

# DIPARTIMENTO DI INGEGNERIA DELL'ENERGIA DEI SISTEMI DEL TERRITORIO E DELLE COSTRUZIONI

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# Feasibility analysis of a new business unit in the Data Center market: the multi-utility ALFA case study

SINTESI

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# Feasibility Analysis of a New Business Unit in The Data Center Market: The case of The Multi-utility ALFA Filippo Gherardi

#### Sommario

Il lavoro di tesi proposto è frutto di un'esperienza lavorativa della durata di quattro mesi, svoltasi all'interno del programma Junior Consulting, presso ELIS Innovation Hub a Roma. Il tirocinio aveva come obiettivo lo sviluppo di un progetto per un'azienda multiutility (d'ora in poi denominata ALFA), riguardante un'analisi di fattibilità sulla creazione di una nuova Business Unit (BU) operante nel settore della fornitura di servizi agli operatori di Data Center con un forte focus sulla sostenibilità, in linea con i valori aziendali. Il progetto si è articolato in tre fasi principali. Nella prima fase, è stata eseguita un'analisi di mercato finalizzata a comprendere le dinamiche e i trend più rilevanti all'interno del settore. Successivamente, sono stati analizzati tutti i possibili modelli di proposizione dell'offerta sul mercato della nuova divisione. Infine, l'ultima parte del progetto si è concentrata sull'analisi economica, in cui, partendo da un dimensionamento del mercato italiano, si è arrivati ad una valutazione del fatturato e della marginalità potenziale della nuova BU. Al termine del progetto, grazie ai risultati raggiunti, il cliente avrà un quadro più chiaro delle caratteristiche del settore e una stima delle variabili di natura economica più rilevanti, utili per decidere se approfondire o meno lo studio attraverso l'elaborazione di un business plan.

#### Abstract

This thesis is the result of a four-month educational program with ELIS Innovation Hub, within the Junior Consulting project.

The internship concerned the build-up of a project for a multiutility company (henceforth called ALFA), concerning a feasibility analysis of a new Business Unit (BU) operating in the field of providing of services to Data Center operators with a strong focus on sustainability, in line with corporate values. The project was divided into 3 main phases. In the first phase, a market analysis was performed to understand the most relevant industry dynamics and trends. Subsequently, all the possible models for proposing the offer on the market were analyzed. Finally, the last part of the project focused on economic analysis, in which, starting from a sizing of the Italian market, has arrived at an assessment of the revenue and marginality of the new BU. In the end, from the analysis' findings, the customer will have a clearer picture of the characteristics of the sector and an estimate of the most relevant economic variables, useful for deciding whether to deepen the study by drawing up a business plan.

#### 1. Context and goals

The project was assigned by ALFA, an Italian multiutility, with a significant presence in the North of Italy, among the firsts Italian multiutility companies for revenue<sup>1</sup>. At the beginning of 2021, ALFA has drawn up an industrial strategic plan, covering a ten-year time horizon (2021-2030), which is based on two fundamental pillars: circular economy and energy transition. To achieve these purposes, ALFA has internally identified several enabling factors including Corporate Venture Capital and Intrapreunership operations.

These initiatives, in the next few years, will involve internal investments regarding the launch of new BUs operating in sectors with a high energy content, diverging from those currently covered, in which, however, the services to be provided are consistent with the internal skills of the group, such as, for example, the Data center sector. A recent study conducted by the European Commission calculated that in 2020 the energy consumption of the EU data centers was 2,8% of the total electricity demand, and, at the current pace, consumption will rise to 3,2% in 2030. Consequently, to achieve the objectives set by the Green Deal, which plan to make the European continent climate neutral by 2050, data center operators, by signing the Climate Neutral Data Centre Pact (CNDCP), have agreed to take actions to ensure that data centers achieve carbon neutrality by 2030.

The companies operating in this sector are mainly involved in one of the three phases necessary to cover the entire data center life cycle or rather the construction, outsourcing the phases that are upstream and downstream: Planning and Running of data center in which the supply of energy is the most relevant service both economically and in terms of environmental sustainability. Based on information gathered during the project related to the services a company needs to offer to compete in the industry, ALFA conducted a series of internal interviews and it emerged that the current competencies could guarantee a transversal coverage of the three phases, although initially uneven and not total. This initiative would make ALFA unique in the Italian context and one of the few in the European context capable of offering services throughout the entire life cycle of a data center. The work carried out fits into this context, which aims at an analysis of technical and economic feasibility regarding a new company division operating in the Data Center sector through different types of possible approaches, but with a common denominator: sustainability. In Appendix A are reported the project activities conducted personally and those carried out by the other group members.

