules, roles, and responsibilities among the various departments and individuals of a company. It is visually represented through the use of an organizational chart, where all departments are hierarchal visualized, from top to bottom, along with their cross-departmental interactions.

There are 4 common types of organizational structure⁵³:

- i. The functional structure:* Also referred to as bureaucratic structure, it divides the company into distinct departments, based on workforce specialization and roles. It revolves around clear defined roles and responsibilities and employs many levels of decision-making authorization. It is commonly used by small and medium sized companies.
- ii. The divisional structure:* It divides the company into departments, based on the products, projects or subsidiaries they operate. It is commonly used by large companies, such as General Electric and Johnson & Johnson, which produce thousands of products targeted at a wide variety of applications and audiences.
- iii. The flatarchy structure:* It flattens the hierarchy and chain of command, thus increasing the autonomy of the employees. It is commonly used by start-ups.
- iv. The matrix structure:* It groups employees by both function and product simultaneously, thus increasing the complexity of the chain of command, as well as increasing the “white collar” to “blue collar” ratio. One major advantage of this structure is the reduction of “silo” effect among departments, thus enabling a more horizontal corporate governance. It is commonly used by project based and multinational companies, as well as universities.

⁵² Source: https://en.wikipedia.org/wiki/Organizational_structure.

⁵³ Source: <https://www.investopedia.com/terms/o/organizational-structure.asp>.

Based on the profile of “Smart Amplify”, its size (SME), its scope, specialization and operational cost, the functional structure shall be utilized. The resulting organizational chart is presented below:

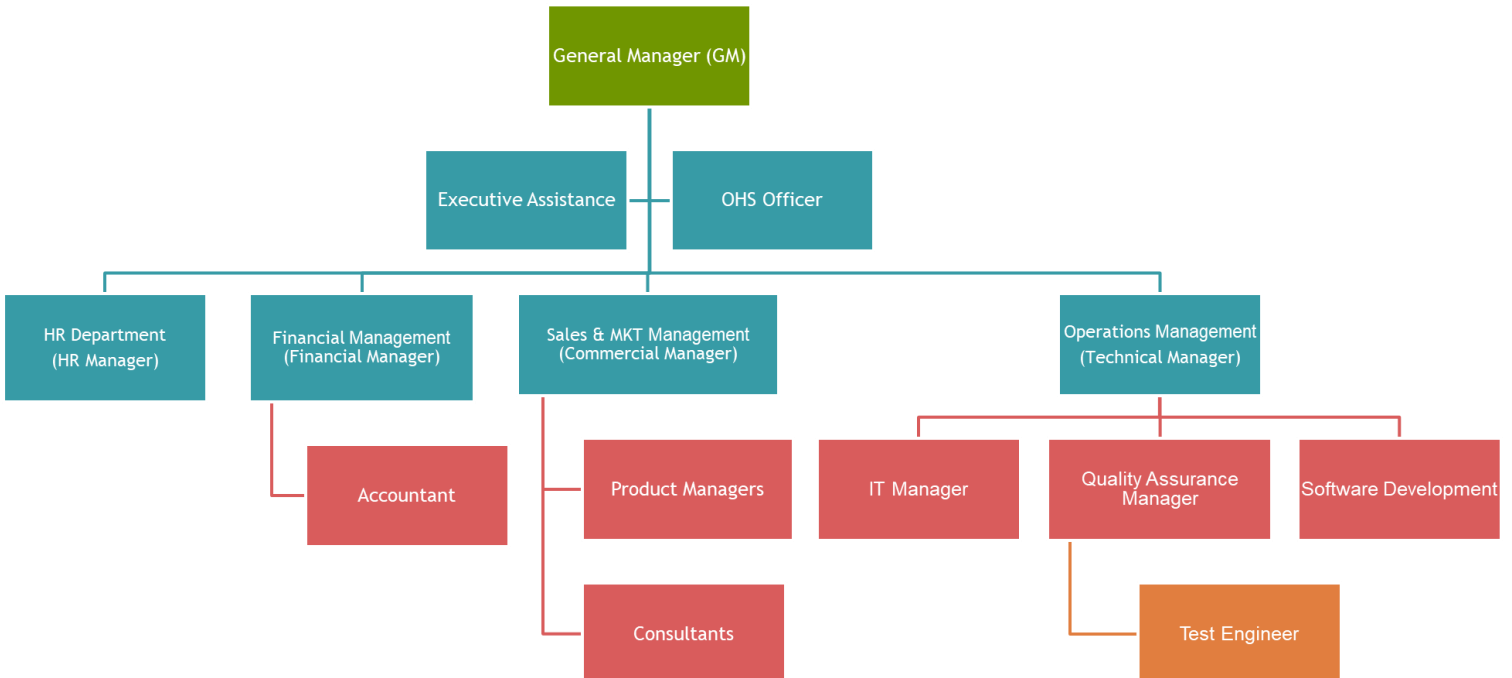


Figure 4.1: Organizational Chart of “Smart Amplify”.

Following the above figure, a short description of each department and role shall be presented:

- *General Manager:* The General Manager (GM) serves as the top executive of the company and is responsible for strategy formulation and implementation, organizational structure, capital expenditure, budgeting, personnel, financial outcome and overall performance of the company. The GM additionally engages in key or targeted customer activities, coordinates the various departments of the company at a high level and oversees sustainability and various regulatory related activities.
- *Executive Assistance:* This department provides high-level administrative support through conducting research, preparing reports, handling information reports, and managing files and records. Additionally, this department performs clerical functions, such as receiving visitors, handling of call center, scheduling meetings and arranging conference calls.

- *OHS Officer:* The Occupational Health and Safety (OHS) Officer is responsible for the company's compliance with occupational health and safety guidelines and regulatory framework. Additionally, the OHS officer is responsible for the continuous improvement of the current Management system, through various activities, such as conducting and renewing risk assessment, designing and implementing safety control measures, reviewing policies and instructions and organizing OHS training of the personnel.
- *HR Department:* The Human Resources (HR) department, which is essentially comprising only the HR manager, is responsible for planning, directing and coordination of human resources and activities of the company. It serves as the link between management and employees, analyzes and modifies compensation and benefits policies in order to ensure compliance with regulatory framework and performs staffing duties, such as solving disputes, administering disciplinary actions and firing employees. The HR department also maintains sensitive personal information, such as hires, performance appraisals and wages records. Finally, one of its major responsibilities is to determine personnel training needs and design employee development and training programs.
- *Financial Management:* This department directs and coordinates all financial activities of the company. Some of its essential responsibilities are the establishment of desirable relationships with business customers, suppliers and creditors, the preparation of operational reports for management analysis, the monitoring of key financial figures (i.e. working capital), the evaluation of potential capital investments, as well as the selection and negotiation of insurance brokers and carriers.

The key person of this department is the Financial Manager, who is responsible for the efficient and effective management of the company's financial resources, in order to accomplish its strategic objectives.

- *Sales & MKT Management:* This department is responsible for the implementation of the company's marketing strategy and plans. It generates revenues through the practical application of sales techniques and promotion of the company's solutions to customers. This department is also in direct contact with customers and is responsible for the development and monitoring of

customer relationship management (CRM). Additionally, it is responsible for sales planning, sales forecasting and reporting, as well as demand management. The key person of this department is the Commercial Manager, who is responsible for the management of the company's sales operations.

- *Operations Management:* This department is responsible for the integrated planning, design, optimization, operation and control of the company's technological products, processes and services. It develops and implements the technology strategy, policies, roadmap and project portfolio in order to provide maximum customer added value and company profits. Finally, the department is responsible for the quality assurance of the company's solutions.

The key person of this department is the Technical Manager, who is responsible for the management of the company's IT and software development operations.

4.4.2 Identification of Cost Centers

A cost center is an organizational subunit or area of responsibility, whose cost is accounted for, in order to measure its overall performance. A cost center incurs costs, yet indirectly contributes to the company's profitability, through its operational effectiveness, customer service or product value. The overall function of a cost center is to track its expenses, in order to provide visibility to top management regarding the company's expenditure.

Based on "Smart Amplify"'s organizational chart, the following cost centers are identified:

- *Operations Cost group*, consisting of the following:
 - Client Services & Software Development cost center
 - Client support services
 - Personnel transportation
 - SaaS services
 - Training

- System Services cost center
 - Hardware
 - Consumables
 - Maintenance
 - Shared services (Microsoft Azure)
 - Training
 - Consulting services
- Quality Assurance (QA) cost center
 - Testing Equipment
 - QA certification and calibration
 - QA tooling
 - QA consumables
 - Legal compliance
 - Training
 - R&D expenses
- *Sales & MKT Cost center*, consisting of the following:
 - Personnel transportation
 - Personnel benefits
 - Telephone expenses
 - Training
 - Marketing expenses
 - Consulting expenses
 - Events & Exhibitions
- *Financial Cost center*, consisting of the following:
 - Personnel benefits
 - Training
 - Accounting
 - Banking expenses

- *Administration Cost group*, consisting of the following:
 - Travelling expenses
 - Telephone expenses
 - Training
 - Utilities (i.e. Water, electricity, broadband connection)
 - Office consumables
 - Facilities maintenance
 - Insurance
 - Security
 - Taxes
 - Miscellaneous GM expenses (i.e. dinner with customers, travel expenses)
 - Environmental and safety legal compliance

4.4.3 General and Administrative Expenses

The general and administrative or overhead expenses are all the expenditure which cannot be conveniently traced to or identified with any particular cost unit⁵⁴. As a result, the overhead expenses cannot be associated with products or services and thus, they do not generate profit. In the case of “Smart Amplify”, there are three types of general and administrative expenses:

- *Production overhead*, such as IT hardware and software (ERP) maintenance, facilities maintenance, cost of utilities and property security.
- *General administrative overhead*, such as cost of insurance, taxes, office consumables, GM salary and benefits, as well as miscellaneous GM expenses.
- *General selling overhead*, such as telephone expenses, personnel transport and benefits.

As a special note, assets’ depreciation and financial costs (i.e interest) are normally considered as part of the general and administrative expenses. Nevertheless, these two categories shall be analyzed and presented in chapter 5, during financial analysis. The same stands for the cost of business space rental and GM salary, which shall be presented in a following session.

⁵⁴ Source: [https://en.wikipedia.org/wiki/Overhead_\(business\)](https://en.wikipedia.org/wiki/Overhead_(business)).

Based on the presented information, the project's General and Administrative expenses are presented in the following table:

General and Administrative Expenses (in € thousand)					
Description	2018	2019	2020	2021	2022
Production Overhead					
Utilities	48,6	49,1	49,9	50,7	51,6
Facilities Management (Outsourced)	11,9	12,0	12,2	12,4	12,6
Property Security (Outsourced)	3,8	3,8	3,9	3,9	4,0
Consulting Services	1,4	1,4	1,4	1,4	1,4
General Administrative Overhead					
Insurance	1,1	1,1	1,1	1,1	1,1
Taxes	1,8	1,8	1,8	1,9	1,9
Telephone Expenses	2,4	2,5	2,5	2,5	2,6
Personnel Benefits	1,5	1,5	1,6	1,6	1,6
Legal Compliance	1,4	1,4	1,4	1,4	1,4
General Selling Overhead					
Travelling Expenses	11,9	12,0	12,2	12,4	12,6
Miscellaneous MKT Expenses	1,8	1,8	1,8	1,9	1,9
Total:	87,5	88,5	89,8	91,3	92,9

Table 4.15: Annual General and Administrative Expenses of “Smart Amplify”.

In the above calculations, the expected year-over-year inflation has been taken into consideration, starting from 2019⁵⁵.

⁵⁵ Source: <https://www.statista.com/statistics/276351/inflation-rate-in-greece>.

4.5 Human Resources

4.5.1 Introduction

One of the key success factors of every project is the proper selection and utilization of human resources. Therefore, the proper planning of human resources management is crucial for this project, in order to maximize the utilization of the other company resources, cultivate a culture of cooperation, provide an environment of financial security and sustain the company's competitive advantage through a long lasting relationship with its personnel.

In the following sessions, the following three topics shall be covered:

- i. Human resources requirements of “Smart Amplify”.
- ii. Personnel recruitment.
- iii. Personnel Training.
- iv. Human resources cost estimation.

