Urban Farming in the Built Environment:
Unveiling its adoption and survival processes

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A thesis submitted in in fulfilment of the requirements for the degree of
Doctor of Philosophy

**The Bartlett School of Sustainable Construction,
University College London (UCL)**

2019 – 2023

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Guilherme Duch Crosta

Impact statement

The following impact statement outlines this research's key benefits and implications within academia and broader societal contexts.

This research examines how the social embrace of sustainability offers a framework for comprehending the mechanisms underpinning social change, applied to the adoption and survival of urban farms. Moreover, this study extends the scholarly dialogue by emphasizing the aesthetic dimension of Urban Farming. It reveals novel facets of the emotional and cognitive connections forged between urban farms and their observers, enriching environmental design, urban planning, and aesthetics discourses.

Likewise, this thesis illuminates how organizations can translate sustainable development principles into tangible, actionable, sustainable values. In this context, it also broadens the analysis of value creation within organizational contexts, as this research sheds light on the multifaceted non-financial benefits of Urban Farming. It enables scholars to deliberate upon the impact of non-financial on organizational success. Lastly, this study provides a novel framework detailing how Urban Farming becomes institutionalized within organizations. This illuminative framework augments the canon of organizational studies, proffering insights into aligning organizational culture, operations, and goals with sustainable values.

In addition to its academic contributions, this thesis offers tangible benefits to urban farms, rendering valuable insights critical to their inception, growth, and operation. Urban Farming initiatives can use these research findings to craft captivating, sensory-rich consumer experiences, augmenting their allure. Encompassing multiple senses in product experiences can invigorate consumer interest and bolster support for sustainable practices. Using the competitive advantages underscored in this study, Urban Farms can leverage this research to communicate the distinctive benefits of Urban Farming. This heightened appeal can captivate diverse stakeholders, from investors and employees to environmentally conscious consumers.

Besides, this research underscores the pivotal role of Urban Farming in reshaping urban landscapes and advancing sustainability. Architects, designers, and

construction professionals can integrate Urban Farming into their projects, elevating sustainability metrics and enhancing urban aesthetics. Finally, by highlighting the potential for community engagement, this research advocates for urban farms to embrace public accessibility and foster community involvement. Organizations can forge stronger bonds with local communities, catalysing collaborative efforts with educational institutions and community organizations to champion sustainable food production and reinvigorate urban spaces.

Therefore, this thesis comprehensively examines how Urban Farming is adopted and survives within the built environment. It offers insights that hold the potential to catalyse positive social change, providing perspectives to empower organizations, urban farms, and stakeholders to enhance sustainability and create more attractive, value-driven initiatives.

Abstract

Ensuring a robust and effective food system is essential to meet the increasing food demands of urban populations. However, the current global food system has become increasingly vulnerable, particularly in the face of global nutritional deficiencies and food shortages. In response to these challenges, Urban Farming emerges as a promising solution for sustainable food production. It involves the integration of various resources within a city to create tailored opportunities suitable for specific urban settings. Urban farming offers numerous benefits, including improved access to fresh food, reduction of food insecurity, city revitalisation, and reduced transportation costs. Despite its advantages and potential importance in the future, more research is needed on Urban Farming. This thesis aims to fill this gap by examining the adoption of Urban Farming and the survival of urban farms. More specifically, this research discusses how institutionalisation practices influence the adoption of Urban Farming and how tactics and attractiveness affect the survival of urban farms. Social Movement, Institutional, and Stakeholder theories serve as the theoretical foundation of this research. Qualitative methodology was used to analyse the qualitative data collected through interviews with 40 participants from urban farms. The data were then analysed using the Gioia method, a qualitative grounded-theory-based interpretive research approach. The discussion is divided into two parts. The first indicates motivations behind the adoption of Urban Farming, showcasing how it is a viable way for organisations to practice sustainable development by adhering to sustainable values esteemed by its stakeholders without undertaking extensive changes in their products, services, or processes. Additionally, Urban Farming offers significant relational value to organisations by fostering improved relationships between their employees and food, the built environment, and within their own ranks. The second identifies the tactics and two primary sources of attractiveness of Urban Farming that are influential for its survival. Tactics concern the collaborations and distinctive business models used by urban farms. Attractiveness is divided between its competitive appeal, derived from the practical advantages and the increased attractivity of the farming activity, and the aesthetic appeal, based on enhanced desirability through the design of Urban Farming sites, buildings, production areas, packaging, and product display. A theoretical model outlines how tactics and

competitive and aesthetic appeals play a pivotal role in urban farms' survival through the benefits, values, legitimacy, and overall attractiveness they grant. By emphasising the importance of these topics, this thesis contributes to a better understanding of how Urban Farming can be leveraged as a sustainable and appealing solution to food production in urban settings.

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Chapter 1. Introduction

By 2050, food production will need to nearly double, by 2009 standards, to feed an increasing urban population (Food and Agriculture Organization, 2009), which raises concerns about the sustainability of current agricultural practices. These are based farming at an industrial scale, often utilizing monoculture, intensive exploration of soil, mechanization, the improvement of crop varieties, and the development of agrochemicals to fertilize crops and control weeds and pests (Altieri, 2003). Amidst this backdrop, Urban Farming offers a potential solution to this problem by harnessing underutilized spaces within cities for food production. By reducing the distance between food production and consumption, for example, Urban Farming, which is a form of urban agriculture concerning the commercial cultivation of food products crops within and around cities (FAO, 2009), can mitigate some of the environmental and logistical challenges associated with industrial agriculture. Considering the urgency to expand urban food production, it becomes crucial to delve deeper into Urban Farming initiatives and uncover the key factors contributing to their adoption and survival.

Within this initial chapter, an introduction is given to present the background problem addressed in this research. It also informs the aims and objectives of the research, which are then consolidated into the research questions which shape the thesis. The need for the research is also identified, along with a brief introduction to the methods that will be utilised to answer each research question. An overview of the thesis is also provided.

1.1. The challenges of feeding the world

Grand, global, or societal challenges (GCs) are ambitious but achievable goals that harness politics, science, technology, and innovation to solve critical complex issues, which are also compelling and intrinsically motivating (Kalil, 2012). They are recognized as pivotal barriers that, once addressed through coordinated and collaborative effort, would contribute to resolving a significant societal issue with a robust potential impact through widespread implementation (George et al., 2016). Key GCs include the climate emergency, digital transformation, migration, education,

different forms of inequality (Gümüsay et al., 2022) and the Covid-19 pandemic (Howard-Grenville, 2021). These act as a locus where science meets social demands, putting forward the idea that scientists' intrinsic motivations should not be restricted to inner-scientific questions or solely profit-related contributions, but may be, in some instances, channelled towards societal goals (Kaldewey, 2018).

The fact that specific phenomena are codified and showcased as 'grand challenges' exemplifies the magnitude of the task at hand and points to the need for new modes of interaction between scientists, engineers, policymakers, and other stakeholders (Hicks, 2016; Kaldewey, 2018). Unlike preceding scientific issues, often referred to as 'problems', the GC concept has successfully diffused into other disciplines, such as social sciences and other institutional settings (Kaldewey, 2018). By using the term 'challenge' instead of 'problems', the issue is framed into a broader social context, with its history, which helps different actors to perceive it as an important issue to be addressed. According to Kaldewey (2018), and based on social constructionist epistemology, this is done primarily because a GC is seen as a "social fact", a transformative term that relates to both the identity of the work of scientists and policymakers and their way of communicating with one another. A GC is, thus, not interpreted as an analyst's category, but rather as an actor's category, a sociological analysis rooted in the actors' world that convenes the gravity and urgency of the issue (Collins, 2008; Kaldewey, 2018). One of the aspects that have helped this shift in perception is the inherent principle of feasibility present in GC, i.e., one based on an implicit understanding that current capabilities must be acknowledged (National Research Council, 2001). Considering this new feasibility-focused approach, specific actions are being explored to address GCs, of which one of the most promising is through sustainable development.

In this case, the UN's 2015 Sustainable Development Goals (SDGs) is a strong example. By arguing that GCs are reflected in the UN SDGs (George et al., 2016), scholars have highlighted that the SDGs are interdependent and, therefore, require considerations of complementarities and contradictions (Günzel-Jensen et al., 2020). The UN's SDGs approach issues of sustainable development for all countries, while recognizing that each nation will adapt and prioritize the goals under its own needs and policies (von Grebmer et al., 2016). The SDG framework addresses the

interconnected root causes of the most persistent issues the world faces, calling for cross-sectorial collaborations that require global and local partners to converge on a set of goals assumed to be important and legitimate (Günzel-Jensen et al., 2020). This includes an ambitious target to eradicate hunger and malnutrition by 2030 (United Nations, 2019; von Grebmer et al., 2016), exemplified by "Goal 2: Zero Hunger" (United Nations, n.d.). It emphasizes ways to "*rethink how we grow, share and consume our food" and advocates for "increasing the capacity for agricultural productivity and sustainable food production systems (that) are necessary to help alleviate the perils of hunger*". Importantly, the SDGs also include a vision of a systematic partnership with the private sector to achieve sustainable development (Kumar et al., 2016). Hunger, therefore, can be considered both an SDG and a GC.

In 2009, the UN's Food and Agricultural Organization (FAO) published a report called "How to Feed the World in 2050". It predicted that food production would need to nearly double to feed a future global population of 9-10 billion people. This would, in turn, require a doubling of food production, using 2009 as a benchmark, an increase that can only be achieved if the necessary policies and innovations are in place (Food and Agriculture Organization, 2009). Since the general rate of growth in yields of major cereal crops has been declining steadily for decades, investment in technology to reverse this trend is one of the options to deal with this challenging scenario (Food and Agriculture Organization, 2009). In developing countries, for example, only 20% of the projected production increases would come from an expansion of arable land, while 80% would need to come from increases in yields and cropping intensity (Food and Agriculture Organization, 2009). The fight against hunger must, therefore, include technological development that increases yields and lowers production costs, while also embracing sustainable and responsible practices that ensure that these solutions are viable in the long term.

In this context, the importance of addressing responsible innovation becomes paramount in tackling hunger. Responsible innovation is the "*transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view on the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products*" (Von Schomberg, 2014, p. 50). Hence, 'responsibility' related to the societal values and norms considered at an early

stage of development of the technology, which helps to recognize products that are broadly accepted and widely (Owen et al., 2013; Von Schomberg, 2014). Furthermore, one of the main aspects of responsible innovation is the requirement to do good by engaging in beneficial societal actions (Voegtlin & Scherer, 2017). For a responsible innovation to be responsive, possessing the ability to react and to answer, it must be situated in a privileged position that considers the product and its purposes within society. Stilgoe et al. (2013) highlight that one of the main aspects of responsible innovation is 'responsiveness', i.e., its adaptability to the needs of stakeholders, public values, and any changing circumstances. For Von Schomberg (2014), the main challenge of responsible innovation is therefore to become more responsive to societal challenges, hence making it one of the most encouraging paths to deal with societal GCs (Stilgoe et al., 2013).

One particularly promising area for responsible innovation is food production. In this case, responsible innovation has historically been in response to issues such as the welfare of livestock, use of pesticides, soil erosion and the intensive use of antibiotics and vaccines (Gremmen et al., 2019). Because innovations applied to food production can have negative societal consequences, such as environmental degradation, a responsible innovation framework enables a debate on the ethical relations between animals, agriculture, and food, as well as the way social issues can be applied and addressed in agriculture (Gremmen et al., 2019). Hence, such innovations need a comprehensive assessment of potential problems deriving from their impacts and associated technologies, going further than a more commonplace responsible innovation management practice (Hellström, 2003). Amongst the many responsible innovations that aim to increase food supply, Urban Farming is one of the most promising options as it can be seen as a vehicle through which multiple resources within a city are combined to create opportunities and challenges tailored for a particular urban setting.

1.2. Urban food production

The food sector presents particular and significant sustainable development challenges. The fight on hunger, for example, is not restricted to the number of calories

ingested per day, but also whether or not these calories are nutritiously beneficial (Sánchez García et al., 2019). For example, approximately two billion people suffer from micronutrient deficiencies as a form of malnutrition, especially from a lack of vitamin A, iodine, and iron (Shaw, 2008). Therefore, when discussing food production within sustainable development, we must acknowledge that the global population should have access to nutritious food in adequate quantities. Fighting hunger must, therefore, be approached from two perspectives: quantitative and qualitative (Sánchez García et al., 2019).