<sup>&</sup>lt;sup>1</sup> https://www.monitoraitalia.it/utilities-le-prime-500-aziende-elettriche-gas-acqua-nel-2020/

#### 2. Phases, Methodologies and Results

The work was divided into three phases: market analysis, identification and assessment of possible offer models and finally analysis of the economic feasibility of the initiative. *Table 1* below shows the three phases mentioned and the macro-activities into which they are divided. For each macro-activity, there is also a brief description of the methodology, the results achieved and the reference paragraph within the thesis.

Phase	Main activity	Methodology	Outcomes	§
	Context analysis	Analysis driven by the five variables of the PESTE aimed at identification of the main dynamics, trends and megatrends	Collection of information relating to the Data Center sector, useful for subsequent activities	1.1
1. Market	Analysis of the competitive scenario and services provided	Analysis of the main operators and services offered in the Data Center sector, drawing on various heterogeneous sources: institutional databases, international standards, white papers, company websites and data center magazines	Defining a list of data center energy-related services and a list of industry's competitors. Measuring the coverage of services offered by competitors and subsequent in- depth analysis of the most relevant competitor	1.2
Analysis	Potential customer segments	Identification of five potential customer segments through customer portfolio benchmarks. Deepening of the Italy colocation market using three international databases about data center mapping and analysis of the major colocation service providers	Mapping of all 129 colocation data centers in Italy and analysis of the sustainability actions and goals in the data center field pursued by the major providers by analyzing their sustainability reports	1.3
	New opportunities	Collection and analysis of political and institutional documents drawn up by the Italian government or competent authorities	Selection, evaluation and sizing of potential future opportunities present in the PNRR, and made available by FNEE and TEE	1.4
	In-house expertise and strengths	Internal company interviews aimed at verifying the coverage of services found and related ALFA BUs potentially involved. Consequent identification of strengths through analysis of projects undertaken by these BUs	Measuring ALFA's potential coverage of services and identifying five strengths	2.1
2. Offer Models	Possible proposition scenarios	Benchmark analysis of market proposition scenarios used by previously identified competitors	Identification of five possible proposition scenarios with an explanation of the pros and cons	2.2
	Innovative ways of differentiating the offer in the ML/T	Scouting for innovative projects or idea undertaken or hypothesized by research centers, industry companies, universities, and other institutions	Selection of four innovative proposals, consistent with the ALFA's business, categorized in two clusters	2.3
	Analysis of the ALFA's strategic industrial plan	Decomposition of the plan into its key objectives and enablers	Verification and quantitative measurement of the consistency of the initiative with the group's long- term goals: adherence index 82%	3.1
	Market sizing	Market sizing through market research and articles or tools provided by industry companies	Market size by area, service, year and segment	3.2
3. Economic Analysis	Revenues	Elaboration of a model and consequent setting of parameters, aimed at calculating revenues	Evaluation of revenues in different proposition scenarios	3.3
	Marginality	Estimating marginality using industry benchmarks identified during the competitive scenario analysis	Evaluation of potential industry marginality and EBITDA calculation in different scenarios	3.4
	Final evaluation	Comparison with the five business BUs according to three quantitative indicators	Schematic representation through a bubble diagram which shows the validity of the initiative	3.5

Table 1 - Phase, Activity, Methodology, Outcomes, and thesis paragraph

# 2.1 Market analysis

# 2.1.1 Context analysis

As a first activity, an analysis of the data center industry was conducted using the PESTE tool. The five variables of the PESTE (political, environmental, social, technological, economic) allowed to clarify fundamental concepts, highlight trends and dynamics within the sector.

# Results

The analysis found that increasing global digitization is heavily influencing the expansion of digital infrastructure. Indeed, the growth in demand for cloud services is leading to the realization of many data centers, which will have increasing energy requirements with a consequent strong climate impact even in those European markets defined as second tier. Particularly in Italy in the next five years there will be huge investments both in New Construction (NC) and Redevelopment (RED) projects. Thereby, the trend of sustainability and energy requalification will have a considerable impact on the European market, considering the climate objectives of the Union, which has launched several political-institutional initiatives to make the sector greener: Code of Conduct and Climate Neutral Data Centre Pact. In this context, increasingly oriented towards sustainability, the interest of ALFA is inserted.