4.5.2 Determination of human resources requirements

“Smart Amplify” is a SME, focusing on high technology solutions and providing them to the niche market of Plastics & Rubber manufacturing. Therefore, its personnel requirements are not high in numbers, yet are high in qualifications and specialization. Moreover, regarding the daily operation of the company, the operation schedule shall be on a 5-day basis, from Monday to Friday, from 08:30 to 16:30, which is considered as the most optimal solution for servicing its customers, who generally operate on a 2 or 3 shift basis; yet their executive staff normally works from 08:30 to 16:30.

Based on the above information and the company's organizational chart, the requirements of each job position shall be presented in the following sessions.

4.5.2.1 General Manager

The General Manager (GM) serves as the top executive of the company and is responsible for strategy formulation and implementation, organizational structure, capital expenditure, budgeting, personnel, financial outcome and overall performance of the company. The position will be filled by one of the founders, Mr. Dimitropoulos.

Key Responsibilities

- Review financial statements, sales or activity reports, or other performance data to measure productivity or goal achievement or to identify areas needing cost reduction or program improvement.
- Direct and coordinate activities of businesses or departments concerned with the production, pricing, sales, or distribution of products.
- Direct administrative activities directly related to providing services.
- Prepare staff work schedules and assign specific duties.
- Monitor suppliers to ensure that they efficiently and effectively provide needed goods or services within budgetary limits.
- Direct or coordinate financial or budget activities to fund operations, maximize investments, or increase efficiency.
- Establish or implement departmental policies, goals, objectives, or procedures in conjunction with board members, organization officials, or staff members.
- Plan or direct activities such as sales promotions that require coordination with other department managers.
- Plan and control change management.

Minimum Skills and Educational Requirements

- Master title in Business Administration.
- Bachelor title in Engineering or Business Administration.
- 10 years of experience in an executive position, at least 5 in top management position.
- Proven knowledge of IoT technology.
- English language fluency, both written and oral.
- Proactive approach to problem-solving with strong decision-making skills.
- Customer service orientation.
- Performance management, strong leadership profile.
- Financial planning and strategy.

4.5.2.2 Executive Assistance

The Executive Assistance department provides high-level administrative support and performs clerical functions. The department will comprise one employee.

Key Responsibilities

- Prepare financial statements, reports, memos, invoices letters, and other documents.
- Answer phones and routing calls to the correct person or taking messages.
- Handle basic bookkeeping tasks.
- File and retrieve corporate records, documents, and reports.
- Research and conduct data to prepare documents for review by top management and executives.
- Assist with preparation of meetings.
- Accurately record minutes from meetings.
- Greet visitors and decide if they should be able to meet with executives.
- Use various software, including word processing, spreadsheets, databases, and presentation software.
- Read and analyze incoming memos, submissions, and distribute them as needed.
- Make travel arrangements for executives.
- Perform office duties that include ordering supplies and managing a records' database.
- Open, sort and distribute incoming faxes, emails, and other correspondence.
- Provide general administrative support.

Minimum Skills and Educational Requirements

- High school diploma.
- Proven experience as an executive assistant or other relevant administrative support experience.
- In-depth understanding of entire MS Office suite.
- Ability to organize a daily workload by priorities.
- Ability to meet deadlines in a fast-paced quickly changing environment.
- Professional level verbal and written communications skills.

4.5.2.3 OHS Officer

The Occupational Health and Safety (OHS) Officer is responsible for the company's compliance with occupational health and safety guidelines and regulatory framework. The position will be outsourced and operate on a part-time basis, approximately at 8 hours per week.

Key Responsibilities

- Provide health and safety measures in a working environment.
- Support staff with the identification of environmental aspects and determining the project objectives and target.
- Identify and evaluate the unsafe environment and practices.
- Identify the root causes of safety and industrial hygiene.
- Develop and communicate hazard control processes, methods and programs.
- Monitor implementation of safety plans according to plans and objectives.
- Measure and audit the effectiveness of hazard control programs.
- Work in compliance with ISO 14001 and 45001 standards.

Minimum Skills and Educational Requirements

- Bachelor degree in any branch of engineering.
- Minimum 5 years of experience as an OHS specialist.
- Knowledge of health and safety engineering processes and practices.
- Ability to manage and control all types of health and safety issues.
- Aware of ISO environment regulations and principles.
- Ability to research and apply the best industrial and working practices to provide effective services.
- Ability to work in teams and lead a project.
- Strong command over verbal and written communication.
- Ability to provide and implement plans, objectives and standards timely.

4.5.2.4 HR Department

The Human Resources (HR) Department is responsible for planning, directing and coordination of human resources and activities of the company. The department will comprise one employee, the HR Manager.

Key Responsibilities

- Develop and implement HR strategies and initiatives aligned with the overall business strategy.
- Bridge management and employee relations by addressing demands, grievances or other issues.
- Manage the recruitment and selection process.
- Support current and future business needs through the development, engagement, motivation and preservation of human capital.
- Nurture a positive working environment.
- Oversee and manage a performance appraisal system that drives high performance.
- Maintain pay plan and benefits program.
- Assess training needs to apply and monitor training programs,
- Report to management and provide decision support through HR metrics.
- Ensure legal compliance throughout human resource management.

Minimum Skills and Educational Requirements

- BS/MS degree in Human Resources or related field.
- Minimum 3 years of experience as HR manager or other HR executive.
- People oriented and results driven.
- Proven experience with human resources metrics.
- Knowledge of HR systems and databases.
- Excellent active listening, negotiation and presentation skills.
- Competence to build and effectively manage interpersonal relationships at all levels of the company.
- In-depth knowledge of labor law and HR best practices.

4.5.2.5 Financial Management

This department directs and coordinates all financial activities of the company. The department will comprise 2 employees; the financial manager and the accountant.

Financial Manager - Key Responsibilities

- Provision and interpretation of financial information.
- Monitoring and interpretation of cash flows and future trends.
- Formulation of strategic and long-term business plans.
- Report on factors influencing business performance.
- Analysis of market competitors and trends.
- Development of management mechanisms that minimize financial risk.
- Conduction of reviews and evaluations for cost-reduction opportunities.
- Management of the company's financial accounting, monitoring and reporting systems.
- Annual budget management.
- Maintain compliance with financial regulations and legislation.

Financial Manager - Minimum Skills and Educational Requirements

- Master title in Finance, Accounting or Economics.
- Bachelor title of in any branch of Economics.
- Minimum 5 years of experience in an executive position.
- English language fluency, both written and oral.
- Proactive approach to problem-solving with strong decision-making skills.
- Customer service orientation.
- Performance management.
- Financial planning and strategy.
- Strong leadership profile.

Accountant - Key Responsibilities

- Preparation, examination and analysis of accounting records, financial statements, or other financial reports to assess accuracy, completeness, and conformance to reporting and procedural standards.
- Reporting to management regarding financial performance.
- Establish tables of accounts and assign entries to proper accounts.
- Development and implementation of document recordkeeping and accounting systems, making use of current computer technology.
- Development and analysis of budgets versus actual incurred costs.
- Computation of taxes owed and tax returns, ensuring compliance with payment, reporting, or other tax requirements.

Accountant - Minimum Skills and Educational Requirements

- Bachelor title in Accounting.
- Minimum 3 years of experience in similar position.
- English language fluency, both written and oral.
- Sound knowledge of tax regulations.
- Strong accounting background with accrual accounting mentality.
- In-depth knowledge of Microsoft office tools.
- Result oriented and high sense of responsibility.
- Excellent communication skills.

4.5.2.6 Sales & MKT Management

This department is responsible for the implementation of the company's marketing strategy and plans. The department will comprise 5 employees; the Commercial manager, 2 product managers and 2 consultants.

Commercial Manager - Key Responsibilities

- Identification of business expansion opportunities.
- Analysis of sales, marketing, finance and other reports in order to gain insights on improving performance and maximizing growth.
- Annual sales & MKT budgeting.
- Development of pricing plan on a per customer basis.
- Creation of sustainable and productive relationships with existing clients.
- Management of daily operations, including employee training and development, contract negotiations and customer visits.
- Risk assessment regarding new initiatives, thus ensuring deadlines are met and unexpected situations can be properly handled.

Commercial Manager - Minimum Skills and Educational Requirements

- Master title in Business Administration.
- Bachelor title in any branch of Economics.
- Minimum 5 years of experience in business development, customer management, sales or related field.
- Strong communication, sales and presentation skills.
- Ability to multitask and prioritize projects.
- Superb negotiation capabilities.
- Team-oriented and results focused.
- Strong leadership profile.

Product Manager - Key Responsibilities

- Determination of customers' needs and wants by specifying the research needed to obtain market information.
- Review of product specifications and requirements and appraisal of new product ideas or changes.
- Assessment of product market data by calling on customers with field salespeople and evaluating sales call results.
- Preparation of short-term and long-term product sales forecasts and special reports and analyses.
- Responsible for building customer awareness and understanding of the company's solutions.
- Provide excellent customer service and technical support.

Product Manager - Minimum Skills and Educational Requirements

- MS/BS degree in Computer Science, Engineering or equivalent field.
- Bachelor's title of in any branch of Economics.
- Minimum 3 years of experience in product management, preferably in service sector.
- Ability to develop product and marketing strategies and effectively communicate recommendations to executive management.
- Solid technical background with understanding and/or hands-on experience in software development and IIoT technologies.
- Strong problem solving skills and willingness to roll up one's sleeves to get the job.
- Excellent written and verbal communication skills.
- Willingness to travel 70%.

Consultant - Key Responsibilities

- Determination of customers' needs and wants through on-site visits, data collection and analysis.
- Preparation of reports, proposals, and presentations to customers.
- Cooperation with multidisciplinary teams of customers in order to gain insights about improvement opportunities.
- Application of L6S methodology to customer Big Data projects.
- Conducting of IIoT plant modernization audits.

Consultant - Minimum Skills and Educational Requirements

- MS/BS degree in Computer Science, Engineering or equivalent field.
- L6S certification, minimum Green Belt.
- Minimum 3 years of experience in project management, with application of L6S methodology.
- Solid technical background with understanding and/or hands-on experience in software solutions and industrial manufacturing.
- Excellent written and verbal communication skills.
- Team-oriented and results focused.
- Willingness to travel 60%.

4.5.2.7 Operations Management

This department is responsible for the integrated planning, design, optimization, operation and control of the company's technological products, processes and services.

The department will comprise 6 employees:

- Technical Manager (Co-founder, Mr. Theodorou)
- IT Manager
- Quality Assurance Manager
- Software Development Team
 - Senior IIoT developer
 - Full stack IIoT developer
- Test Engineer

Technical Manager - Key Responsibilities

- Recruitment, training, assignment, counseling and discipline of employees.
- Enforcement of company's policies and procedures.
- Contribution of operational information and recommendations to strategic plans and reviews.
- Annual budgeting of Operations department according to strategic plan.
- Process workflow analysis and improvement actions.
- Annual performance appraisal of all Operations employees.
- Relationships management with key operations vendors.
- Tracking of vendor pricing, rebates and service levels.
- Communication of customer issues with operations team and devise ways of improving the customer experience, including resolving problems and complaints.
- Close collaboration with GM and top management to set and implement objectives, policies and procedures.
- Assurance of the company's operation according to regulatory framework.

Technical Manager - Minimum Skills and Educational Requirements

- Master title in Business Administration.
- Bachelor title in Electrical and Computer Engineering.
- 10 years of experience in an executive position, at least 5 in top management position.
- Proven knowledge of IoT technology.
- English language fluency, both written and oral.
- Proactive approach to problem-solving with strong decision-making skills.
- Customer service orientation.
- Performance management.
- Financial planning and strategy.
- Team-oriented and results focused.
- Strong leadership profile.

IT Manager - Key Responsibilities

- Management of information technology and computer systems.
- Control and evaluation of IT and electronic data operations.
- Design, development and implementation of systems, policies and procedures.
- Assurance of data security, network access and backup systems.
- Preservation of assets, information security and control structures.

IT Manager - Minimum Skills and Educational Requirements

- Bachelor title in Computer Science or relevant field.
- 5 years of experience in similar position.
- Proven knowledge of IoT technology.
- English language fluency, both written and oral.
- Excellent knowledge of technical management, information analysis and of computer hardware/software systems.
- Expertise in data center management and data governance.
- Hands-on experience with computer networks, network administration and network installation.
- IRCA certification according to ISO 20000 and 27000.

Quality Assurance Manager - Key Responsibilities

- Development of quality inspection and reporting procedures.
- Operations monitoring for quality issues.
- Head of R&D department.
- Appraisal and solution of customers' complaints.
- Review and development of quality standards and policies.
- Preparation of quality reports, statistical reviews and relevant documentation.
- Assurance of compliance with the relevant ISO standards.