Food production presents several interesting paradoxes. It contributes to environmental degradation, while also suffering from its effects. It provides farming communities with livelihoods and incomes, while also potentially fuelling land grabs that undermine community rights and wellbeing. In addition, it feeds the growing global population, yet contributes to the epidemic of obesity diseases, not to mention that chronic malnutrition has continued to worsen even since the adoption of the SDGs (Columbia Center on Sustainable Investment, 2019). Furthermore, the efforts aimed to create guidelines for more sustainable practices in the food industry have lacked industry consensus and fall short of a holistic, comprehensive framework for responsible practices in the food sector that would align with the SDGs (Columbia Center on Sustainable Investment, 2019).

The 2030 Agenda for Sustainable Development recognizes that a lasting end to hunger and undernutrition cannot be achieved in isolation, necessitating multiple, coherent actions from numerous participants. Chiefly, von Grebmer et al. (2016) focuses on four areas of inter-arrangements: universal government commitment, inclusion, and participation of all members of society, rigourous monitoring to hold stakeholders to account and transformation of food systems (von Grebmer et al., 2016). Within this context, urban agriculture emerges as a possible element in the joint actions to address these challenges.

The Food and Agriculture Organization (2009) defines urban agriculture, or Urban Farming, as the growing of food products from different types of crops, within and around cities. It is a responsible innovation that aligns with the SDGs to fight a GC, with the potential to significantly support the fight against hunger in urban areas. Proponents believe that, with technological advances, Urban Farming could help feed

the population when climate change and environmental concerns may limit the expansion of the agricultural sector (Orsini & D'Ostuni, 2022).

Urban farms can be installed in greenhouses, indoor environments, like a vertically stacked-layer system, and outdoor settings, such as rooftops and green walls (Conserve Energy Future, 2020). They have the potential to supply almost all the recommended consumption of vegetables for city dwellers (Martellozzo et al., 2014) while cutting food waste (Kulak et al., 2013) and reducing emissions from the transportation of agricultural products (Weber & Matthews, 2008). Urban Farming improves access to fresh fruits and vegetables in countries with a temperate climate (McCormack et al., 2010), resulting in higher quality, more readily accessible nutrition. Moreover, it can also add value to under-utilized urban spaces, being a tool for income generation and providing social inclusiveness (Prain & De Zeeuw, 2007).

Aside from the gains in food production, urban farms also increase vegetation cover, helping balance carbon dioxide emissions, reducing the "urban heat island effect" in cities (Susca et al., 2011), lowering the risk of flooding during heavy downpours and retaining water in dry areas (Deng, 2021). Despite higher energy costs normally associated with some Urban Farming models (such as indoor Urban Farming) (Avgoustaki & Xydis, 2020), investors have been attracted due to projected higher yields and lower consumption of water, fertilizers, and pesticides (Yuan et al., 2022). Giving a sense of the scale of the potential of Urban Farming, Clinton et al., (2018) has projected an annual food production of 100–180 million tonnes, with energy savings ranging from 14-15 billion kilowatt-hours, nitrogen sequestration between 100,000-170,000 tonnes, and avoided stormwater runoff between 45-57 billion cubic meters annually. The same study estimated that Urban Farming could contribute about 5–10% of the global production of pulses, roots and tubers, and vegetables (Clinton et al., 2018).

Urban Farming and the subsequent development of sustainable urban food systems have gradually been incorporated into cities' plans for social innovation. This stems from the understanding that the complex issues faced by contemporary cities can no longer be addressed solely through conventional solutions, and how food is produced and consumed is no exception (Jégou & Bonneau, 2014). In this context, Urban Farming can be seen as a vehicle through which multiple resources within a city

are combined to create opportunities and overcome challenges specific to a given urban setting (Van Der Schans et al., 2014). The built environment in which an urban farm is inserted plays a defining role in the impact of said farm, as the scope for the farm to improve food security can vary significantly, depending on its geographic setting (Clinton et al., 2018).

However, Urban Farming is not without its potential downsides, which can mitigate its benefits. These primarily encompass environmental concerns and urban management challenges, particularly evident in developing regions where essential infrastructures such as regulation, sanitation, and education are inadequate or disorganized (Deelstra & Girardet, 2000; Smit et al., 2001). One of the most pointed criticisms of Urban Farming arises from its associated costs. Limited space, extensive labour, and high operational expenses often result in Urban Farming products being costlier than those from industrial agriculture (Yuan et al., 2022). While some urban farms manage to achieve financial sustainability, others encounter difficulties in generating consistent revenue due to these higher costs and the inherent complexity of the practice. Consequently, despite its land-efficiency and high productivity, economic and embodied energy analyses reveal that Urban Farming is comparatively inefficient in its utilization of material and labour resources (McDougall et al., 2019). Despite the unclear economic advantages, a trend of commercial urban farms has been on the rise, particularly in major northern cities, championing environmentally friendly produce cultivated within highly efficient installations situated atop or within buildings (Benis & Ferrão, 2018). This underscores a motivation that transcends objective values, such as financial metrics, pointing to other driving forces that propel urban farms within urban contexts.

Therefore, alternative solutions to some of the challenges in addressing urban food systems are offered by Urban Farming. While issues like food security and environmental degradation are addressed, challenges remain, including economic viability and urban management complexities. This research takes the approach that, despite the downsides to Urban Farming, it is mostly seen as a positive development and will mainly focus on its benefits.

1.3. Aims, objectives and research questions

At the highest level, this research aspires to contribute to the transformation of urban landscapes by embracing Urban Farming as an integral component of a sustainable and thriving built environment. Ultimately, it seeks to enhance access to fresh produce in cities while promoting sustainable urban development. The purpose, therefore, is to bridge the gap between academic knowledge and practical application by providing a deeper understanding of Urban Farming dynamics and processes. This is done through the examination of the drivers behind the adoption and survival of urban farms.

To achieve this, the following two research questions will guide the investigation:

I.   The first research question explores the underlying motivations driving organizations to adopt Urban Farming initiatives, particularly focusing on the institutionalization process that guides them toward embracing sustainable values. Therefore, the first research question asks: why is Urban Farming adopted? Chapter 6 is devoted to examining this question.

II.   The second research question reveals some of the factors that contribute to the survival of urban farms by exploring the competitive and aesthetic appeal, as well as organizational tactics, employed by urban farms. Hence, the second research question is: how do urban farms survive? Chapter 7 will investigate this question.

The unit of analysis of this research is the urban farm itself. However, the research also analyses the process through which Urban Farming is adopted, a phenomenon occurring within an urban farm. This approach allows to examine both how external trends and factors are assimilated within individual urban farms, as well as how these farms internally evolve to survive their institutional contexts.

1.4. Thesis structure

The thesis is primarily divided into background research and empirical analysis. The background research comprises Chapters 2 and 3. Chapter 2 centres around the global food system, the issues that have necessitated the development of urban agriculture, and Urban Farming as a proposed method of food production, along with its connection to the built environment. Chapter 3, on the other hand, presents a literature review of the main theoretical frameworks used throughout the research, which includes institutional, stakeholder, and social movement theories. While other theories could also be relevant to this study, these chosen theories provide new and different pathways to understanding urban farms within the built environment, considering the social and institutional contexts that shape the practice of Urban Farming in urban environments.

The empirical portion of the thesis is comprised of Chapters 4 to 7. Chapter 4 outlines the research methodology, which incorporates qualitative data collection and processing methods. Following that, Chapter 5 presents the data analysis and results. The discussion is divided into two parts. In Chapter 6, the adoption of Urban Farming is analysed, while Chapter 7 explores how urban farms survive. The thesis concludes with Chapter 8, which includes the research's conclusions, addressing the research questions posed, and final considerations about the role of Urban Farming in the built environment. Below, a flow diagram illustrating the thesis structure is presented, followed by a brief synopsis of each chapter (**Figure 1**).
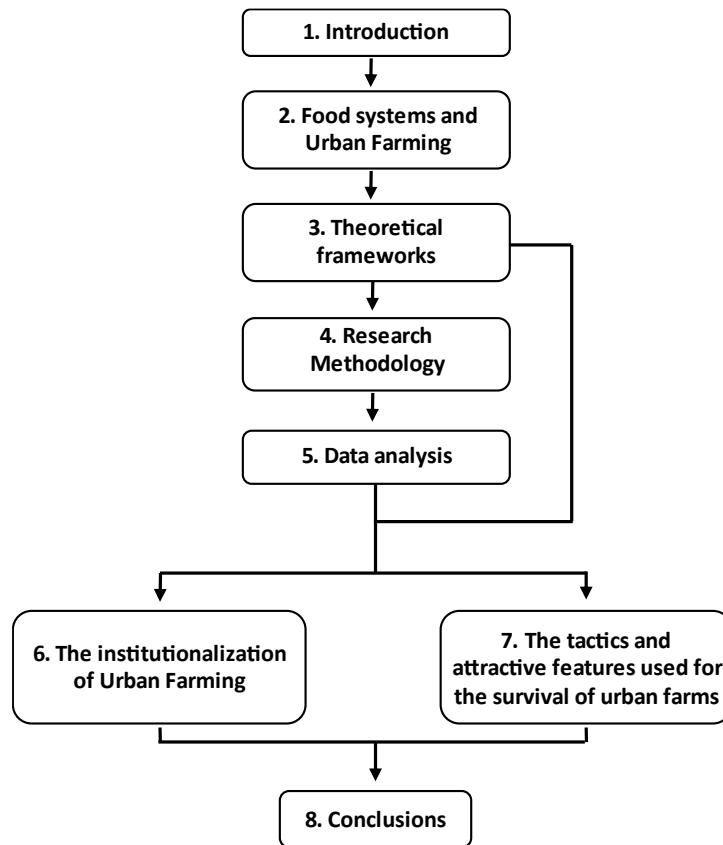
Figure 1. Diagram of the thesis' chapter structure.

Chapter 2. Food systems, Urban Farming, and the built environment

After an initial overview of the chapter, the broader global food system is analysed, focusing on various aspects such as the environmental impacts of food production, diets and nutrition, population challenges for food production, global food crises and initiatives aimed at addressing the challenges faced by the global food system. The section examines the challenging context of rural food production and urban food consumption. Then, the concept of urban agriculture and Urban Farming is visited, providing an understanding of their definitions, purposes, and practices. It further explores various types of Urban Farming initiatives and the role of urban agriculture in enhancing food security and promoting urban resilience. Subsequently, the environmental impacts associated with Urban Farming are investigated, as well as its benefits and criticisms. The broader concept of sustainability within the built environment is explored, encompassing strategies and considerations for farm construction and approaches to integrating Urban Farming into urban landscapes alongside a chapter conclusion.

Chapter 3. Theoretical frameworks

The chapter on theoretical frameworks in the PhD thesis is structured to provide a comprehensive understanding of the key theories that will be later used in the discussion. Three theories have been chosen for their relevance in addressing the research inquiries within the framework of the social, institutional, and organizational dynamics inherent to urban farms. The first section of the chapter focuses on Social Movement Theory, providing an overview of its core concepts and examining how social movements can influence organizational behaviour and their role in promoting social change. The second section, regarding Institutional Theory, explains how institutions shape organizational behaviour, norms, and practices, highlighting the influence of institutional pressures on organizations. The third section centres on Stakeholder Theory, describing the role of stakeholders in influencing organizational behaviour and decision-making processes. These theories, usually aligned with organizational studies and not commonly associated with Urban Farming studies, will later be used, together with the findings of Chapter 5, in the discussion (Chapters 6, 7 and 8).

Chapter 4. Research Methodology

Chapter 4 explores the research's philosophical assumptions (its ontological assumption and epistemological position), research approach, research strategy, and data collection methods. It also describes the data collection process and analysis techniques, explaining the data collection process, its ethical considerations, the interview structure, and the analysis methods used before making a chapter summary.

Chapter 5. Data analysis

The data analysis chapter in this thesis analyses the interviews gathered during the data collection phase inspired by the methodology proposed by Gioia et al. (2013). This chapter presents the collected data and findings by grouping it into 9 overarching topics. Each topic is supported by relevant quotes from the interviews, illustrating the identified themes and patterns. Through this systematic approach, the data analysis

chapter provides insights that contribute to the research findings featured in the discussion chapters.

Chapter 6. Discussion – The institutionalization of Urban Farming

The first part of the discussion probes into the institutionalization process of Urban Farming, showcasing how this activity is adopted. Using the example of organizations that are non-food related, it demonstrates why these organizations embrace sustainable practices even in initiatives that may not directly relate to their core activities. Findings from interviews with collaborators of urban farms reveals how Urban Farming improves an organization's relational value within itself, the built environment and food and how taken together, these consolidate the institutionalization of Urban Farming in organizations. A theoretical model showcasing Urban Farming's value to organizations is developed, demonstrating how sustainability is integrated into organizations through sustainable development via Urban Farming, ultimately leading to the development of the organization's sustainable value.