# 2.1.2 Analysis of the competitive scenario and services provided

In this second part of the market analysis, the competitive scenario was explored in order to identify the main players in the sector and the relative services they provide to data center owners throughout the IT infrastructure lifecycle. Several heterogeneous sources were used, also delving into the information gathered during the context analysis. The identification methodology is shown in flowchart form in *Figure 1*.



Figure 1 - Methodology for identifying key competitors in the industry and the services provided

#### Results

Two key results were achieved through this survey: a list of industry's competitors and a list of all the services that must be provided by a company in the industry that intends to operate throughout the data center lifecycle. The services, which can be classified into 3 macrophases: Planning, Building and Running, have been reported in the Appendix B with a brief description. Based on this list, a more in-depth follow-up survey was conducted to verify service coverage of each company (Appendix C). The results that emerged made it possible to identify the two main competitors, both multi-utilities, which present an almost total coverage on all macro-phases. Consequently, an extensive analysis of one of the two players was carried out, which made it possible to identify: the market approach adopted, internal/external resources and strategic partnerships. This intelligence information has proven useful to identify competitive proposition scenarios consistent with market needs.

#### **2.1.3 Potential customer segments**

Examining the competitor's customer portfolio revealed five main customer segments: DC operator (cloud and/or colocation provider), Telco, "Big Tech", Banking and Institutional Organization. In view of the explosive growth of cloud services and colocation market, the analysis focused on DC operators. To do this, data from three international databases about colocation data centers mapping were cross-referenced.

#### Results

Mapping of all 129 data centers offering cloud and/or colocation services in Italy with relative geographical distribution and identification of the most important DC features. Ranking of top service providers by number of data centers owned. Finally, for the most relevant, the services and products offered in the DC area, the history of the actions carried out in the field of energy efficiency and the consequent future sustainability objectives have been deepened, drawing on the relevant sustainability reports.

## 2.1.4 New opportunities

Once potential customer segments were identified, the major economic opportunities within the industry that could contribute to its growth were researched. For the research, political and institutional documents drawn up by the European Commission, the Italian government or competent authorities were examined.

4

# Results

Sizing of the investments planned by the Italian public administration in the PNRR on new digital infrastructures aimed at the creation of a strategic national hub and existing data center redevelopment and disposal projects. Identification and consequent qualitative sizing of the possibility to access to incentives made available by the "Fondo Nazionale Efficienza Energetica" (FNEE) and by the mechanism of "Titoli di Efficienza Energetica" (TEE), in case of efficiency and energy redevelopments projects of data centers.

# 2.2 Offer models

The macro-activities are now summarized within the second phase used for evaluating all the company's potential offer models on the market.

# 2.2.1 In-house expertise and strengths

After providing the company referent with a list of the main services with a detailed description attached, ALFA carried out a series of internal interviews with both the managers and the operational staff of the five BUs whose core business was consistent with the services that should be provided. Once completed, a list was procured with the services that can currently be provided and the company name of the five BUs that possess the skills. At this point, knowing each BU, the projects undertaken were investigated, drawing on the collection on its website and the press releases of the clients, to summarize the main strengths.

## Results

Appendix D shows the services that the company would currently be able to provide and the relevant internal BUs that possess the competencies.

# 2.2.2 Possible proposition scenarios

Analyzing the methods of proposition on the market of the operating companies, three main approaches have been identified, which combined appropriately become five. The pros and cons of the various approaches, shown in *Table 2*, were then processed in order to have a preliminary qualitative assessment. Lastly, were suggested as possible future subcontracting partners, those companies operating in the sector with which the joint coverage of services with ALFA was maximum in the various macro-phases.

#### Results

Scenario	Description	Pros	Cons		
Paca	Supply of internally	<ul> <li>High speed of market entry</li> </ul>	Low attractiveness on the		
Dase	covered services only	<ul> <li>No need to acquire new skills</li> </ul>	market due to the multiple		

