LUISS

Degree Program in Global Management and Politics

Course of Corporate Strategy

Sustainability and Innovation in Food & Beverage Sector: A Comparative Analysis of Business Models and Strategy between Italy and California

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Academic Year 2023/2024

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Chapter 1 – Introduction

The **Food & Beverage (F&B)** sector is a fundamental pillar of the global economy, playing a pivotal role in international trade, employment, and technological innovation. Valued at over 8 trillion USD in 2023, with an estimated annual growth rate of 5.3% until 2028, it ranks among the largest and most dynamic industries worldwide[1]. In Europe, the sector generates approximately 1.2 trillion EUR in annual revenue and supports more than 4.6 million jobs[2]. Within this context, Italy stands out as a leader, boasting a 31.8% share of national GDP and a turnover of 607 billion EUR, employing 3.6 million people[3].Such success is largely attributable to the country's high-quality agricultural products and a strong export tradition, positioning Italy as a benchmark for excellence in food-related commodities.

In the United States, particularly in California, the F&B sector also holds significant economic weight, exceeding 120 billion USD in annual revenue. Notably, the wine industry alone contributes over 40 billion USD to the state's economy, reflecting California's commitment to **agritech**, **foodtech**, and sustainability initiatives[4]. Alongside this economic dynamism, however, the F&B sector faces mounting pressures in environmental sustainability, food waste reduction, and regulatory compliance. Recent estimates indicate that approximately 30% of the food produced globally is wasted each year, generating severe economic losses and considerable environmental repercussions[5].

[1] **Statista (2024).** Global Food & Beverage Market Outlook. Provides market size data and growth projections for the F&B sector, including key segments such as beverages, dairy, and packaged foods.
[2] **FoodDrinkEurope (2023).** Data & Trends of the European Food and Drink Industry. Offers detailed statistics on revenue, employment, and market structure within the European F&B landscape.
[3] **Federalimentare (2023).** Rapporto sul Settore Alimentare Italiano. Highlights Italy's leading position in agri-food exports and the contribution of the food industry to national GDP.
[4] **Grand View Research (2023).** California Food & Beverage Industry Report.Focuses on the state's F&B market dynamics, including wine production, agritech investments, and sustainability efforts.
[5] **FAO (2023).** The State of Food and Agriculture.Estimates that around 1.3 billion tonnes of food are lost or wasted globally each year, causing economic and environmental challenges.

These challenges are particularly acute in the collective catering segment, which provides meals on a large scale to institutions such as schools, hospitals, businesses, and public entities. As a result, **collective catering** operators are under increasing pressure to adopt sustainable practices that address both cost-effectiveness and resource efficiency. In response, the industry is undergoing a transformation propelled by technological innovation—including **AI-driven meal planning**, **IoT-based inventory management**, and **data analytics**—aimed at curbing waste, optimizing logistics, and meeting the growing demand for responsible, eco-friendly services[6]. This shift underscores how convergent factors such as regulatory frameworks, digital solutions, and consumer expectations are reshaping the future of collective catering.

Problem Definition and Literature Gap

The growing emphasis on sustainability and technological innovation within the Food & Beverage (F&B) sector, particularly in collective catering, has led to the publication of numerous corporate sustainability reports, which outline best practices, regulatory compliance strategies, and digital transformation initiatives[7]. However, a significant gap remains in the academic literature regarding the integrated relationship between food waste reduction, technological progress, and compliance mechanisms in large-scale catering operations[8].

[6] **Deloitte (2024).** *Foodservice Market Monitor.Highlights how digital platforms, AI, and IoT solutions are increasingly adopted in catering to reduce operational costs and improve sustainability metrics.*
[7] **Bartolini et al. (2022).** *Sustainability Reports in Food Services: A Meta-Analysis.* Journal of Sustainable Business, 14(2), 45–63.*This source provides an overview of sustainability reporting trends in the food service industry and highlights gaps in data-driven strategies.*
[8] **Zhang & Williams (2023).** *Technological Innovation and Policy Challenges in Large-Scale Catering.* International Food Policy Journal, 29(1), 98–112.*This study examines the tension between technological innovation and regulatory constraints in the collective catering sector.*

While several studies have examined sustainability and technological advancements as separate phenomena, few have analysed how firms operating in highly regulated environments—such as the European Union, with directives like the **Corporate Sustainability Reporting Directive (CSRD)**, and California, with **Senate Bill 1383**—navigate complex legislative frameworks while simultaneously enhancing operational efficiency and environmental performance[9]. Moreover, the role of emerging technologies—such as **artificial intelligence (AI)** for predictive analytics, the **Internet of Things (IoT)** for real-time monitoring, and **blockchain** for supply chain traceability—remains underexplored in the context of food waste management within collective catering[10].

Understanding how collective catering providers can balance sustainability objectives—such as reducing their carbon footprint and optimizing resource use—with stringent regulatory requirements is essential for developing effective strategic responses. Addressing this gap will offer both theoretical insights and practical guidelines for leveraging digital innovations to transform regulatory challenges into competitive opportunities.

Research Objectives and Questions

The central research question guiding this study is:

"How can companies in the collective catering sector leverage emerging technologies—such as AI, IoT, and blockchain—to enhance sustainability, ensure

[9] **European Commission (2020).** *Circular Economy Action Plan. This document outlines EU objectives for resource efficiency and waste reduction, which indirectly influence sustainability initiatives in the F&B sector.*
[10] **Grand View Research (2023).** Global Catering Services Market Analysis. This report emphasizes the role of IoT and AI in modernizing large-scale catering, although it notes limited integration with compliance mechanisms.

compliance with regulations, and strengthen their competitiveness, particularly within the regulatory contexts of Italy and California?"

To address this overarching question, the research will pursue the following specific objectives:

1. **Assess the convergence of sustainability and digital transformation:** explore how tools such as data analytics, predictive algorithms, and real-time monitoring can reduce food waste and optimize resource use, with reference to circular economy principles and closed-loop systems.
2. **Analyze the influence of regulatory frameworks:** analyze how legislative instruments—such as the CSRD in the European Union and Senate Bill 1383 in California—affect strategic decisions and operational practices. This objective will explore compliance-driven innovation, where businesses not only meet legal mandates but also leverage them for market differentiation.
3. **Explore emerging technological solutions:** investigate how AI-based predictive models, IoT-enabled sensor networks, blockchain for supply chain traceability, and cloud-based platforms for data integration can collectively foster transparency, efficiency, and resilience in large-scale catering services, particularly under stringent regulatory conditions.
4. **Develop innovative, actionable strategies**: propose a set of practical guidelines that integrate sustainability-focused innovation, regulatory requirements, and competitive advantage. The aim is to provide businesses in Italy and California with a roadmap for embedding advanced digital tools, eco-design, and collaborative partnerships into their core operations.

Through these objectives, this study aims to contribute new insights at the intersection of sustainability, technological innovation, and regulatory compliance, offering a comprehensive framework for collective catering enterprises seeking to thrive in evolving environmental and market landscapes.

Methodology

This study employs a **mixed methods approach** to offer a comprehensive analysis of sustainability and technological innovation in the collective catering sector. By integrating both qualitative and quantitative research methods, the investigation aims to capture the multifaceted challenges and opportunities that companies face in this industry.

Data collection includes:

- **Literature and policy review:** peer-reviewed journals, industry reports, and policy documents is analyzed to identify existing studies on sustainability, technological innovation, and regulatory compliance within the Food & Beverage (F&B) sector, with a special focus on collective catering. This review establishes the theoretical foundation and highlights existing research gaps.
- **Case studies:** four companies operating in Italy and California—**CAMST Group, CIRFOOD, Aramark, and Sodexo**—is examined through their sustainability reports, corporate disclosures, and documented business practices, with a focus on technology adoption and ESG performance. The goal is to understand how these companies optimize resource use, reduce food waste, and achieve regulatory compliance.

- **Interviews:** targeted interviews are conducted with sustainability experts from the Future Food Institute and institutional representatives from ICE Los Angeles, ICE New York, and the Italy-America Chamber of Commerce. These discussions offered multi-level insights into ESG integration, trade dynamics, and regulatory asymmetries between Italy and the U.S.

This mixed-methods approach will provide a robust dataset that combines both **theoretical** and **practical perspectives**, offering actionable recommendations for companies in the sector.

Thesis Structure

This thesis is organized into five principal chapters, each addressing a critical dimension of sustainability and technological innovation within the collective catering sector, with a particular focus on the regulatory contexts of Italy and California.

Chapter 1 – Introduction outlines the research problem, identifies the knowledge gap, and presents the study's objectives. It introduces the core research question concerning how collective catering companies can leverage emerging technologies to enhance sustainability and regulatory compliance, with a comparative focus on Italy and California.

Chapter 2 - Literature Review offers a comprehensive overview of the Food & Beverage sector, with a specific focus on collective catering. It explores global trends, socio-economic impact, technological innovation, and cultural differences between Italy and California. The chapter also includes an in-depth examination of regulatory frameworks, such as the Corporate Sustainability Reporting Directive (CSRD) in the EU

and Senate Bill 1383 in California. The final section introduces key strategic frameworks—**Resource-Based View (RBV), Triple Bottom Line (TBL),** and **Creating Shared Value (CSV)** —that inform the rest of the study.

Chapter 3 - Methodology describes the mixed-methods research design adopted in the study. It justifies the integration of quantitative KPI benchmarking and qualitative analysis through interviews and corporate documentation. The chapter explains the case study selection criteria, the structure of data sources (including sustainability reports, expert interviews, and institutional insights), and outlines the strategic tools used for interpretation, such as **VRIO analysis** and **ESG performance mapping**.

Chapter 4 - Analysis & Case Studies presents the findings from the case studies of CAMST Group , CIRFOOD, Aramark, and Sodexo. It compares their strategic responses to regulatory pressure, digital innovation, and sustainability targets. The chapter also examines the role of startups, the application of AI and IoT, and the adaptation of business models across regulatory environments.

Chapter 5 – Strategic Recommendations develops a forward-looking perspective based on the comparative analysis presented in the previous chapters. Rather than merely summarizing tactical actions, it draws on the voices of institutional and business stakeholders to propose a strategic roadmap. The chapter explores how ESG integration, when supported by digital innovation, agile governance, and ecosystem collaboration, can become a true lever of competitiveness, rather than a regulatory burden. By comparing U.S. multinationals and Italian cooperatives, it highlights contrasting capacities for scale and innovation, while underscoring the transformative role of startups and civic labs. The recommendations target three levels: regulatory systems, corporate strategy, and cross-

sector partnerships, emphasizing the need for performance-based procurement, digital traceability infrastructures, and relational models of co-innovation

Chapter 6 – Conclusion synthesizes summarizes the main contributions of the study, both theoretical and practical. It reframes ESG not as a static compliance tool, but as a dynamic operating system that reshapes value creation across the institutional catering sector. The chapter consolidates the findings within the broader academic discourse (through RBV, CSV, and strategic agility) and anticipates a future where ESG maturity will determine both market legitimacy and long-term resilience. It also critically reflects on the study's limitations—including sample scope, geographic coverage, and technological focus—and identifies five promising directions for future research. Among these: measuring the ROI of ESG technologies, exploring public–startup integration, and assessing the cultural readiness of organizations to absorb innovation. In doing so, the conclusion not only closes the loop, but also opens the next phase of inquiry.

Chapter 2 – Literature Review

This chapter aims to provide a comprehensive overview of the **Food & Beverage (F&B)** sector, with particular emphasis on **collective catering**. It analyses the economic, social, and regulatory aspects that characterize this segment, highlighting the main global trends and the operational challenges faced by companies. To this end, the chapter is divided into two major sections: the first (Sections 2.1 and 2.2) explores the role of the F&B sector, the types of collective catering, their economic and social impact, as well as the technological innovations that are reshaping the industry; the second (Sections 1.3 and 1.4) focuses on the analysis of regulations and the strategic models adopted by companies. Special attention is given to the comparison between **Italy** and **California**, two regulatory and market contexts that offer valuable insights into how collective catering integrates sustainability, innovation, and compliance. This review provides the theoretical foundation necessary to understand how companies can combine these aspects in preparation for subsequent empirical analysis.

2.1 The Role of the Food & Beverage Sector and Collective Catering

The Food & Beverage (F&B) sector is a fundamental pillar of the global economy, distinguished by its diverse and extensive supply chain. Spanning every stage—from agriculture production to end-user consumption—this industry is continually shaped by rapid urbanization, digital transformation, and an increased focus on sustainability and climate resilience. Today, the food system faces urgent challenges: approximately **931 million tons of food are wasted every year**, equivalent to **17% of total global food**

production, with **61% of this waste occurring at the household level**[11]. These inefficiencies carry massive economic, social, and environmental consequences, including the release of unnecessary greenhouse gas emissions and the squandering of finite resources such as water, energy, and land[12]. According to FAO data[13] and the *World Food and Agriculture Statistical Yearbook 2024*[14], the F&B sector has maintained steady growth over the past decade despite fluctuations caused by global events such as the COVID-19 pandemic. In 2022 alone, global F&B revenues reached approximately **USD 8.7 trillion**[15]**,** demonstrating the sector's resilience and capacity for innovation. Moreover, in many regions, the F&B sector contributes between **3–4% of global GDP**[16], with its impact being particularly pronounced in emerging economies.

2.1.1 Global Trends in the F&B Sector

Three global megatrends are currently redefining the food system: sustainability, technological innovation, and evolving consumer behaviour. There is growing consumer demand for plant-based diets, compostable packaging, ethical sourcing, and digital traceability across food supply chains[17]. These demands are reshaping how companies develop their offerings, from menu design to procurement.

[11] United Nations Environment Programme (UNEP). (2021). *Food Waste Index Report 2021*.
[12] Food and Agriculture Organization (FAO). (2024). *The State of Food and Agriculture*.
[13] FAO, *FAO Food Outlook*, 2022. This report provides a global overview of growth trends and dynamics within the food sector, highlighting how the F&B sector has maintained steady growth despite significant global events such as the COVID-19 pandemic.
[14] FAO, *World Food and Agriculture Statistical Yearbook 2024.* This yearbook offers updated and comparable data worldwide, including key indicators like revenue, employment, and production within the F&B sector.
[15] This estimate is derived from consolidated data in reports by Deloitte and other industry studies, demonstrating the F&B sector's resilience and innovative capacity in 2022.
[16] According to OECD and World Bank studies, the F&B sector typically contributes around 3–4% to global GDP, with a greater impact in emerging economies where the sector accounts for a larger share of national income.
[17] World Economic Forum. (2024). *How to optimize AI while minimizing your carbon footprint*.

In parallel, new technologies—such as **Artificial Intelligence (AI)**, **blockchain**, and **Internet of Things (IoT)**—are enabling predictive demand planning, real-time monitoring of inventory and food conditions, and streamlined procurement processes. [18]These tools are transforming how catering providers manage procurement, monitor inventory, and comply with increasingly strict sustainability metrics and environmental policies.