Chapter 7. Discussion – The tactics and attractive features used for the survival of urban farms

The second part of the discussion centres on the tactics and attractiveness of urban farms that are instrumental for their survival. It analyses this appeal through a dual lens, encompassing the general public's perspective and organizations' response to this attraction, as well as the tactics used by urban farms to remain competitive. An empirical analysis of the interview data identifies these tactics and two main sources of attractiveness: the competitive and the aesthetic appeal of Urban Farming. The competitive appeal of Urban Farming pertains to its attractiveness in terms of employment opportunities, the allure of engaging in farming activities and the practical advantages it offers. On the other hand, the aesthetical appeal revolves around the impact of production and product display, as well as the sensorial advantages of the products. Tactics concerns the collaborations and distinctive business models used by urban farms. To illustrate the driving factors behind Urban

Farming survival, a theoretical model is presented. This model outlines how tactics, competitive and aesthetic appeals play a pivotal role in urban farms' survival through the benefits, values, legitimacy, and overall attractiveness granted by Urban Farming.

Chapter 8. Conclusions

The final chapter of this thesis presents the research conclusions, offering a summary of the study's relevance, theoretical perspective, methodology, and data analysis process. The chapter addresses the research questions and highlights the major and minor theoretical contributions of the thesis, as well as some implications for practice. The chapter also acknowledges the limitations of the study, outlines potential future research directions, and is finalised by the thesis' closing remarks, including a short personal reflection from the author.

Chapter 2. Food systems, Urban Farming, and the built environment

In the previous chapter, the aims and objectives of the thesis were identified, which included the formulation of the research questions. To address these, the issues that have led to the development of Urban Farming as a possible method of large-scale food production need to be better understood. This chapter, therefore, analyses the global food system - focusing on food production and consumption issues, the urban and rural dimensions of food and current urban agriculture and Urban Farming practices.

2.1. Introduction

Due to a perception that agricultural activities are separate from the urban space, food production and nutrition security have traditionally been neglected in the built environment (Steenkamp et al., 2021). However, given the growth in urban population (United Nations, 2022) and the increasing climate change impacts on industrialized agriculture (Lin et al., 2011), amongst other issues, there is a clear need to establish sustainable agricultural production practices suited for this reality. In this context, urban agriculture is proposed as a potential method of intervention for planners to support sustainable food production and strengthen supply chains (Steenkamp et al., 2021).

Urban agriculture is an umbrella term for all the different modalities of agricultural production in cities. This includes urban food gardening, agricultural activities with generally low economic dependence on material outputs destined for social purposes, and Urban Farming, the intentional business models offering local or regional agricultural products originated in cities (Simon-Rojo et al., 2016). Thus, 'farming' indicates the commercial activity of urban agriculture, often done at a larger scale. Since the focus of this research is on urban farms, the adopted taxonomy of this thesis will be 'Urban Farming' and 'urban farm', with the abbreviation 'UF', which will stand for 'urban farm' as the physical site.

This chapter presents the topic of urban agriculture, which underpins this thesis. First, the urban and rural dimensions of food will be discussed, with attention to urban food systems. Then, a section dedicated to urban agriculture and Urban Farming follows, which includes subsections on food security and urban resilience, environmental impacts of food and types of Urban Farming. The theoretical frameworks used in Urban Farming studies, their benefits, potential, criticisms and limitations and their integration into the built environment are also examined.

2.2. The global food system

Food systems relate to all activities, resources, and outputs concerning the pre-production, production, processing, distribution, preparation, and consumption of food, including its losses and waste (Niles et al., 2017). Rastoin & Ghersi (2010) define the food system as: "*an interdependent network of actors (businesses, financial institutions, public and private bodies) located in a given geographical area (region, State and plurinational area), while directly or indirectly participating in the creation of flows of goods and services geared towards fulfilling the food needs of several consumer groups locally or outside of the considered area*" (Rastoin & Ghersi, 2010, p. 19). At the global level, the food system is extremely complex and multi-scaled, involving a multitude of private, public, and civil stakeholders (Lang et al., 2009). To monitor the efficiency and applicability of this intricate network of activities that govern the global food system, entities such as the Food and Agricultural Organisation (FAO) of the United Nations work to identify and remedy gaps in food access, leading to an increased awareness of the challenges concerning global food production. Understanding the nutrition needs of a post-war world led to the 'green revolution' starting in the 1960s, in which significant food research and development efforts led to its increase in productivity, varieties of crops, improved application of pesticides, herbicides and fertilisers, and improved rural infrastructure and water management (Mazoyer & Roudart, 2006).

As a result, while the world's population doubled between 1961 and 2007 (2.2 times), agricultural production tripled (3.1 times), with the per capita food production increasing by 41% in the same period (Lam, 2011). The agricultural land area (arable

and pasture) expanded by only 10%, from 4.36 to 4.79 billion hectares, and the arable area grew by only 9% from 1.28 to 1.41 billion hectares (FAO, 2009). Average global food consumption increased as a result, from 2280 kcal per capita per day to 2800 kcal per capita per day (Pretty, 2012). The agricultural gains associated with the green revolution made food more accessible, with its cost reducing as much as 75% in some cases (Mazoyer & Roudart, 2006), helping millions of people escape starvation and providing a platform on which rural and urban development has been built (Jenkins, 2018).

However, despite these productivity gains, hunger remains an issue (United Nations, n.d.). Although the green revolution allowed for increased farming yields, it focused on income generation and export rather than sustenance and self-sufficiency (Jenkins, 2018). Hence, the food system's strategies are, for the most part, essentially supply- and market-oriented (Brouwer et al., 2021). Furthermore, food distribution remains unequal, as the increases in food yields have no significant impacts on food access or reduced global poverty (Misselhorn et al., 2012). While it is estimated that there is enough food produced to calorically feed the world, more than half of the population is at risk of hunger (Dybas, 2009; Holt-Giménez et al., 2012).

This rapidly increased productivity has, additionally, accelerated nutrient depletion in soils and decreased the resilience of plants, making farmers progressively more reliant on fertilizers, herbicides, and pesticides (Mosier et al., 2021). The dependence on external inputs and resources has not only imposed financial pressures on farmers but has also caused significant harm to ecosystems that support agricultural practices (Pathak et al., 2022). Use of pesticides has brought negative effects on the health of both food producers and consumers. Hence, despite significant advances in agricultural science and technology that have driven increased food production, there have been multiple, unintended negative consequences, both socially and environmentally.

2.2.1. Environmental impacts of food production

The environmental impacts of agriculture and food production refer to the effects that various farming and food production practices have on ecosystems, which

can be directly or indirectly linked to those practices (Awuchi et al., 2020). There is a growing body of evidence that highlights the environmental damage caused by the global food system. Globally, agriculture occupies 4.8 billion hectares, which is about one-third of the global land area (FAO, 2021) and half of the habitable land (land that is ice- and desert-free).
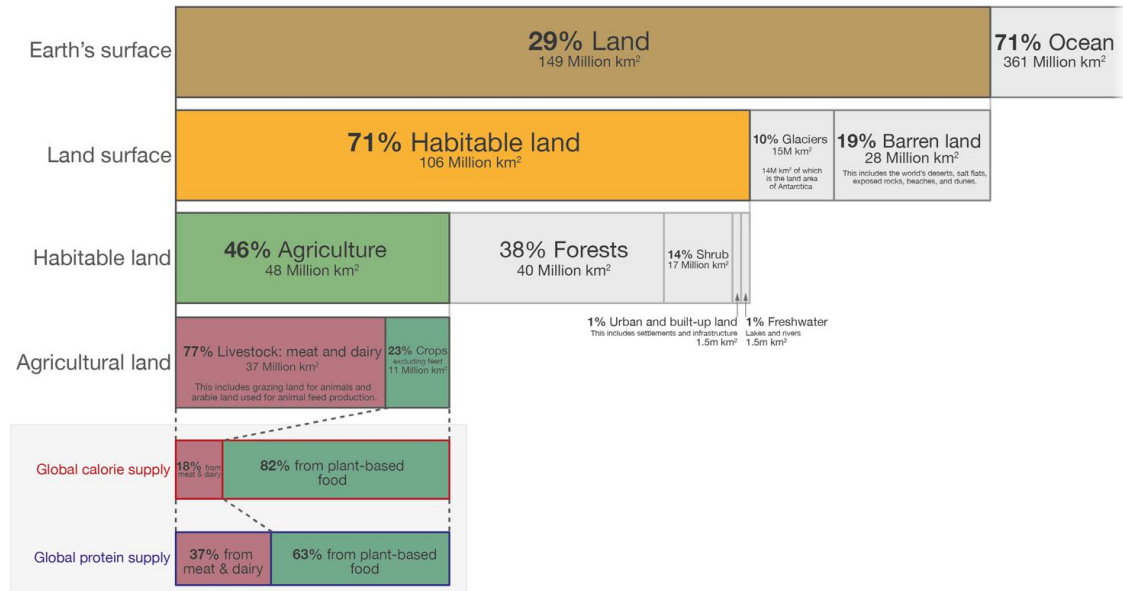
Figure 2. Global land use for food production. Source: Ritchie & Roser, 2013.

Agriculture uses 70% of all water withdrawals worldwide (FAO, 2017) and causes 78% of the global ocean and freshwater pollution of waterways (Poore & Nemecek, 2018). Regarding animal biodiversity, 94% of non-human mammal biomass is livestock, while 71% of bird biomass is poultry livestock.
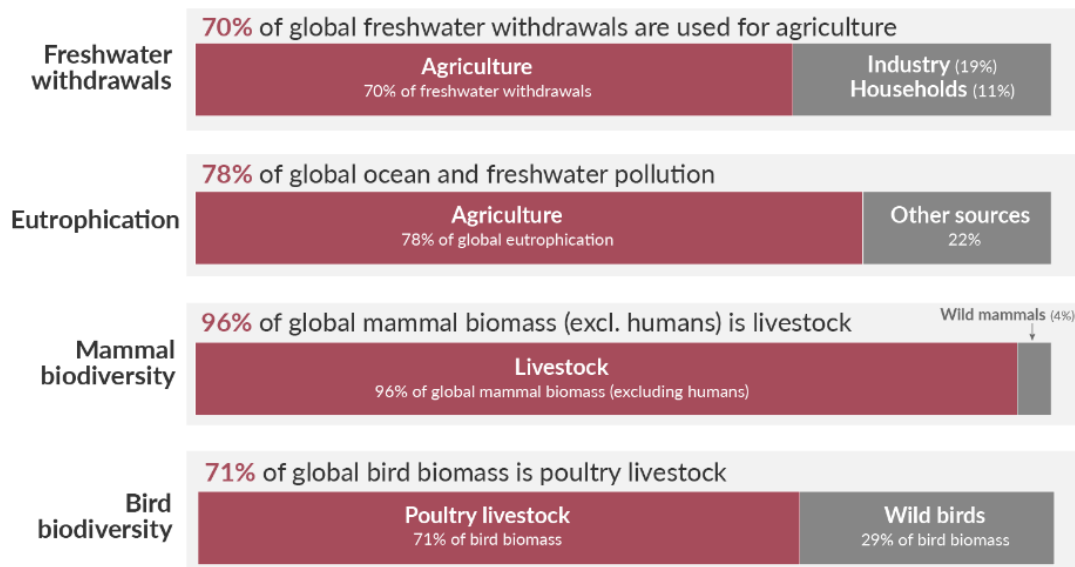
Figure 3. The environmental impacts of food and agriculture. Source: Ritchie et al., 2022.

Crippa et al. (2021) calculated that the food-system emissions amounted to 18 Gt CO_2 equivalent per year globally, representing 34% of total GHG emissions in 2015. The largest contribution came from agriculture and land use/land-use change activities (LULUC) (71%), while the remaining were from supply chain activities: retail, transport, consumption, fuel production, waste management, industrial processes, and packaging (Crippa et al., 2021).
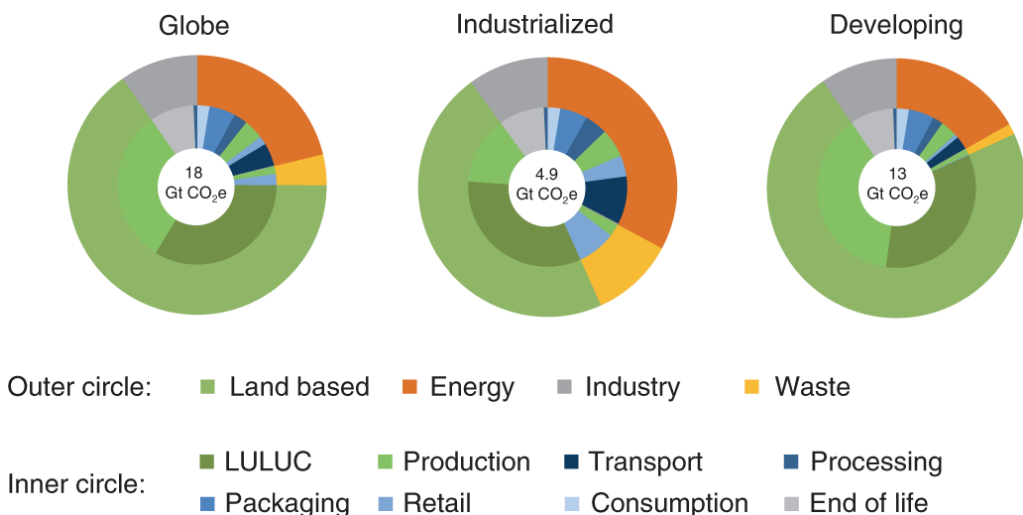
Figure 4. GHG emissions from the food system in different sectors in 2015 (Crippa et al., 2021).