		Possibility to intercept orders     related to NC and RED projects	interlocutors to which the client must address
General Contractor (GC)	Supply of all services through signing agreements with subcontractors	<ul> <li>High market attractiveness</li> <li>Possibility of charging a mark-up on services provided by subcontractors</li> </ul>	<ul> <li>Initial effort to research, evaluate and choose partners</li> <li>Inability to unbundle the offer and then intercept orders for RED projects</li> </ul>
Acquisitions	General Contractor approach that includes over time acquisitions of companies specializing in services not covered	<ul> <li>High market attractiveness</li> <li>Possibility of charging a fee on services provided by subcontractors</li> <li>Ability to accelerate growth</li> </ul>	<ul> <li>Initial effort to research, evaluate and choose partners</li> <li>Inability to unbundle the offer and then intercept orders for RED projects</li> <li>High effort to find candidate companies</li> <li>Financial exposure</li> </ul>
Mixed General Contractor	Combined approach: Base for RED and General Contractor for NC	<ul> <li>'GC pros'</li> <li>Possibility to intercept orders for RED projects</li> </ul>	<ul> <li>Initial effort to research, evaluate and choose partners</li> </ul>
Mixed Acquisitions	Combined approach: Base for RED and Acquisitions for NC	<ul> <li>'Acquisitions pros'</li> <li>Possibility to intercept orders for RED projects</li> </ul>	<ul> <li>Initial effort to research, evaluate and choose partners</li> <li>High effort to find candidate companies</li> <li>Financial exposure</li> </ul>

Table 2 – Possible proposition scenarios with pros and cons

# 2.2.3 Innovative ways of differentiating the offer in the ML/T

One of the drivers which influence the decision to enter or not to enter an industry is the innovative potential and the consequent added value it can bring in terms of offer differentiation in the medium-long term. Given the nature of the research, the sources used to gather the main innovative trends in the industry are numerous and heterogeneous: company case studies, university projects, European commission projects, Scopus scientific articles and white papers published by companies in the sector. *Table 3* below shows the result of the research, four ideas/proposals subsequently classified into two main cluster.

#### Results

Area	Ideas	Introduction	Maturity		
Energy	Energy adaptive model	Use of predictive platforms and algorithms that allow the postponement of non-critical data center activities to times or geographical sites with greater availability of renewable sources and the ability to pre-cool server rooms	High		
Management	Energy balancing Use redundant UPS batteries to help balance the grid and provide ancillary services to the local energy provider, compensating for frequency variations and balancing power supply				
Heat Management	Waste heat recovery	Recovery of waste heat from the cooling process of server rooms through heat pumps and district heating systems	High		
	Data center for agriculture	Reuse of waste heat recovered from data centers in agriculture for heating adjacent agricultural greenhouses or vertical farms in urban settings	Medium		

Table 3 – Innovative proposals classified into two main cluster with maturity level and brief description

## 2.3 Economic analysis

The third phase, concerning the economic analysis of the initiative, is subdivided into five fundamental macro activities.

# 2.3.1 Analysis of the ALFA's strategic industrial plan

This analysis was used to understand how much the initiative is compatible with the guidelines and objectives expressed in the ALFA's strategic industrial plan, as long as, a poor compatibility would definitely arrest any future in-depth analysis.

#### Results

This initiative confirmed strong compatibility with the plan and company vision. In particular, once the plan was broken down into its two main pillars and eleven related sub-objectives, it emerged that the new BU could contribute to achieving nine out of eleven objectives, demonstrating an adherence index to the plan of 82%.

## 2.3.2 Market sizing

Subsequently, for the sizing of the market value of Planning and Building services, a report made available by ALFA was used. However, only the forecasts of the market volume of those services that, from the client's side, generated investments and then CAPEX were reported, divided into New Construction (NC) and Redevelopment (RED) segment, and not the services that generate OPEX. As a result, the market sizing was partial. Therefore, in order to size services in the Running macro-phases, different sources were used. For example, for estimating energy provider, maintenance, and staffing services, a free tool available on Schneider Electric's website called "Data center build vs. colocation TCO calculator" was used after a reverse engineering process. While the recycling service was sized based on a benchmark from a server vendor. All OPEX market values were sized as a percentage of the starting CAPEX.



Figure 2 - Schneider Electric tool interface

#### Results

Market sizing by service, year, and segment (NC/RED). In particular, Appendix E shows the annual trend of the market volume of the three macro-phases divided by segment and the total market value of the individual services over the five-year period analyzed.

#### 2.3.3 Revenues

In order to calculate potential revenue, it was necessary to develop a model suitable for the purpose and then estimate the values of the variables taken into consideration: scenario, segment (NC/RED), service and year (2022-2026). The parameters identified are:

- market size of service (MSS): this parameter varies according to the service (i), segment (j) and year (k). Each individual value has been estimated in the previous paragraph;
- service coverage (SC): 100% if the service can be provided directly by ALFA, 0% if not, and a percentage that varies from 3 to 5% if it is a service offered by any subcontractors. This percentage represents a sort of markup which takes into consideration a component linked to a labor procurement fee and costs of direction and coordination of works that the general contractor will have to sustain. This parameter was estimated based on the fees requested by general contractors in the civil construction sector. This parameter varies according to the scenario, service (i) and segment (j) (in the Acquisitions and Mixed Acquisitions scenarios this parameter also depend on time due to acquisitions);
- market share (MS): potential market share for each identified service, sized through an interview conducted with the managers of the BUs involved. This parameter varies according to the scenario, service (i) and segment (j);
- market share progression (MSP): index of the ALFA's readiness to approach the estimated market share during the five-year period analyzed. It was estimated by opinion-gathering process of the managers of the BUs involved. This parameter varies according to the scenario, segment (j) and year (k);

SC, MS and MSP vary according to scenario and refer to the summarized values in the *Table 4* below. Lastly, is reported in *Equation 1*, for simplicity, the formula for a particular scenario.

$$Revenues^{GC} = \sum_{i} \sum_{j} \sum_{k} MSS_{ijk} * SC^{GC}_{ij} * MS^{GC}_{ij} * MSP^{GC}_{jk}$$

Equation 1 - Revenue calculation model for General Contractor scenario

Once the parameters had been set, the revenues for each proposed scenario were calculated. In addition, a comparison was also made with a mode defined as accelerated, in which the MSP target is advanced by one year.

#### Results

Summary tables of identified parameter values are provided in *Table 4*. While in Appendix F.1 are reported the total revenues (2022-2026) of the different scenarios in the two modes.

			Service	coverage				Market share					
Scenario	Inte	Internal Services			External services			Internal se	ervices	External	External services		
	NC		RED	NC		RED		NC	RED	NC	RED		
Base	100%	6	100%	0%		0%		1-8%	1-8%	0%	0%		
General Contractor	100%	6	0%	3%		0%		8%	0%	8%	0%		
Acquisitions	100%	6	0%	3%*		0%		8%	0%	8%	0%		
Mixed GC	100%	6	100%	3%*		0%		8%	1-8%	8%	0%		
Mixed Acquisitions	100%	6	100%	3%		0%		8%	1-8%	8%	0%		
	Market share progression												
Scenario	20	22	2023			2024		2	025	20	2026		
	NC	RED	NC	RED	NC	RED	)	NC	RED	NC	RED		
Base	33%	33%	66%	66%	100%	1009	%	100%	100%	100%	100%		
General Contractor	0%	-	25%	-	50%	-		75%	-	100%	-		
Acquisitions	0%	-	20%	-	40%	-		75%	-	100%	-		
Mixed GC	0%	33%	25%	66%	50%	1009	%	75%	100%	100%	100%		
Mixed Acquisitions	0%	33%	20%	66%	40%	1009	%	75%	100%	100%	100%		

Table 4 - Service coverage, market share and market share progression values broken down by the factors by which vary

# 2.3.4 Marginality

At this point, as far as the evaluation of the potential marginality of the sector is concerned, it was opted for a high-level analysis that did not foresee the need to detail the necessary costs and investments, which, in any case, will have to be studied in future developments. To accomplish this task, a parameter was chosen to measure how much income the company can generate per unit of revenue, without considering investment, financing, extraordinary or fiscal policies: EBITDA/Revenue. This variable was measured for several companies identified in the competitive context analysis, and beyond, by dividing them in the three macro phases. Taking into consideration the financial statements made available on the AIDA portal, it was possible to extrapolate the necessary data, based on the last three years of operation. Once the average marginality of the individual macro-phase was identified, to find the average marginality of the industry, a weighted average of the three values was made with respect to the macro-phase market value, as shown in *Table 5*.

#### Results

Macro-phase	Sample companies	Average marginality	Macro-phase weight	Industry marginality
Planning	6	9,2%	12%	
Building	4	6%	48%	6,6%
Running	6	6,6%	40%	

Table 5 - General information about the industry's potential marginality estimation process

Finally, starting from the value of the industry marginality, in the Appendix F.2 EBITDA was calculated in all possible scenarios in the two modes, highlighting the most convenient scenario: Mixed GC.

#### 2.3.5 Final evaluation

The projected value of the revenues and the industry potential marginality are values that, considered individually, are not sufficient to make decisions regarding a future deepening of the initiative. In fact, it is necessary to better contextualize these values by considering the current performance of the other five ALFA's BUs involved.

#### Results

The following parameters were measured for each BU: revenue, CAGR revenue and marginality for the last five years of operation, drawing on the values made available by AIDA. Finally, all these values have been summarized in the bubble diagram in *Figure 3*. Its purpose has been to assist management in the decision-making process, summarizing and contextualizing all the necessary information, highlighting the high growth potential, good profitability, and significant potential revenues of the new BU in a Mixed GC scenario.