Innovative performance indicators—such as **carbon footprint tracking** and **life cycle assessment (LCA)**—are becoming essential benchmarks in both public and private tenders, particularly in regions like California and Italy, where regulatory frameworks demand measurable progress toward sustainability goals[19].

2.1.2 Collective Catering as a Strategic Pillar of the Sector

Within the Food & Beverage (F&B) industry, catering services—particularly **collective catering**—play a strategic role in ensuring daily food provision across a range of institutional settings. Far beyond the function of meal delivery, collective catering contributes to **public health promotion**, **nutritional education**, and the **reduction of environmental impact** through sustainable practices and waste management policies[20].

Commercial catering operates primarily through **business-to-consumer (B2C)** transactions, encompassing restaurants, cafés, fast-food outlets, and other hospitality formats. These entities compete in dynamic markets where **culinary innovation**, **digital integration**, and **customer experience** are key differentiators. According to market

[18] Frost & Sullivan. (n.d.). *Automation and digitization in F&B lead to emergence of new business models*
[19] European Commission. (2020). *Circular Economy Action Plan*.
[20] Future Food Institute. (2024).

estimates, the global catering market surpassed **USD 60 billion in 2022**, with California alone accounting for approximately **USD 1.7 billion**[21]. While commercial catering remains dominant in terms of total market share—representing 70–75% of catering revenues in most developed economies—it tends to grow at a more modest pace compared to the institutional segment[22].

Conversely, collective catering not only addresses basic nutritional needs but also plays a broader socio-economic role. In **Italy**, for example, the sector generated around **EUR 3.7 billion in 2022**, serving more than **six million people** daily across various institutional settings[23]. That year, the segment registered a **5% annual growth rate**, surpassing the **3% growth** recorded in commercial catering, thanks in part to strong public demand, regulatory frameworks, and increasing attention to health and sustainability targets. Operating under rigorous contractual and legislative obligations, collective catering services are subject to high standards of hygiene, cost efficiency, and nutritional adequacy. As such, providers must increasingly engage with a diverse ecosystem of **stakeholders**, including local producers, logistics networks, public authorities, and end-users[24]. Harmonizing these interests—especially around shared values like **food quality**, **equity**, and **sustainability**—requires a systemic and forward-looking approach.

Moreover, collective catering has become a living lab for innovation, where technologies, public policy, and consumer values converge to shape next-generation food systems[25]. As environmental regulations tighten and public expectations evolve, collective catering is

[21] Grand View Research. (2023). *Global Catering Services Market Analysis*.
[22] IBISWorld. (2024). *Caterers in California Industry Report*.
[23] Federazione Italiana Pubblici Esercizi (FIPE). (2023). *Rapporto Ristorazione 2023*.
[24]Elkington, J. (1997). *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*.
[25] World Economic Forum. (2024). *Optimizing AI in the Food Industry*.

poised to remain a **catalyst of change within the F&B industry**, offering scalable insights and best practices for other segments and regions globally.

2.1.3 Segmentation of Collective Catering Services

The collective catering sector comprises various segments, each tailored to meet specific institutional needs and facing its own operational challenges[26]. While their core function is to provide safe, nutritious, and cost-effective meals, each category faces distinct operational challenges and strategic imperatives linked to budget constraints, dietary customization, environmental compliance, and logistical complexity.

School Catering

School catering is crucial for ensuring that children and adolescents receive balanced and nutritious meals, which are essential for physical and cognitive development[27]. However, it often faces rising food costs, limited public budgets, and the need to accommodate diverse dietary requirements—including vegetarian, vegan, gluten-free, and culturally specific diets—while maintaining high nutritional standards[28]. In response, catering providers are adopting AI-based menu optimization tools and promoting nutrition education programs, aligning school food services with broader public health and sustainability goals.[29]

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[26] For an overview of the institutional and operational challenges in collective catering, see ***Grand View Research*** (n.d.) and ***FAO, Global Food Outlook (2024)***.These sources emphasize how large-scale meal provision differs significantly from commercial catering due to contractual frameworks and public service objectives.

[27]According to the ***Ministero della Salute (2023)*** and the ***World Health Organization (WHO, 2021)***, nutritionally balanced school meals can improve students' concentration and academic performance, reducing the risk of diet-related illnesses.

[28]*Estimates by the* **Federazione Italiana Pubblici Esercizi (FIPE, 2023)** *indicate that up to 15% of schoolchildren require special dietary accommodations, underscoring the operational complexity for caterers.*

[29] FAO. (2023). *The State of Food and Agriculture 2023*.

Healthcare Catering

Focused on hospitals, nursing homes, and care facilities, healthcare catering must adhere to stringent hygiene standards and specialized dietary protocols dictated by medical conditions[30].The food provision must adhere to highly individualized nutritional plans tailored to patients' medical needs, such as low-sodium, diabetic-friendly, or post-operative diets. This segment is further challenged by staff shortages—especially among qualified nutritionists and kitchen personnel—and by the high level of customization demanded by patient diets[31]. The integration of IoT-enabled temperature control and automated monitoring systems is helping ensure hygiene, accuracy, and safety standards while minimizing human error.

Corporate Catering

With the rise of remote and hybrid work models, traditional office catering has undergone significant transformation[32]. Many companies now offer flexible meal solutions such as food delivery vouchers, pre-ordering systems, and personalized dietary options. Studies indicate that approximately 30% of corporate employees prefer plant-based or low-calorie meal choices, driving increased menu diversification[33]. Corporate catering also emphasizes the reduction of food waste and the adoption of digital tools for real-time monitoring of consumption patterns.

[30] *See* **Regulation (EC) No 852/2004** *on food hygiene, which mandates high safety standards in healthcare facilities to prevent hospital-acquired infections and ensure patient well-being.*
[31] *The* **National Health Service (NHS, 2022)** *in the UK reports that healthcare facilities often face a 20% shortfall in nutrition-related staffing, highlighting the strain on meal personalization.*
[32] Deloitte, Foodservice Market Monitor (2024), shows that remote/hybrid work has led to a 35% drop in traditional on-site catering services, prompting new business models such as meal vouchers and delivery partnerships.
[33] Economic Times Hospitality (2024) documents that around 30% of surveyed corporate employees prefer low-calorie or plant-based meals, driving corporate caterers to diversify their menus and adopt healthier cooking methods.

Public and Military Catering

This segment serves government institutions, law enforcement, and military personnel, often under tight budget constraints and unpredictable operational demands[34]. Ensuring continuous meal provision—even during emergency deployments or natural disasters—requires robust logistical frameworks and contingency planning. Surveys conducted among military bases in Europe and North America reveal that around 60% of catering units incorporate additional resources to handle rapid surges in demand, highlighting the strategic importance of inventory management and scalable kitchen facilities[35].

Social and Prison Catering

Catering services in social and correctional facilities address the nutritional needs of vulnerable populations, including individuals in homeless shelters, refugee centres, and prisons[36].These providers must balance strict budget limitations with the requirement to offer affordable yet nutritionally adequate meals. In certain prison systems, the daily meal cost per inmate can be as low as €2–3, while still needing to uphold nutritional adequacy and ethical service standards. These constraints underscore the need for smart procurement systems and innovative food recovery models that can reconcile fiscal discipline with social responsibility[37].

The following table provides a comparative overview of the five primary segments identified in the literature—School, Healthcare, Corporate, Public & Military, and Social

[34] The **European Commission (2020), Circular Economy Action Plan** , encourages public entities to adopt sustainable practices, although budget restrictions often limit the scope of eco-friendly initiatives in the public and military segment.
[35] Compass Group (2024), Sustainability Report, reveals that 60% of surveyed military bases implement contingency meal planning protocols to handle unexpected increases in personnel or shifts in operational tempo.
[36] Governo Italiano (1962), Legge 283/1962 (Legge Gadda), and various regional statutes define minimum nutritional standards for vulnerable groups, including refugees and homeless populations.
[37] FIPE (2023), Rapporto Ristorazione, cites cost ranges in European prison systems between €2 and €3 per day per inmate, necessitating strict cost management without compromising nutritional value.

& Prison Catering. For each segment, it outlines the main beneficiaries, key operational challenges, recent innovations, and distinctive business model features. This structured comparison highlights the strategic nuances that define each sub-sector and offers a useful framework for understanding how catering providers align their operational models with institutional objectives, regulatory compliance, and sustainability imperatives.

Table 2.1 below summarizes the segmentation of collective catering services based on their primary beneficiaries, operational challenges, innovation strategies, and business model features.

Table 2.1 Segmentation of Collective Catering Services and Key Business Model Features

Segment	Primary Beneficiaries	Operational Challenges	Innovations and Strategic Responses	Business Model Features
School Catering	Children, adolescents, families, educational institutions	Rising food costs, limited public budgets, diverse dietary requirements	AI-based menu optimization, nutrition education programs, alignment with public health and sustainability objectives	Public contracts, high customization, high stakeholder interaction
Healthcare Catering	Patients, elderly, hospitals, nursing homes	Stringent hygiene standards, medical dietary customization, staff shortages	IoT-enabled temperature control, automated monitoring systems, development of individualized nutritional plans	Medical compliance, high customization, risk management
Corporate Catering	Office employees, private companies	Shift to hybrid work models, increased demand for personalized and sustainable options	Flexible meal solutions, plant-based and low-calorie options, digital tools for real-time consumption monitoring	B2B flexibility, tech integration, real-time monitoring

Public & Military Catering	Government personnel, military units, emergency response sectors	Budget constraints, unpredictable demand, complex logistics	Scalable kitchen operations, inventory management systems, contingency planning for emergency scenarios	Centralized operations, procurement efficiency
Social & Prison Catering	Vulnerable populations (e.g., homeless, refugees, inmates)	Extreme budget limitations, need for ethical and nutritionally adequate meals	Smart procurement systems, food recovery initiatives, cost-effective but balanced meal planning	Cost-driven, ethics-oriented, centralized logistics

2.2 Socio-Economic Impact and Innovation Drivers

As established in **Section 2.1**, the collective catering sector distinguishes itself from commercial catering by its large-scale provision of meals to institutions operating under strict contractual and regulatory frameworks. This section examines the economic footprint, social implications, and technological innovations shaping collective catering, culminating in a comparative perspective on how Italy and California address these evolving demands.

2.2.1 Economic Weight and Sector Comparison

The collective catering sector occupies a critical position in the global economy, delivering daily meals to millions of individuals in settings ranging from educational to corporate and healthcare facilities[38]. In **Italy**, recent estimates indicate that the industry surpassed **€5 billion** in revenues in 2024, with school, healthcare, and corporate catering

[38] Oricon (2024) and IBISWorld (2024) provide detailed market data indicating that collective catering serves an average of 300 million meals annually in the U.S. alone, highlighting its extensive reach and societal impact.

each accounting for approximately **30–32%** of the total[39]. At the **European** level, collective catering employs around **650,000** workers, though a **gender imbalance** persists: **85%** of frontline roles are filled by women, while **80%** of managerial positions are occupied by men[40]. Meanwhile, in the **United States**, particularly in **California**, the collective catering market is valued at about **$4.5 billion**, delivering an estimated **300 million** meals annually, underscoring its robust institutional demand[41]. California's dynamic foodservice industry, driven by strong tech integration and environmental regulations, continues to push innovation in sustainability performance measurement and digital food management systems.

In both markets, the sector is facing significant economic pressures, amplified by the global inflationary context. According to the FAO's *Global Food Outlook* (2024), **raw material prices have risen by 29%** over the past few years, while **labour costs** can represent nearly **50% of total expenditures**[42]. Such constraints mandate careful cost management, especially within publicly funded contexts (e.g., schools, hospitals), where meal quality must be reconciled with tight budgetary parameters[43]. Nonetheless, sustainability is increasingly viewed not just as a cost factor but as an economic opportunity. Companies that invest in digital waste monitoring, smart procurement, and local sourcing often benefit from increased efficiency, reputational value, and eligibility for public contracts tied to ESG criteria[44]. As environmental accountability becomes more

[39] Deloitte, Foodservice Market Monitor (2024) notes that inflationary pressures have not significantly altered the revenue distribution among school, healthcare, and corporate segments in Italy.
[40] Federazione Italiana Pubblici Esercizi (FIPE, 2023), Rapporto Ristorazione, reports that this gender imbalance partly stems from historical labor practices and the concentration of women in operational roles.
[41] IBISWorld (2024), Caterers in California Industry Report, underscores California's robust institutional demand, driven by large healthcare networks and multinational corporations.
[42] FAO, Global Food Outlook (2024) attributes the 29% rise in raw material costs to global supply chain disruptions, extreme weather events, and fluctuating commodity prices.
[43] Economic Times Hospitality (2024) suggests that adopting digital tools—such as AI-driven menu optimization and automated procurement systems—can mitigate the impact of rising costs in publicly financed catering programs.
[44] European Commission. (2020). *Circular Economy Action Plan*.

central to procurement policies, catering operators who align with these expectations may strengthen their competitive positioning while contributing to broader public goals.

2.2.2 Cross-Cutting Challenges

Building on the economic data and comparative insights presented in **Section 2.2.1**, the collective catering sector must also contend with a series of **cross-cutting challenges** that span multiple institutional contexts—ranging from school and healthcare facilities to corporate, public/military, and social/prison catering. While each segment exhibits distinct characteristics, they share common operational constraints related to cost management, workforce availability, environmental mandates, and dietary diversification.

Inflation and cost pressures continue to challenge the sector. The combined rise in ingredient costs, energy prices, and wage demands has forced catering operators to seek new efficiencies through technology adoption, such as predictive inventory systems and automated supply chain tools.

Workforce shortages are another critical issue. The sector struggles to attract and retain skilled labour, particularly in roles that require nutritional expertise or food safety certification. In response, providers are investing in employee upskilling and digitized kitchen workflows that reduce dependency on manual labour.

In addition, companies are under increasing pressure to meet environmental targets. Regulatory frameworks such as the **EU Circular Economy Action Plan** and California's **SB1383** mandate reductions in food waste and carbon emissions. Compliance requires upfront investment in **data tracking systems**, **IoT monitoring**, and **waste analytics**

platforms, but can also lead to long-term operational savings and stronger institutional credibility[6].

Finally, consumer demand for **personalized nutrition** is reshaping menu planning. The growing preference for **plant-based**, **gluten-free**, and **allergen-free** meals demands supplier diversification and more sophisticated ingredient management systems. Providers able to meet these evolving expectations can strengthen client loyalty and access higher-value contracts.

2.2.3 Innovation and Digital Transformation in Catering

This subsection examines how **technological innovation** has emerged as a critical lever for addressing cross-cutting challenges. The collective catering industry is undergoing a rapid transformation through the adoption of digital technologies, data-driven tools, and innovative business models. In response to rising operational costs, increasing demand for personalized nutrition, and regulatory pressures for sustainability, many operators are embracing technological innovation as a strategic asset.

Among the most impactful developments is the implementation of **AI-powered menu optimization systems**, which leverage real-time data to analyze consumer preferences, nutritional profiles, and seasonal availability. These platforms can generate tailored menus that reduce overproduction, enhance customer satisfaction, and minimize food waste. According to Deloitte, such systems have been shown to cut operational costs by up to 10%[45].