Consequently, agriculture and the food system in general have become the primary cause of loss of biodiversity - at the genetic, species and ecosystem level -

across the world (Benton et al., 2021). The increased use of synthetic pesticides, herbicides and fertilisers contribute to this loss, as well as widespread monocultures and cultivation of new land that was once forest or wetland (Green et al., 2005). Collectively, excessive resource use, exhaustion of land and pollution of the environment, are referred to as negative agricultural externalities, imposing environmental costs that are not factored in the market price of food items (Becker, 2017; Godfray et al., 2010; Pretty, 2012). In the long run, the costs associated with these negative externalities will need to be addressed to guarantee future food production for generations to come (Jenkins, 2018), possibly through lower yields and higher prices.

2.2.2. Diets and nutrition

The definition of what is "food" has undergone significant changes over the last decades. Globalization, urbanization, changes in lifestyles and new food technologies, which led to the production of processed foods, have significantly changed global diets (Vermeulen et al., 2020). The food industry has responded to changing consumer preferences by developing new products that are convenient and easy to prepare, often employing highly processed ingredients containing substantial levels of fat, sugar, and salt (Elizabeth et al., 2020). Concurrently, the decline in the consumption of fresh, whole foods was noticeable over time. The concept of what is considered "food" has shifted from being primarily focused on nutrition and sustenance to include convenience, taste, and affordability (Herforth & Ahmed, 2015). Hence, while total food production and production per capita have increased, the nutritional value of modern diets is questionable, with obesity and other health issues being a major concern (Samaras, 2016; Tahreem et al., 2022). Proper nutrition depends on the consumption and absorption of both caloric energy and essential macro and micronutrients (Butler & Dixon, 2012). However, despite the expanding global food supply chain, nutritional deficiencies arising from poor dietary diversity and food quality are expected to rise due to the poor quality of modern diets (Jenkins, 2018).

Meanwhile, the demand for meat is another topic of concern. Despite being an important source of nutrients, the production of animal proteins has significant negative environmental impacts. It is responsible for a sizable portion of the planet's

GHG emissions, land use, water consumption and water pollution (González et al., 2020). Meat production consumes substantial resources, taking 11-17 calories of food to produce just one calorie of meat (Smil, 2002). Estimates put one-third of all food being diverted to the production of meat (Steinfeld et al., 2006). Concurrently, as meat consumption rises, diverting grains to animal feed and destining more land for grazing, food access around the world diminishes (Van Kernebeek et al., 2016). The increased consumption of red meat and dairy, when combined with bigger intakes of sugar, fat, and salt, is likely to lead to the growing prevalence of obesity and other diet-related diseases (Jenkins, 2018).

2.2.3. Population challenges for food production

As the global population is expected to reach 9.7 billion by 2050 (United Nations, 2022), the FAO expects that food production will need to increase by 50% (FAO, 2018). van Dijk et al. (2021) elaborated five representative scenarios that span divergent but plausible socio-economic futures to conclude that total global food demand is expected to increase by 35% to 56% between 2010 and 2050. If accurate, this increase in production will have to be met regardless of changing climates and concerns over energy security, without the cultivation of additional land and without further damage to essential ecosystem services.

Due to population growth, the amount of agricultural land available per person has significantly decreased. In 1970, there were 0.38 hectares of global agricultural land per capita. By the year 2000, this value had significantly dropped to 0.23 hectares, and it is expected to further decrease to 0.15 hectares by 2050 (FAO, n.d.). Additionally, the improvements in food yields have not had a significant impact on food accessibility or alleviating global poverty, which are the root causes of worldwide hunger (Wu et al., 2014). Hence, the challenge of meeting this substantial increase in food production is not only daunting but is compounded by the inability to meet the demands of a current population of eight billion people. Moreover, climate change is expected to further complicate global food production and food security in the future. These include reduced food quality due to soil nutrient depletion, the accumulation of toxins in crops due to excessive heat or rain, decreased food yields caused by adverse

weather and reduced accessibility and availability due to spoilage in unfavourable warm or wet conditions (Butler, 2014; Butler & Dixon, 2012).

2.2.4. Global food crises

The ongoing inflation in food prices is a product of multiple factors (Ben Hassen & El Bilali, 2022). The most common motivations associated with this are the supply chain disruptions caused by the COVID-19 pandemic and the conflict in Ukraine, which affected grain exports from the Black Sea region (Clapp, 2023). In addition, strong global demand, drought, and poor harvests in have further weakened the global supply chain (Ben Hassen & El Bilali, 2022).

However, at its heart, the food crisis represents a fundamental feature of the food system: the transition of food into a commodity. The production of the world's staple crops destined for export is concentrated in a small number of countries, being shipped by a few large trading firms (Gliessman, 2022). Most globally traded food is grown from a narrow range of seed varieties, using uniform industrial agricultural methods, fossil fuel-intensive machinery, and costly inputs of synthetic chemical fertilizers and pesticides (Gliessman, 2022). This dynamic has led to manufactured food dependencies that are extremely difficult to break. Subsequently, local food systems, from production to distribution, have been severely weakened, impacting severely countries that have shifted their local production to focus on crop exports, ergo losing their food security (Gliessman, 2022).

This partially explains why this is the third food crisis the world has experienced over the last 50 years, alongside the 2007–12 and the 1973–74 crises (Clapp, 2023). The food price spike that followed the 2008 financial crisis, for example, resulted in 100-150 million people facing malnutrition (Watson, 2012), while also contributing to social and political instability in the countries most affected by it. If these crises are any indication of the future, cycles of climate change, conflict and pandemics are likely to continue having significant negative impacts on the global food supply. The current food system is, thus, unable to be employed as a sustainable way of securing food for future populations (Jenkins, 2018).

2.2.5. Addressing the global food system's challenges

The aforementioned issues highlight the significant burden that the existing approach to global agriculture imposes on the environment and societies. The inability to efficiently meet the current and future needs of a planet that increasingly demands more food is a factor that should be acknowledged addressed. The interconnected socio-ecological nature of food systems together with the challenges ahead requires solutions that will need to mobilize varying spheres of technological, political, and economic influences; i.e., energy and resilience, climate change and water use, social capital and gender, biodiversity and ecosystem services, consumption patterns, food supply chains, power and policymaking, and governance (Pretty, 2012). Tackling this unprecedented Grand Challenge means not only increasing food production that is affordable, accessible, and nutritious, but in doing so utilising methods that are both socially and environmentally sustainable (Godfray et al., 2010; National Research Council, 2010).

To achieve this, an extraordinary effort must be undertaken through a new agricultural revolution with a more rational use of scarce land and water (Watson, 2012). This approach must simultaneously consider ecological, climate and energy issues to ensure a future global food system that delivers healthy, nutritious food to all (Butler & Dixon, 2012). Nevertheless, this needs to be achieved in an adverse scenario, with slower increases in productivity, higher competition for water, exhaustion of agricultural soils and looming effects of climate change (Watson, 2012).

2.3. Urban and rural dimensions of food

Dividing areas between either rural or urban is a common form of interpreting the physical human space, with mainstream census data, for example, segregating the population into these two segments (Vejre et al., 2016). Whereas the urban system deals with trade, industrial production and the presence of legal systems and administration, the rural system is associated with the production and supply of food, energy, and fibres (Vejre et al., 2016). Hence, given this contrast, whatever area is not 'urban' must, therefore, be 'rural' and vice-versa. However, urban areas are widespread and continuously sprawling over to green and peri-urban spaces, the

fringe regions of cities defined by their intimate relationship with nearby metropolitan and rural areas (Buxton et al., 2006), making boundaries unclear (Kabisch & Haase, 2014). The gradual transition from urban to rural implies a definitional problem related to the location of the urban-rural border (Lichter & Brown, 2011), as the 'urban shadow', lands under the influence of a given urban area, is hard to assess and, along with the urban dynamic, everchanging.

Food production has traditionally been regarded as an issue outside the urban domain, mainly relegated to the rural sphere. This is reflected in the rural bias on food security issues dominating global discourse (Steenkamp et al., 2021). However, not only do the majority of people today live in urban environments, but, of the global population expected to reach 9.7 billion people by 2050 (United Nations, 2022), it is predicted over two-thirds will be residing in urban areas (United Nations, 2022) as indicated in **Figure 5**.
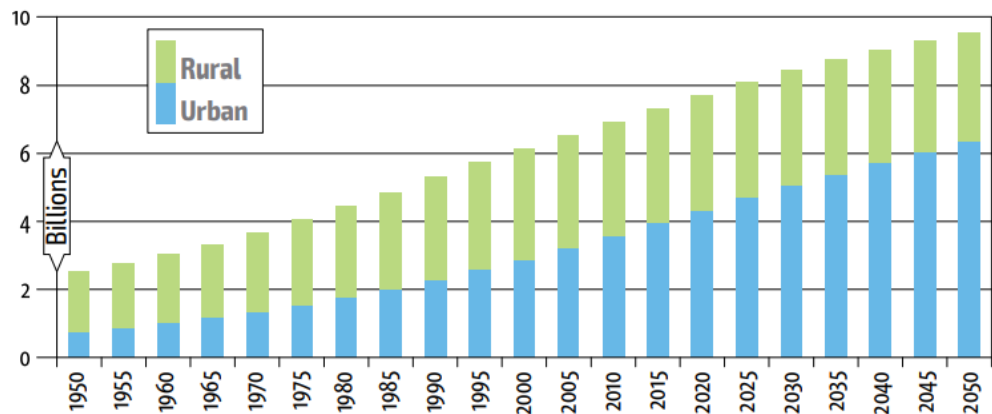
Source: UN, 2015.

Figure 5. Growth in global urban and rural populations to 2050 (United Nations, 2022).

Modern cities almost exclusively rely on the import of resources to meet their daily basic needs (Grewal & Grewal, 2012). The more perishable the food products, the more frequent their replenishment needs, which contributes to more frequent and longer distances travelled by freight vehicles, thus incrementing emissions and waste (Oliveira et al., 2021). In addition, to support these long journeys to the final consumer, often in cities, many producers rely on agrochemicals and preservatives, further compromising food quality. This puts further strain on the ability of rural environments

to support the food demands of growing urban populations (Steenkamp et al., 2021), as the productivity demands of rural land have increased significantly. Whereas a single hectare of agricultural land could feed 2.6 people in 1970, the same area of land will need to supply enough food for 6.7 people by 2050 (FAO, 2012).

The dissociation between the loci of food production and food consumption further risks the food security of urban residents (Steenkamp et al., 2021). This scenario stresses the need for a more expansive and appropriate approach to food production to serve the urban population, one that includes sustainable food production methods and supply chains (Steenkamp et al., 2021) and accounts for the expanding urbanization and increasing food insecurity (Parece & Campbell, 2017). In this context, Urban Farming, through its varied manifestations, can offer a multi-dimensional solution to these problems (Martellozzo et al., 2014; Parece & Campbell, 2017). It improves access to healthy and nutritious fresh food, especially reducing food insecurity in lower-income urban populations (Mougeot, 2000; Nasr et al., 2001), revitalizes inner cities, promotes social interactions, improves urban hydrology, and mitigates adverse climatic effects (Parece & Campbell, 2017) and reduces transportation costs food (Deelstra & Girardet, 2000), among other benefits.

2.4. Urban agriculture and Urban Farming

The two most common definitions of urban agriculture have originated from a publication by the United Nations Development Program (UNDP, 1996) and from Mougeot (2000). Broadly speaking, urban agriculture is generally defined as the practice of growing crops and rearing livestock, destined for food, fuel and other uses, in urban, suburban, and peri-urban areas (Mougeot, 2000; UNDP, 1996). It includes any "*industry that produces, processes and markets food, on land and water dispersed throughout urban and peri-urban areas*" (UNDP, 1996) and may include gardens and allotments, rooftop gardens, building integrated greenhouses and complex indoor plant factories (O'Sullivan et al., 2019a).