Quality Assurance Manager - Minimum Skills and Educational Requirements

- Bachelor title in Computer Science or relevant field.
- Minimum 3 years of experience in similar position.
- Proven knowledge of IoT technology.
- English language fluency, both written and oral.
- Thorough knowledge of methodologies of quality assurance and ISO standards.

- Excellent numerical skills and understanding of data analysis/statistical methods.
- Good knowledge of MS Office and databases.
- Great attention to detail and results focused.
- Excellent organizational and leadership abilities.
- IRCA certification according to ISO 9001, 14001 and 24773.

Senior IIoT Developer - Key Responsibilities

- Development and integration of the company's technologies according to Operations specifications.
- Creation of architectural models and presentation of complex business ideas in a simplified manner.
- Integration development through APIs and service-oriented architectures.
- Identification of business processes and opportunities for technology value creation.
- Process improvement and business alignment activities.
- Hand-on support during the development of new solutions features.

Senior IIoT Developer - Minimum Skills and Educational Requirements

- Bachelor title in Computer Science or relevant field.
- Minimum 5 years of experience in similar position.
- Proven knowledge of IoT technology.
- English language fluency, both written and oral.
- Ability to work both in team and independently.
- Communication and presentation skills.
- Background in systems software development utilizing multiple modern technologies and techniques, such as JAVA, .NET, JavaScript and design patterns.
- Experience with APIs and integration of IIoT technology
- Understanding of manufacturing systems and processes
- Proficiency with Microsoft Azure cloud solutions.
- Proficiency with both relational and non-relational databases as well as SQL.
- Proficiency with development tools such as GitHub and Visual Studio.
- Time management, critical thinking and comprehension skills

Full Stack IIoT Developer - Key Responsibilities

- Prototyping custom web/mobile apps based on Microsoft Azure Platform.
- Development of custom apps to drive business development and marketing.
- Building of a core platform (app, data, code) to enable modular/standardized development of a variety of applications.
- Integration of the company's solutions with 3rd Party APIs.
- Development of custom monitoring and business dashboard apps.
- Continuous improvement of the scalability, security, seamless deployment and fail-over/disaster recovery of the company's IIoT cloud solutions.

Full Stack IIoT Developer - Minimum Skills and Educational Requirements

- Bachelor title in Computer Science or relevant field.
- Minimum 5 years of programming experience, preferably in similar position.
- English language fluency, both written and oral.
- Ability to work both in team and independently.
- Background in systems software development utilizing multiple modern technologies and techniques, such as JAVA, .NET, JavaScript and design patterns.
- Experience with APIs and integration of IIoT technology.
- Understanding of manufacturing systems and processes.
- Proficiency with Microsoft Azure cloud solutions.
- Familiarity with web application security and redundancy/availability practices
- Proficiency with both relational and non-relational databases as well as SQL.
- Proficiency with development tools such as GitHub and Visual Studio.
- Prior experience with big data and/or machine learning preferred, but not required.
- Time management, critical thinking and comprehension skills.

Test Engineer - Key Responsibilities

- Development and execution of manual and automated test plans for IIoT systems and solutions.
- Collaboration with developers regarding software defects fixes.
- Reproduction of defects, root cause analysis and validation of fixes.
- Conducting of exploratory test sessions.
- Preparation of test reports.
- Part-time employment in R&D department.

Test Engineer - Minimum Skills and Educational Requirements

- Bachelor title in Computer Science or relevant field.
- Minimum 3 years of experience in similar position.
- English language fluency, both written and oral.
- Ability to work both in team and independently.
- Experience in testing large scale .Net applications, both manually and automated.
- Experience in working with DevOps, Docker, Gherkin, or Linux.
- Knowledge of IoT and cloud services (Microsoft Azure).
- Working experience in environments that integrate software and hardware products.

4.5.3 Human Resources Planning

Following the determination of human resources requirements of “Smart Amplify”, the total number of employees per department are presented in the following table:

“Smart Amplify”’s Personnel		
Description	Position Type	Nr. of Employees
General Administration		
General Manager	Top Management	1
Executive Assistance	Employee	1
OHS Officer	External Consultant	0
HR Manager	Executive	1
Financial Management		
Financial Manager	Top Management	1
Accountant	Executive	1
Sales & MKT Management		
Commercial Manager	Top Management	1
Product Manager	Employee	2
Consultant	Employee	2
Operations Management		
Technical Manager	Top Management	1
IT Manager	Executive	1
Quality Assurance Manager	Executive	1
Software Development	Employee	2
Test Engineer	Employee	1
Total:		16

Table 4.16: Aggregated Table of “Smart Amplify”’s Personnel.

Regarding the position of OHS officer, it is not counted as part of the company’s workforce, since it shall be outsourced. Additionally, its cost has been already accounted for in the General and Administrative Expenses session (legal compliance).

4.5.4 Personnel Recruitment

Following the determination of human resources requirements of “Smart Amplify”, the next step is the process of attracting and selecting suitable candidates for each job position.

4.5.4.1 Candidate Attraction

Candidate attraction refers to the tools and techniques used by an employer in order to attract potential applicants to fill a vacancy⁵⁶. This practice aims at acquiring the most suitable candidates in a timely manner, by utilizing the best sources of job vacancies information and by narrowing down the applicants through the precise specification of each vacancy’s role and requirements.

“Smart Amplify” shall utilize the following candidate attraction mechanisms:

- i. Post its employee vacancies through proven job vacancy web sites, such as “Skywalker.gr” and “Kariera.gr”.
- ii. Post its executive vacancies through LinkedIn, the world’s largest professional network.
- iii. Assign the attraction of top management candidates for the positions of Financial Manager and Sales & MKT Manager, to local executive search firms, such as Stanton Chase in Athens, or AIMS International Hellas.
- iv. Participation in “Carrier Days” events, as an additional means to attract software developers and test engineers.

4.5.4.2 Candidate Selection

Following the candidate attraction phase, the selection process begins. The phase consists of the following sequential phases:

- i. *Resume collection and evaluation:* In this phase the resumes are collected and an initial evaluation takes place, in order to choose the “potential-fit” candidates for the next phase, thus narrowing down the initial number of candidates.
- ii. *Preliminary interview:* In this phase a short preliminary job interview takes place, in the presence of each department’s manager and the HR manager, in order to evaluate the skills and personal traits of the candidates against the

⁵⁶ Source: <https://www.xperthr.co.uk/good-practice-manual/candidate-attraction/151933>.

position requirements and company culture. At the end of this phase, only a few candidates (up to three) remain for next phase.

- iii. *Selection interview:* In this phase, the remaining few candidates are invited again for a second, more detailed interview, in order to evaluate if each candidate is the best fit for the corresponding job position. The General Manager is also participating in this interview, along with the manager of the relevant department.
- iv. *Verification of the candidate's qualifications and skills:* In this phase, the declared qualifications and letters of recommendation are verified through research, following the candidate's consent and signature.
- v. *Selection phase:* In this phase the GM, the department manager and the HR manager decide jointly upon the best fit for the position and sort the few prevailing candidates in a hierarchal list. This list contains up to three candidates and serves as the basis for job proposition.
- vi. *Job offer proposition:* In this final stage, the HR manager contacts the first candidate on the selection list and presents him/her with the offer proposition, along with the time frame for the candidate's response to the offer. In case the first candidate denies the offer or does not reply during the defined time frame, he/she is rejected and the procedure is repeated with the next candidate on the final list, until the job position is filled.

4.5.5 Personnel Training

“Smart Amplify” is focusing on cutting edge technology, therefore its philosophy is the continuous training of its personnel, in order to be always up-to-date with IIoT developments. To that end, the company has the following training plan:

- *Top Management:* IIoT related seminars and business administration seminars (i.e. change management, performance and conflict management) shall be the core focus of training for this subgroup. Additionally, participation in AHPI events is mandatory, in order to be always aware of the trends in Plastics & Rubber Manufacturing, therefore getting indirect training on identifying their customers’ current and future needs.
- *Middle Management:* IIoT related seminars of technical nature and project management seminars shall be the core focus of this subgroup.
- *Other Employees:* Deep technical seminars shall be the core focus of the solutions’ development team. The majority of their training needs shall be covered through the free six month educational courses from Microsoft, which are part of its yearly Visual Studio license. Regarding consultants and product managers, sales and IIoT related seminars shall be their main focus.

The sources of these seminars can be either state organizations (i.e. Hellenic Management Association), private organizations (i.e. Microsoft Hellas, TUV Austria Hellas) or web seminars (i.e. IEEE, MIT and various IoT manufacturers). The HR manager shall be responsible for training management of all personnel.

Finally, the HR manager is responsible for delivering an initial training on each new employee, regarding the organization, its objectives, policies, rules of operation and safety regulations.

4.5.6 Estimation of Personnel Cost

In this session the estimated total personnel cost shall be presented, including both direct and indirect remuneration. The direct remuneration includes basic salary, bonuses and overtime payment. The indirect remuneration includes regular or non-regular allowances, health/life insurance, training and other benefits, such as company car, laptop and mobile phone.

Following the above, the total personnel cost of “Smart Amplify” is presented below:

Annual Personnel Cost (in € thousand)				
Description	Nr. of Employees	Monthly Gross Salary	Monthly Employer Contribution	Total Annual Cost
General Administration				
General Manager	1	3,0	0,8	52,5
Executive Assistance	1	0,9	0,2	15,8
OHS Officer	0	-	-	-
HR Manager	1	1,3	0,3	22,8
Financial Management				
Financial Manager	1	2,7	0,7	47,3
Accountant	1	1,3	0,3	22,8
Sales & MKT Management				
Commercial Manager	1	2,7	0,7	47,3
Product Manager	2	2,8	0,7	49,0
Consultant	2	2,8	0,7	49,0
Operations Management				
Technical Manager	1	2,7	0,7	47,3
IT Manager	1	1,8	0,5	31,5
Quality Assurance Manager	1	1,8	0,5	31,5
Software Development	2	3,3	0,8	57,8
Test Engineer	1	1,4	0,4	24,5
Total:	16	28,5	7,1	498,8

Table 4.17: Personnel Cost Breakdown of “Smart Amplify”.

Based on the above estimated annual personnel cost, the calculated total annual personnel cost per year is presented in the following table, with the assumption that each year there is a slight increase by 2%, as a means to absorb year-over-year inflation:

Total Personnel Cost (in € thousand)					
Description	2018	2019	2020	2021	2022
General Administration	68,3	92,8	94,7	96,6	98,5
Financial Management	52,5	71,4	72,8	74,3	75,8
Sales & MKT Management	108,9	148,2	151,1	154,1	157,2
Operations Management	144,4	196,4	200,3	204,3	208,4
Total:	374,1	508,7	518,9	529,3	539,9

Table 4.18: Annual Personnel Cost of “Smart Amplify”.

As a special note, the personnel cost of 2018 is calculated at 75% of its nominal value, due to the expected project initiation from March.

4.6 Location – Establishment – Environment

4.6.1 Company Establishment Requirements

The effective implementation of the project depends heavily on the proper estimation of the establishment space requirements, along with the selection of the optimal location. Since “Smart Amplify” shall develop and offer applications and services, there are no external criteria (i.e. RM and product nature) affecting its space requirements, other than its own needs to host its personnel and IT systems.

Therefore, “Smart Amplify” shall have the following layout:

- General Manager’s office.
- Financial Manager’s office.
- Commercial Manager’s office.
- Technical Manager’s office.
- HR Manager’s office.
- Accountant’ office.
- Product Managers’ and Consultants’ offices (common space).
- IT Manager’s office and server room.
- Quality Manager’s office.
- Software Development and Test Engineer offices (common space).
- Executive Assistance reception and meeting room.

Based on the prescribed layout, the space requirements of “Smart Amplify” are approximately 220 m².

4.6.2 Alternatives for Company Location

The optimal location of the company has to fulfill a variety of requirements other than the already specified space requirements. The main criteria behind location research and selection are:

- Geographical position (region).
- Accessibility via public and private transport.
- Proximity to customer base.
- Proximity to potential competitors.
- Abundancy of professional space offerings.
- Affordable rental rates (purchase is not considered as an option).
- Availability of qualified personnel (talent supply).
- Quality of life to the company's personnel.