Figure 3 - Bubble diagram depicting the comparison between the corporate BUs and the potential new BU

## **3.** Conclusion and future development

The analysis performed allows the customer to get a complete picture of the data center industry. Specifically, the benefits of this thesis are:

 the assessment of macrotrends, competitive scenario, services provided, customer segments, new opportunities and potential innovative trends;

- the identification and analysis of all current market approach models with the evaluation of ALFA's internal competencies;
- the economic evaluation of the revenues and marginality of each viable approach.

Further evidence in support of the adequacy of the feasibility analysis is the satisfaction expressed by ALFA's CIO when the final results were presented to him.

Future developments will include, in the short term, a request by company referral for a board of directors (BoD) meeting where the evidence gathered will be presented. Lastly, if the BoD expresses a positive consensus, the ALFA's future objective will be to draw up a more in-depth business plan involving the other business units more closely and begin to organize the internal and external resources available to start entering the market.

# **Appendix A – Consulting Project GANTT**

Thus, the following thesis work focuses exclusively on the project activities that were conducted in the first person.



Figure A.1 - Project GANTT with activities performed independently and by other team members

# **Appendix B – Services**

Internet connectivity services, server and software supply and related maintenance have not been taken into consideration as there is a highly qualified supply market with extremely specialized companies and high barriers to entry (considered as potential suppliers).

Macro- phase	Service	Description					
	Site selection	Feasibility analysis and comparative studies of available options in which to build the site					
	Intermediation and development	Services of promotion and development of operations on the entire project chain, from pre- to post-sale and assistance for the development of business relationships with companies and suppliers					
	Insurance consulting services	Insurance brokerage and provision of risk management solutions					
Planning	Design and Commissioning	Civil and plant engineering design and parallel commissioning activities aimed ensuring that the outlined standards are met by all parties involved in accordance with the design intent					
	Area development	Support for strengthening economic growth and sector profiling for government, media, and society (e.g., identifying cross-cutting projects such as municipal calls or association and third-party initiatives targeted for funding)					
	Legal services	Legal support in ICT matters related to data centers, cloud computing and big data on topics of computer crimes, privacy and data protection					
	Construction	Construction of the data center facilities (excluding the envelope containing the server room) and ancillary structures according to the criteria of environmental sustainability imposed by the level of certification of the IT infrastructure					
	Virtual security services	Provision of systems and technologies for data center protection aimed at improving virtual security					
	Emergency Generation Power	Auxiliary generation systems to be used in case of ordinary power failure from the mains and from the UPS unit					
	Fiber connectivity	Provision and grounding of external data center connectivity facilities and services (plant and cable network from routers to telecom operators, cloud destinations and Internet exchange points) using fiber connection					
	HVAC systems	Supply of systems, machinery and technology used to provide heating, ventilation and refrigeration for the building (CACS, CRAC and CRAH systems)					
	Lighting solutions	Design and supply of all lighting systems required for the entire infrastructure					
	Load Bank testing	Testing of all infrastructures through load banks					
Building	Network connectivity	Provision and grounding of internal data center connectivity facilities and services (plant and cable network from routers to internal servers)					
	Power and Network Cable systems	Installation of cabling systems for power and data exchange in accordance with ISO/IEC 11801 and EN 50173-1 standards					
	Power distribution and metering solutions	Supply and installation of efficient and reliable systems for the distribution of the electric carrier					
	Roofing & Facade	Unique construction of the exterior envelope of the building within which sensitive IT infrastructure, including servers, are enclosed					
	Firefighting systems	Construction of escape routes, signal stations and provision of fire detection and suppression systems					
	UPS systems and batteries	Provision of uninterruptible power supplies (UPS) to ensure proper server operation					
	Water management systems and products	Providing consulting services and products for efficient water resource management, which is critical to ensuring cooling system efficiency and achieving strategic sustainability goals					
	Energy provider	Provision of the energy vectors needed to operate the data center					
	Maintenance and	Integrated management and monitoring of the entire facility housing the data					
	management of the	center. This includes ordinary and extraordinary management and maintenance					
	external building and	activities of the data center aimed at preserving the functionality of the					
Running	internal equipment	buildings, including cleaning and maintenance of the electrical system					
	Staffing	Use of personnel, internal to the client company or made available by the					
		manufacturer, assigned to daily activities: security, monitoring, identification					
	Recycling	Provision of specialized IT hardware recycling and reconditioning services or secure dismantling and destruction of data					