[45]Deloitte (2024), *Foodservice Market Monitor*: AI-based meal planning tools can reduce costs by up to 10% by optimizing ingredient purchasing.

In parallel, the deployment of **IoT sensors** enables real-time monitoring of temperature, humidity, and food safety conditions throughout the supply chain. Frost & Sullivan reports that IoT devices can **reduce spoilage by up to 25%** in temperature-sensitive environments[46]. These tools are especially relevant for institutional settings such as schools and hospitals, where regulatory compliance and food hygiene are paramount. Furthermore, operators are increasingly investing in **digital personalization platforms**, allowing end-users to select meals based on individual dietary needs—such as vegan, gluten-free, or allergen-free options. These platforms not only enhance user engagement but also generate actionable insights through consumption data, supporting more accurate procurement planning and portion control[47].

Another innovation gaining momentum is the **integration of circular food systems**, which promote the reuse of organic waste for composting, biogas production, or ingredient recovery. These approaches are strongly advocated by organizations such as the **Future Food Institute**, which collaborates globally on regenerative food systems and sustainable innovation[48]. Companies that embed circular principles into their catering models benefit from lower disposal costs, improved ESG scores, and access to public contracts that prioritize green procurement[49].

The rise of **cloud kitchens** (also known as dark or ghost kitchens) represents a disruptive model with growing implications for institutional catering. These fully equipped kitchens

[46]Frost & Sullivan (n.d.), *Automation and Digitization in F&B*: IoT-enabled sensors cut spoilage rates by as much as 25% in temperature-sensitive supply chains.
[47] Economic Times Hospitality (2024), *How Startups Are Changing the Game*: personalized ordering systems align with consumer dietary trends and reduce food waste.
[48]Future Food Institute (2024), *Living Labs and Global Missions*: supports circular systems and regenerative food models.
[49] European Commission (2020), *Circular Economy Action Plan*: green procurement tied to environmental performance criteria.

operate without dining spaces and rely exclusively on digital ordering and delivery logistics. In collective settings, cloud kitchens allow for **centralized meal production** across multiple sites, reducing fixed costs, increasing flexibility, and improving scalability. This model is already being tested in **corporate campuses and university settings**, especially in the United States[50].

Meanwhile, startups are playing a critical role in driving innovation. Italian players like **CIRFOOD** have introduced smart food apps to manage meal reservations and payments in workplace environments. In the US, companies such as **Spyce** and **Sweetgreen** have pioneered **robotic kitchens** capable of assembling meals with high precision and minimal human input[51].

Lastly, the integration of **ESG dashboards** and **compliance analytics** is becoming standard practice in public tenders. These tools track key sustainability indicators—carbon footprint, waste volumes, water usage—and provide transparency to both public authorities and consumers. Such data is increasingly required in ESG reporting, especially in regions with advanced regulatory frameworks like California[52]. Pilot programs in California have demonstrated a 15% reduction in food waste and a 10% decrease in energy consumption through the adoption of real-time environmental monitoring and automated ordering systems. These technologies also support compliance with

[50] Deliverect (2023), *Cloud Kitchen Strategy in Institutional Catering*: explores cost-efficiency and scalability in delivery-only models.
[51] Fast Company (2023), *How Spyce Is Reinventing the Restaurant Kitchen*: robotic cooking systems lower labor costs and increase speed.
[52] World Economic Forum (2024), *ESG Monitoring Tools in Foodservice*: real-time sustainability dashboards are used in public tenders and corporate reporting.

increasingly stringent sustainability mandates by tracking key metrics—such as carbon emissions and resource usage—in real time[53].

2.2.4 Cultural Perspectives: Italy vs. California

Beyond technological considerations, the evolution of collective catering systems is deeply influenced by cultural attitudes toward food. In Italy, meals are strongly associated with tradition, social connection, and regional identity. Collective catering—particularly in schools and public institutions—tends to emphasize balanced nutrition, local sourcing, and seasonality, often reflecting the values of the Mediterranean diet. The involvement of families, educators, and public health experts in menu design underscores a community-centered approach, where food is not only sustenance but also a vehicle for cultural continuity and education.

By contrast, in California, food culture is shaped by individualization, innovation, and diversity. Institutional catering prioritizes flexibility and personalization, offering a wide range of options including vegan, gluten-free, and allergen-conscious meals. Consumer demand tends to focus on convenience, transparency, and sustainability, with strong adoption of mobile ordering systems and digital feedback tools. The multicultural fabric of California also influences menu development, often incorporating global flavours and fusion concepts.

These differing cultural frameworks inform how institutions define quality, success, and impact in catering services. While the Italian model is anchored in collective values and nutritional integrity, the Californian approach leverages technological agility and consumer responsiveness. Understanding these cultural nuances is essential for any

[53] IBISWorld (2024), *Catering Technology Case Studies*: real-time monitoring systems in California pilot programs reduced food waste by 15% and energy consumption by 10%.

comparative analysis and helps contextualize the broader transformation of food systems in both regions.

2.3 Regulatory Frameworks and Their Influence on Business Strategy

Regulations play a pivotal role in shaping both the operational and strategic decisions of collective catering enterprises. Global, regional, and national legislative frameworks are designed to ensure food safety, protect consumer health, and promote environmental sustainability. At the same time, these regulations impose compliance costs that affect profit margins and competitive positioning. This section explores key international standards, followed by a detailed analysis of regulatory frameworks in **Italy** and **California**, and concludes with an exploration of the **economic and strategic implications** for businesses operating within these regimes.

2.3.1 Global Regulatory Landscape and ESG Standards

At the international level, a set of foundational regulatory instruments establishes common ground for food safety, transparency, and sustainability across the Food & Beverage sector. While enforcement varies by region, these frameworks serve as critical reference points for national and regional legislation.

The **Codex Alimentarius**, developed by the **Food and Agriculture Organization (FAO)** and the **World Health Organization (WHO)**, [54]sets voluntary but widely adopted standards for food hygiene, labelling, and risk assessment. It supports

[54]WHO (2021) explains that adherence to Codex Alimentarius standards is crucial for harmonizing food safety protocols globally, thereby facilitating smoother international trade and enhancing consumer protection.

international trade and harmonization of safety practices, and many of its provisions are embedded in national laws across Europe, North America, and Asia[1].

In the United States, the **Food Safety Modernization Act (FSMA)** marked a major shift from reactive to preventive food safety. It mandates that companies implement risk-based preventive controls throughout the supply chain—an approach that has influenced global best practices[55].

At the European level, **Regulation (EU) No. 1169/2011** on food information to consumers ensures clear labelling of allergens, ingredients, and nutrition facts. Complementing this, broader policies like the **European Green Deal** and the **Circular Economy Action Plan** promote sustainability in food systems by encouraging waste reduction, resource efficiency, and eco-friendly[56].

2.3.2 Italy's Regulatory Environment

Building on the **international standards** discussed in **Section 1.3.1**, Italy's regulatory approach is built upon EU legislation, but also reflects national priorities in food safety, social responsibility, and circular economy practices.

- **Legge Gadda (Law 283/1962)** promotes the recovery and redistribution of surplus food, helping reduce waste while supporting vulnerable populations.
- **Corporate Sustainability Reporting Directive (CSRD)** is introduced through **Directive (EU) 2022/2464**, it broadens the scope of sustainability reporting to

[55]According to the FDA (2011), the Food Safety Modernization Act's focus on prevention, including enhanced facility registration and risk-based inspections, has set new global standards for food safety management.
[56] The European Commission (2020) highlights that the Circular Economy Action Plan and European Green Deal are designed to reduce waste and improve resource efficiency, pushing companies to adopt sustainable practices that have significant implications for the collective catering sector.

encompass a wider range of companies, applying the **"double materiality[57]"** principle to assess both financial and societal impacts. For collective catering, this entails mandatory reporting on food waste reduction, sustainable supply chain initiatives, and ethical sourcing, thereby fostering greater transparency and corporate responsibility.

- **Law 283/1962** and **Regulation (EC) No. 852/2004** imposes strict hygiene standards across the entire food chain. It requires the implementation of **Hazard Analysis and Critical Control Points (HACCP)**[58] systems to identify and mitigate food safety risks, ensuring that collective catering operations maintain high levels of consumer safety.
- **Decree No. 116/2020** enforces circular economy principles, with mandates sustainable waste management practices, including the use of eco-friendly packaging and food waste minimization[59].

Compliance with these regulations increases operational costs by an estimated 10–15% per meal, but it also enhances transparency, trust, and competitiveness in public procurement[60]. By meeting high standards for food safety and sustainability, catering

[57] **Double materiality** is a central concept under the CSRD that requires companies to evaluate sustainability issues from two perspectives. First, it considers the **financial materiality** of environmental, social, and governance (ESG) factors—how these issues affect the company's financial performance, risks, and opportunities. Second, it assesses the **impact materiality**, which examines the external effects of the company's operations on the environment and society. This dual approach encourages organizations not only to manage risks that might affect their profitability but also to account for the broader societal and environmental consequences of their activities. For further details on double materiality, see European Commission (2022).

[58]Regulation (EC) No 852/2004 on the Hygiene of Foodstuffs establishes mandatory HACCP-based procedures, underscoring risk assessment and preventive controls for all stages of food handling.

[59]Legislative Decree No. 116/2020 aligns with the EU's Circular Economy Action Plan, mandating waste reduction, recycling, and responsible resource usage in line with broader sustainability objectives.

[60] Federazione Italiana Pubblici Esercizi (FIPE, 2023), Rapporto Ristorazione, estimates that operational costs have risen by 10–15% per meal due to enhanced regulatory compliance, but notes corresponding gains in efficiency and consumer confidence.

firms may gain competitive advantages in securing public contracts and enhancing their market reputation.

2.3.3 California's Legislative Framework

California presents one of the most advanced regulatory environments in the United States, combining strict food safety requirements with forward-thinking environmental policies.

- **Senate Bill 1383**[61]—officially known as the **Short-Lived Climate Pollutants Reduction Act**—targets the reduction of organic waste in landfills and mandates robust waste management practices, including composting and recycling. Non-compliance leads to financial penalties and reputational risk.

- The **California Retail Food Code (CalCode)** establishes rigorous standards for food safety, sanitation, and hygiene throughout the state's foodservice sector[62]. Under CalCode, catering firms must maintain detailed documentation of their safety practices and are subject to frequent inspections, ensuring that public health is consistently safeguarded.

- **Proposition 65**, formally the **Safe Drinking Water and Toxic Enforcement Act**, which requires businesses to provide clear warnings about potential exposure to chemicals known to cause cancer or reproductive harm[63].

[61]California State Legislature (2016), Senate Bill 1383: Short-Lived Climate Pollutants Reduction Act, aims to cut organic waste disposal by 75% and recover 20% of edible food currently sent to landfills, thereby mitigating greenhouse gas emissions and promoting food donations.
[62]California Department of Public Health (2020), California Retail Food Code (CalCode), outlines comprehensive requirements for safe handling, storage, and preparation of food, along with inspection protocols to uphold public health.
[63]Office of Environmental Health Hazard Assessment (OEHHA, 2020), Proposition 65, mandates that businesses warn consumers of significant chemical exposures, influencing ingredient choices and menu labelling in collective catering.

- The **California Green Building Standards Code (CALGreen)** further extends sustainability requirements to facilities used by catering companies, mandating energy efficiency, water conservation, and waste reduction measures[64].

- Additionally, **sustainable sourcing** and **Corporate Social Responsibility (CSR)** initiatives are integral to California's policy landscape, encouraging companies to purchase locally grown, organic, and ethically produced ingredients[65]. These practices are often embedded in broader CSR strategies, enhancing brand reputation and meeting the growing consumer demand for eco-friendly and ethically sourced products. As a result, collective catering firms that exceed minimum sustainability benchmarks may secure premium contracts and differentiate themselves in a highly competitive market.

2.3.4 Implications of Regulation

Across jurisdictions, regulatory compliance is increasingly integrated into business strategy—not merely as an obligation, but as a competitive differentiator. Providers that align with sustainability standards and demonstrate transparency in sourcing, waste management, and reporting can access preferential scoring in public tenders, build stronger client trust, and position themselves as ESG leaders.

Technological tools—such as real-time dashboards, AI-driven reporting, and IoT waste monitoring—are no longer optional, but essential for tracking compliance and optimizing

[64]California Building Standards Commission (2020), California Green Building Standards Code (CALGreen), enforces environmental standards in building design, encouraging reduced energy usage, water conservation, and overall waste reduction.

[65]Forbes Partners (n.d.), Food & Beverage Industry Overview, highlights California's leadership in sustainable sourcing, noting that local, organic, and ethically produced ingredients often command higher consumer trust and institutional support.

operations. Though initial implementation costs may be high, these innovations often result in long-term efficiencies, reduced risk exposure, and improved brand reputation. In both Italy and California, regulation is not just a constraint—but a roadmap for future-proofing the collective catering industry.

2.4 Strategic Models for Sustainable and Compliant Growth

In the context of collective catering, developing robust corporate strategies is essential for navigating a complex and dynamic business environment. The following section critically examines three key strategic frameworks—**Resource-Based View (RBV)**, **Triple Bottom Line (TBL)**, and **Creating Shared Value (CSV)**—that offer complementary perspectives on how firms can build competitive advantage while responding to sector-specific challenges. These models provide the theoretical foundation for understanding how companies align strategic goals with economic, environmental, and social imperatives.

While each framework emphasizes value creation and long-term sustainability, they must also be reconciled with cost containment pressures, particularly in publicly funded and highly competitive tendering environments. This tension—between innovation-driven ESG strategies and cost leadership constraints—will be explored in greater depth throughout the chapter.

2.4.1 Resource-Based View (RBV)

The **Resource-Based View (RBV)** is a strategic management framework that emphasizes the importance of an organization's internal resources and capabilities in achieving a

sustainable competitive advantage[66]. According to RBV, resources that are **valuable**, **rare**, **inimitable**, and **non-substitutable** (VRIN criteria) form the basis for enduring success. Within collective catering, such resources might include advanced kitchen technologies, proprietary food safety protocols, or exclusive partnerships with local, organic suppliers. These capabilities not only support compliance with stringent regulations—such as FSMA, CalCode, Regulation (EC) No. 852/2004, or Italy's Legge Gadda—but also help firms stand out in a market defined by cost pressures and rising sustainability expectations.[67].

Scholars such as **Teece et al. (1997)** and **Peteraf (1993)** have underscored that the difficulty of replicating these unique resources is a key determinant of long-term performance. In collective catering, this difficulty may arise from intangible knowledge, technological barriers, or long-standing supplier networks. By cultivating specialized capabilities—for instance, AI-driven menu optimization or innovative waste reduction systems—companies can navigate the cross-cutting challenges of inflation, labour shortages, and sustainability mandates more effectively.