Based on the company's nature, strategy and objectives, there are three alternatives, which are all located in Athens and are considered capable of satisfying the specified requirements. Prior to comparing these alternatives, a brief presentation of each one follows below:

- i. Amaroussion:* The municipality of Amaroussion is located in the northern part of Athens, where the majority of software development companies are located. The area is moderately close to the center of Athens and offers high accessibility to the rest of Athens via public transport and fast access to the National Highway as well as the Attica Motorway. Regarding customer proximity, this area offers great accessibility towards the customers at North Attica and Voiotia and modest one towards those at the south and east suburbs of Athens. Regarding rental rates and market supply, the area offers a lot of options, custom-tailored for companies, yet the rental rates are quite high, ranging from €1.000 to €3.500, depending on the floor and proximity to public transport.

- ii. *Ampelokipoi*: The municipality of Ampelokipoi is located in the central district of Athens, where a mix of private and public business is located. The area is very close to the center of Athens and offers high accessibility to the rest of Athens via public transport and the Attica Motorway. Access to the National Highway is considered as modest. Regarding customer proximity, this area is the middle solution regarding great accessibility towards customers, either to the North or the South.

Regarding rental rates and market supply, the area offers limited options, custom-tailored for companies, yet the rental rates are quite high, ranging from €1.000 to €2.600, depending on the floor and proximity to public transport.

- iii. *Piraeus*: The municipality of Piraeus is located at the southern part of Attica, where a mix of private and public business is located. The area is moderately close to the center of Athens and offers high accessibility to the rest of Athens via public transport and the National Highway. Access to the Attica Motorway is considered as poor. Regarding customer proximity, this area provides limited accessibility towards customers to the North and good one to those at the South. Nevertheless, since the majority of customers is located to the north Attica and Voiotia region, this area is not considered as ideal.

Regarding rental rates and market supply, the area offers a huge variety of options, custom-tailored for companies, with the rental rates ranging from €500 to €4.600, depending on the floor and proximity to public transport.

4.6.3 Selection of Company Location

Following the presentation of the location alternatives, the evaluation process shall be presented, based on a weighted score method, including the aforementioned criteria.

The evaluation scheme is as follows:

- Criteria score, ranging from 1 to 10, from not satisfactory to fully satisfactory.
- Weight coefficients, ranging from 0 to 100, with a sum of 100.

The relevant evaluation table is presented onwards:

Location Evaluation of “Smart Amplify”							
		Criteria Score			Total Score		
Criteria	Weight	Amaroussion	Ampelokipoi	Piraeus	Amaroussion	Ampelokipoi	Piraeus
Geographical Position	10	10	10	10	100	100	100
Transport Accessibility	15	9	8	7	135	120	105
Customer Proximity	20	8	9	5	160	180	100
Competitors Proximity	5	9	7	5	45	35	25
Space Offerings Availability	10	8	6	10	80	60	100
Rental Rates	15	7	8	9	105	120	135
Talent Supply	15	9	9	8	135	135	120
Quality of life	10	8	7	7	80	70	70
Total:	100				840	820	755

Table 4.19: Location Evaluation for “Smart Amplify”.

Based on the presented evaluation, the most optimal location for hosting “Smart Amplify”’s activities is the area of Amaroussion. Following a thorough area survey, with the aid of real estate agents, the company’s headquarters shall be in the of district “Kokkinias”, very close to the subway station, on the second floor of a building well-suited for professionals, which offers the requested offices’ layout and 4 parking positions. The agreed rate is at €1.450 per month.

Therefore the annual cost of space rental is presented below, taking into consideration inflation, starting from 2019 and onwards:

Business Space Rental Cost (in € thousand)					
Description	2018	2019	2020	2021	2022
Rental Rate	17,4	17,6	17,9	18,2	18,5

Table 4.20: Annual Business Space Rental Cost of “Smart Amplify”.

4.6.4 Environmental Impact

The operations and other activities of “Smart Amplify” do not heavily impact the environment, due to the nature and scope of the company. Nevertheless, the founders of the company are environment-conscious and understand that even a service provider SME should operate with social responsibility and aim towards environmental sustainability. To that end, the company shall proceed with the following actions:

- All electronic devices shall be “Energy Star®” certified⁵⁷.
- The HVAC equipment shall be load-driven operated (variable speed drive).
- The lighting infrastructure shall be utilizing LED and sensor technology.
- The thermal dissipation of the server room shall be utilized for heating the offices during winter time.
- Provide instructions and resources to it personnel regarding Green computing⁵⁸ and paperless operation.

The above shall enable “Smart Amplify” to minimize its environmental footprint, develop a culture of environmental responsibility and become a shining example to its business environment.

4.7 Project Planning and Execution

4.7.1 Objective of Project Planning and Execution

The scope of project planning is to determine the duration required in order to realize the project, starting from the decision to proceed with the project, up to the first day of commercial activity. In order to properly plan and manage the execution of the project, a realistic action plan has to be thoroughly prepared, which shall define the various execution stages and their correlation, thus providing a clear guideline on each stage’s implementation.

This plan mainly comprises the following actions:

- Determination of the type of activities required for project realization.
- Determination of the activities’ sequence required for project realization.

⁵⁷ Source: <https://www.energystar.gov>.

⁵⁸ Source: https://en.wikipedia.org/wiki/Green_computing.

- Determination of the time duration and other resources required per project activity.
- Project management budgeting and cash flow provisioning, in order to ensure capital availability for the project's realization.
- Documentation of the various project stages and required actions, in order to assist with proper financial and time planning of the project's execution.

4.7.2 Project Planning of “Smart Amplify”

In this session, the major project execution stages shall be presented, followed by the corresponding timeframe. The proper time budgeting is important in order to realize the project in a timely manner and without major delays and added costs. Based on the above, the analytical project implementation plan is presented onwards, starting from March 2018:

i. Formation of project implementation team → 15 days

In this stage, the founders of the project select and form a small team that will be responsible and accountable for the correct and timely implementation of the project. The team is expected to identify and resolve issues, such as project delays, budget exceedance, insufficient quality of service or delivered equipment, poor coordination and management, as well as safety issues.

In order to minimize the appearance of such issues, the founders of the project shall be the superintending members of the team.

ii. Company establishment → 20 days

In this stage, the team shall proceed with the necessary actions for company establishment:

- Letter of agreement signed by the two founders, regarding the establishment of the company.
- Signed agreement regarding the financial arrangements and dividends of the company.
- Formal applications to state authorities regarding company establishment (public insurance, tax office, technical chamber of Greece, general commercial registry).

iii. Planning of project funding → 15 days

Aside from the initial cost of investment, which shall be co-financed through equity and long-term loan, the company shall require funding for its working capital and pre-production marketing expenses. Therefore, the team must investigate the alternative sources of funding and choose the most optimal scheme for the smooth project execution and initial operation, such as:

- Founders' private funds.
- Bank short-term loan.
- Other funding sources (i.e Partnership Agreement 2014-2020).

iv. Engineering and Technology specification and acquisition → 60 days

In this stage the specifications of the main and auxiliary equipment are finalized and the equipment is ordered from the respective suppliers. The same is true for technology acquisition, which in our case is the MS Azure IoT PaaS and Visual Studio licensing.

v. Business installation → 60 days

In this stage the physical business space is prepared according to the specifications of the project team. This stage is critical to the project success, since any delays directly impact the cost and revenue provisions of this feasibility study.

vi. Personnel recruitment and training → 40 days

In this stage the company proceeds with personnel recruitment and training. The recruited personnel is trained in the company's policies, internal and external regulations, management systems and product/service portfolio. Additionally, specific training is performed on a per department basis (i.e. IT systems training for testing engineer and software developers).

vii. Pre-production marketing → 60 days

This stage is critical to the project's success, since it is directly linked to the initial revenues of the company. Pre-production marketing involves the creation and launch of the company's web site, where potential customers shall also have the chance to use an interactive demo of the company's SaaS Predict® platform. Additionally, the first introductory meetings with potential customers shall commence, along with web ads and a small sponsorship to AHPI events.

viii. *Auditing, coordination and control* → 90 days

This is the final stage of the project implementation and involves the formation of an internal auditing team, which shall be entrusted with verifying that the former stages have been properly finalized. Based on the audits' findings, the team shall coordinate with the corresponding department manager for alleviating any deviations from the initial plan. Finally, the auditing team shall ensure the sustainability of the company's procedures' and processes' performance through the implementation of a control system, comprising tactical audits, sample checks and RACI (Responsible – Accountable – Consulted – Informed) matrices.

Following the detailed presentation of each project execution stage, the sequence and duration of the various stages shall be presented in the following Gantt chart:

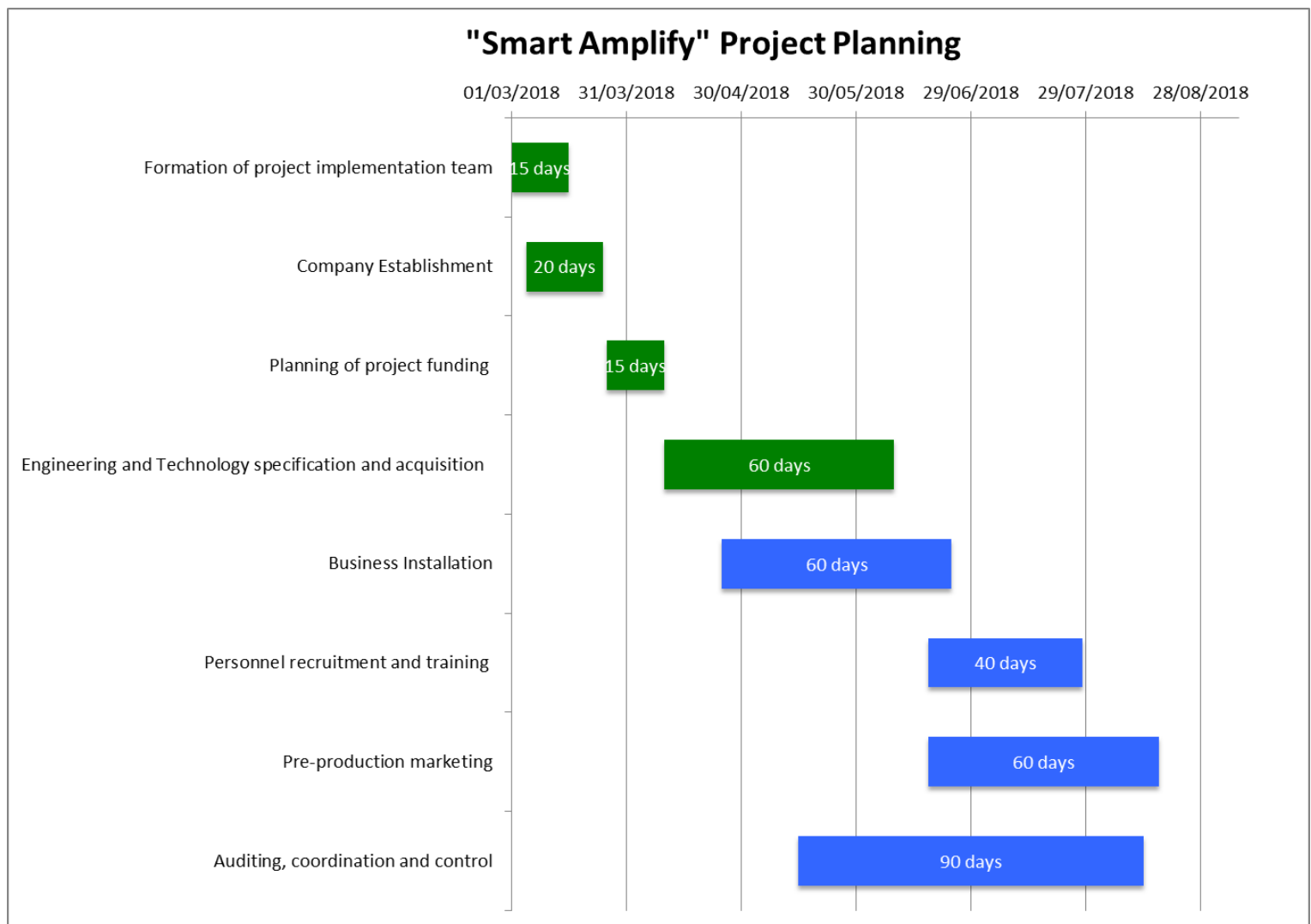


Figure 4.2: Gantt Chart of “Smart Amplify” Project Planning.