Urban Farming, in turn, as described by Hashim et al. (2020), is an agricultural activity happening within an urban destination beyond merely food production, including additional environmental, economic, and social aspects. The integration of

urban agriculture into the urban economic and ecological system, interacting with the host city's material and energy metabolism (Koc et al., 1999), is the main distinguishing factor that differentiates urban from rural agriculture rather than its urban location only (Mougeot, 2000). Vejre et al. (2016) distinguish urban agriculture from industrial agriculture based on an assessment of the spatial (where?), functional (what?), motivational (why?), market (where?), origin (how?) and actor (who?) dimensions of production. Under these definitions, and respecting the aforementioned conditions, there are few restrictions on the form or scale of food production that can be termed urban agriculture (O'Sullivan et al., 2019a).

A practice as old as human settlements (Van Leeuwen et al., 2011), urban agriculture was common in the industrial cities of the 19th and early 20th century as it provided subsistence, health, and social stability for factories workers (Moran, 2010). However, by the end of the 20th century, urban sprawl, material prosperity, job opportunities, new lifestyles and the international corporate monopoly on food structures had greatly reduced the practice (Viljoen et al., 2005). Yet, urban agriculture has traditionally intensified during periods of crisis when food supply is negatively affected, such as wars, economic recessions, and droughts (Deelstra & Girardet, 2000; Iaquinta & Drescher, 2015). During World War II, for example, household urban agriculture was promoted in the UK and the USA through the 'Dig for Victory' and 'Victory Garden' campaigns, playing an important role in increasing food security (Mok et al., 2014). In Cuba, especially after 1991, urban agriculture, through the collective action of the government and communities, has been instrumental to prevent a catastrophic shortfall of food in the country (A. J. Hamilton et al., 2014). But, for most parts of the world, and particularly in developed countries, there was a period of decline in activity in the post-war years.

Recently, however, with new technologies and agro-architecture being employed to grow food in cities at a commercial scale in developed countries, there has been a resurgence of interest in urban agriculture (O'Sullivan et al., 2019a). This has been accompanied by an increase in media coverage and attention from the general public and decision-makers (Baker & de Zeeuw, 2015), with ambitious claims of its potential for alleviating many issues of the current food system (O'Sullivan et al., 2019a). Among these, improved health, and well-being for city residents (Brown &

Jameton, 2000), lowering the carbon footprint of food production (Coelho et al., 2018) and improving food security (Despommier, 2011) are highlighted. The following subsections will explore the different types of Urban Farming, how it addresses food security and urban resilience, the environmental impacts of food, the theoretical frameworks used in Urban Farming studies, its benefits, potential and criticisms, and how to integrate Urban Farming into the built environment.

2.4.1. Types of urban agriculture and Urban Farming

Urban agriculture comes in multiple sizes and forms ranging from micro-gardening (i.e., containers on balconies and patios), mesoscale (i.e., shared garden plots) and macro-scale (i.e., urban farms) (Pearson et al., 2011). In classifying the typologies of urban rooftop farming, Sanyé-Mengual et al. (2015) divided Urban Farming into its objectives, either for commercial or social activities, and the types of farming, whether they were indoors or outdoors, but did not include different classifications regarding their growing technologies. The scale at which urban farms operate also significantly impacts production capability, start-up costs, and manpower (Parece & Campbell, 2017).

Due to their simplicity and lower costs, home gardens are the most common form of urban agriculture (Smit et al., 2001), providing food for household consumption to an individual or family in an area adjacent to their residence (Drescher et al., 2006). This can be in backyards, side yards and front yards, and consist of micro-gardening in containers on windowsills, patios, and balconies (Pearson et al., 2011). A 'community garden' consists of participants of a community in which each member has its own plot, owned by a community garden association, and contributes to the maintenance and care of common areas (Iaquinta & Drescher, 2015). Similarly, Informal gardening, or guerrilla gardens, are made by local residents who occupy vacant lots and maintain and cultivate them without the permission of the landowner (Hardman & Larkman, 2014). On the other hand, allotment gardens are community gardens that benefit from direct sponsorship and management of the local government (Parece & Campbell, 2017). In common, all these forms of urban agriculture are, in essence, for hobby or subsistence.

In contrast, urban farms are commercial in nature. They account for the greatest extent of urban agriculture, by area (Smit et al., 2001). Urban farms operate for-profit by families or commercial enterprises in most instances and include greenhouses, rooftop gardens, and community-supported agriculture (Parece & Campbell, 2017). In the literature, the term Zero-acreage Farming (ZFarming) is often used to describe these kinds of farms, characterized by the non-use of farmland or open spaces, instead opting to utilize otherwise unused spaces in the urban built environment, including low-tech alternatives such as rooftop open-air on-soil farming (Benis & Ferrão, 2018; Specht et al., 2014; Thomaier et al., 2015). Due to the constraints imposed by the built environment and the technological growing adaptations, many forms of urban farms exist, both indoors and outdoors.

Goldstein et al. (2016) developed a taxonomy that exemplifies most types of urban farms, classifying them into four broad categories that account for the demand for energy and materials used on site, as shown in **Figure 6**. Hence, farms are ground-based or building integrated and conditioned or unconditioned, which refers to the varying levels of environmental control such as lighting, heating, and humidity. The authors also characterized the four resulting classifications by their operational characteristics, capital inputs and potential for urban symbiosis. Based on these categorizations, Koegler et al. (2017) conducted a further sub-division of the aforementioned four categories based on economic models and size for ground-based structures, and technological sophistication and access to sunlight for building-integrated ones. The research demonstrated the diverse potential of these sub-categories concerning climate change adaptation and mitigation.

Figure 6. Proposed taxonomy of urban farms by Goldstein et al. (2016).

Benis & Ferrão (2018) utilize Gould & Caplow's (2012) concept of Building-Integrated Agriculture (BIA) to propose a typology of urban farms. With the objective of implementing large-scale urban horticultural production that delivers high yields, BIA adapts soilless cultivation techniques, such as hydroponics or aquaponics, and integrates them into the building. These are intended for outdoor use on the building envelope, taking advantage of the availability of natural light on rooftops or facades, and/or indoors in a fully controlled environment, exploiting synergies between the buildings and the agricultural activities (Gould & Caplow, 2012). The five urban farm types proposed within the typology are rooftop farms and roof greenhouses, vertically integrated greenhouses, vertical farms, and shipping container farms (**Figure 7**).
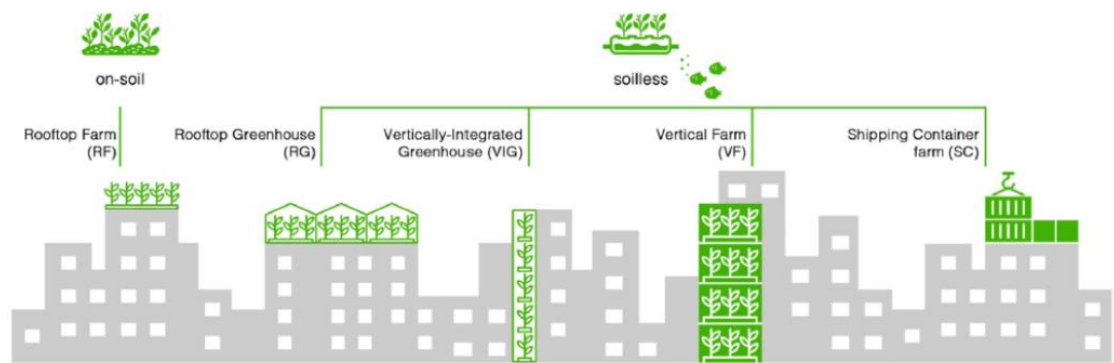
Figure 7. Typologies of commercial urban farms, adapted from Benis & Ferrão (2018).

Rooftop farming, one of the most popular forms of Urban Farming due to its site and solar availability, is either practised on intensive green roofs, using soil, or in Rooftop Greenhouses (RG), usually equipped with hydroponic equipment. In the more technologically advanced of these farms, greenhouses may include recirculating water systems, waste heat captured from the building's HVAC system, photovoltaic solar panels, rainwater harvesting systems and evaporative cooling (Gould & Caplow, 2012). Vertically Integrated Greenhouses (VIG) systems is a concept combining double skin building facades with hydroponic systems, that has yet to be implemented (Benis & Ferrão, 2018). Vertical Farming (VF) grows crops in controlled environments using soilless cultivation methods, frequently stacking plants vertically on shelves or tall pillars. Lastly, insulated and fitted out Shipping Containers (SC) are commercial Urban Farming modules that can be installed in vacant lots, warehouses, basements, or

rooftops. A technologically intensive method, container farms are equipped with state-of-the-art climate control technology and hydroponic growing equipment (Benis & Ferrão, 2018). Urban farms using controlled environments enable year-round production, which is especially advantageous in countries with harsh climates.

2.4.2. Food security and urban resilience

The physical and economic access and the stability of food provision form the basis of food security, which also includes a sufficient biological utilization of food consumed (i.e., the capacity of the human body makes the most of various nutrients) (FAO, 2008). The FAO defines food security as an ideal in which all people can physically, socially, and economically access adequate, healthy, and nourishing food at all times to satisfy their nutritional requirements to live an active and healthy life (Azra et al., 2021). In developed parts of the world, food security relates to the quality of food production systems, aiming to produce more food materials locally (Kalantari et al., 2020), as well as assimilating the pressures stemming from the ecological and political implications into their food supply system (Morgan & Sonnino, 2010). However, food insecurity, especially the accessibility of food, is a greater challenge for developing countries mainly located in Asia, Africa, and Latin America, with nearly 670 million people estimated to be undernourished in 2030, or 8% of the projected global population (FAO et al., 2022).

Cities are currently highly dependent on globalised supplies, making them vulnerable to environmental, economic, social, and geopolitical disturbances (FAO, 2020; Ingram et al., 2020; Sustainable Food Trust, 2020), as recently evidenced by the Covid pandemic. Thus, the current urban paradigm of development needs to change from prioritizing economic growth to more valuable urban systems' sustainability and resilience (Oliveira et al., 2021), to which urban agriculture can increase city resilience by strengthening its food system (Gulyas & Edmondson, 2021). Resilience can be improved through local self-reliance, in which localities should strive to obtain their necessities, such as food, energy, water, and materials, from within their own physical footprints (Grewal & Grewal, 2012). Local production and the development of shorter supply chains could decrease the likelihood of disruption to food supplies and reduce dependency on external inputs, making the food system able to react and adapt to

shocks (Dubbeling et al., 2019; Ingram et al., 2020; Tendall et al., 2015). Moreover, utilizing unused urban spaces can enhance food production without the need for additional scarce land resources, and certain types of urban agriculture can provide protection against adverse weather conditions, ensuring consistent and year-round crop cultivation (Chang & Morel, 2018; Sanyé-Mengual, Oliver-Solà, et al., 2015; Winiwarter et al., 2014).

2.4.3. Environmental impacts of urban agriculture

Supplying food to cities is associated with a range of environmental challenges such as contributing to greenhouse gas (GHG) emissions, biodiversity loss, water pollution, land-use change, and non-renewable resource exhaustion (Garnett, 2013). Due to increasing demand based on population and income growth and dietary change, The total GHG emissions from agriculture are likely to increase by about 30–40% by 2050 (based on the period 2007-2016) (FAO, 2021). Therefore, transitions towards sustainable urban systems must include the mitigation of the environmental impacts derived from urban food consumption (Goldstein et al., 2016). This can be done through measures addressing demand, such as implementing Pigovian taxes (i.e., tax on activities deemed to generate negative externalities) (Edjabou & Smed, 2013) and adapting diets (Saxe, 2014), or supply, promoting eco-efficiency gains within existing production systems (A. S. Davis et al., 2012; Tilman et al., 2011).

For the latter, urban agriculture is regarded as one possible answer due to its potential environmental benefits. Across the literature, numerous benefits are cited, for instance, that it: makes productive use of vacant lands (Grewal & Grewal, 2012; Parece & Campbell, 2017) reduces stormwater runoff, increases groundwater recharge, and improves water quality (Schuetze et al., 2013; van Leeuwen et al., 2010); reduces urban heat island effects (van Leeuwen et al., 2010); enables the recycling of organic urban wastes as fertiliser and reduces reliance on mineral fertilisers (Dubbeling et al., 2019; Schuetze et al., 2013); promotes environmental knowledge of urban residents (Parece & Campbell, 2017; Viljoen et al., 2005); and generates ecosystem services (Parece & Campbell, 2017; van Leeuwen et al., 2010).