2.4.2 Triple Bottom Line (TBL)

Building on the **Resource-Based View** discussed in Section 1.4.1, the **Triple Bottom Line (TBL)** framework, as introduced by **Elkington (1997)**, broadens the traditional

[66] Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. Journal of Management, 17(1), 99–120.Barney introduces the VRIN criteria (valuable, rare, inimitable, non-substitutable) as the foundation for resource-based competitive advantage.

[67] Deloitte, Foodservice Market Monitor (2024), highlights that proprietary technology and specialized supplier relationships can lower operational costs and improve compliance, thereby differentiating catering providers in public tenders.

focus on financial performance to include environmental and social dimensions[68].This holistic approach compels companies to evaluate success across three pillars: economic viability, environmental sustainability, and social responsibility. An illustrative example is the investment in sustainable sourcing and waste reduction technologies, which can yield operational efficiencies and enhance public perception, ultimately generating value beyond mere profit[69]. Such an integrated performance measurement aligns with rising consumer expectations for transparency and socially responsible business models, particularly in publicly funded settings such as schools and healthcare facilities. TBL also aligns with rising expectations from public clients—especially in school, healthcare, and institutional settings—that demand ethical and transparent service provision. Companies embracing TBL principles are better positioned to comply with sustainability regulations and to meet the increasing scrutiny from stakeholders seeking more than just cost efficiency.

2.4.3 Creating Shared Value (CSV)

Creating Shared Value (CSV), as conceptualized by **Porter** and **Kramer (2011)**, represents a paradigm shift from traditional Corporate Social Responsibility (CSR) by framing business success and social progress as mutually reinforcing[70]. Rather than treating ethical initiatives as peripheral to profitability, CSV encourages companies to integrate societal needs into their core strategies, thereby generating economic value

[68] Elkington, J. (1997). Cannibals with Forks: The Triple Bottom Line of 21st Century Business. Capstone. Elkington's work conceptualizes TBL as a tri-dimensional measure of corporate performance, encompassing economic, social, and environmental metrics.

[69] Savitz, A. W., & Weber, K. (2006). The Triple Bottom Line: How Today's Best-Run Companies Are Achieving Economic, Social, and Environmental Success. Jossey-Bass. According to Savitz & Weber, companies integrating TBL principles often observe long-term benefits in operational efficiency, brand reputation, and stakeholder engagement.

[70] Porter, M. E., & Kramer, M. R. (2011). Creating Shared Value. Harvard Business Review, 89(1-2), 62–77.Porter and Kramer argue that aligning business strategy with societal goals can simultaneously drive economic growth and address social issues, positioning CSV as a more integrated approach than conventional CSR.

while addressing environmental and community concerns. In the context of collective catering, this approach can manifest through local procurement from agricultural cooperatives, ensuring the supply of fresh, locally sourced ingredients that reduce environmental impact and support community development[71].

Moreover, CSV principles guide firms to develop tailored meal programs for diverse dietary requirements thereby enhancing public health outcomes and opening new market opportunities in sectors like healthcare and education. This model demonstrates that when companies proactively address social and environmental challenges as part of their strategic agenda, they can unlock shared value for both shareholders and society[72]. CSV-aligned strategies also help companies align with regulatory demands such as local sourcing mandates, food recovery goals, and nutritional transparency.

2.4.4 The Role of Cost Leadership in Public Sector Catering

Among the most widely recognized strategic approaches in management theory, **cost leadership**, originally conceptualized by Porter (1985)[73], refers to a firm's ability to offer goods or services at lower prices than competitors by minimizing production and operational costs. In essence, this strategy focuses on achieving efficiency and scale to gain a competitive edge, particularly in price-sensitive markets.

In the context of public sector collective catering, cost leadership plays an especially significant role. Public procurement procedures often prioritize the most economically

[71]Economic Times Hospitality (2024) highlights that collective catering firms adopting local procurement strategies not only reduce their carbon footprint but also gain community support, thereby enhancing brand reputation.
[72]Grand View Research (n.d.) notes that catering companies embracing CSV in meal design and sourcing often secure long-term contracts with institutions prioritizing social impact and environmental responsibility.
[73] Michael E. Porter, *Competitive Advantage: Creating and Sustaining Superior Performance* (New York: Free Press, 1985).

advantageous tender, which places strong emphasis on cost containment. For catering providers operating in schools, hospitals, and correctional facilities, this means being able to deliver nutritionally adequate meals within very strict budgetary constraints. In such environments, cost-efficient service organization becomes a prerequisite not only for winning contracts but also for ensuring long-term operational sustainability.

Nonetheless, this thesis does not explore cost leadership in detail, for two main reasons. First, it is a well-established concept in both academic literature and industry practice. Second, the primary focus of this research lies elsewhere—namely, in examining how sustainability, innovation, and regulatory compliance are shaping the future of collective catering. These dimensions represent emerging strategic priorities that extend beyond mere cost efficiency and are increasingly central to how organizations differentiate themselves in both public and private markets.

That said, a basic understanding of cost leadership remains important, especially for interpreting the economic dynamics of public tenders and the strategic decisions of market players. For this reason, the topic will be briefly revisited during the oral defense of this dissertation.

2.4.5 Strategic Responses to to Compliance

While each model offers unique insights, their integration provides a powerful framework for strategic action. By leveraging unique internal resources (RBV), balancing economic, environmental, and social objectives (TBL), and embedding societal impact in core strategies (CSV), companies can address cross-cutting challenges ranging from food safety mandates to public health obligations.

This integrated perspective is especially relevant in a context shaped by legislation such as the CSRD, Legge Gadda, Senate Bill 1383, and the California Retail Food Code, all of which demand high standards of traceability, waste reduction, and transparency[74]. As the following chapters will demonstrate, many firms combine these frameworks in practice, using technology, partnerships, and sustainability metrics to align strategy with performance.

In parallel, another critical factor influencing strategic decision-making in collective catering is the need to maintain cost competitiveness—particularly in publicly funded environments where pricing remains a dominant selection criterion. While RBV, TBL, and CSV emphasize value creation and differentiation, their implementation often entails significant investment in technology, training, and compliance. For this reason, the tension between sustainability-oriented innovation and cost leadership strategies must be acknowledged.

Firms—especially cooperatives—must find ways to align ESG objectives with cost efficiency, leveraging low-cost solutions such as portion control, local procurement, or waste prevention programs. Conversely, multinational firms increasingly adopt hybrid models, using ESG credentials not only for compliance but also to justify premium pricing or unlock performance-based contracts. Understanding this strategic trade-off between value-driven and cost-driven logic is essential to interpreting how ESG is integrated into real-world business models.

[74]Federazione Italiana Pubblici Esercizi (FIPE, 2023) underscores that integrating advanced digital systems for compliance can reduce operational costs and bolster public trust, especially under mandates like the CSRD and Senate Bill 1383.

2.4.6 Strategic Agility and Business Model Innovation

Building on the foundations established by RBV, TBL, and CSV, **strategic agility** and innovation emerge as critical enablers of long-term competitiveness in the collective catering sector[75]. Strategic agility refers to an organization's capacity to sense emerging trends, rapidly respond to external shifts, and reconfigure internal processes to sustain a competitive advantage[76]. In collective catering, agility is manifested through the swift integration of flexible production models, such as cloud kitchens, or the adjustment of menus based on real-time dietary analytics. Firms capable of rapidly pivoting operations—without compromising on quality or compliance—are more likely to sustain competitive advantage in volatile contexts (Teece et al., 2016). Innovation complements agility by enabling the transformation of constraints into growth opportunities. Firms that invest in AI-based menu forecasting, IoT-enabled safety monitoring, and automated procurement systems not only improve operational efficiency but also align with regulatory expectations around food safety, sustainability, and traceability.

Together, agility and innovation serve as strategic levers that bridge theory and practice—connecting the capability focus of RBV, the performance balance of TBL, and the societal integration of CSV. In doing so, they position collective catering companies not merely as service providers, but as proactive agents of transformation within evolving food systems. At the same time, firms must ensure that agile and innovative solutions remain cost-effective, especially in procurement-driven markets. Strategic agility is most

[75] Deloitte, Foodservice Market Monitor (2024) indicates that collective catering firms increasingly leverage AI and IoT solutions to adapt swiftly to changes in consumer dietary needs and regulatory shifts.
[76] Doz, Y. L., & Kosonen, M. (2010). Embedding Strategic Agility: A Leadership Agenda for Accelerating Business Model Renewal. Long Range Planning, 43(2–3), 370–382. The authors define strategic agility as the organizational capability to rapidly sense and seize new opportunities in a shifting environment.

impactful when it allows companies to reconcile ESG commitments with the operational demands of cost leadership, ensuring that sustainability does not become a financial burden but a source of scalable efficiency**.**

Conclusions of Chapter 2

This chapter has provided a comprehensive overview of the strategic and regulatory landscape shaping the collective catering industry, with a particular focus on the intersection between theoretical models and sector-specific challenges.

First, it examined the structural characteristics, economic significance, and innovation trajectories of collective catering in both Italy and California. The analysis highlighted key regulatory frameworks—such as the CSRD, SB1383, and EU food hygiene regulations—that are redefining performance expectations across the industry. These frameworks have not only increased operational complexity but also created new incentives for differentiation based on sustainability, safety, and transparency.

To interpret how companies respond to these conditions, three strategic models were introduced:

- the **Resource-Based View (RBV)**, which emphasizes unique internal capabilities as the basis of competitive advantage,
- the **Triple Bottom Line (TBL)**, which expands strategic evaluation to include environmental and social performance, and
- **Creating Shared Value (CSV)**, which integrates social impact into the core business logic.

These models were then contextualized through the concepts of strategic agility and innovation, which enable firms to navigate regulatory volatility and align business goals with evolving consumer expectations and institutional demands. Furthermore, while the focus of this chapter has been on sustainability-oriented strategies and innovation frameworks, it also briefly introduced the concept of cost leadership as a traditional yet still highly relevant competitive approach—particularly within the public catering sector. In contexts where price remains a dominant selection criterion in public tenders, cost efficiency continues to be a decisive factor in market access and operational survival. Although this thesis does not explore cost leadership in detail, acknowledging its role is essential for a complete understanding of strategic positioning in highly regulated and price-sensitive environments.

Taken together, these theoretical perspectives offer a robust conceptual foundation for analyzing how catering firms operate and compete in dynamic environments. The following chapters will apply this framework to compare strategic practices and market positioning across different regulatory and cultural contexts, offering deeper insight into how companies transform constraints into opportunities for sustainable growth.

Chapter 3 – Methodology

This chapter outlines the methodological approach used to investigate how companies in the collective catering sector integrate sustainability and digital innovation within distinct regulatory frameworks—specifically, in Italy and California. The design is informed by the conceptual foundations introduced in Chapter 1, including the Triple Bottom Line (TBL), Resource-Based View (RBV), and Creating Shared Value (CSV). These frameworks guided the selection of performance indicators, enabling a multidimensional exploration of strategic adaptation under environmental, social, and economic pressures.

Given the complexity of the research topic, a **mixed-methods approach** was adopted, combining the robustness of KPI-based analysis with the interpretive depth of qualitative inquiry. This design enables structured cross-case comparisons while capturing contextual and strategic dynamics, especially relevant in a sector undergoing rapid transformation driven by digitalization and ESG imperatives.

3.1 Mixed-Methods Strategy

The choice of a mixed-methods strategy[77] reflects both the epistemological demands of the research question and the practical need to triangulate diverse sources of evidence. On the one hand, **quantitative data**—in the form of environmental, financial, and operational KPIs—allow for the benchmarking of organizational performance over time and across firms. On the other hand, **qualitative data**—collected through structured interviews and the analysis of institutional and corporate documents—offer critical

[77] Johnson, R. B., & Onwuegbuzie, A. J. (2004). *Mixed Methods Research: A Research Paradigm Whose Time Has Come*. *Educational Researcher*, 33(7), 14–26.

insights into the strategic rationales, cultural dynamics, and governance mechanisms that underpin observed outcomes.

This integrated methodology enhances the internal validity of the research by enabling a cross-verification of findings (methodological triangulation) and aligns with the theoretical logic of the RBV and CSV frameworks, both of which necessitate a dual focus on resource deployment and value generation. Moreover, the approach supports a **comparative analysis** between European and North American regulatory systems, enabling a more comprehensive evaluation of how context-specific drivers influence the adoption of sustainable and technological practices in the catering industry.

3.1.1 Data Collection Design and Sources

Data collection was structured across three main streams:

1. **Corporate documentation** sustainability and ESG reports, CDP responses, and financial statements published between 2021 and 2023 were systematically reviewed. These documents offered access to comparable KPIs on environmental impact, digitalization, and compliance.
2. **Semi-structured interviews** with representatives from both companies and institutional bodies to enrich the analysis with qualitative insights. Interviews were conducted via video call or in person, transcribed, and used to clarify organizational priorities, strategies, and constraints that may not be evident in formal reporting.
3. **Qualitative extraction of innovation initiatives**, often embedded within narrative reporting formats and not readily quantifiable via standard indicators.

This three-tiered strategy allowed for both vertical depth (within each company) and horizontal comparison (across cases), thereby enhancing the interpretive richness of the empirical material.[78]

3.1.2 Case Study Selection Criteria

The case study design adopts a theoretical sampling approach, selecting four leading companies—Aramark, Sodexo, CAMST Group, and CIRFOOD—that operate within the collective catering sector but differ in scale, ownership structure, and geographic scope.

The selection is guided by six criteria:

1. **Market Relevance**: All firms hold significant positions in institutional foodservice—CAMST Group and CIRFOOD in Italy, and Sodexo and Aramark in North America—ensuring strategic exposure to sectoral pressures.
2. **ESG Commitment**: Each company demonstrates formal engagement with sustainability goals, supported by structured ESG agendas and public KPI disclosure aligned with European or global standards.
3. **Technological Adoption**: All four implement advanced digital tools (e.g., IoT for waste tracking, AI for resource planning), making them relevant subjects for exploring innovation through the Resource-Based View (RBV).
4. **Contextual Diversity**: The juxtaposition of European cooperative models (CAMST Group and CIRFOOD) with global corporations (Aramark and Sodexo)

[78] According to Creswell and Plano Clark (2017), mixed-methods designs are especially useful in organizational and policy studies where both measurable outcomes and human perceptions must be understood.

facilitates a dual analysis of regulatory environments—CSRD in the EU and SB 1383 in California—and consumer expectations shaped by local culture.

5. **Organizational Scale**: The inclusion of both regionally embedded cooperatives and multinational corporations enables reflection on how market scope affects ESG implementation and innovation strategies.
6. **Data Accessibility**: All companies provide detailed, publicly available reports across the 2021–2023 period, enabling longitudinal KPI tracking. This was further complemented by expert interviews and institutional perspectives.

This case selection ensures sectoral comparability while capturing strategic and contextual variation, which is critical for the mixed-methods design underpinning this research.