4.7.3 Cost of Project Planning and Execution

The cost of project planning and execution comprises every expense regarding project implementation, from the day of investment takeover decision until the first day of commercial activity. This cost is considered as part of the initial investment cost and is presented in the following table:

Project Planning and Execution Cost (in € thousand)	
Description	Cost
Formation of project implementation team	0,5
Company Establishment	2,5
Planning of project funding	0,5
Engineering and Technology specification and acquisition	1,0
Business Installation	4,0
Personnel recruitment and training	3,5
Pre-production marketing	4,5
Auditing, coordination and control	1,0
Total:	17,5

Table 4.21: Cost of Project Planning and Execution of “Smart Amplify”.

CHAPTER 5

FINANCIAL STUDY

5.1 Objective of the Financial Study

The scope of the financial feasibility study is to analyze and evaluate the viability of this project. It provides an overall view of the project and an assessment whether and to what extent it is advisable to develop and implement the project and how viable its operation is, during the first 5 years of operation.

Its scope is to determine whether the investment is attractive in the long-term, since an investment is by definition a long-term commitment of capital. The outcome of the evaluation process is dependent on two factors; the expected return and the expected risk of the investment.

This part of the feasibility study covers the complete financial analysis of “Smart Amplify”, comprising the following:

- *Total Cost of Investment.*
- *Project Financing.*
- *Financial Statements.*
- *Financial Feasibility Assessment.*
- *Impact on National Economy and Final Assessment.*

5.2 Total Cost of Investment Analysis

The total cost of investment comprises all the expenses related to the deployment of the project. These expenses are the costs of business founding and establishment, fixed assets' acquirement, net working capital and any other expenses that are related to the company being operational-ready. In the following sessions, these costs shall be presented.

5.2.1 Fixed Assets

The fixed assets of the company consist of all long-term assets, along with pre-productions expenses, which are presented below:

Fixed Assets (in € thousand)	
Description	Cost
Tangible Assets	
Main Operations' Equipment	46,8
Auxiliary Operations' Equipment	35,4
Intangible Assets	
Entersoft Business Suite	6,0
Pre-production Expenses	
Project Planning and Execution	17,5
Total:	105,7

Table 5.1: Fixed Assets of “Smart Amplify”.

The above costs are undertaken once prior to the company's operation and are expected to have a useful life of 10 years.

5.2.2 Net Working Capital

The net working capital of the company is calculated as the aggregate amount of all current assets (i.e. accounts receivable, inventory, cash and cash equivalents) and current liabilities (i.e. accounts payable). It determines the short-term liquidity of the company and it can offer a general impression regarding the company's ability to efficiently utilize its assets. Normally, a healthy net working capital is positive, which means that the company is able to cover its short-term liabilities, but it should not be too positive, as this could be a sign of assets' poor management. On the contrary, a substantially negative net working capital denotes lack of sufficient funding and increased danger of bankruptcy.

In order to calculate the net working capital, the total cost of production has to be firstly estimated, which has been calculated in the study's previous chapters, except for the annual depreciation of fixed assets.

Depreciation is a planned, gradual reduction in the recorded value of an asset over its useful life, by charging it to expense. Depreciation is a mechanism of acknowledging the gradual loss of an asset's utility over multiple years. This recognition of expense is

not considered an actual cash flow, therefore it is a non-cash expense and is excluded from cash flow statements.

Moreover, there are various methods of calculating depreciation, such as straight-line, double declining balance, units of production based and sum-of-the-years-digits method⁵⁹. For this project the straight-line depreciation shall be used, with no residual value following the end of the assets' useful life.

Based on the cost of fixed assets, presented in table 5.1, the annual straight-line depreciation of "Smart Amplify"'s fixed assets is presented below:

Annual Depreciation of Fixed Assets (in € thousand)	
Description	Unit
Value of Fixed Assets	€ 105,7 thousand
Fixed Assets' Useful Life	10 years
Annual Depreciation	€ 10,57 thousand

Table 5.2: Annual Depreciation of "Smart Amplify"'s Fixed Assets.

Following the calculation of annual depreciation, the total production cost for the first 5 years of operation is presented below:

Production Cost (in € thousand)					
Description	Cost				
	2018	2019	2020	2021	2022
Various Consumables	1,8	1,3	1,3	1,3	1,3
Technology Licensing	126,6	145,7	177,7	216,4	258,4
Salaries and Wages	374,1	508,7	518,9	529,3	539,9
Marketing Expenses	235,9	271,8	243,4	242,9	290,2
Management Systems	17,0	3,7	3,7	3,7	3,7
Annual Maintenance	2,6	3,8	3,8	3,8	3,8
General and Administrative Expenses	87,5	88,5	89,8	91,3	92,9
Financial Expenses (Interest)	0,0	6,5	5,4	4,2	2,9
Business Space Rental	17,4	17,6	17,9	18,2	18,5
Depreciation	10,6	10,6	10,6	10,6	10,6
Total:	873,5	1.058,1	1.072,4	1.121,7	1.222,2

Table 5.3: Total Production Cost of "Smart Amplify".

⁵⁹ Source: <https://corporatefinanceinstitute.com/resources/knowledge/accounting/types-depreciation-methods>.

Following the previous calculations, the net working capital calculation method is presented below:

Net Working Capital Calculation Method		
Description	Cost	Days of minimum coverage
Current Assets		
Accounts Receivable	Production cost, minus depreciation and financial expenses	25 days, defined by company credit policy
Inventories (Various Consumables and Raw Materials ⁶⁰)	Total cost of various consumables and raw materials	30 days, defined by company credit policy
Cash and Cash Equivalents	Production cost, minus depreciation, financial expenses and inventories	15 days, defined by ending cash balance and operation expenses
Short-term Liabilities		
Accounts Payable	Production cost, minus various consumables and raw materials	45 days, defined by agreement with suppliers

Table 5.4: Net Working Capital Calculation Method.

Moreover, based on days of minimum coverage, the annual turnover factor can be calculated, by dividing 360 days by days of minimum coverage.

Finally, the working capital needs per account are determined by dividing the total cost per account by the corresponding turnover factor. The sum of current assets needs minus short-term liabilities equals to the net working capital.

⁶⁰ The cost of technology licensing is considered as raw material for working capital calculation.

Following the aforementioned method information, the net working capital needs of “Smart Amplify” are presented onwards:

Net Working Capital (in € thousand)				
Description	Cost (A)	Days of Minimum Coverage (X)	Turnover Factor (Y=360/X)	WC Needs (based on 2018) (B=A/Y)
Current Assets				101,2
Accounts Receivable	862,9	25,0	14,4	59,9
Inventories (Various Consumables and Raw Materials)	128,4	30,0	12,0	10,7
Cash and Cash Equivalents	734,5	15,0	24,0	30,6
Short-term Liabilities				16,1
Accounts Payable	128,4	45,0	8,0	16,1
Total Net Working Capital				85,2
Total Production Cost				873,5
Cost of Various Consumables and Finished Products				-128,4
Depreciation				-10,6
"Net" Production Cost				734,5
Cash and Cash Equivalents				30,6

Table 5.5: Net Working Capital of “Smart Amplify”.

Finally, the same method shall be used in order to calculate the working capital needs of “Smart Amplify” for the first 5 years of operation, which are covered by this study:

Annual Net Working Capital (in € thousand)					
Description	Cost				
Current Assets					
Accounts Receivable	59,9	72,3	73,4	76,9	83,9
Inventories	10,7	12,3	14,9	18,1	21,6
Cash and Cash Equivalents	30,6	37,3	36,6	37,0	39,5
Short-term Liabilities					
Accounts Payable	16,1	18,4	22,4	27,2	32,5
Total Net Working Capital	85,2	103,4	102,5	104,8	112,7
Total Production Cost	873,5	1.058,1	1.072,4	1.121,7	1.222,2
Cost of RM and Consumables	-128,4	-147,0	-179,0	-217,8	-259,8
Depreciation	-10,6	-10,6	-10,6	-10,6	-10,6
"Net" Production Cost	734,5	900,6	882,8	893,4	951,9
Cash on Hand	30,6	37,3	36,6	37,0	39,5

Table 5.6: Annual Net Working Capital Needs of “Smart Amplify”.

5.2.3 Total Cost of Investment

Following the calculation of net working capital, the total cost of investment is presented in the following table:

Total Cost of Investment (in € thousand)	
Description	Cost
Fixed Assets	105,7
Net Working Capital	85,2
Total:	190,9

Table 5.7: Total Cost of Investment of “Smart Amplify”.

5.3 Project Financing

Even though the total cost of investment is not strictly prohibitive, the project’s founders have decided to opt for a mixed combination of funding, comprising their own private funds and a long-term bank loan. To that end, the necessary negotiations with the banking sector have been made and the loan shall cover 40% of the total cost of investment. The relevant funding breakdown is presented below:

Project Financing (in € thousand)		
Description	Cost	Ratio
Owners’ Equity	114,5	60%
Long-term Bank Loan	76,4	40%
Total:	190,9	100%

Table 5.8: Funding Sources of “Smart Amplify”.

The long-term bank loan shall have a steady interest rate of 8,48%⁶¹ and a five year duration of repayment. The first year of operation, 2018, shall be treated as grace period and no outstanding liabilities shall arise. Therefore, the loan shall be fully repaid at the end of 2023, the sixth year of “Smart Amplify”’s operation.

⁶¹ Source: Bank of Greece, “*Bank deposit and loan rates – January 2018*”.

Based on the above, the annual loan installment can be calculated as follows⁶²:

- $P = \frac{r(PV)}{1-(1+r)^{-n}} = \text{€}19,37 \text{ thousand}$

, where P = Annual installment

R = Interest rate

PV = Present value of loan

N = Number of periods/years

Following the calculation of annual installments, the complete loan repayment breakdown is presented in the following table:

Project Amortized Loan Repayment (in € thousand)				
Year	Annual Installment	Interest	Principal	Outstanding Balance
2018	-	-	-	76,35
2019	19,37	6,47	12,89	63,46
2020	19,37	5,38	13,98	49,47
2021	19,37	4,20	15,17	34,30
2022	19,37	2,91	16,46	17,84
2023	19,37	1,51	17,85	0,0
Sum:	96,83	20,47	76,35	

Table 5.9: Loan Repayment Plan of “Smart Amplify”.

5.4 Financial Statements

In this session, the major financial statements of “Smart Amplify” shall be presented:

- P&L Statement (Profit & Loss).
- Cash Flow Statement.
- Balance Sheet.

5.4.1 P&L Statement

The profit and loss statement, or income statement, is a financial statement that summarizes the revenues, costs and expenses incurred during a specified period, usually a fiscal quarter or year⁶³. These records provide information about a company's ability or inability to generate profit by increasing revenue, reducing costs or both.

⁶² Source: http://financeformulas.net/Loan_Payment_Formula.html.

⁶³ Source: <https://www.investopedia.com/terms/p/plstatement.asp>.

In the case of “Smart Amplify”, the P&L statement is presented on annual basis, in the following table:

Profit & Loss Statement (in € thousand)					
Description	2018	2019	2020	2021	2022
Total Revenues / Sales	786,4	906,0	1.106,4	1.349,4	1.612,4
Minus					
Production Cost	873,5	1.058,1	1.072,4	1.121,7	1.222,2
Profit before Taxes (PBT)	-87,0	-152,1	34,0	227,7	390,2
PBT (%)	-11,1	-16,8	3,1	16,9	24,2
Minus					
Taxes (29%)	-25,2	-44,1	9,9	66,0	113,2
Net Profit	-61,8	-108,0	24,2	161,7	277,0
Net Profit Margin (%)	-7,9	-11,9	2,2	12,0	17,2

Table 5.10: P&L Statement of “Smart Amplify”.

Based on the P&L statement, the company is expected to generate profits at the end of its third year of operation, which is logical and acceptable for a new project. In the first year of operation, the losses of the company are less than those of the second, entirely due to less overall operational time, which is estimated at 9 out of 12 months. From the third year and onwards, the profit generation is following a geometric progression, which is driven by its increased sales volume, while keeping its fixed costs in control.

5.4.2 Cash Flow Statement

The cash flow statement is a financial statement that provides aggregate data regarding all cash inflows a company receives from its ongoing operations and external investment sources, as well as all cash outflows that pay for business activities and investments during a given period⁶⁴.

The cash flow statement breaks down into three main categories; operations, investing activities and financing activities. The combined view of these categories provide clear insights regarding the flow of cash during a period of operation, thus enabling optimal financial planning. Finally, there are two different forms of cash flow statement; one based on accrual accounting and one based on cash accounting. In this study, the statement shall be presented in accrual accounting form, meaning that the income statement will not be the same as the company’s cash position.