Table B.1 - Services divided by macro-phase with a brief description attached

								Compa	anies						
Area	Services	AECOM	engie	<b>e</b> ∙on	Sector and a	ARIATTA		💩 KWS	SIEMENS	Schneider Electric	HUAWEI	cefla	RITTAL	STARCHING	Murtur
	SITE SELECTION			•			•								
	INTERMEDIATION AND DEVELOPMENT			•											
888	INSURANCE CONSULTING SERVICES			•											
Planning	DESIGN AND COMMISSIONING			•			•				•	•		٠	
	AREA DEVELOPMENT			•			•								
	LEGAL SERVICES														
Macro-phase	e percentage coverage	83%	83%	83%	83%	50%	50%	50%	33%	33%	17%	17%	17%	17%	17%

# Appendix C – Industry companies and their service coverage

							C	ompanie	S					
Area	Services	Schneider Electric	engie	eon	SIEMENS	GALLI ITALO	dalkia			RITTAL		cefla	💩 KWS	
	CONSTRUCTION	•	•	•		•		•			•		•	
	VIRTUAL SECURITY SERVICES	•	•	•	•				•					
	EMERGENCY GENERATION POWER	•	•	•	•	•	•							
	FIBER CONNECTIVITY	•	•	•	•									
	HVAC SYSTEMS	•	•	•	•		•		•		•	•		•
	LIGHTING SOLUTIONS		•	•	•	٠	•							
Building	LOAD BANK TESTING	•	•	•			•							
Dunung	NETWORK CONNECTIVITY	•	•	•	•	٠			•		•			
	POWER AND NETWORK CABLE SYSTEMS		•	•	•	٠		•	•					
	POWER DISTRIBUTION AND METERING SOLUTIONS	•	•	•	•	٠	•	•	•		•			
	ROOFING & FACADE	•	•					•						
	FIREFIGHTING SYSTEMS	•	•		•			•				•		•
	UPS SYSTEMS AND BATTERIES	•	•	•	•	٠		•	•					
	WATER MANAGEMENT SYSTEMS AND PRODUCTS	•		•		•	٠				•	•		•
Macro-phas	e percentage coverage	93%	86%	86%	79%	50%	43%	43%	43%	36%	29%	21%	7%	14%

			Companies									
Area	Services	engie	eon	SIEMENS	Schneider		RITTAL		HUAWEI	cefla		
	ENERGY PROVIDER		•					•				
	MAINTENANCE AND MANAGEMENT OF THE EXTERNAL BUILDING AND INTERNAL EQUIPMENT	•	•	•	•	٠			•	•	•	
Kunning	STAFFING	•	•			٠						
	RECYCLING											
Macro-phas	e percentage coverage	100%	100%	50%	50%	50%	25%	25%	25%	25%	25%	

Figure C.1 – Service coverage of industry companies by macro-phase and identification of key competitors

# Appendix D – Services covered by ALFA and related internal BUs involved

	Planning	Building	Running
	Site Selection	Power distribution and metering solutions	Energy Provider
		UPS systems and batteries	Maintenance and management of the external building and internal equipment
Contended		HVAC systems	Recycling
Covered		Emergency generation power	
services		Lighting solutions	
		Water management systems	
		Fiber connectivity	
		Network connectivity	
		Load bank testing	
Coverage % of total services	17%	70%	75%
Strengths		• Experience in the construction and upgrading of high capacity and complex facilities gained in civil/industrial environment	<ul> <li>Experience in plant operation and maintenance activities aimed at optimizing energy performance</li> <li>Experience in waste heat recovery</li> <li>Experience in managing energy portfolios and providing advanced energy services</li> <li>Experience in circular economy models</li> </ul>

Table D.1 - Services potentially provided by ALFA's BUs and relative strengths divided by area

BU 1 - Electricity production and distribution	BU 2 - Energy requalification and efficiency	BU 3 - Heating system management	BU 4 - Waste collection and treatment	BU 5 - Smart city and connectivity
Site Selection	Load bank testing	HVAC systems	Recycling	Fiber connectivity
Energy Provider	UPS systems and batteries	Water management systems		Network connectivity
Maintenance and management of the external building and internal equipment	Emergency generation power			Lighting solutions
	Power distribution and metering solutions			

Table D.2 - Division of services among the five business units that have the necessary expertise

# Appendix E – Market sizing



Figure E.1 - Annual market value trend of the three macro phases 2022-2026 broken down by segment