The **2021–2023-time frame** was selected intentionally to capture the strategic adaptation of companies both before and after the entry into force of key regulatory frameworks—specifically, California's Senate Bill 1383 (enacted in January 2022) and the European Union's Corporate Sustainability Reporting Directive (formally adopted in late 2022, with implementation from 2024). This window allows for a longitudinal analysis of how firms progressively align their sustainability and innovation strategies in response to increasing regulatory pressure and evolving ESG expectations

3.2 Stakeholder Perspectives through Interviews

This section integrates qualitative insights into the quantitative framework by drawing on interviews with innovation experts, and institutional stakeholders. Rather than undertaking an exhaustive thematic coding exercise, the purpose here is to leverage direct

stakeholder narratives to contextualize and enrich the analysis of sustainability and digital innovation strategies across the selected case study companies. This approach is consistent with the corporate strategy methodology, which emphasizes triangulation, stakeholder mapping, and the identification of strategic responses to external pressures such as regulation, cultural expectations, and market dynamics.

3.2.1 Role of Interviews in Strategic Interpretation

In line with the conceptual foundation presented in Chapter 1, interviews were designed to serve as an interpretive complement to the quantitative data.

Participants were selected across two axes:

- **Experts in sustainability and innovation** (e.g., Future Food Institute), to offer cross-sectoral and cross-national perspectives.
- **Institutional stakeholders** (e.g., ICE, Italy-America Chambers of Commerce), to provide insights on regulatory contexts and internationalization processes.

Interviews were conducted in person or via videoconference and lasted approximately 45–60 minutes. The contents were transcribed and used as a qualitative lens to interpret and complement corporate reports and KPI data.

3.2.2 Corporate and Innovation Expert Interviews

Insight was provided by **Sandhya Sriram**, chef, food designer, and research lead at the **Future Food Institute (FFI)**. FFI is based in Italy but maintains operational and research collaborations in various part of the world, also in San Francisco, giving this interview a

cross-national dimension. Sandhya emphasized FFI's work in promoting circular economy practices and digital experimentation in food innovation, including initiatives such as the Food Alchemist Lab and sustainable culinary education models.

This discussion highlighted how technological innovation is being embedded in strategic frameworks that combine environmental, educational, and operational goals — often blending local adaptation with global learning networks.

3.2.3 Institutional Interviews

To complement the company-specific interviews, additional conversations were conducted with key institutional actors — including representatives from the **Italian Trade Agency (ICE)** and the **Italy-America Chambers of Commerce** in Los Angeles and New York. These interviews did not aim to analyze individual firms but rather to provide a broader overview of the Food & Beverage sector in the United States, highlighting regional differences and how Italian companies navigate internationalization processes.

The institutional insights proved valuable in clarifying how organizational typologies and strategic approaches differ across contexts — particularly between Italy and the U.S., and within the U.S., between the East and West Coasts.

- **Giosafat Riganò**, Director of ICE Los Angeles, discussed the logistical, regulatory, and cultural barriers that small and medium-sized Italian enterprises face when entering the West Coast market, while also emphasizing innovation as a key competitive asset.

- **Genny Nevoso**, Executive Director of the Italy-America Chamber of Commerce in Los Angeles, explained the strategic relevance of certifications, sector-specific events, and local partnerships for gaining credibility in a Californian business environment that prioritizes sustainability and digital transformation.
- **Raimondo Lucariello and Mirella Menglide,** Head of Food & Wine Sector and the Senior Trade Analyst of Food & Wine Sector at ICE New York, provided a more traditional perspective on the East Coast, noting the emphasis on long-established trade relations and a preference for product quality and traceability over purely digital innovation.

These contributions proved essential in understanding how firm size, ownership structure, and strategic orientation vary significantly between the two geographical and institutional frameworks. Whereas the U.S. market is largely populated by multinational corporations and digitally mature operators, the Italian context remains characterized by cooperatives and family-run enterprises with a more incremental approach to innovation.

3.3 Data Analysis Framework

This section presents the methodological structure adopted to analyse the interaction between sustainability, digital innovation, and regulatory adaptation in the collective catering sector.

3.3.1 Quantitative Component

While the complete dataset includes 184 KPIs collected across all four companies and three years, a more focused subset of **approximately 70 indicators** was used for the core

strategic analysis across four case-study companies. These KPIs were extracted from publicly available corporate reports, including sustainability disclosures, integrated reports, CDP Climate Responses, and financial statements from 2021 to 2023. They were grouped into five thematic clusters:

1. **Human Capital & Training** (e.g., digital skills, training hours, gender diversity);
2. **Strategic and Economic Impact** (e.g., revenue growth, ESG-linked investments**);**
3. **Emerging Technologies** (e.g., implementation of AI, IoT, blockchain);
4. **Environmental Sustainability** (e.g., CO_2 emissions, waste reduction, renewable energy usage);
5. **Regulatory Compliance and Digital Governance** (e.g., ESG-linked bonuses, ISO certifications, digital audits);

The dataset was structured in a horizontal Excel matrix, allowing for both longitudinal analysis (trends within each company) and cross-sectional comparisons (between companies within a given year). Absolute data was prioritized over percentages wherever available, to ensure consistent benchmarking across entities and years.

3.3.2 Qualitative Component

In parallel with the KPI framework, the research included a qualitative review of each company's strategic documents and sustainability reports, with the goal of mapping innovation programs, digital initiatives, and ESG integration strategies that are often presented in narrative form rather than as quantifiable indicators.

The outputs of this qualitative analysis were organized into thematic matrices and visual summary tables (Appendix, Table 1), which consolidate:

- Project names and technologies involved (e.g., WasteWatch, PowerChef, CoolFood, AI-driven analytics);
- The scope and scale of implementation;
- The strategic framing of innovation (reactive, compliance-driven, or proactive integration).

Where relevant, this documentation was supplemented by interview insights and institutional perspectives to triangulate findings and clarify context-specific dynamics.

3.3.3 Triangulation through Interviews

The role of interviews in this study is not primarily empirical but interpretative. Interviews were conducted with company representatives, innovation experts, and institutional actors, as outlined in Section 2.3. Their main purpose was to support the interpretation of trends already emerging from the KPI analysis and project reviews.

Instead of coding and quantifying responses, selected excerpts and examples were incorporated as contextual illustrations, validating or problematizing the patterns observed in the quantitative dataset. This usage reflects a logic of **theoretical triangulation**[79], enhancing the explanatory depth of the analysis without altering its empirical core.

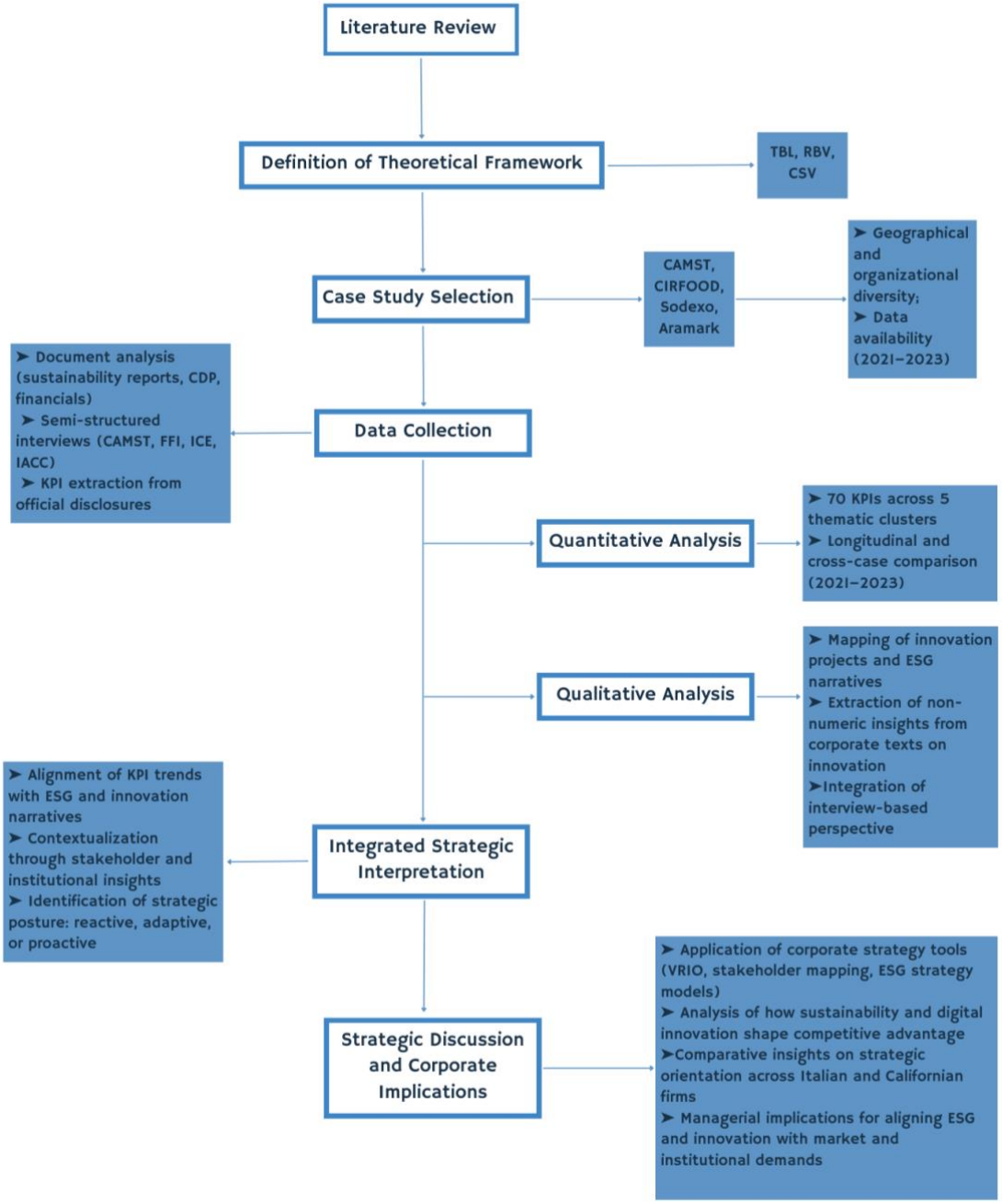
[79] The triangulation of data from multiple sources enhances the validity and reliability of findings, particularly in sustainability and innovation research.

3.3.4 Strategic Tools for Interpretation and Corporate Alignment

The analytical framework employed in this study is aligned with several key analytical instruments from the field of Corporate Strategy. Specifically, the KPI structure supports the application of **VRIO analysis**, identifying whether digital and sustainability-related resources are valuable, rare, inimitable, and organizationally embedded. Moreover, cross-company comparison allows the identification of **adaptive** vs**. proactive ESG strategies**, a typology relevant for assessing strategic posture and competitive alignment. The mapping of innovation projects reveals patterns of stakeholder engagement, investment prioritization, and digital capacity building, consistent with long-term strategic repositioning. Additionally, the integration with financial data enables an exploration of potential correlations between technological innovation and profitability, aligning operational sustainability with business model evolution.

This multifaceted analytical design supports the research's broader ambition to connect strategic decisions and regulatory contexts with measurable innovation outcomes, offering a framework that is both academically rigorous and practically applicable to firms operating in highly regulated and rapidly evolving industries. The methodological process underpinning this approach is synthesized in *Table 3.1 Methodological Framework*, which offers a visual representation of the key stages of the research design and their interconnections.

Table 3.1 Methodological Framework



Conclusion of Chapter 3

While the mixed methods approach significantly enhances the reliability and interpretability of the findings, several limitations must be acknowledged. First, the study covers a **limited sample of four companies**, which, although diverse in typology and geography, cannot fully capture the entire spectrum of practices within the collective catering sector.

Second, **differences in data granularity and transparency** across companies limited the scope of direct comparisons, particularly in financial metrics and innovation spending. This was partially mitigated through triangulation with interviews and third-party assessments.

From an ethical standpoint, all interviews were conducted in compliance with academic research standards, including informed consent and confidentiality protections. No sensitive information was disclosed, and all participants were given the opportunity to review excerpts prior to inclusion in the final report.

Despite these limitations, the empirical and conceptual contributions offered in this chapter set the stage for a cross-case strategic analysis, further explored in the following chapters.

Chapter 4 – Analysis and Case Studies

This chapter presents the empirical core of the thesis: a comparative analysis of four institutional catering firms—CAMST Group, CIRFOOD, Sodexo, and Aramark—focusing on their strategic responses to sustainability, digital innovation, and regulatory compliance. Building on the theoretical frameworks and methodological design developed in previous chapters, the analysis highlights how firms adapt their business models to different institutional and cultural environments, particularly in Italy and California.

The chapter is structured around key thematic areas: integration of ESG principles, digital and operational efficiency, innovation models, regulatory adaptation, and strategic positioning. Insights are drawn from sustainability reports, ESG indicators, and qualitative interviews, offering a comprehensive understanding of how each company navigates current transformation drivers in the sector.

4.1 Analytical Framework

The selection of the four case studies reflects a deliberate contrast in ownership models, market scope, and regulatory exposure. CAMST Group and CIRFOOD operate as Italian cooperatives primarily serving public institutions, while Sodexo and Aramark are global corporations with strong presences in the U.S. market and high exposure to performance-based regulation such as California's SB 1383.

The comparative analysis focuses on the 2021–2023 period and is guided by four analytical dimensions:

1. the strategic depth of ESG integration;
2. the role of digital tools in driving efficiency and compliance;
3. the engagement with external innovation ecosystems;
4. the ability to adapt business models to different regulatory frameworks.

Throughout the chapter, ESG (Environmental, Social, and Governance) serves as a unifying analytical thread. Rather than treating ESG merely as a reporting framework, the analysis adopts a multidimensional view: ESG principles are explored as operational practices (e.g., waste reduction, energy monitoring), strategic drivers (e.g., compliance and competitive positioning), and innovation platforms (e.g., data infrastructure and startup ecosystems). This integrated perspective allows for a deeper comparison of how ESG is embedded—or not—into each firm's organizational architecture and decision-making logic.

4.2 Strategic Models and Sustainability Orientations

Sustainability is interpreted and operationalized differently across the four cases, reflecting variations in business models, governance structures, and market pressures. These differences concern not only the depth of ESG integration but also whether sustainability is treated as a regulatory requirement, a reputational asset, or a competitive driver.

CAMST Group and CIRFOOD adopt a stakeholder-oriented approach consistent with their cooperative identity. Sustainability is framed around social inclusion, community welfare, and workforce wellbeing. ESG tools are primarily used for reporting purposes

and to meet public procurement criteria or third-party certifications. Innovation, while present, tends to be gradual and compliance-driven rather than market-led.

In contrast, Sodexo and Aramark operate in more dynamic and performance-oriented environments, particularly in California, where regulation is outcome-based and investor scrutiny is high. For these firms, sustainability is embedded into value propositions, pricing models, contractual obligations, and digital infrastructure. ESG metrics serve not only compliance but also client differentiation and strategic growth.

The analytical framework draws on two key theoretical models: the Resource-Based View (RBV), to assess how internal resources—technological, organizational, relational—contribute to sustainable competitive advantage; and the Creating Shared Value (CSV) paradigm, to understand how firms align economic objectives with social and environmental impact.