⁶⁴ Source: <https://www.investopedia.com/terms/c/cashflowstatement.asp>.

Smart Amplify Ltd.						
5-Year Cash Flow						
	For the Year Ending	31/12/2018	31/12/2019	31/12/2020	31/12/2021	31/12/2022
	Cash at Beginning of Year	114,5	25,1	- 63,9	- 21,5	166,3
	Cash at End of Year	25,1	- 63,9	- 21,5	166,3	475,1
Operations						
		2018	2019	2020	2021	2022
Cash receipts from						
	Customers	786,4	906,0	1.106,4	1.349,4	1.612,4
	Other operations	-	-	-	-	-
Cash paid for						
	Inventory purchases (Various consumables)	- 10,7	- 12,3	- 14,9	- 18,1	- 21,6
	General operating and administrative expenses	- 487,0	- 531,0	- 536,2	- 576,3	- 667,6
	Wage expenses	- 374,1	- 508,7	- 518,9	- 529,3	- 539,9
	Interest	-	- 6,5	- 5,4	- 4,2	- 2,9
	Income taxes	25,2	44,1	9,9	66,0	113,2
Net Cash Flow from Operations		- 60,1	- 108,4	21,2	155,4	267,3
Investing Activities						
Cash receipts from						
	Sale of property and equipment	-	-	-	-	-
	Collection of principal on loans	-	-	-	-	-
	Sale of investment securities	-	-	-	-	-
Cash paid for						
	Purchase of property and equipment	- 105,7	-	-	-	-
	Making loans to other entities	-	-	-	-	-
	Purchase of investment securities	-	-	-	-	-
Net Cash Flow from Investing Activities		- 105,7	-	-	-	-
Financing Activities						
Cash receipts from						
	Issuance of stock	-	-	-	-	-
	Borrowing	76,4	-	-	-	-
Cash paid for						
	Equity reserve (5% of Net Profit)	-	-	1,2	8,1	13,9
	Repayment of loans	-	19,4	19,4	19,4	19,4
	Dividends (3% of Net Profit)	-	-	0,7	4,9	8,3
Net Cash Flow from Financing Activities		76,4	19,4	21,3	32,3	41,5
Net Cash Flow		- 89,4	- 89,0	42,5	187,7	308,8

Table 5.11: Cash Flow Statement of “Smart Amplify”.

The cash flow statement of “Smart Amplify” is predictable, in terms of cash flow generation mostly through its operations. Additionally, starting from the third year of operation, the company intends on paying dividends to the 2 founders and gradually build up equity reserve. Finally, the same trend of high positive cash inflows can be observed, starting from the third year and onwards.

5.4.3 Balance Sheet

The balance sheet reports a company's assets, liabilities and shareholders' equity at a specific point in time, and provides a basis for computing rates of return and evaluating its capital structure. It is a financial statement that provides a snapshot of what a company owns and owes, as well as the amount invested by shareholders⁶⁵.

The balance sheet is based on the simple equation of:

- $Assets = Liabilities + Shareholders' Equity$, meaning that a company has to finance its assets through borrowing money from others (liabilities) or through its investors (shareholders' equity).

The Assets category includes:

- Fixed Assets.
- Current Assets.
- Other Assets, such as good will and intangible assets.

The Liabilities category includes:

- Short-term Liabilities.
- Long-term Liabilities.
- Provisions for Liabilities and Charges.

The Shareholders' Equity category includes:

- Equity.
- Equity Reserve.
- Additional Paid-in Capital.

⁶⁵ Source: <https://www.investopedia.com/terms/b/balancesheet.asp>.

Based on the above, the balance sheet of “Smart Amplify is presented onwards:

Smart Amplify Ltd.						
5-Year Balance Sheet						
Assets						
Fixed Assets	2018	2019	2020	2021	2022	
Pre-production expenses	17,5	15,8	14,0	12,3	10,5	
Fixed Assets	82,2	74,0	65,8	57,5	49,3	
Minus Accumulated Depreciation	- 10,0	- 10,0	- 10,0	- 10,0	- 10,0	
Total Fixed Assets	89,7	79,8	69,8	59,8	49,9	
Current Assets						
Accounts Receivable	59,9	72,3	73,4	76,9	83,9	
Inventories	10,7	12,3	14,9	18,1	21,6	
Cash and Cash Equivalents	30,6	37,3	36,6	37,0	39,5	
Pre-paid Expenses	-	-	-	-	-	
Total Current Assets	101,2	121,8	124,8	132,1	145,1	
Other Assets						
Intangible Assets	6,0	5,4	4,8	4,2	3,6	
Goodwill	-	-	-	-	-	
Minus Accumulated Amortization	- 0,6	- 0,6	- 0,6	- 0,6	- 0,6	
Cash Balance	-	-	42,5	187,7	308,8	
Total Other Assets	5,4	4,8	46,7	191,3	311,8	
Total Assets	196,4	206,4	241,3	383,2	506,8	
Liabilities & Equity						
Short-term Liabilities	2018	2019	2020	2021	2022	
Accounts Payable	16,1	18,4	22,4	27,2	32,5	
Sales Taxes Payable	-	-	9,9	66,0	113,2	
Accrued Wages	13,4	18,2	18,5	18,9	19,3	
Dividends Payable	-	-	0,7	4,9	8,3	
Total Short-term Liabilities	29,4	36,5	51,5	117,0	173,2	
Long-term Liabilities						
Long-term Bank Loan Payable	76,4	63,5	49,5	34,3	17,8	
Total Long-term Liabilities	76,4	63,5	49,5	34,3	17,8	
Provisions for Liabilities and Charges						
Provision for staff retirement compensation	1,2	12,0	12,0	12,0	12,0	
Other Provisions	36,7	87,9	0,3	14,6	33,7	
Total Provisions for Liabilities and Charges	37,9	99,9	12,3	26,6	45,7	
Shareholder's Equity						
Equity	114,5	114,5	114,5	114,5	114,5	
Equity Reserve	-	-	1,2	8,1	13,9	
Net Profit	- 61,8	- 108,0	12,4	82,7	141,7	
Total Capital	52,7	6,5	128,1	205,3	270,1	
Total Liabilities & Equity	196,4	206,4	241,3	383,2	506,8	

Table 5.12: Balance Sheet of “Smart Amplify”.

5.5 Financial Feasibility Assessment

In this session, the financial feasibility assessment of the project shall take place, through the use of various proven methods, such as:

- Simple Payback Period.
- Return on Investment (RoI) and Return on Equity (RoE).
- Net Present Value (NPV).
- Internal Rate of Return (IRR).
- Break Even Point Analysis (BEP).
- Sensitivity Analysis.

5.5.1 Simple Payback Period

The simple payback period is the length of time required to recover the cost of an investment. The payback period of a given investment or project is an important determinant of whether to undertake the position or project, as longer payback periods are typically not desirable for investment positions⁶⁶.

This method is referred to as “Simple Payback Time”, due to the fact that it does not take into account the time value of money or the size of each cash flow, therefore it should be combined with other, more precise methods, in order to provide a better assessment of an investment.

In order to calculate the payback period of the project, its annual net cash flows have to be calculated, excluding interest, since it has already been included in the cost of production. Then, the cumulative net cash flow is calculated and by the time it surpasses the total cost of investment, the payback is complete.

The above method is presented in the following table:

⁶⁶ Source: <https://www.investopedia.com/terms/p/paybackperiod.asp>.

Simple Payback Period (figures in € thousand)					
Description	2018	2019	2020	2021	2022
Total Revenues / Sales	786,4	906,0	1.106,4	1.349,4	1.612,4
Minus					
Production Cost	873,5	1.058,1	1.072,4	1.121,7	1.222,2
Profit before Taxes	-87,0	-152,1	34,0	227,7	390,2
Minus					
Taxes (29%)	-25,2	-44,1	9,9	66,0	113,2
Net Profit	-61,8	-108,0	24,2	161,7	277,0
Plus					
Depreciation	10,6	10,6	10,6	10,6	10,6
Net Cash Flow	-51,2	-97,5	34,7	172,2	287,6
Cumulative Net Cash Flow	-51,2	-148,7	-114,0	58,3	345,9
Capital Investment Payback	156,9	254,4	219,7	47,4	-240,2
Payback Period	4 years and 2 months				

Table 5.13: Simple Payback Period of “Smart Amplify”.

Based on the above information, the estimated payback period of the project is 4 years and 2 months, which is considered as satisfying and deems the investment as quite attractive.

5.5.2 Return on Investment and Return on Equity

The Return on Investment (RoI) is a performance measure, used to evaluate the efficiency of an investment or compare the efficiency of a number of different investments. RoI measures the amount of return on an investment, relative to the investment's cost. To calculate RoI, the benefit (or return) of an investment is divided by the cost of the investment. The result is expressed as a percentage or a ratio⁶⁷.

Return on equity (RoE) is the amount of net income returned as a percentage of shareholders' equity. Return on equity, also known as Return on Net Worth (RoNW), measures a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested⁶⁸.

⁶⁷ Source: <https://www.investopedia.com/terms/r/returnoninvestment.asp>.

⁶⁸ Source: <https://www.investopedia.com/terms/r/returnnonequity.asp>.

The above KPIs are presented in the following table:

RoI and RoE of “Smart Amplify” (figures in € thousand)					
Description	2018	2019	2020	2021	2022
Net Profit	-61,8	-108,0	24,2	161,7	277,0
Total Investment	190,9				
Equity	114,5				
Interest	-	6,5	5,4	4,2	2,9
RoI	-32%	-53%	15%	87%	147%
RoE	-54%	-94%	21%	141%	242%

Table 5.14: RoI and RoE KPIs of “Smart Amplify”.

Based on the above table, the two KPIs show a similar trend, where the first 2 years are very negative, yet the next 3 look very promising for the company and its shareholders’ profitability. Therefore, the project is considered to be very attractive for its founders.

5.5.3 Net Present Value

Net Present Value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows over a period of time. NPV is used in capital budgeting to analyze the profitability of a projected investment or project⁶⁹.

NPV is calculated based on the following formula:

- $$NPV = \sum_{t=1}^T \frac{C_t}{(1+r)^t} - C_0$$

, where C_t = Net cash flow during period t

C_0 = Total initial cost of investment

r = Discount rate

t = Number of periods/years

A positive net present value indicates that the projected earnings generated by a project or investment exceeds the anticipated costs, thus the project shall be profitable. The general “rule of thumb” is that if a potential investment has positive NPV, then it should be undertaken. For this project, 10% is considered to be a realistic discount rate and will serve as the basis for NPV calculation.

⁶⁹ Source: <https://www.investopedia.com/terms/n/npv.asp>.

Based on the aforementioned information, the NPV of “Smart Amplify” is presented below:

Net Present Value of “Smart Amplify” (figures in € thousand)					
Description	2018	2019	2020	2021	2022
Net Cash Flow	-51,2	-97,5	34,7	172,2	287,6
Net Present Value Factor (10%)	-	0,909	0,826	0,751	0,683
Present Value	-51,2	-88,6	28,7	129,4	196,4
Total Present Value	214,7				
Total Investment	190,9				
Net Present Value	23,8				

Table 5.15: NPV of “Smart Amplify”.

As presented above, the NPV of the project is positive, at €23,8 thousand, therefore the project is deemed as attractive and should be undertaken.

5.5.4 Internal Rate of Return

Internal rate of return (IRR) is a metric used in capital budgeting to estimate the profitability of potential investments. Internal rate of return is a discount rate that makes the net present value (NPV) of all cash flows from a particular project equal to zero⁷⁰. IRR calculations rely on the same formula as NPV does. The difference is that NPV equation is set to 0 and then solved for the discount rate.

Generally, the higher the IRR the more attractive the project. IRR is often used to evaluate and rank mutually exclusive investments. Its drawback against NPV method lies in cases where there is alternation among consecutive cash flows (i.e. from positive to negative and then from negative to positive), where this metric does not give meaningful results. In the case of “Smart Amplify” this is not true, therefore IRR can be safely used.

The method relies on “trial and error”, meaning that in order to approach the IRR, the equation has to be solved using various discount rates, until the point where one discount rate gives positive NPV and the other one negative NPV. In the case of “Smart Amplify”, the IRR lies in the region of 11% discount rate.

⁷⁰ Source: <https://www.investopedia.com/terms/i/irr.asp>.