Macro phace	Sorvico	Total market volume 2022-2026	% Market value of
wacro-phase	Service	(MLN €)	the macro-phase
Planning	Site selection	245	
	Intermediation and development	125	
	Insurance consulting services	244	
	Design and Commissioning	187	12%
	Area development	244	
	Legal services	181	
	TOTALE	1.226	
Building	Construction	738	
	Virtual security services	47	
	Emergency Generation Power	265	
	Fiber connectivity	947	
	HVAC systems	376	
	Lighting solutions	135	
	Load Bank testing	95	
	Network connectivity	570	
	Power and Network Cable systems	395	48%
	Power distribution and metering	228	
	solutions	228	
	Roofing & Facade	215	
	Firefighting systems	43	
	UPS systems and batteries	534	
	Water management systems and	320	
	products		
	TOTALE	4.908	
Running	Energy provider	3.159	
	Maintenance and management of		
	the external building and internal	765	40%
	equipment		
	Staffing	155	
	Recycling	6	
	TOTALE	4.085	

Table E.1 - Total market volume of data center services from 2022 to 2026

#### Appendix F.1 – Revenues

Figure F.1.1 shows the breakdown of total revenues in the three macro-phases in the different scenarios. In particular, the Running phase also includes a component called Cumulated Running due to the fact that Running services involve signing a contract that will generate revenues for a





certain period (assumed to be five years). As can be seen, this component has a strong impact in the Base scenario as it has the possibility of entering the sector more quickly and therefore signing a greater number of contracts earlier than in the other scenarios. Consequently, a new mode of market entry has been analyzed, defined as Accelerated, in which the MSP of each scenario is brought forward by one year.





Accelerated Mixed GC has been identified as the best way to approach the market as it allows for the interception of both New Construction orders with a GC approach and Redevelopment projects without the need for specialized company acquisitions that could be sources of increased business risk and fatal operational slowdowns in the initial market entry phase.



#### Appendix F.2 – EBITDA

Figure F.2.1 - Comparison of 2022-2026 total EBITDA in planned and accelerated modes for all considered scenarios

# Appendix G – La mia esperienza

Arrivato alla conclusione del mio percorso di studi, affascinato dalla dinamicità del settore consulenziale, mi sono rivolto alla Prof.ssa Antonella Martini per scegliere l'opportunità più adatta ai miei obiettivi. Su sua indicazione ho partecipato al programma Junior Consulting presso il Consorzio ELIS. ELIS è una realtà no profit attenta allo sviluppo personale e professionale degli studenti, che nel tempo è cresciuta e ha iniziato ad erogare anche servizi di consulenza alle aziende facenti parte del Consorzio, dando vita ad ELIS Innovation Hub. L'edizione 2021 è stata suddivisa in due fasi: una prima fase di formazione, durante la quale sono state approfondite le principali soft skills ed è stato possibile incontrare i CEO delle aziende partner, con l'obiettivo di risolvere Business Cases ad alto contenuto innovativo; una seconda fase di lavoro su un progetto reale di consulenza, che è stato oggetto del presente lavoro di tesi. A lavoro ultimato, vi è stata inoltre l'opportunità di presentare in prima persona l'elaborato al CIO di ALFA.



Figura G.1 – Foto dell'Executive Meeting svolto in remoto che ha visto la partecipazione del CIO di ALFA

Conclusa la mia esperienza di tirocinio, ho partecipato a un Bootcamp ELIS in collaborazione con Bip su tematiche IT, a seguito del quale ho ricoperto prima la posizione di Business Analyst in Bip e poi il ruolo di IT Strategy Consultant presso PwC in cui attualmente lavoro. Ringrazio ELIS e la Prof.ssa Martini per avermi dato la possibilità di maturare questa importante esperienza di crescita personale e professionale.

Fase	Metodologie acquisite
Training week	Overview delle principali competenze trasversali condivise dal World Economic Forum come Teamwork, Personal Leadership e Design Thinking, oltre alla capacità di progettare e svolgere presentazioni efficaci
Progetto di consulenza	Metodologia di strutturazione di un progetto di consulenza strategica e modalità di implementazione di un tool omnicomprensivo su Excel a supporto della fase di valutazione economica
IT Bootcamp ELIS-Bip	Concetti chiave del mondo IT, le forme che assume a livello organizzativo e le principali architetture, oltre a competenze relative al Project Management e agli strumenti a suo supporto

Tabella G.1 - Competenze tecniche acquisite e Strumenti utilizzati durante il periodo di tirocinio con ELIS Innovation Hub