A cross-cutting interpretive lens is the distinction between **reactive strategies**, centered on procedural compliance and institutional legitimacy, and **proactive strategies**, which anticipate regulatory shifts, attract investment, and embed ESG performance into commercial and operational dynamics.

4.3 Trends in Food Waste Reduction

Food waste reduction and operational efficiency have emerged as strategic priorities across all four companies analyzed. While their overall goals align, the implementation models differ substantially—especially in terms of digital maturity, data integration, and the strategic framing of waste as both a cost and ESG factor. All companies have

introduced structured programs to reduce food waste, but with different levels of technological intensity and organizational integration.

CAMST Group has developed the *Ciò che Resta* program, using LeanPath sensors and Power BI[80] dashboards to track waste at the site level. Data is collected manually and mainly supports internal benchmarking and tender performance. However, its strategic use remains limited, with weak links to broader commercial or pricing strategies.

CIRFOOD applies sensor-based monitoring systems complemented by computer vision technology in school cafeterias. These tools generate localized data that feeds into its ESG cockpit but are primarily used to influence behavioral interventions and menu planning, not as part of a centralized analytics system.

Sodexo, through its *WasteWatch* platform[81] integrates IoT sensors and a global data lake managed by its Digital Factory to track food waste in real time. As detailed in section 4.7.1, this system feeds into tools like CarbonCloud[82] for carbon footprint tracking and supports both internal ESG KPIs and contractual performance obligations. WasteWatch is considered a VRIN resource due to its strategic integration and impact on cost efficiency and compliance.

Aramark uses *FoodWISE*[83], a platform co-developed with academic partners and linked to *Hospitality IQ*, to generate predictive waste insights and ensure compliance with California's SB 1383These tools transform waste data into a contractual and strategic asset.

[80] *Power BI* is a business analytics tool developed by Microsoft, often used in the foodservice sector to visualize performance data and support decision-making processes.
[81] *WasteWatch* is a digital platform developed by Sodexo that uses IoT sensors to monitor food waste in real time. It enables automatic data collection and ESG reporting, supporting operational optimization and sustainability goals.
[82] *CarbonCloud* is a software platform that enables real-time carbon footprint analysis of food products, helping companies make informed decisions about sustainable sourcing and menu planning.
[83] *FoodWISE* is Aramark's integrated platform for tracking consumption, reducing food waste, and generating ESG performance metrics. It is developed in collaboration with universities and technology partners.

Ultimately, the difference lies not just in the technologies adopted, but in how each company uses data as a value-generating asset. Italian cooperatives focus on documentation and internal improvements, while U.S.-based firms integrate waste metrics into pricing, performance management, and client relationships.

This strategic use of waste data increasingly aligns with digital planning systems, explored in the next section.

4.3.1 Digitization and Predictive Efficiency Management

Operational efficiency is increasingly supported by digital transformation strategies that enable predictive planning, resource optimization, and performance transparency.

- **CAMST Group** uses *MyCAMST Group 2.0*, a digital platform for pre-ordering and payments in school canteens. However, its infrastructure remains fragmented, with limited ERP integration and predictive functionality. As a result, insights are not easily scaled across units.
- **CIRFOOD** experiments with smart meters and predictive maintenance tools such as Jarvis, as introduced in section 4.4.1,within its innovation campus, the *CIRFOOD District*[84].These initiatives offer promising results but remain largely pilot-based and disconnected from enterprise-wide governance.
- **Sodexo** employs the *Everyday App* [85] to collect real-time consumption data, which feeds into forecasting algorithms for menu planning and procurement. These tools, discussed more fully in section 4.7, feed into its digital ESG ecosystem, supporting daily decision-making and contractual alignment.

[84] *CIRFOOD District* is an innovation hub launched by CIRFOOD. It includes experimental labs, educational canteens, and pilot projects focused on sustainability, digitalization, and foodservice technologies.
[85] *Everyday App* is a digital application by Sodexo that tracks consumer food choices in real time. It feeds predictive models for menu planning and procurement optimization.

- **Aramark's** *Hospitality IQ* platform supports dynamic labor scheduling and nutrition personalization while aligning ESG goals with cost efficiency and client engagement. As analyzed in section 4.7.2, this platform integrates predictive modeling and real-time compliance capabilities.

The contrast in technological maturity underscores a broader strategic divide. In the U.S., ESG-linked technologies are embedded into the firms' digital backbone, enabling regulatory agility, cost control, and enhanced client value propositions. In Italy, fragmented systems and pilot-heavy approaches limit the ability to scale innovation and realize efficiency gains.

This divergence illustrates how the integration of predictive digital tools can evolve from operational support into a core component of competitive strategy—when aligned with governance, compliance, and market expectations.

4.4 The Role of Startups in Driving Innovation

Startups have emerged as critical actors in advancing sustainability-driven innovation within institutional catering. They provide the technological agility, niche specialization, and flexibility to experiment that many incumbent organizations often lack. Across the four case studies, firms exhibit varying degrees of integration with startups, reflecting distinct governance structures, openness to external partnerships, and degrees of strategic alignment.

4.4.1 Models of Engagement and Ecosystem Integration

- **CAMST Group** maintains a primarily internal innovation model. While the company has explored sustainability and digitalization through proprietary initiatives (e.g.,

LeanPath implementation), it has not yet developed a formal structure to engage with the startup ecosystem. As a result, its innovation tends to focus on operational refinement rather than transformative collaborations, limiting exposure to emerging solutions in areas such as digital traceability or circular logistics.

- **CIRFOOD** has taken more proactive steps through its *CIRFOOD District*, an innovation campus designed to foster cross-sectoral collaboration. The District has supported pilot projects with startups such as *Hector* (AI-based allergen detection) and *Jarvis* (predictive maintenance). While these collaborations demonstrate openness, their impact remains localized and project-based, with limited system-wide scaling or strategic integration into core operations. The CIRFOOD District acts as a **strategic VRIN resource**. It enables **valuable** cross-sector innovation, is **rare** in Italy's cooperative sector, and its embeddedness within CIRFOOD's structure makes it **difficult to replicate**, thus supporting long-term competitive advantage.
- **Sodexo** demonstrates a mature and modular open innovation strategy. Through structured accelerators and API-compatible infrastructures, it integrates startup solutions such as *Replate*[86] (food surplus redistribution), *CarbonCloud* (carbon footprint tracking), and *Nudge* (behavioral change platforms) into its global operations. These startups are not peripheral but embedded within Sodexo's ESG architecture and client offerings, enhancing both regulatory compliance and service personalization.
- **Aramark** similarly incorporates external innovations into its core platforms *FoodWISE* and *Hospitality IQ*. Partnerships with organizations like *ReFED* and

[86] *Replate* is a U.S.-based non-profit organization that partners with foodservice companies to redistribute surplus food to local communities, contributing to waste reduction and social impact goals.

Menus of Change University Research Collaborative (MCURC) provide access to data models, benchmarks, and prototype testing. These collaborations feed directly into strategic metrics and client-facing solutions, reinforcing Aramark's capacity to adapt quickly to both market and policy signals.

4.4.2 Innovation Governance and Scalability

The capacity to convert external innovation into scalable value creation depends not only on technical integration but also on organizational design.

- **Sodexo and Aramark** have dedicated innovation units with independent budgets, KPIs aligned with ESG performance, and direct access to decision-making structures. This enables them to test, scale, and monetize startup collaborations efficiently.
- **CAMST Group** and **CIRFOOD**, by contrast, embed innovation within broader CSR or strategic planning departments. While aligned with social missions, these structures often lack the agility and autonomy needed to pilot and integrate external technologies at speed.

4.4.3 Strategic Value and Competitive Implications

For Sodexo and Aramark, startups function as strategic amplifiers—enhancing data capabilities, regulatory responsiveness, and client differentiation. Their ecosystem approach positions innovation as a core competency and a source of resilience.

For CAMST Group and CIRFOOD, innovation remains more incremental and institutionally anchored. While this reinforces social legitimacy and internal coherence, it may limit competitiveness in rapidly evolving environments, particularly where digital

integration and ESG monetization are becoming market expectations. A systemic approach to startup integration is increasingly vital for achieving measurable ESG performance. U.S.-based firms collaborate with ventures such as Divert Inc., Apeel Sciences, and Afresh, leveraging their specialized capabilities to reduce waste, track carbon, and optimize logistics. These relationships not only generate environmental impact but deliver traceable metrics essential for public contracting and investor relations.

In Italy, startup collaborations tend to be community-centric, exemplified by Regusto, Agreenet, and ReCup. These initiatives provide social value and policy alignment but are often limited by institutional fragmentation, financial constraints, and insufficient data integration.

Crucially, the insights provided by the Future Food Institute (FFI) underscore that innovation ecosystems require more than procurement mechanisms. FFI exemplifies a hybrid innovation model—merging education, entrepreneurship, and policy experimentation—to enable transformative change in food systems. According to Sandhya Sriram, technologies such as fermentation, upcycling, and regenerative packaging will scale only if supported by:

- Consumer education and trust-building;
- Participatory co-design methodologies;
- Cultural reconfiguration around food and sustainability narratives.

FFI's model embodies the principles of strategic agility and Creating Shared Value (CSV), fostering organizational adaptability in the face of evolving ESG imperatives and societal expectations. It bridges the gap between experimentation and systemic change,

offering a replicable blueprint for institutions seeking to align competitiveness with public value.

Consequently, the role of startups and innovation intermediaries should evolve from peripheral to central. Firms must cultivate absorptive capacity—developing internal mechanisms, relational networks, and governance flexibility that allow them to identify, integrate, and co-develop with external innovators. The future of sustainable institutional catering lies in embedding this ecosystem logic within both strategic intent and operational execution. The differentiated engagement with startups reinforces the broader divergence between Italian and Californian innovation ecosystems, which is explored in the comparative analysis below.

4.4.4 Visual Summary of Startup Engagement Models

To synthesize the comparative findings of section 4.4, the following tables summarize the strategic engagement of the four case study companies with external startups. The framework captures their respective innovation models, concrete examples of collaboration, and the degree to which startups act as enablers of ESG integration and competitive repositioning. Table 4.1 and Table 4.2 also highlight the governance structures and systemic constraints that differentiate incremental, socially anchored innovation from modular, performance-driven ecosystems. In doing so, the comparison reveals not only organizational differences but also the broader strategic logics underpinning startup engagement in Italian cooperative firms versus U.S.-based multinationals. This visual synthesis supports the broader argument that startup engagement is not merely a function of corporate openness, but is shaped by institutional architectures, investment logics, and cultural attitudes toward innovation.

Table 4.1 Startup Engagement Models in Italian Cooperatives

	Camst Group	**CIRFOOD**
Innovation model	Internally driven, lacking a formal startup engagement structure	Partial openness through the CIRFOOD District, with an experimental focusPartial openness through the CIRFOOD District, with an experimental focus
Startup involvement	Limited to operational tools like LeanPath for food waste tracking	Hector (AI-based allergen detection), Jarvis (predictive maintenance)
Strategic impact	Incremental improvement; absence of transformative partnerships	Innovation assets with VRIN potential; not yet mainstreamed into core operations
Key limitation	No agile governance to integrate external solutions at scale	Localized collaborations; low systemic integration across the organization

This table outlines the incremental and socially anchored approach adopted by Italian cooperative firms in engaging with startups, emphasizing project-based experimentation and limited scalability.

Table 4.2 Scalable Innovation Ecosystems in U.S. Multinationals

	Sodexo	**Aramark**
Innovation model	Mature open innovation strategy integrated with ESG and digital platforms	Hybrid ecosystem combining proprietary platforms with academic and data partnerships
Startup involvement	Replate (food surplus redistribution), CarbonCloud (carbon tracking), Nudge (behavioral nudges)	FoodWISE, Hospitality IQ, ReFED, MCURC
Strategic impact	Startups are embedded within core services, supporting regulatory compliance and service customization	Scalable innovation embedded in ESG metrics and contractual performance

Key strength	API-compatible infrastructure; dedicated innovation units with ESG-aligned KPIs	Structural capacity for rapid integration of external innovations into client-facing solutions

This table presents the structured, performance-oriented engagement of U.S.-based firms with startups, where innovation is embedded in modular platforms and aligned with ESG and client-facing objectives.

4.5 Comparative Analysis: Italy vs. California

To contextualize these patterns within broader strategic systems, the following comparative analysis contrasts the Italian and Californian paradigms. Drawing on all the dimensions outlined in Table 4.1 and Table 4.2, the Table 4.3 incorporate factors such as compliance logic, innovation governance, digital maturity, and investment behaviour. The goal is not only to highlight differences, but to understand how companies can translate these external variables into strategic advantage.

Table 4.3 Comparative Overview: Italy VS California

	Italy (CAMST Group, CIRFOOD)	**California (Sodexo, Aramark)**
Regulatory Framework	Principles-based (CAM, CSRD, ISO, GPP)	Performance-based (e.g. SB 1383, real-time metrics, penalties)
Compliance Logic	Ex-ante, document-driven	Real-time, automated, outcome-focused
Food Waste KPI	Kg/meal ratio (localized, used for reporting)	% reduction per site (live dashboard; contractual KPI)
Digital Maturity	Fragmented tools, pilot-based	Cloud-native platforms, centralized data lakes
Startup Collaboration	Project-based, low scalability (e.g. Hector, Jarvis)	Fully integrated (e.g. Replate, CarbonCloud, MCURC)

ESG Integration	Separate reporting; limited pricing influence	ESG linked to pricing, procurement, performance contracts
Innovation Governance	Embedded in CSR/strategy units	Dedicated innovation units with ESG-aligned KPIs
Cultural Orientation	Stakeholder-focused, social value emphasis	Market-driven, efficiency and data-centered
Investment Logic	Social reinvestment, capital constraints	Private capital, ESG as competitive asset
Scalability	Regionally anchored, cautious	Global scalability, API-driven integration

In the Italian context, firms like CAMST Group and CIRFOOD operate within a principles-based regulatory framework rooted in European directives, ISO standards, and public procurement requirements such as the CAM criteria. Compliance is approached in an ex-ante, documentation-driven manner, with sustainability efforts largely concentrated in formal reporting. While both companies demonstrate strong social alignment and cooperative identity, ESG tends to remain compartmentalized, focused more on reputational positioning than on performance integration. Digital tools are often utilized for benchmarking rather than real-time optimization, and compliance processes, though rigorous, are generally static and audit-oriented. In contrast, Californian companies such as Sodexo and Aramark are embedded in a performance-based regulatory environment, exemplified by legislation like Senate Bill 1383. Compliance here is a dynamic, outcome-oriented mechanism driven by digital monitoring and real-time metrics. ESG performance is deeply embedded in business models, frequently tied to Service Level Agreements (SLAs) and client procurement processes. In this context, sustainability becomes inseparable from competitiveness—less a moral imperative than a monetizable, contract-bound performance metric.