Based on the previous information, the IRR of “Smart Amplify” is presented onwards:

Internal Rate of Return of “Smart Amplify” (figures in € thousand)					
Description	2018	2019	2020	2021	2022
Total Investment	190,9				
Net Cash Flow	-51,2	-97,5	34,7	172,2	287,6
Net Present Value Factor (11%)	-	0,901	0,812	0,731	0,659
Present Value	-51,2	-87,8	28,2	125,9	189,5
Total Present Value	204,6				
Net Present Value	13,7				
Net Present Value Factor (11,5%)	-	0,897	0,804	0,721	0,647
Present Value	-51,2	-87,4	27,9	124,2	186,1
Total Present Value	199,6				
Net Present Value	-5,1				
IRR	11,37				

Table 5.16: IRR of “Smart Amplify”.

The calculated discount rate of 11,37% denotes the highest discount rate that the potential investors could overtake, without risk of losing capital invested on the project of “Smart Amplify”, even if the project is 100% equity financed. Since the current interest rates do not surpass 7% for periods up to 5 years⁷¹, the investment should be undertaken.

5.5.5 Break-even Analysis

Break-even analysis entails the calculation and examination of the margin of safety for an entity based on the revenues collected and associated costs. Analyzing different price levels relating to various levels of demand, an entity uses break-even analysis to determine what level of sales are needed to cover total fixed costs⁷².

The analysis is for management’s use only as the metric and calculations are often not required to be disclosed to external sources such as investors, regulators or financial institutions. Break-even analysis looks at the level of fixed costs relative to the profit earned by each additional unit produced and sold. This “intermediate” profit is called contribution margin and is the excess between sales price and variable cost of a product or service.

⁷¹ Source: https://www.bankofgreece.gr/pages/en/statistics/rates_markets/deposits.aspx.

⁷² Source: <https://www.investopedia.com/terms/b/breakevenanalysis.asp>.

Furthermore, based on the linear Cost–Volume–Profit analysis model⁷³, the following equation must apply:

$$TR = TC$$

$$\leftrightarrow P \times X = TFC + TVC$$

$$\leftrightarrow P \times X = TFC + (V \times X)$$

$$\leftrightarrow (P - V) \times X = TFC$$

$$\leftrightarrow X = TFC / (P - V)$$

, where TR = Total Revenue

TC = Total costs

TFC = Total fixed costs

TVC = Total variable costs

X = Quantity sold

P = Sales price

V = Variable cost per unit

Based on the above, X is the Break-even quantity, where the company does not lose or earn money from its operation. Since “Smart Amplify” is an application and service provider, the quantity unit of measurement shall be the SaaS instances which are required for servicing its customers. For simplicity, the price and variable costs of consulting services shall be integrated into the SaaS instances, which shall further on be used for Break-even analysis. As a reminder, the following sales data is presented in chapter 3, where the new “unified” instance sales price is now presented:

Service Type	2018	2019	2020	2021	2022
SaaS (Nr. of instances)	5	5	6	8	9
Consulting (Nr. of customers)	8	10	12	15	18
SaaS Unit Price (in € thousand)	119,5	137,7	140,1	128,2	136,2
Consulting Unit Price (in € thousand)	23,6	21,7	22,1	21,6	21,5
“Modified” SaaS Unit Price (in € thousand)	157,3	181,2	184,4	168,7	179,2

Table 5.17: Calculation of “Modified” SaaS Unit Price of “Smart Amplify”.

⁷³ Source: <https://www.investopedia.com/terms/c/cost-volume-profit-analysis.asp>.

Based on the “modified” SaaS price, the Break-even point (BEP) of 2018 can be easily calculated, as follows:

Total Cost Breakdown by Nature - 2018			
Description	Cost (in € thousand)		Cost per Unit (in €)
	FC	VC	VC per Instance (Nr. Of Instances = 5)
Various Consumables		1,8	0,4
Technology Licensing	1,1	125,5	25,3
Salaries and Wages	374,1		
Marketing Expenses		235,9	47,2
Management Systems	17,0		
Annual Maintenance	2,6		
General and Administrative Expenses	87,5		
Financial Expenses (Interest)	0,0		
Business Space Rental	17,4		
Depreciation	10,6		
Total:	510,2	363,3	72,7

Table 5.18: Total Cost Breakdown of “Smart Amplify”.

Break-even Point (BEP) – Year 2018	
TR (in € thousand)	786,4
FC (in € thousand)	510,2
VC / unit (in € thousand)	72,7
Sales Price / unit	157,3
Contribution Margin / unit (in € thousand)	84,6
Contribution Ratio ⁷⁴	54%
BEP Quantity (in instances)	6,0

Table 5.19: Break-even Point of “Smart Amplify”.

Based on the calculated BEP quantity, the total revenue in 2018 for 6,0 units would be equal to €943,7 thousand, equaling the total cost. The relevant contribution ratio is at 54%. By taking the Break-even equation, the relevant graph can be drawn, which showcases the correlation between TC, FC and TR in a more clarifying manner.

⁷⁴ *Contribution Ratio = Total Contribution Margin/Total Revenues.*

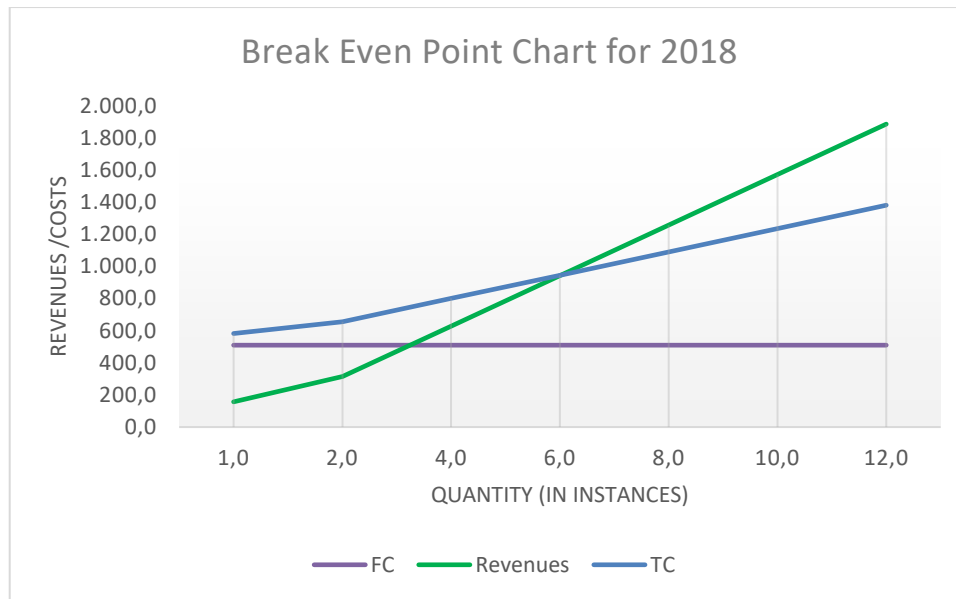


Figure 5.1: Break-even Analysis Chart of “Smart Amplify” for 2018.

The chart verifies the already presented fact, where the company shall operate for the first 2 years of operation below its break-even point. During the third year of operation, the 6 sold instances combined with the increase in sales price, result in the company being profitable.

5.5.6 Sensitivity Analysis

The sensitivity analysis determines how different values of an independent variable affect a particular dependent variable, under a given set of assumptions⁷⁵. This technique is used within specific boundaries that depend on one or more input variables, such as unit sales price, sold quantities etc. It is essentially a simulation method, which aims to predict the outcome of a decision, given a specified range of independent variables.

There are various variables that could impact the financial outcome and performance of the project, such as the sales price, the variable cost, the fixed cost and quantity of sales. In order to measure the impact of each of the above on the outcome, a few scenarios shall be presented, showcasing some of the alternate operation and cost structure scenarios:

⁷⁵ Source: <https://www.investopedia.com/terms/s/sensitivityanalysis.asp>.

	Original (2018)	110% Price	120% Price
Quantity (in instances)	5,0	5,0	5,0
Revenues (in € thousand)	786,4	865,1	943,7
VC (in € thousand)	363,3	363,3	363,3
Contribution Margin (in € thousand)	423,2	501,8	580,4
Contribution Ratio	54%	58%	62%
FC (in € thousand)	510,2	510,2	510,2
TC (in € thousand)	873,5	873,5	873,5
Profit	-87,0	-8,4	70,2
BEP Quantity	6,0	5,1	4,4

Table 5.20: Sensitivity Analysis on Sales Price Changes.

	80% VC	90% VC	110% FC
Quantity (in instances)	5,0	5,0	5,0
Revenues (in € thousand)	786,4	786,4	786,4
VC (in € thousand)	290,6	326,9	363,3
Contribution Margin (in € thousand)	495,8	459,5	423,2
Contribution Ratio	63%	58%	54%
FC (in € thousand)	510,2	510,2	561,2
TC (in € thousand)	800,8	837,1	924,5
Profit	-14,4	-50,7	-138,1
BEP Quantity	5,1	5,6	6,6

Table 5.21: Sensitivity Analysis on FC and VC changes.

	150% Instances + 110% Price	125% Instances + 105% Price + 110% FC	187% Instances + 110% Price + 90% VC
Quantity (in instances)	7,5	6,3	9,4
Revenues (in € thousand)	1.297,6	1.032,2	1.617,7
VC (in € thousand)	544,9	454,1	611,4
Contribution Margin (in € thousand)	752,7	578,1	1.006,3
Contribution Ratio	58%	56%	62%
FC (in € thousand)	510,2	561,2	561,2
TC (in € thousand)	1.055,1	1.015,3	1.172,6
Profit	242,5	16,9	445,1
BEP Quantity	5,1	6,1	5,2

Table 5.22: Sensitivity Analysis on a Combination of Variables' Changes.

	2019 Scenario (100% Instances + 115% Price + 115% VC + 125% FC)	2020 Scenario (120% Instances + 117% Price + 97% VC + 127% FC)	2021 Scenario (180% Instances + 114% Price + 84% VC + 132% FC)	2022 Scenario (180% Instances + 114% Price + 84% VC + 132% FC)
Quantity (in instances)	5,0	6,0	8,0	9,0
Revenues (in € thousand)	906,0	1.106,4	1.349,4	1.612,4
VC (in € thousand)	417,7	421,3	459,6	61,0
Contribution Margin (in € thousand)	488,3	685,1	889,8	1.551,4
Contribution Ratio	54%	62%	66%	96%
FC (in € thousand)	640,4	651,1	662,1	673,3
TC (in € thousand)	1.058,1	1.072,4	1.121,7	734,3
Profit (in € thousand)	-152,1	34,0	227,7	878,1
BEP Quantity	6,6	5,7	6,0	3,9

Table 5.23: Sensitivity Analysis based on the Study's Projections.

Following the above presented information, the impact of each variable can be calculated, as follows:

Independent Variables Impact on Profit	
+ 10% Variable Cost	- €36,3 thousand
+ 10% Fixed Cost	- €51,0 thousand
+ 10% Sales Price	+ €78,6 thousand
+ 1 instance	+ €84,6 thousand

Table 5.24: Sensitivity Analysis – Impact of Independent Variables on Profit.

Based on the above table and the presented scenarios, it is evident that the most important parameters are the quantity of sold units and sales price. Of course, the other two variables are very important, but on a realistic level, they are not easily adjustable, due to the nature of the company, which relies on specialized personnel and inflexible suppliers, such as Microsoft. As a special note, the rise of FC from 2019 and onwards is fictional, since 2018 bears 75% of the normal FC, due to the project's expected launch from March 2018.

Overall, the company must show diligence upon attaining and preserving its customer base, thus ensuring the desired sold quantity. Additionally, through the delivery of added value to its customers' operations and the establishment of long-term trusting relationships, the company should be able to achieve the projected sales price increase, based on its first mover advantage and its strong product and consulting services portfolio.

On a closing note, the sensitivity analysis does not change the already formed conclusion that the project is feasible and attractive.

5.6 Impact on National Economy and Final Appraisal

During the recession period in Greece, it has become evident that investments in modern technologies and business models are mandatory, in order to make the country attractive to external investors and its products and services competitive on global scale. One step towards that direction is this project, which opts to become the first industrial manufacturing IIoT project in Greece. An additional positive element of this project is that it is entirely driven by Greeks, thus providing expertise and added value on a national level.

Additionally, such a project shall be a pilot to other companies and entrepreneurs, especially those who believe in creating new revenue streams and business models through the adoption of new technology and desire to carve their own path in the ICT sector.