Yet, much of the discourse around urban agriculture's environmental potential focuses on its ability to reduce the distance from farm to fork (Goldstein et al., 2016). Furthermore, the extent to which these claims are true and, thus, urban agriculture's environmental performance advantage over conventional agriculture, is still a matter of debate, as empirical data verification is still incipient (Pearson et al., 2011; Specht et al., 2014). Sanyé-Mengual et al. (2013) and Sanyé-Mengual et al. (2015) assessed that tomatoes produced on urban rooftop greenhouses have lower embodied environmental burdens relative to traditionally cultivated tomatoes. However, the same authors assessed major differences in environmental performance between the different cultivation methods on the same rooftop (Sanyé-Mengual et al., 2015). Thus, urban agriculture systems with fundamentally dissimilar characteristics would tend to have greater differences in performance, making it difficult to assess their environmental performance. Consequentially, it remains unclear whether installing different forms of agricultural production in cities across the globe constitutes a net reduction in food-related environmental impacts from cities, necessitating a holistic and systematic look at urban agriculture's environmental performance (Goldstein et al., 2016).

2.4.4. Benefits and criticisms

The list of benefits propagated by proponents of urban agriculture is extensive. In short, they claim that this agri-food model can produce positive results considering environmental, economic, and social dimensions (Nasr et al., 2001; Oliveira et al., 2021; Olsson et al., 2016). The more evident benefits, and, thus, the ones that gain more attention when discussing urban agriculture, were listed by Hashim et al. (2020), based on Hui (2011) and Noseir (2014), dividing them between their environmental, social, and economic dimensions. These are shown in **Table 1**.

Environmental	Social	Economic
• Greener the environment • Recycle organic waste • Reduce ecological footprint • Mitigate urban heat island • Improve urban stormwater management	• Strengthen the community relationship • Education • Community green space and amenity	• Local food production • Increase food security • Generate profits • Local employment

Table 1. Benefits of Urban Farming - adapted from Hashim et al. (2020), based on Hui (2011) and Noseir (2014).

However, more interestingly are the benefits not very commonly associated with urban agriculture, such as adding restorative infrastructure to cities (Keeffe & Jenkins, 2017). Restorative qualities, are positive responses to natural environments, allowing for the recovery of physiological, psychological, and social resources that have become diminished in efforts to meet the demands of everyday life (Hartig, 2007). The restoration can also be achieved through non-tangible experiences, such as viewing nature through a window, allowing people the opportunity for 'micro-restoration' in their everyday indoor environments (Keeffe & Jenkins, 2017). Although the level of interaction would depend on the type of urban agriculture, the engagement with the public would bring with it a multitude of opportunities for micro-restoration throughout the day as well as opportunities for full psychological restoration through the creation of vegetative social spaces and centres for commerce (Keeffe & Jenkins, 2017).

On the other hand, Urban Farming has often been criticized for its potentially high-energy demand and concerns about health and safety related to contamination and diseases (Cofie et al., 2005; Dongus et al., 2009; Ellis & Sumberg, 1998). Urban hydroponic farms, for example, tend to have a substantial energy consumption, which may offset their potential for greater yields and water conservation methods (Barbosa et al., 2015). Due to the technological and capital-intensive nature of many of these farms, their economic viability in the absence of guaranteed long-term profits is also questionable (Carolan, 2020). Moreover, by itself, Urban Farming cannot ensure vegetable self-sufficiency for urban populations and even less solve the general problem of food security, due to limited urban area that constrains its food supply

capacity (Martellozzo et al., 2014). More importantly, Urban Farming would require significant urban space to produce the necessary amount of food to meet the global vegetable consumption of urban dwellers, with one study showing it could number around one third of the total global urban area (Martellozzo et al., 2014). Its current scale is difficult to measure and the limited evidence available suggests that urban food production is especially important for poorer households (Zezza & Tasciotti, 2010), meaning small-scale agricultural activities in developing countries are more significant for food security than aforementioned capital-intensive industrialised farms.

2.5. Urban Farming and the built environment

The built environment is formed in response to an existing and ever-changing set of conditions, which reflects the social, political, and economic climate, as well as functionality. This response should, in theory, contribute to finding solutions that address the challenges posed by these initial conditions (Ching, 1979). The need for a more expansive food system that takes into account the needs of a growing urban population must, thus, acknowledge its role within urban settings and it is within this context that Urban Farming develops. Considering the expanding urban population and the necessity for a more robust food system, understanding, and recognizing the role of Urban Farming within urban settings becomes paramount. Within this context, Urban Farming emerges as a compelling approach to meet the evolving demands of urban communities and address the pressing need for sustainable food production.

2.5.1. Construction of urban farms

The design and construction of urban farms, as explained in section 2.4.1, heavily depend on their characteristics. Large-scale and technologically complex farms often require significant investments in or the development of new materials and techniques, some of which have not yet been fully realized (Specht et al., 2014). Moreover, many conceptual designs mentioned in section 2.5.3. combine various individual technologies that are known but have never been used together, or they call for entirely new building materials or cultivation techniques (Specht et al., 2014).

With the rapid growth of Urban Farming as an activity, numerous research and educational institutes, real estate developers, business ventures, and construction companies are actively involved in developing urban farms, leading to a plethora of unique and innovative designs (Shamshiri et al., 2018).

In this context, a study by D'Ostuni et al. (2022) reviewed 21 cases of urban farms incorporating Building-Integrated Agriculture (BIA) to explore the concept of Embedded Circular Features (CF) during the construction phase of these farms. The primary principles were expertly employed to retain product and material value, minimize waste, and resource use, and generate additional value. In retrofitting projects, rather than resorting to conventional demolition and reconstruction, buildings or components were repurposed as construction parts, while temporary installations were thoughtfully designed for future dismantling and material reuse (D'Ostuni et al., 2022). Notably, BIA projects employed material choices and passive solutions to optimize energy efficiency and enhance the productivity of farming spaces. Smart materials and sensor-based climate control systems in greenhouses effectively reduced energy consumption and minimized energy loss (D'Ostuni et al., 2022). Furthermore, the selection of construction materials, whether reused or new, played a significant role in conserving energy and reducing carbon emissions, thereby maximizing the overall efficiency of farming spaces. By integrating circular features with sustainable practices, BIA projects promoted resource efficiency and environmental benefits in urban agriculture (D'Ostuni et al., 2022).

The emphasis on circular principles and sustainability in the design and construction of urban farms reflects the growing significance of sustainability within the built environment. This recognition prompts a closer examination of the pivotal role played by the construction industry in incorporating sustainable practices, particularly concerning Urban Farming.

2.5.2. Sustainability in the built environment

The construction industry has gradually begun to internalize the importance of incorporating sustainability in its projects through sustainable construction (Construction Innovation Hub, 2021). This is especially important given the significant

environmental and social impact created by construction activities (Myers, 2005; Tan et al., 2015). Thus, the construction industry has increasingly been pressured by civil society and regulators to change and address these concerns in projects (Berardi, 2012; Sev, 2009; Tan et al., 2015), engaging and investing in sustainable construction, which emphasizes resource-efficient and ecologically based principles (CIB, 1999). Sustainable construction aims not only to attend to the needs of its clients but to do so in an economic, social, and ecologically responsible form (Plessis, 2007).

Engaging in sustainable construction is the industry's response to sustainable development (CIB, 1999). With the emergence of discussions centred on sustainability in the late 1980s, which includes the influential Brundtland Report developing the guiding principles for sustainable development (Brundtland, 1987), ecologically sustainable construction began to receive attention, as well as the environmental and social impacts created by the construction industry (Myers, 2005). Governments, clients, users, and the general public are becoming increasingly aware of the construction industry's role in environmental degradation (Ofori, 1992). Hence, construction companies are assimilating ideas of sustainability in their marketing, corporate communication, annual reports and, most significantly, in their actions, especially through sustainable projects (Silvius & Schipper, 2014).

The construction industry has a major influence on the progress of sustainable development (Bae & Kim, 2008). Due to its scale and widespread presence, this industry and its related activities impact heavily on the environment (Hill & Bowen, 1997). It is a significant contributor to climate change (Plessis, 2007), one of the largest global polluters (Gluch & Bosch-Sijtsema, 2016; Horvath, 2004), while also consuming high levels of energy and causing environmental damage and resource depletion (Ortiz et al., 2009).

Most impacts associated with the construction industry are related to energy consumption, dust and gas emission, noise pollution, waste generation, water discharge, misuse of water resources, land misuse and pollution, and consumption of non-renewable natural resources (Shen et al., 2007). Hence, to minimize the industry's environmental impacts, sustainable construction has become an important focus of research and development (Ding & Forsythe, 2013; Kuitert et al., 2019). By adopting this strategy, the construction industry can maintain its activities while making a

responsible contribution towards protecting the environment (Du Plessis, 2007; Hill & Bowen, 1997).

Sustainable construction is known as the "creation and maintenance of a healthy built environment using ecologically sound principles" (Kibert et al., 2000). In this kind of construction, there is a responsibility and process to achieve environmental sustainability (Hill & Bowen, 1997). This term comprises a process starting in the planning and design stages and continuing long after the construction has concluded, including managing the serviceability of a building during its lifetime and in the eventual deconstruction and recycling of resources to mitigate the demolished waste (Hill & Bowen, 1997; Tan et al., 2015). Sustainable construction emphasises both environmental protection and value addition to the quality of life of individuals and communities (Du Plessis, 2007). Requiring a more thorough analysis of the many actors involved in the whole construction life cycle than those traditionally identified in construction projects, sustainable construction aims to not only attend to the needs of its clients but to do so in an economic, social, and ecologically responsible form (Du Plessis, 2007). These dimensions are considered the three pillars of sustainable construction, influencing construction projects' performance (Li et al., 2018; Pocock et al., 2016; Wang et al., 2018). The activities of the construction industry directly contribute to industrial growth (economy), while consuming resources and generating waste (environment) to create the facilities necessary to develop and improve the living standard of a community (social), linking it to the sustainable pillars (Leje et al., 2020). Thus, in theory, sustainable construction should accommodate all pillars of sustainability for the construction industry to become sustainable (Kordi et al., 2021). However, since there is no uniformity in the conceptions of these pillars, different projects may emphasize one or two values above the other(s), depending on the construction company's perception of sustainability (Berardi, 2012; T. Jones et al., 2010; Kordi et al., 2021).

Sustainable construction comprises undertaking an assessment of proposed activities using a life cycle framework (Hill & Bowen, 1997; Mokhlesian & Holmén, 2012). Hence, sustainable construction starts at the planning stage of a building, continuing throughout its life to its eventual deconstruction and recycling of resources (Hill & Bowen, 1997). This includes changing the entire cycle of construction materials

to reduce the industry's environmental and resource impacts (Kibert et al., 2000). The building life cycle analysis is shifted from the established "cradle-to-grave" strategy to a "cradle-to-cradle" approach, which takes into account the material disposal and recycling at the end of the life of a building (Mokhlesian & Holmén, 2012).

To engage in real change, the implementation of sustainable construction practices may require substantial adjustments in the structure and processes of construction firms (Ahn & Pearce, 2007). Construction companies engaging in sustainability must alter their business model as it changes cost structure, partner network and capability elements when parting from conventional construction (Mokhlesian & Holmén, 2012). The implications of changing a project's traditional value configuration to one that includes features that highlight the social (Barraket & Loosemore, 2018), environmental (Hill & Bowen, 1997) and financial (Duong et al., 2021; Feige et al., 2013) benefits must be clear for developers and clients (Mokhlesian & Holmén, 2012). Hence, there are clear organisational implications for construction firms choosing to engage in sustainable construction in the built environment.

2.5.3. Integrating Urban Farming into the built environment

Integrating Urban Farming into the built environment is a complex task. The limited space and competitive real-estate markets are usually constraining elements for food production sites. At the same time, location is a key factor in Urban Farming (Kalantari et al., 2020), as production cannot be located far from consumers. Conceptual designs of UFs are usually set within highly dense areas of cities, integrating food production into the built methods (de Anda & Shear, 2017). Despite the higher costs of these areas, the insertion of production structures into the built environment occupies otherwise underutilized space in the built environment, such as rooftops (Harada & Whitlow, 2020), basements, facades, and vertical spaces (Specht et al., 2014; Thomaier et al., 2015). Hence, the idea is to transform increasingly dense cities and design the future urban environment around a sustainable food infrastructure (Gorgolewski et al., 2011).