This divergence extends into digital infrastructure. Italian cooperatives typically operate with fragmented, pilot-based technologies. Promising initiatives, such as CIRFOOD's ESG Cockpit or CAMST's "Ciò che Resta", remain isolated, lacking full ERP integration or predictive capabilities. These systems support post hoc analysis but fall short in terms of strategic foresight or scalability. On the other hand, U.S. firms leverage cloud-native platforms and centralized data lakes, such as WasteWatch and FoodWISE, enabling dynamic efficiency, automated compliance, and advanced analytics. Digital maturity in these firms acts as a backbone, not a supplement, for corporate strategy.

The role of external innovation ecosystems also differs markedly. Italian firms demonstrate low scalability in startup engagement, favoring community-centric collaborations with ventures like Hector, Jarvis, or Regusto. While these initiatives reinforce social legitimacy and local embeddedness, they are not structurally embedded into the firms' resource orchestration or long-term innovation architecture. By contrast, U.S. companies treat startups as strategic accelerators. Partnerships with platforms like CarbonCloud or Replate are not peripheral, they are deeply integrated into ESG systems, facilitating traceability, automation, and investor-grade accountability. These collaborations exemplify an orchestrated ecosystem logic that strengthens adaptive capacity and regulatory agility.

Organizational design reinforces this strategic asymmetry. In Italy, innovation is typically governed within CSR or strategic planning departments, reflecting a centralized and socially oriented governance model. While aligned with cooperative values, this structure often limits the autonomy and speed required to scale innovation. Conversely, Californian firms maintain dedicated innovation units with ESG-aligned KPIs and independent

budgets, allowing for rapid experimentation, cross-functional integration, and responsiveness to both regulatory shifts and market expectations.

Culture further amplifies the divergence. Italian catering firms operate within a stakeholder-driven ethos, prioritizing social cohesion, nutritional quality, and workforce wellbeing—particularly in education and healthcare contexts. These values build long-term legitimacy but can slow responsiveness to technological and commercial shifts. Californian firms are shaped by a market-driven logic where efficiency, differentiation, and data visibility define success. Innovation here is not just about compliance—it is a tool for value creation and client acquisition. The cultural orientation thus influences how ESG is interpreted: in Italy, as an ethical obligation; in California, as a strategic instrument.

Financial structure compounds these dynamics. Italian cooperatives adopt a logic of social reinvestment, channeling profits into internal improvement and community benefit. While this approach ensures resilience and institutional trust, it constrains capital flexibility for high-risk innovation. U.S. firms, by contrast, benefit from access to private capital markets and performance-based contracts, allowing them to scale ESG technologies and digital infrastructure more aggressively. ESG in this context is a growth vector, not a compliance cost.

Taken together, these differences reflect two distinct models of strategic capability. The Italian model emphasizes institutional legitimacy, stakeholder engagement, and cultural alignment; the Californian model prioritizes operational agility, technological integration, and market responsiveness. Each offers unique strengths—but also trade-offs. What emerges is a clear strategic tension between stakeholder depth and competitive velocity. Firms that can balance these forces—embedding ESG and innovation into flexible,

digitally enabled governance systems—will be best positioned to lead the next phase of sustainable transformation in the sector.

These findings not only clarify how companies respond to varying regulatory architectures but also contribute to broader debates on the institutional drivers of innovation and sustainability. In this light, the following section explores how firms operationalize compliance in complex environments—shifting from reactive reporting to predictive, strategy-aligned models that align ESG, innovation, and competitive performance.

4.6 Business Challenges in Regulatory Compliance

While all four companies express strong public commitments to sustainability, their ability to operationalize and sustain regulatory compliance varies significantly. These differences are not only technological but also institutional and organizational. This section identifies and interprets the key challenges firms face in translating complex ESG regulation into effective, scalable business practices.

4.6.1 Regulatory Fragmentation and Complexity

One of the main challenges—particularly evident in Italy—is the fragmentation of applicable frameworks. CAMST Group and CIRFOOD must simultaneously align with national standards (e.g., CAM criteria), EU-wide directives such as the CSRD, and local procurement rules. These often overlap or conflict, generating administrative burden and uncertainty. Compliance is documentation-heavy, requiring procedural adherence without necessarily driving behavioral or technological innovation.

In California, by contrast, regulation operates as a performance framework, linking incentives and sanctions to measurable results. This creates a regulatory culture that encourages innovation, rewards data transparency, and fosters cross-sector collaboration (e.g., utilities, waste authorities, tech providers). ESG compliance becomes a strategic asset in public tenders, supported by ecosystem alignment.

This asymmetry was highlighted by several institutional stakeholders. Giosafat Riganò (ICE Los Angeles) emphasized that many Italian SMEs are not structurally equipped to meet the expectations of ESG-intensive markets like California, particularly in terms of digital readiness and supply chain traceability. Genny Nevoso (Italy-America Chamber of Commerce) further noted that traceability, circularity, and real-time performance reporting have become essential prerequisites—not differentiators—in competitive procurement environments.

Raimondo Lucariello (ICE New York), while not drawing a direct regulatory comparison, pointed to the difficulty many Italian companies face in scaling internationally due to fragmented managerial structures and underinvestment in long-term strategy. Together, these insights illustrate how institutional architecture, regulatory culture, and innovation ecosystems shape firms' ability to transform ESG from a compliance burden into a competitive advantage.

4.6.2 Data Infrastructure and Digital Readiness

Effective compliance increasingly depends on robust data systems. Sodexo and Aramark benefit from mature digital infrastructures—WasteWatch, FoodWISE, and Hospitality IQ—that allow for real-time monitoring, automated reporting, and integrated ESG

management. These platforms enable the seamless transformation of regulatory requirements into operational KPIs.

Conversely, CAMST Group and CIRFOOD face limitations due to fragmented ERP systems, manual data entry, and isolated pilot projects. Their reporting processes are often retrospective and not embedded into daily operations, which limits responsiveness and strategic use of ESG data.

4.6.3 Organizational Capacity and Governance Constraints

Strategic compliance also requires organizational alignment and resource investment. Sodexo and Aramark dedicate entire teams to ESG compliance and innovation, supported by internal training programs and performance incentives.

In contrast, CAMST Group and CIRFOOD—despite strong internal values—are constrained by cooperative governance models that prioritize stability and reinvestment in local ecosystems. While this ensures social cohesion, it can also limit agility, delay technology adoption, and make it difficult to attract and retain digital talent in key compliance-related roles.

4.6.4 Verification, Transparency, and Risk Exposure

Verification mechanisms differ significantly. In California, Sodexo and Aramark must provide audit-ready documentation and time-stamped data streams to regulatory authorities and clients. These systems enhance transparency and reduce reputational risk but increase dependency on technological accuracy and cybersecurity.

In the Italian cases, third-party verification relies heavily on voluntary certifications or public tenders, where performance is often self-reported and difficult to independently validate. This can limit credibility with investors or international stakeholders and heightens vulnerability in the face of tightening European regulation (e.g., CSRD mandatory reporting). Such asymmetry affects how companies frame ESG investment—as either a bureaucratic cost or a tool for market positioning. In contexts where regulation emphasizes measurable outcomes, ESG becomes a business enabler. Conversely, where compliance is reduced to documentation, firms may hesitate to invest in technologies that are not explicitly required but would otherwise improve competitiveness and transparency. Digital technologies are not only tools of efficiency but enablers of regulatory compliance. The next section explores the strategic deployment of AI and IoT in this context.

4.7 The Role of AI and IoT in Ensuring Compliance

Finally, these pressures reshape corporate structures and strategies. The concluding section investigates how firms adapt their business models to align with ESG imperatives. Artificial Intelligence (AI) and the Internet of Things (IoT) have become pivotal tools for firms seeking to meet the growing complexity of ESG regulation. Their capacity to enable real-time monitoring, predictive analysis, and automated reporting transforms compliance from a static obligation into a dynamic operational function. This section explores how these technologies are deployed across the four-case study companies and assesses their contribution to regulatory responsiveness and strategic alignment.

4.7.1 Real-Time Monitoring and Data Capture

IoT technologies are primarily used to collect granular, continuous data on key environmental metrics such as food waste, energy consumption, and resource utilization.

- **Sodexo** uses IoT sensors embedded in its *WasteWatch* platform to track food waste volumes across thousands of sites globally. The system produces time-stamped logs that feed into weekly dashboards, supporting both internal optimization and external reporting aligned with client KPIs and ESG standards.
- **Aramark's** *FoodWISE* platform combines IoT devices with cloud-based analytics to ensure full traceability of waste reduction outcomes, a requirement under California's SB 1383. The system supports localized compliance while enabling corporate-level performance synthesis.
- **CIRFOOD** has deployed over 600 smart meters to monitor energy consumption in selected facilities and piloted visual analytics systems in school canteens for waste measurement. However, these tools remain project-specific and are not yet connected to an integrated ESG infrastructure.
- **CAMST** Group employs IoT tools through LeanPath sensors, mostly for internal benchmarking and reporting in the *Ciò che Resta* program. While effective at a micro level, the lack of centralized dashboards limits scalability and predictive insight.

4.7.2 Predictive Analytics and Scenario Planning

AI capabilities add a layer of intelligence to ESG management, enabling companies to anticipate risks, simulate regulatory scenarios, and adjust resource allocation dynamically.

- **Aramark** utilizes *Hospitality IQ* to model operational scenarios based on changing compliance requirements, labor dynamics, and nutritional standards. This allows for proactive planning and regulatory agility. Hospitality IQ serves as a VRIN resource, combining real-time AI and IoT integration. It offers valuable predictive insights, is rare due to custom development, inimitable through embedded client-specific KPIs, and tightly organized within Aramark's innovation governance, making it central to their strategic positioning in the U.S. institutional catering market.
- **Sodexo** leverages AI-powered modules such as *Future Forward* (developed with Persefoni) for automated carbon accounting and forecasting aligned with global standards like SBTi and the CSRD.
- **CIRFOOD** has piloted AI solutions in the *CIRFOOD District*, such as allergen detection (Hector) and predictive maintenance (Jarvis). While promising, these remain confined to innovation units and are not yet mainstreamed into compliance management.
- **CAMST Group** does not currently integrate predictive AI in its ESG workflows, focusing instead on retrospective analysis and performance reporting through BI dashboards.

4.7.3 Automated Reporting and Standards Alignment

The capacity to produce standardized and audit-ready ESG disclosures increasingly depends on automated reporting pipelines. Automation ensures compliance with evolving standards and minimizes human error.

Sodexo has established automated data workflows that translate operational metrics into ESG disclosures aligned with multiple frameworks (CSRD, GRI, SBTi). This reinforces transparency, supports client communication, and strengthens investor confidence.

Aramark embeds compliance reporting into its client-facing platforms. The integration of ESG data into service-level dashboards enhances contractual accountability and reduces manual reporting burdens.

Conversely, CAMST Group and CIRFOOD still rely on semi-automated or manual reporting structures, which limit scalability and responsiveness—particularly in the face of increasingly stringent European disclosure mandates.

4.7.4 Strategic Integration and Governance Considerations

The deployment of AI and IoT is most effective when embedded in broader governance structures and linked to accountability frameworks.

- In **U.S. firms**, ESG-related technologies are managed by dedicated innovation and compliance teams, ensuring alignment between technical functionality and regulatory purpose.
- **Italian cooperatives** face governance constraints, including compliance with GDPR and budgetary oversight, which can slow down integration. Human oversight and ethical data use are prioritized, sometimes at the expense of speed and adaptability.

In conclusion, AI and IoT are not simply tools of efficiency; they are strategic enablers of compliance. Firms that invest in interoperable platforms and predictive analytics are better equipped to manage risk, align with dynamic regulatory environments, and turn

ESG compliance into a source of strategic value. However, these technologies require not only capital investment but also cultural readiness and governance structures that support responsible innovation.

4.8 Business Adaptation

The convergence of regulatory tightening, digital transformation, and stakeholder expectations has triggered a gradual but irreversible shift in the business models of institutional catering providers. However, the degree to which each company has adapted—strategically, operationally, and culturally—varies significantly. This section explores how CAMST Group, CIRFOOD, Sodexo, and Aramark are reconfiguring their organizations in response to these pressures.

4.8.1 Strategic Flexibility and Organizational Alignment

Strategic flexibility in ESG integration depends on an organization's ability to align governance models, digital systems, and compliance frameworks.

CAMST Group has formally embraced a dual identity as both a cooperative and a Benefit Corporation. While this enhances public legitimacy and stakeholder trust, limitations in digital integration and centralized governance—highlighted in section 4.3.2—undermine the potential for rapid strategic reconfiguration.

CIRFOOD has consolidated ESG monitoring through its ESG cockpit, centralizing key metrics such as waste, energy, and inclusion. However, as noted in section 4.3.2, the lack of full ERP integration and reliance on localized pilots restricts systemic responsiveness.

Sodexo exhibits a high degree of strategic coherence between ESG goals, digital systems, and operational practices. Its modular architecture enables global standards compliance while allowing for local customization. ESG targets are embedded into corporate planning and commercial offerings.

Aramark uses tools like Hospitality IQ and FoodWISE not only for compliance tracking but also as enablers of flexible, scenario-based business strategies. This capacity to adapt regulatory requirements into value-added client solutions demonstrates a high level of strategic agility and operational alignment.

4.8.2 Investment Logic and ESG Value Realization

- **Italian cooperatives** allocate capital primarily through a logic of social reinvestment and long-term community benefit. While this reinforces stakeholder trust and local embeddedness, it constrains rapid deployment of high-tech systems. Their innovation path tends to favor control, continuity, and incrementalism.
- **Multinational firms**, by contrast, integrate ESG goals with financial strategy. They leverage external funding, strategic partnerships, and client-facing innovation to build scalable ESG platforms. This approach turns ESG performance into a commercial differentiator and a procurement asset.

4.8.3 ESG in Client Value Propositions

CAMST Group and CIRFOOD leverage ESG credentials in public tenders, using social impact and local sourcing as reputational strengths. However, these elements are rarely embedded into service pricing, customization, or ongoing performance-based contracts.

One critical challenge for these firms lies in balancing their strong social mission with the need to remain competitive in price-driven procurement processes. The cooperative model, with its emphasis on inclusivity and reinvestment, supports legitimacy and stability but leaves limited margin for high-cost innovation. As a result, ESG integration must be aligned with **cost leadership strategies**—focusing on low-cost, high-efficiency solutions such as portion control, localized food sourcing, or behavioural interventions that reduce waste without major capital investments.

Sodexo and Aramark, by contrast, incorporate ESG metrics directly into their commercial models. Environmental and social indicators are negotiated with clients and embedded in SLAs (Service Level Agreements), enabling outcome-based pricing and long-term performance alignment. Their approach allows them to combine compliance with value-added services, thereby **decoupling ESG from cost sensitivity** and leveraging it as a differentiator—even in competitive bid environments. This creates a hybrid model where **sustainability becomes compatible with revenue growth**, rather than an operational trade-off

4.8.4 Resilience and Forward Compatibility

- **Cooperative firms** benefit from long-standing institutional relationships and community loyalty, which supports long-term legitimacy. However, their risk-averse governance and decentralized decision-making structures limit their capacity to pivot rapidly in response to regulatory or technological shifts.
- **Digital-first firms** demonstrate greater adaptability, but must actively manage the risks of platform dependence, stakeholder detachment, and ethical concerns in AI

deployment. Their long-term resilience depends on balancing innovation with transparency and accountability.