Thus, “Smart Amplify” desires to initiate the creation of an ICT subsector which holds great potential for the future and the national economy as a whole. Moreover, this projects fits well into the strategic goal of Greece for its digital transformation expected to be fully implemented until 2020.

Furthermore, “Smart Amplify” shall employ 16 people total and indirectly support many other job positions, relevant to its operation. At the same time, it shall aid the Plastics & Rubber manufacturing sector with its modernization, which is critical for its long-term survivability, competitiveness and sustainability.

Finally, “Smart Amplify” shall operate in an environment-conscious manner, ensured by its ISO 14001 certification, its Green computing and paperless operation, as well as its environment-friendly main and auxiliary equipment.

Therefore, based on this feasibility study, the project is considered as a high potential project and is suggested to be undertaken as soon as possible, so that the future company can start developing in-house expertise on high-end technologies and enjoy the advantages of the first mover.

Bibliography

CHAPTER 2

White Papers, Studies and Reports:

1. *“CEO Briefing 2015 – From Productivity to Outcomes”*, Published by Accenture Strategy, Accenture, 2015.
2. *“Blueprints and feasibility studies for Company IoT (Part 2 of 3)”*, White paper for ThingWorx, Emil Berthelsen, Published by Machina Research, April 2015.
3. *“Benchmark Study for Large Scale Pilots in the area of the Internet of Things”*, Published by the European Commission, 2016.
4. *“Definition of a Research and Innovation Policy Leveraging Cloud Computing and IoT Combination”*, Published by the European Commission, 2016.
5. *“Driving Unconventional Growth through the Industrial Internet of Things”*, Published by Accenture technology, Accenture, 2015.
6. *“Industry 4.0 – Smart Manufacturing for the Future”*, Published by Germany Trade and Invest, 2014.
7. *“Industry 4.0 – Top Challenges for Chemical Manufacturing”*, Published by Elsevier B.V, March 2017.
8. *“Industry 4.0 in a Global Context – Strategies for cooperating with International Partners”*, Published by Acatech Study, 2016.

Portals and Websites:

1. <https://inductiveautomation.com/what-is-iiot>, Electronic Article, “What is IIoT?”
2. <https://ptolemy.berkeley.edu/projects/cps>, Electronic Article, “Cyber-Physical Systems”.
3. <https://www.i-scoop.eu/internet-of-things-guide>, Web Portal, “The Internet of Things (IoT) – essential IoT business guide”.
4. <https://www.tripwire.com/state-of-security/featured/5-key-challenges-for-the-industrial-internet-of-things-iiot>, Electronic Article, “5 Key Challenges for the Industrial Internet of Things (IIoT)”.
5. <https://ec.europa.eu/digital-single-market/en/desi>, Electronic Article, “The Digital Economy and Society Index (DESI)”.
6. <https://ec.europa.eu/digital-single-market/en/scoreboard/greece>, Electronic Article, “Digital Single Market – Greece”.

CHAPTER 3

White Papers, Studies and Reports:

1. *“Definition of a Research and Innovation Policy Leveraging Cloud Computing and IoT Combination”*, Published by the European Commission, 2014.
2. *“Production and Sales of Manufactured Products (ProdCom) 2016”*, Published by the Hellenic Statistics Authority, March 2018.
3. *“Digital Greece – The path to Growth – Communications Industry Digital State”*, Published by Accenture, 2017
4. *“Greece in figures, October – December 2017”*, Published by the Hellenic Statistics Authority, March 2018.
5. *“Production and sales of manufactured products (PRODCOM) 2016”*, Published by the Hellenic Statistics Authority, March 2018.
6. *“Survey on the use of Information and Communication Technologies and E-Commerce in Enterprises”*, Published by the Hellenic Statistics Authority, December 2017.
7. *“Concepts in Strategic Management and Business Policy”*, Published by Pearson, 2015.
8. *“Greece’s Economic and Social Transformation 2008-2017”*, Published by MDPI, January 2018.
9. *“Methodology of Feasibility Studies”*, Lesson notes by Professor Dimitrios Georgakellos, 2017
10. *“Marketing Opportunities for B2B IoT Companies”*, Published by Ironpaper, 2017.

Portals and Websites:

1. <https://www.microsoft.com/en-us/internet-of-things/manufacturing>, Electronic Article, *“IoT for manufacturing”*.
2. <https://apprenda.com/library/paas/iaas-paas-saas-explained-compared>, Electronic Article, *“IaaS, PaaS, SaaS (Explained and Compared)”*.
3. <https://docs.microsoft.com/en-us/azure/iot-central/overview-iot-options>, Electronic Article, *“Compare Azure IoT Central and Azure IoT options”*.
4. <https://catalog.azureiotsuite.com/kits>, Web Site, *“Find your IoT device”*.

5. <https://www.ibm.com/services/analytics>, *Electronic Article*, “Business Intelligence and Analytics Consulting”.
6. <https://corporatefinanceinstitute.com/resources/knowledge/strategy/first-mover-advantage>, *Electronic Article*, “First mover Advantage”.
7. <https://www.kraussmaffei.com/en>, *Web Site of Krauss-Maffei plastics equipment manufacturer*.
8. <https://www.battenfeld-cincinnati.com/products/controls-automation-systems/extruder-and-line-control-system.html>, *Web Site of Battenfeld-Cincinnati plastics equipment manufacturer*.
9. <http://www.f-in.gr>, *Web Site of Future Intelligence Ltd IoT application and service provider*.
10. <http://www.intracom-telecom.com/index.htm>, *Web Site of Intracom Telecom IoT application and service provider*.
11. <http://pleg.ma>, *Web Site of Plegma Labs IoT application and service provider*.
12. <https://exm.gr>, *Web Site of Ex Machina IoT application and service provider*.
13. <http://meazon.com>, *Web Site of Meazon IoT application and service provider*.
14. <https://www.export.gov/article?id=Greece-Information-and-Communications-Technology>, *Electronic Article*, “Greece – Information and Communications Technology”.
15. <https://www.cloudcomputing-news.net/news/2017/jul/05/how-innovation-accelerators-will-drive-global-ict-growth>, *Electronic Article*, “How innovation accelerators will drive global ICT growth”.
16. <https://www.forbes.com/sites/louiscolombus/2017/12/10/2017-roundup-of-internet-of-things-forecasts/#6d28c0bf1480>, *Electronic Article*, “2017 Roundup of Internet of Things Forecasts”.
17. https://en.wikipedia.org/wiki/Marketing_strategy, *Electronic Article*, “Marketing Strategy”.
18. https://en.wikipedia.org/wiki/Marketing_mix, *Electronic Article*, “Marketing Mix”.

CHAPTER 4

White Papers, Studies and Reports:

1. *“Building the Hyperconnected Society, IoT Research and Innovation Value Chains, Ecosystems and Markets”*, Published by River Publishers, 2015.
2. *“Methodology of Feasibility Studies”*, Lesson notes by Professor Dimitrios Georgakellos, 2017.

Portals and Websites:

1. <https://www.ptc.com/en/products/iot>, Web Site, “Unlock Innovation with IoT”.
2. <https://www.sap.com/products/iot-platform-cloud.html>, Web Site, “SAP Cloud Platform for the Internet of Things”.
3. <https://azure.microsoft.com/en-us/overview/iot>, Web Portal, “Azure Products – Internet of Things”.
4. <https://www.aylanetworks.com/products/iot-platform>, Web Site, “Ayla Networks – Agile IoT Platform”.
5. <https://www.ibm.com/internet-of-things/industries/iot-manufacturing>, Web Portal, “Watson Internet of Things for Industries”.
6. https://aws.amazon.com/iot-core/?nc2=h_iot, Web Portal, “AWS IoT Core”.
7. <https://www.ge.com/digital/predix-platform-foundation-digital-industrial-applications>, Web Portal, “GE Digital – Predix Platform - The place where industry runs”.
8. <https://www.ptc.com/en/resources/iot/report/forrester-wave>, Web Site, “The Forester Wave: IoT Software Platforms”.
9. <https://azure.microsoft.com/en-us/pricing/calculator>, Web Site, “Microsoft Azure Pricing Calculator”.
10. <https://www.ibm.com/products>, Web Site, “IBM Marketplace”.
11. https://aws.amazon.com/pricing/?nc2=h_ql_pr&awsml=ql-3, Web Site, “AWS Pricing”.
12. <https://visualstudio.microsoft.com/vs/pricing>, Web Site, “Visual Studio Pricing”.
13. https://en.wikipedia.org/wiki/Organizational_structure, Web Site, “Organizational Structure”.

14. <https://www.investopedia.com/terms/o/organizational-structure.asp>, Web Site, “Investopedia - Organizational Structure”
15. <https://www.onetonline.org>, Web Portal, “O*Net Online”.
16. <https://www.investopedia.com/terms/o/operations-management.asp>, Web Portal, “Operations Management”.
17. <https://strategiccco.com/cost-center>, Web Site, “The Strategic CFO – Cost Center”.
18. [https://en.wikipedia.org/wiki/Overhead_\(business\)](https://en.wikipedia.org/wiki/Overhead_(business)), Web Site, “Overhead (business)”.
19. <https://www.statista.com/statistics/276351/inflation-rate-in-greece>, Web Site, “Greece: Inflation rate from 2012 to 2022”.
20. <https://www.xperthr.co.uk/good-practice-manual/candidate-attraction/151933>, Web Site, “Xpert HT – Candidate Attraction”.
21. <https://www.kariera.gr>, Web Portal, “Kariera.gr”.
22. <https://www.skywalker.gr>, Web Portal, “Skywalker.gr”.
23. <https://www.stantonchase.com/office/executive-search-firm-in-athens-greece>, Web Site, “Stanton Chase – Executive Search Firm in Athens, Greece”.
24. <https://aimsinternational.com/locations/greece>, Web Site, “AIMS International Hellas”.
25. <https://www.energystar.gov>, Web Site, “Energy Star – The simple choice for energy efficiency”.
26. https://en.wikipedia.org/wiki/Green_computing, Web Site, “Wikipedia – Green Computing”.

CHAPTER 5

White Papers, Studies and Reports:

1. *“Methodology of Feasibility Studies”*, Lesson notes by Professor Dimitrios Georgakellos, 2017.
2. *“Financial Management”*, Lesson notes by Associate Professor Panagiotis Artikis, 2016.

Portals and Websites:

1. https://www.bankofgreece.gr/Pages/el/Bank/News/PressReleases/Displtem.aspx?Item_ID=6005&List_ID=1af869f3-57fb-4de6-b9ae-bdfd83c66c95&Filter_by=DT, Web Site, “Bank deposit and loan rates – January 2018”.
2. <https://www.accountingtools.com/articles/what-is-net-working-capital.html>, Web Site, “Accounting Tools – Net working capital”.
3. <https://www.accountingtools.com/articles/2017/9/20/depreciation?rq=depreciation>, Web Site, “Accounting Tools – Depreciation”.
4. <https://corporatefinanceinstitute.com/resources/knowledge/accounting/types-depreciation-methods>, Web Site, “CFI – Depreciation Methods”.
5. <https://www.investopedia.com/terms/p/plstatement.asp>, Web Site, “Investopedia - Profit and Loss Statement (P&L)”.
6. <https://www.investopedia.com/terms/c/cashflowstatement.asp>, Web Site, “Investopedia – Cash Flow Statement”.
7. <https://www.investopedia.com/terms/b/balancesheet.asp>, Web Site, “Investopedia – Balance Sheet”.
8. <https://www.investopedia.com/terms/p/paybackperiod.asp>, Web Site, “Investopedia – Payback Period”.
9. <https://www.investopedia.com/terms/r/returnoninvestment.asp>, Web Site, “Investopedia – Return on Investment”.
10. <https://www.investopedia.com/terms/r/returnnonequity.asp>, Web Site, “Investopedia – Return on Equity”.
11. <https://www.investopedia.com/terms/n/npv.asp>, Web Site, “Investopedia – Net Present Value”.
12. <https://www.investopedia.com/terms/i/irr.asp>, Web Site, “Investopedia – Internal Rate of Return”.

-
13. <https://www.investopedia.com/terms/b/breakevenanalysis.asp>, Web Site,
“Investopedia – Break-even Analysis”.
 14. <https://www.investopedia.com/terms/c/cost-volume-profit-analysis.asp>, Web
Site, “Investopedia – Cost-Volume-Profit Analysis”.
 15. <https://www.investopedia.com/terms/s/sensitivityanalysis.asp>, Web Site,
“Investopedia – Sensitivity Analysis”.