Initiatives such as 'eco-effective architecture' are becoming increasingly popular within the context of 'sustainable eco-cities' (Specht et al., 2014). The

challenge to be addressed by these designs is to combine the aesthetic, ecological, and productive principles into productive and eco-efficient buildings (Komisar et al., 2009). The planning and design of constructed ecosystems that enable efficient urban food production could offer opportunities for advancing the 'ecology of cities' which is the science of coupled human-natural systems in the urban environment (McPhearson et al., 2016). By contrast, 'regenerative' design and development is an emerging notion that emphasizes a co-evolutionary, partnered relationship between humans and the natural environment to, in this case, enhance urban food supply (Cole, 2012). These approaches are very different from industrial farming in terms of environmental and economic performance, but are, nonetheless, direct outcomes of urban planning and design intentions (Harada & Whitlow, 2020), which are important and testable subjects for understanding and improving coupled human-natural systems. Furthermore, this emphasis on the ways and extent that buildings should mitigate resource depletion and environmental degradation, highlights the need for the built environment to deal with the problems caused by the development of the built environment itself.

The establishment of building design priorities is intricately intertwined with the dominant paradigm and value system prevailing in the societal and cultural context in which they originate (du Plessis & Cole, 2011; A. King, 2004). Likewise, the selection and utilization of technologies by a society serve as manifestations of its culture and its comprehension and interaction with natural systems (Cole, 2012). Encased within this overarching value framework, the degree to which environmental concerns are emphasized in building design is additionally influenced by immediate societal preoccupations arising from significant events, such as the rapid urban populational growth and environmental and food crises. Furthermore, execution and delivery are influenced by the construction industry's developing ability to realise sustainable construction practices in the projects that it creates. Thus, it can be argued that the recent surge in the proliferation of Urban Farming initiatives can be interpreted as a reflection of the prevailing societal attitudes towards sustainability and the environment.

2.6. Chapter conclusion

The problems associated with the current global food system are increasingly evident. The environmental impacts of food production are substantial, with agriculture occupying a large portion of land, consuming significant water resources, and contributing to greenhouse gas emissions and biodiversity loss. In addition, the shift in global diets towards processed foods has resulted in nutritional deficiencies and the rise of obesity and diet-related diseases. Within this context, global food crises have occurred, driven by factors such as supply chain disruptions and dependence on a few countries for staple crop production, highlighting the vulnerability of the current food system.

To address the challenge of feeding an increasingly urban global population and to make the food system more resilient to different crises, a set of alternative food production methods must be implemented, including sustainable methods and supply chains. In this context, Urban Farming provides one of the possible solutions, supplying food where demand is highest. It improves access to fresh food, reduces food insecurity, revitalizes cities, and lowers transportation costs. Although this production will never be able to meet the full demands of urban populations, it can help reduce the need for imported foods and improve their quality, as well as reduce the need to cultivate natural environments elsewhere (Keeffe & Jenkins, 2017). This emphasizes the importance of incorporating Urban Farming initiatives into the field of construction, stressing the need for an integrated approach between farming and the built environment. Furthermore, there are indirect benefits of Urban Farming which are not directly related to food production, such as increasing green spaces within the city and urban regeneration, improving air quality, and fostering social interactions and community building.

Chapter 3. Theoretical frameworks

The previous Chapter introduced the challenges and problems of the current food system and the concept of Urban Farming and presented this within a built environment context within which sustainable construction was emerging. This chapter outlines the theoretical frameworks upon which this study is built. Social Movement, Institutional, and Stakeholder theories offer valuable lenses through which to comprehend the context in which urban farms operate. Moreover, a systematic review of literature (SRL) has been undertaken, presenting the research landscape concerning Urban Farming in the management field. This evaluation not only delineates the current scope of research but also exposes theoretical gaps that the Social Movement, Institutional, and Stakeholder theories stand poised to fill.

3.1. Introduction

In this chapter, three distinct frameworks, Social Movement, Institutional and Stakeholder theories are presented. This process is shown in **Figure 8**.
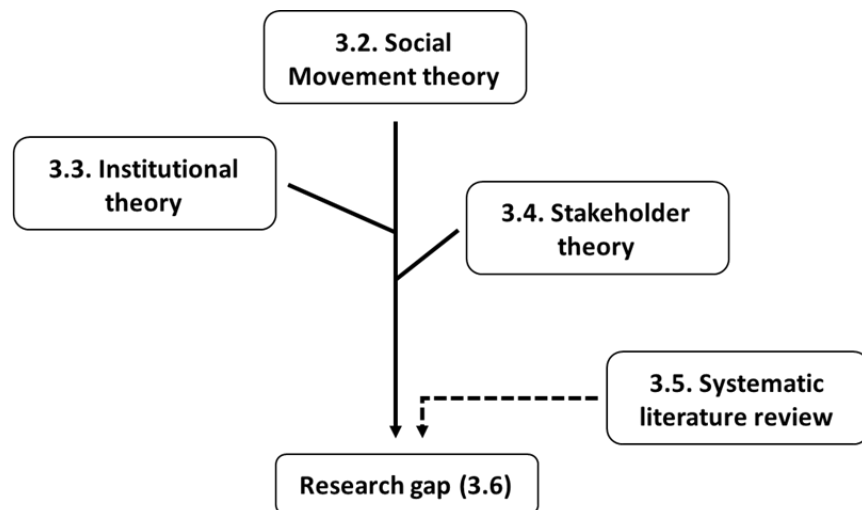
Figure 8. Structure diagram for Chapter 3.

While other theories commonly used in the construction management field could also be considered for this research, the selection of these three theories is

justified by their appropriateness to address the research questions within the context of the social, institutional, and organizational settings in which urban farms operate.

Social movement theory can provide insights into the reasons behind the adoption and promotion of sustainability by organizations, highlighting the social dynamics and collective actions that drive such initiatives. Their campaigning for sustainable practices (Stern et al., 1999) can lead to a change in the understanding of what value means in its society and, subsequently, to its stakeholders.

Simultaneously, there is a growing interest for more ethical and sustainable initiatives and a conscious endeavour for fairness and engagement of all stakeholders through a 'management-for-stakeholders' approach (Eskerod & Huemann, 2013; R. E. Freeman et al., 2007). Thus, stakeholder theory offers a comprehensive perspective on the diverse range of individuals and groups that have a vested interest in Urban Farms, enabling a deeper understanding of their expectations, concerns, and contributions.

Institutional theory, on the other hand, examines how institutions, a set of rules, norms, and procedures that define, enable, and constrain the behaviours and actions of actors (Greenwood et al., 2008).This notion is used to shed light on the formal and informal rules, norms, and structures that shape the adoption and implementation of Urban Farming practices within organizations. Given their distinct position within the social context to assimilate structural shifts towards sustainability in societal developments (Pesch, 2015), organizations wield considerable social and cultural impact on broader socioeconomic and physical settings, thereby driving change across various levels (Goggins & Rau, 2021).

This combination of theories culminates in a comprehensive understanding of how institutional influences, societal dynamics, and stakeholder engagements shape Urban Farming initiatives. Ultimately, these chosen theoretical frameworks align with the aim of examining the relationships between various stakeholders, organizations, and social movements involved in Urban Farming to elucidate the mechanisms driving Urban Farms within the built environment.

3.2. Social Movement theory

Social movement theory investigates what causes social movements to be born. More specifically, it attempts to explain why and how certain people may organize themselves in the form of a social movement, as well as how people may behave within that movement and its outcomes. To this end, theoretical frameworks from other social sciences are usually employed, such as deprivation theory, resource mobilization theory, political process theory, structural strain theory and new social movement theories (Sen & Avci, 2016).

Social Movement theory can be used to understand how groups organize to create or resist new institutional arrangements or transform existing ones (Schneiberg & Lounsbury, 2008). These movements politicize and bring into the public sphere practices such as ethical consumption and sustainability through a cumulative cultural process. Within this context, social movements are considered a political condition for diffusion, depending on their mobilization and collective action reach (Diani, 1992). Activists can influence the institutional environment by destabilizing, antagonizing, and fomenting claims about firms and building pressure on them (Waldron et al., 2022). Social movements can moderate institutional processes, supporting diffusion in three ways: by serving as field-wide or cross-field mechanisms for mobilizing power, by working as political forces within organizations to increase their receptivity to alternatives, or by working between organizations to increase innovators' influence as exemplars (Schneiberg & Lounsbury, 2008).

3.2.1. Social movements and Social Movement theory

Social movements are societal forces rooted in a set of opinions and beliefs in a population which shows preferences for changing some elements of the social structure (McCarthy & Zald, 1977). When social movements are structured in complex or formal organizations identified and actively seeking to implement a goal, social movement organizations (SMO) are formed (McCarthy & Zald, 1977). Their members are deeply rooted in identity claims, as these are seen as an expression and affirmation of their cause and help to organize their political participation (Polletta & Jasper, 2001a).

For social movements to be effective, support is needed from two groups: committed activists and non-activist individuals who identify themselves with the cause (Johnston et al., 1994; Stern et al., 1999). Social movement activists are the individuals continuously committed to public actions projected to influence the social behaviour and policies of a cause which they see as a central element of their identity (Stern et al., 1999). The non-activists are individuals sympathetic to the social movement's cause who become mobilized in various degrees when they perceive that their human values can be either highlighted by their actions or threatened by their inaction. While committed activists are essential to keep the cause in evidence and attract non-activists, it is the latter's adhesion that upgrades the cause. Hence, a widespread change in individual behaviours among non-activists becomes essential to generate the necessary public support for social change (Johnston et al., 1994).

Different attempts have been made by scholars to establish the motivations behind social movements, leading to the development of Social Movement theory. Social Movement theory can be regarded as a product of the social struggles of post-industrial economies (Pichardo, 1997). Over time, the objectives of these social movements have shifted from the classic instrumental issues of industrialism, such as economic redistribution, to post-materialistic issues, such as quality of life issues and life-style concerns (Inglehart, 1990) ingrained in the contemporary capitalist transformations (della Porta, 2017). Initial efforts centred on social-psychological drive (Klandermans, 1984) and the availability of resources for collective action (Marx & Wood, 1975). These approaches, nevertheless, have fallen into disuse as the progress of social movements alongside social developments demanded a fresh approach to the subject.

New social movement theory arose in the 1990s emphasizing identity, culture, and the role of the civic sphere aspect of social movements to achieve engagement and support. The civic sphere, where culture and identity resides, becomes a locus of social protest, just as the economic and political spheres were to traditional social movements (Pichardo, 1997). Their members are deeply rooted in identity claims, as these are seen as an expression and affirmation of their cause and help to organize their political participation (Polletta & Jasper, 2001b). However, all these approaches

tend to focus on a macro scale, explaining social movements from societal and field levels, often relegating the individual to the background.

Aiming to establish individual motivation, the value-belief-norm (VBN) theory was developed in the same period, focusing on the individual's role in shaping social movements. In it, social movements originate from individuals who embrace a cause, believe that the valued cause needs promotion or is under threat, and organize themselves collectively to provide the necessary support for those values (Stern et al., 1999). For social movements to be effective, support is needed from two groups: committed activists and non-activist individuals who identify themselves with the cause (Johnston et al., 1994; Stern et al., 1999). Social movement activists are the individuals continuously committed to public actions projected to influence the social behaviour and policies of a cause which they see as a central element of their identity (Stern et al., 1999). The non-activists are individuals sympathetic to the social movement's cause who become mobilized in various degrees when they perceive that their human values can be either highlighted by their actions or threatened by their inaction. While committed activists are essential to keep the cause in evidence and attract non-activists, it is the latter's adhesion that upgrades the cause. Hence, a widespread change in individual behaviours among non-activists becomes essential to generate the necessary public support for social change (Johnston et al., 1994).

Since the 2010s, social movements have been seen as entities more activated by the logic of aggregating individuals, both activists and non-activists, than by traditional organizational networking (Juris, 2012). The need for an existing formal structure dedicated to mobilization is reduced, with social media providing decentralized forms of organization and the means to connect masses of individuals from diverse backgrounds (Juris, 2012). Therefore, over time, the objectives of social movements have shifted from the classic instrumental issues of industrialism, such as economic redistribution, to post-materialistic issues, such as quality of life issues and lifestyle concerns (Inglehart, 1990), while making sense of the societal transformations of the period (della Porta, 2017).