4.8.5 Summary Table: ESG Strategic Profiles

To consolidate the comparative insights presented throughout this chapter, the Table 4.4 summarizes the ESG-related strategic positioning of the four firms across six key dimensions. These categories reflect how sustainability is embedded, managed, and leveraged in each case, offering a high-level snapshot of strategic strengths and constraints.

Table 4.4 Summary Table: ESG Strategies Profiles

	CAMST Group	**CIRFOOD**	**Sodexo**	**Aramark**
ESG Integration	Strong on social, limited on E/G	Strong on social, evolving on E/G	Fully integrated across E/S/G	ESG embedded in commercial strategy
Digital Maturity	Fragmented, pilot-based	Intermediate, innovation-driven	Centralized, cloud-native	Highly integrated platforms
Compliance Approach	Documentation-focused	Reporting-focused, semi-digital	Real-time, outcome-based	Predictive, contract-linked
Innovation Model	Internal, low ecosystem exposure	Pilot-based, growing startup links	Scalable, ecosystem orchestrator	Embedded startup innovation
Cost Leadership Compatibility	High-cost sensitivity, limited flexibility	Partial alignment, waste-focused solutions	ESG used to justify service premium	ESG used to drive efficiency gains
Scalability Potential	Regionally anchored	National expansion potential	Global, API-ready	Global, contract-scalable

This summary highlights the dual nature of ESG transformation: while all firms recognize its centrality, their approaches diverge sharply in terms of digital readiness, governance

models, and scalability potential. These contrasts will be further explored in the next chapter through a critical discussion of strategic implications and policy relevance.

Conclusion Chapter 4

The analysis of the four case studies companies highlight a structural divergence in how sustainability and innovation are operationalized within institutional catering. On one side, CAMST Group and CIRFOOD embody a **reactive strategic posture**, where ESG initiatives are largely shaped by regulatory obligations, public procurement requirements, and organizational legacy. Their efforts tend to focus on internal efficiency, compliance documentation, and socially driven legitimacy, with innovation projects often confined to pilots and without full integration into the enterprise model.

On the other side, Sodexo and Aramark exhibit a **proactive approach**, treating ESG not as an external constraint but as an embedded strategic driver. These firms integrate digital tools, predictive analytics, and startup collaborations into their operational backbone, enabling scenario-based planning, performance-based contracting, and real-time regulatory alignment. ESG, in this context, becomes both a lever of differentiation and a source of value creation.

This distinction between reactive and proactive postures is not simply technological, but deeply embedded in governance models, investment logic, and cultural orientation. Companies with the capacity to align ESG objectives with digital infrastructures and adaptive strategy are better positioned to respond to external pressures, capture new opportunities, and lead the transition toward sustainable and resilient food systems.

The evidence presented here suggests that the future of institutional catering will increasingly depend on the ability to transform ESG compliance into a competitive advantage—through innovation, agility, and ecosystem collaboration.

Chapter 5 – Strategic Recommendations

Building upon the comparative insights of Chapter 4, this chapter offers a strategic synthesis and a forward-looking agenda. It draws upon qualitative evidence, theoretical frameworks—including the Resource-Based View (RBV), Triple Bottom Line (TBL), strategic agility, and cost leadership—and comparative case analysis to frame institutional catering as a sector undergoing profound transformation. The aim is to establish how Environmental, Social, and Governance (ESG) integration, when coupled with digital innovation and regulatory evolution, can become a core lever of competitiveness and public legitimacy.

5.1 Strategic Recommendations and Implications for Businesses and Institutions

The analysis presented in this thesis not only supports tactical recommendations but also exposes a deeper shift in how value is created, measured, and legitimized in institutional catering. ESG integration, enabled by emerging technologies, is no longer an isolated objective: it is a transformative force that reshapes business models, procurement logic, and inter-organizational relationships.

5.1.1 Institutional Perspective

A reconfiguration of regulatory design is essential. Traditional compliance models centered on documentation and procedural audits must evolve toward performance-based governance frameworks. The Californian example of Senate Bill 1383 illustrates how

regulation can function as a catalyst for innovation by tying incentives to measurable results and fostering digital accountability.

The comparative insights gathered from institutional stakeholders reveal key asymmetries, Giosafat Riganò (ICE Los Angeles) noted that many Italian SMEs struggle to adapt to ESG-intensive markets due to limitations in digital infrastructure and a lack of traceability standards required by international buyers and public institutions. This insight underscores the structural challenges that inhibit innovation and responsiveness in Italy's regulatory environment.

Genny Nevoso (Italy-America Chamber of Commerce) further emphasized that in high-regulation markets like California, ESG traceability and circularity are now basic entry conditions in public and private procurement, not optional enhancements. Italian companies therefore face mounting pressure to align with international expectations for transparency, digital reporting, and sustainability metrics.

Although Raimondo Lucariello (ICE New York) did not focus specifically on regulatory asymmetry, he stressed that fragmented managerial practices and limited investment in long-term planning remain significant barriers for Italian firms aiming to scale in foreign markets. These issues, while not rooted in ESG misalignment, contribute to a broader inability to leverage sustainability as a competitive asset.

To bridge this gap, institutional change must prioritize:

- The modernization of procurement systems to reward verified ESG outcomes;
- Public investment in interoperable digital infrastructures that facilitate traceability;

- Regulatory harmonization between national, European, and international standards (e.g., CAM, CSRD, ISO, GRI).

Such reforms are necessary to enable ESG integration not just as a legal requirement but as a driver of market positioning, innovation, and systemic resilience.

5.1.2 Business Standpoint

ESG should be internalized not merely as a reporting function but as a strategic operating principle embedded in governance, procurement, and value delivery. Firms such as Sodexo and Aramark provide instructive cases. By integrating ESG metrics into pricing models, contractual KPIs, and AI-powered tools, they align sustainability with operational and commercial performance.

Conversely, Italian cooperatives like CAMST Group and CIRFOOD exhibit strong social missions but often limit ESG efforts to pilot projects. As noted by Riganò, "Innovation exists, but it doesn’t scale." To address this, ESG must be institutionalized through:

- Cross-functional ESG governance bodies;
- Integration of sustainability into strategic planning and performance incentives;
- Formal alignment between ESG goals and client service contracts.

5.1.3 Ecosystem Dimension

Innovation in ESG increasingly arises from outside traditional corporate boundaries. As Sandhya Sriram of the Future Food Institute asserts, "the most effective solutions come from hybrid spaces"—including civic platforms, accelerators, and public-private labs.

Firms must evolve from transactional engagement with startups to relational, co-creative models. Organizations like Regusto, Agreenet, and Divert Inc. offer scalable technologies

for food waste recovery, circular packaging, and traceability. Yet legacy caterers often fail to incorporate these innovations into core operations.

To remain competitive in ESG-intensive environments such as California, companies must develop "absorptive capacity"—the ability to recognize, assimilate, and apply external innovation—by:

- Structuring long-term partnerships with high-impact startups;
- Embedding co-innovation mechanisms into procurement and service design;
- Cultivating a culture of openness to experimentation and agility.

Conclusion of Chapter 5

This chapter has demonstrated that ESG integration, when aligned with enabling technologies, adaptive governance, and supportive regulatory ecosystems, serves as a powerful driver of strategic renewal. The comparative analysis confirmed a dual trajectory: U.S. multinationals embed ESG into digital infrastructures and market-facing contracts, while Italian cooperatives, though rooted in social legitimacy, encounter obstacles in scaling innovation due to fragmented governance and rigid compliance models.

The role of institutions is decisive. Where regulation rewards outcomes and digital transparency, firms are more likely to invest in transformative ESG strategies. Equally critical is the role of ecosystem actors—startups, hybrid platforms, and civic innovators—as sources of specialized capabilities and co-created value.

Ultimately, ESG is not a peripheral concern or symbolic narrative. It constitutes a dynamic operating system that redefines how firms generate, measure, and legitimate value—strategically, operationally, and societally. Future research must continue to

interrogate how this system evolves and how organizations can build the cultural and structural readiness to harness its full potential. These strategic insights form the foundation for the concluding reflections in Chapter 6, where a unified model for ESG-driven transformation is proposed, together with a critical assessment of the study's scope and future research trajectories

Chapter 6 – Conclusion

This thesis set out to explore the following research question: *How can institutional catering firms strategically integrate ESG principles through digital innovation and ecosystem collaboration to respond to evolving regulatory environments?* The investigation addressed this question through a comparative analysis of four case studies—CAMST Group, CIRFOOD, Sodexo, and Aramark—representing divergent models of governance, regulatory exposure, and innovation capacity.

The findings demonstrate that ESG is no longer an optional reporting obligation but has become a strategic operating system. Companies that embed ESG into their governance, procurement, pricing, innovation processes, performance measurement, and client engagement are those that generate measurable competitive advantage. Particularly in performance-based regulatory contexts such as California, where Senate Bill 1383 incentivizes data transparency and rewards tangible environmental outcomes, U.S. multinationals have developed advanced digital infrastructures, integrated platforms, and startup collaborations that enable ESG to operate as a value driver. In contrast, while Italian cooperatives exhibit strength in social sustainability, community legitimacy, and stakeholder trust, they face structural limitations, fragmented technologies, input-based procurement logic, and limited absorptive capacity for external innovation, which hinder their ability to scale ESG efforts beyond compliance.

Digital technologies such as AI and IoT have proven essential in transforming ESG from a static to a dynamic system, enabling real-time monitoring, predictive analytics, and outcome-based service delivery. These tools enable firms to monitor performance,

anticipate future scenarios, and optimize resources, enhancing both operational efficiency and stakeholder value. Yet technology alone is insufficient. As demonstrated by initiatives such as the Future Food Institute, Regusto, and Agreenet, it is the strength of the innovation ecosystem—built on collaborations among companies, startups, public institutions, and civil actors—that drives systemic ESG transformation. Firms capable of embedding themselves into such ecosystems enhance not only their adaptive capacity but also their reputational and cultural capital.

Theoretically, the findings reaffirm the relevance of the Resource-Based View (RBV) in interpreting ESG as a rare and inimitable internal resource; the Creating Shared Value (CSV) framework in linking social impact to business value; and Strategic Agility as a key determinant of competitiveness in public sectors exposed to rapid regulatory change.

From a managerial perspective, the thesis provides a roadmap for operationalizing ESG through digital infrastructures and innovation alliances. From a policy perspective, it advocates for a shift away from formalistic, input-based procurement towards performance-driven regulatory frameworks and targeted support measures that enable even resource-constrained firms to deploy scalable ESG solutions. Ultimately, this research contributes to reframing ESG as a strategic architecture—an integrative system that aligns sustainability with innovation, competitiveness, and public legitimacy. Firms that continue to treat ESG as an external cost will lag behind; those that embed it as a foundational dimension of their value proposition—supported by digital tools, institutional alignment, and ecosystem engagement—will be best positioned to lead the sustainable transformation of institutional food systems. Nevertheless, unlocking the full transformative potential of ESG also requires a critical understanding of the

methodological and contextual limitations of the present study, which in turn define the boundaries and priorities of a future research agenda. This strategic convergence of digital infrastructure, regulatory foresight, and collaborative innovation marks a turning point for the evolution of sustainable public food systems.

6.1 Limitations and Future Research Directions

While this study provides a robust strategic analysis of ESG integration within institutional catering, it is necessary to acknowledge its limitations and propose directions for future inquiry. In doing so, several methodological and contextual constraints must be considered that frame the scope and interpretation of the findings. First of all, the empirical analysis was deliberately limited to four representative cases: two Italian cooperatives and two multinationals operating in California. While these firms illustrate contrasting regulatory and organizational models, the sample does not reflect the full heterogeneity of the sector—particularly hybrid business models such as franchise-based caterers, kitchen-as-a-service platforms, or digitally native players. Expanding the sample to include such actors would enrich the comparative lens. Beyond this sampling limitation, the study is also temporally situated within a regulatory transition phase (2022–2024) with ongoing ESG policy reforms, including the implementation of the CSRD and CAM revision. Future studies could adopt a longitudinal perspective to assess how firms adapt to evolving regulatory pressures over time. Additionally, the composition of interviewees introduces another layer of limitation. Interviews were conducted with strategic and institutional experts, providing high-level insights into ESG architecture. However, they did not include operational perspectives (e.g., chefs, site managers, ESG officers) or end-users in education and healthcare. Including these voices

would illuminate the practical challenges and behavioural dimensions of ESG implementation. From a geographical perspective, the research scope also remains circumscribed on California as a benchmark for innovation-driven regulation. Yet, emerging models in other U.S. states (e.g., New York) and EU countries (e.g., Denmark, Germany) offer alternative pathways worth examining. Lastly, on the technological front, the analytical focus was intentionally restricted to AI, IoT, and blockchain—three core enablers of ESG transformation. However, adjacent technologies such as digital twins, LCA tools, and smart safety systems are increasingly relevant for public food services. Their strategic potential remains underexplored.

Taken together, these limitations open up several avenues for future academic inquiry that could deepen and extend the present analysis. In light of these reflections, five main research trajectories can be identified.

1. **Measuring the ROI and Strategic Impact of ESG Technologies**

There is a need to quantify how AI-powered forecasting, IoT-based monitoring, and ESG dashboards impact financial performance, public contract acquisition, and long-term resilience—especially for resource-constrained cooperatives and SMEs.

2. **Exploring Innovation Ecosystems and Public–Startup Integration**

Further work should investigate co-development frameworks and metrics for evaluating startup contributions beyond pilot projects. Models like Regusto, Agreenet, and Divert Inc. suggest that innovation readiness must extend beyond internal capabilities to include institutional and procurement flexibility.

3. **Understanding Regulation as a Strategic Design Tool**

Comparative analyses of performance-based (e.g., SB 1383) versus input-based models (e.g., CAM) can shed light on how regulation stimulates or inhibits innovation. A focus on ESG-linked scoring in public tenders could reveal how procurement systems affect SME competitiveness and sustainability investment.

4. **Investigating Organizational Culture and ESG Absorptive Capacity**

As emphasized by Sandhya Sriram, transformation depends not only on tools, but on culture. Research should explore how leadership alignment, mid-level ESG champions, and employee engagement influence the internalization of sustainability goals—particularly in mission-driven cooperatives.

5. **AI-Powered Personalization and Automation in Public Catering**

The application of AI in large-scale institutional kitchens deserves deeper analysis. Cases like CaliExpress by Flippy, and platforms like RxDiet or January AI, demonstrate how real-time data and automation can enable hyper-personalized nutrition, enhanced food safety, and operational efficiency. The challenge is to assess how such models can be ethically and practically adapted to sensitive environments such as hospitals, schools, or correctional facilities.

These trajectories represent a strategic research agenda aimed at strengthening the capacity of institutional catering to evolve into a digitally enabled, regulation-responsive, and sustainability-driven ecosystem.

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