3.2.2. Change through social movements

One of the key objectives of social movements is to influence and generate change in organizations and society. They emerge and thrive from the contradictions or multiple logics within fields to mobilize support, forge new paths or produce change (Schneiberg & Lounsbury, 2008). The diffusion process of social movements is non-linear, as diffusion strategies highly depend on a social movement's goal and its institutional context. The adopted actions of social movements can be summarized as being either through disputes against institutions, collaboration with them, or the creation of alternative market niches outside the established market actors (Balsiger, 2016; B. G. King & Pearce, 2010). These three pathways imply, to an extent, the effectiveness of social movements' influence over market actors and in helping to shape them (Giugni & Grasso, 2018). Therefore, actions may vary between the creation of new markets that address social movements' goals, unilateral or multilateral regulation efforts (such as implementing certifications and elaborating frameworks of action), and contentious activities, i.e., protests, public campaigns, and boycotts (Balsiger, 2016).

Evidence-based actions, such as material evidence that enhance the credibility of social movements (Benford & Snow, 2000), tend to have a more contagious effect on the targeted organizations, fields, and institutions than disruptive actions. Hence, actions more likely to increase susceptibility to diffusion must be chosen based on the institutional contexts and the differences in receptivity and probability of contagious influence (Briscoe et al., 2015). Yet, disruptive tactics can lead decision-makers to become increasingly responsive to more moderate movement organizations whose conduct and goals they find more agreeable (Briscoe et al., 2015).

The ability of social movements to form alliances with other actors in the social sphere is a key factor. Thus, social movements must have powerful allies within and without the institutional arena, to balance the complex system of alliances and oppositions needed to achieve their goals (Giugni, 1998). If successful, these mobilizations generate the essential political space for the contestation of existing institutional and organizational logic, thus creating the conditions for change (Schneiberg & Lounsbury, 2008). This process is cumulative, meaning the higher profile a social movement achieves, the easier it will be for it to gather further public and

institutional endorsements. Indeed, the more successful a social movement is, the more likely it will expand its scope of activism to campaign for a wider set of fields to adopt alternative practices (Schneiberg & Lounsbury, 2008).

Social movements can further improve the chances of fostering change by raising the receptivity of organizations to alternative practices. This can be accomplished through campaigns aiming to increase supporter adhesion, accumulate resources, establish a frequent positive presence in the media, enhance the visibility of alternate activities, or demonstrate the possibility of disruption that leads to a transformation (Schneiberg & Lounsbury, 2008). If successful, such mobilizations generate the essential political space for the contestation of existing institutional and organizational logic, thus creating the conditions for change (Schneiberg & Lounsbury, 2008). Hence, social movements then operate as political forces in promoting the spread of alternatives (Schneiberg & Lounsbury, 2008). This process is cumulative, meaning the higher profile a social movement achieves, the easier it will be for it to gather further public and institutional endorsements.

3.2.3. Paradigmatic shifts

To produce long-lasting change, social movements must also alter the paradigms affecting their object of campaign. A shift in paradigms can also mean a change in hegemonic ideologies rooted in social coalitions (Kagan & Burton, 1995). For this shift to happen, the agenda pushed by social movements, originally counter-hegemonic by nature, needs to become gradually accepted as potentially hegemonic by parts of society (Schneiberg & Lounsbury, 2008). The paradigmatic shift towards a change can, however, spark counter-mobilization by influential actors with opposing interests. Diffusion, then, becomes a contested process in which social movements must mobilize strong and continuous political support at either the field level or within organizations, to protect their agenda (King & Soule, 2007; Schneiberg & Lounsbury, 2008). The ability to overcome these counter-actions depends on the social movement's capacity to rally political resources and create favourable political contexts for the maintenance of their agenda in the public debate. Under these conditions, social movements become a locus not only for the theorization and implementation of ideals but also for the organization and promotion of a supportive

political power to movements' goals (Schneiberg & Lounsbury, 2008). A favourable institutional context, in which social movements build a solid political relationship with institutions, strengthens the capacity of a social movement to disseminate its ideas, information or influence through various interconnected networks or channels, thus translating their ideals into concrete actions and increasing the possibility of a desirable outcome (Bartley & Schneiberg, 2002).

Establishing the effectiveness of a social movement is quite difficult due to the natural struggle between establishing a causal relationship and the necessity of a nuanced analysis (Giugni, 1998). In addition, the effects of social movements' actions are often indirect and can sometimes misrepresent their original goals (Giugni, 1998). Nonetheless, social movement theory provides promising possibilities to analyse changes seen in different institutional contexts.

3.3. Institutional theory

Scholars of organizations and social movements have increasingly recognized that these two areas of research would both benefit from greater crossover (G. F. Davis et al., 2008). This seems like a logical progression as organizations, such as religious, medical, and educational organizations, professional associations, and private employers, are usually the targets of social movement activities (Dyke et al., 2004). In fact, this convergence has been indicated since the beginning of neo-institutionalism with the works of Zald & Berger (1978), exploring the analytic parallels between political change processes in organizations, and McCarthy & Zald (1977), describing the organizational foundations of most social movements.

Institutional theory is a research tradition that reshaped our understanding of organizational founding and change. Seminal articles, such as Meyer & Rowan (1977), discussed how organizational behaviours were driven less by functional considerations and more by symbolic actions and external influences than the theory at the time assumed. These articles tapped into the core tenets of bounded rationality inherent in behavioural theories, thereby delineating a wide spectrum of potential research inquiries. However, subsequent studies diverged from the initial emphasis on

behavioural theories, shifting towards examining environmental influences like the spread of new institutional practices among firms (Greve & Argote, 2015).

Neo-institutionalism is one development of theoretical perspectives used to understand organizational behaviour (Saks, 2016), being influenced by other organizations and wider social forces, especially broader cultural rules and beliefs (Schneiberg, 2022). The engagement of both areas has tended to be limited to the exploration of specific organizational attributes of social movements (G. F. Davis et al., 2008) and how movements bring about change, either through a sequence with institutional dynamics, as institutional forces themselves, or through interaction with institutional processes (Schneiberg, 2022).

Institutional theory is a framework embodied within organizational theory and is, perhaps, the dominant approach to understanding organizations (Greenwood et al., 2008), having steadily become a more mainstream and prominent framework in fields like organizational theory (Greenwood et al., 2008). It studies the institutionalization process, which occurs through diffusion (following a creation, theorization, objectification and acceptance process) of ideas and practices and is based on gaining and maintaining legitimacy (Greenwood et al., 2002; Powell & Di Maggio, 1991; Scott, 2001; Suddaby & Greenwood, 2005) to a point where it is something widely taken for granted (Jennings & Hoffman, 2018). In other words, it analyses the processes by which structures, rules, norms and routines become established as authoritative procedures for social conduct, thus explaining organizational behaviours that can? defy economic rationality.

Institutions are defined as the fundamental frameworks comprising taken-for-granted beliefs, rules, and norms that shape and govern the behaviour of organizations (Berthod, 2016). These institutions provide the context within which organizations operate and evolve, serving as broader societal structures that influence the design, conduct, and practices of organizations. Organizations, on the other hand, are seen as localized manifestations or instantiations of these wider institutional frameworks (Berthod, 2016). They embody and enact institutionalized prescriptions within their specific contexts, adhering to established norms and rules as a means of gaining legitimacy, reducing uncertainty, and enhancing the comprehensibility of their actions and activities.

In this context, according to Zucker (1977), institutionalization within organizations refers to two key aspects: firstly, it encompasses the rule-like, social fact quality of an organized pattern of action, representing the external manifestation of institutionalized norms and practices. Secondly, institutionalization involves the embedding of these norms and practices within formal structures, such as organizational policies, procedures, and structures, which are not tied to specific individuals or situations. This nonpersonal, objective embedding reinforces the institutionalized nature of organizational practices and ensures their continuity and stability over time (Zucker, 1977).

The fundamental theoretical idea is that conformity processes are also found at the level of entire institutional complexes within world society, with actors and actions as constructions reflecting highly institutionalized cultural patterns. While previously the social embeddedness of people, groups, and societies was at the centre of discussion, the rise of institutional theory reconceptualized all these actors as non-embedded members and focused on the construction and social control of these entities (Jepperson & Meyer, 2021). Along with many other post-functionalist lines of thought, institutional theory emphasizes broad cultural themes and shifts in wider social environments as impacting actors of all types, such as organizations and individuals (J. W. Meyer & Rowan, 1977), rather than a model of actors involved in functional interdependencies (Jepperson & Meyer, 2021). In essence, institutional theory conceives the world as a society and analyses the impact of that society on all of its subunits (Jepperson & Meyer, 2021), including organizations.

3.3.1. Institutionalism

Modern culture depicts society as made up of "actors", formed by individuals, nation-states and the organizations derived from them (Jepperson & Meyer, 2021). While actors are traditionally regarded as purposive, strategic, and (fairly) rational entities functioning within society, with their agency seen as based on their self-interest, institutionalism revises the notion of agency, since the capacity of actors to choose and act is undermined by their constructed role in a wider society, which may empower as much as constrain them (Jepperson & Meyer, 2021).

Institutionalism is a general approach to governance and social science. It concentrates on institutions and studies them using inductive, historical, and comparative methods (Bevir, 2009). The central tenet of institutionalism revolves around the idea that institutions play a key role when accounting for social behaviour. The core assumptions can be summarized in four key points: institutions are governance structures, exemplifying rules for social conduct; groups and organizations that follow these rules are granted social legitimacy, which contributes to their survival; institutions are characterized by inertia, translated in a natural tendency to resist change; and past institutional structures tend to constrain and channel new arrangements (Jepperson & Meyer, 2021).

In analysing the rationalization and diffusion of formal bureaucracies in modern society, Meyer & Rowan (1977) placed emphasis in the "the institutional context" (1977: 346). They postulated that the organizational formal structures, an organization's explicit goals and policies including its cultural models, reflect the myths of their institutional environments rather than the demands of their work activities. This includes, especially, myths of rationality which "signal rationality" to internal and external groups, thus enhancing internal and external legitimacy, access to resources, and ultimately organizational survival (J. W. Meyer & Rowan, 1977, pp. 352–353, 355).

In contrast to prevailing theories like contingency theory or resource dependence, which emphasize technical requirements, resource streams, and information flows, the new formulation of institutional theory emphasizes the role of cultural elements such as symbols, cognitive systems, and normative beliefs environment (Scott, 1987). Hence, a distinction is made concerning the power inherent to different environments and how organizations are affected. The institutional effects on organizations may vary widely according to an organization's "institutional" and "technical" environment (Scott, 1987). For Scott and Meyer (1983: 140, 149), technical environments are "those within which a product or service is exchanged in a market such that organizations are rewarded for effective and efficient control of the work process", whereas institutional environments "are characterized by the elaboration of rules and requirements to which individual organizations must conform if they are to receive support and legitimacy". As not all environments are equal, while some organizations are subject to strong versions of both institutional

and technical environments, depending on their sector, others are subjected to weak versions of both or in mixed forms (Jepperson & Meyer, 2021).

3.3.2. The institutionalization process

Organizational behaviour has traditionally been viewed as a product of the economic pressures suffered by these organizations (Huczynski et al., 2013). This line of thinking considers organizations as reactive, in which actors respond to situational circumstances and concentrate their efforts to adapt to them, as per the principal agent model (Greenwood et al., 2008). Therefore, the main theories explaining organizations were aligned with this overarching view, such as the structural-contingency theory, the resource-dependence theory, and the behavioural theory (Greenwood et al., 2008).

However, the works of Meyer & Rowan (1977) and Zucker (1977) established the foundations of institutional theory, which signalled an approach towards an understanding of organizations and management practices as the product of social, rather than economic, pressures. In this 'new institutionalism' (Greenwood et al., 2008), Meyer & Rowan (1977) argue that organizations are influenced by their 'institutional context', which are the "rules, norms, and ideologies of the wider society" (J. W. Meyer & Rowan, 1983, p. 84) or the "common understandings of what is appropriate and, fundamentally, meaningful behaviour" (Zucker, 1983, p. 105). Thus, the widespread social understandings, or 'rationalized myths', serve to determine what it means to be rational and have become accepted as prescriptions of appropriate conduct in a rational setting and adopted to succeed in a competitive environment (Greenwood et al., 2008).

Another important aspect included in new institutionalism is how institutional myths are used to consolidate and legitimize practices. The 'institutionalization' of these practices is how '*social processes, obligations, or actualities come to take on a rule-like status in social thought and action*' (J. W. Meyer & Rowan, 1977, p. 341). Through an institutionalization process, these practices become later 'institutlionalized', leading to their crystallization through formal regulations and laws (J. W. Meyer & Rowan, 1977; Zucker, 1983). Here, alternative organization methods

become unthinkable as institutionalized practices are widely followed without debate and gain permanence within organizations.

Meyer & Rowan (1977) define three types of control structures that drive the process of institutionalization. The first type of structure is exemplified by formal organizations, which embed rules and procedures into a system of coordinated and controlled activities (J. W. Meyer & Rowan, 1977). The second, structured through "regimes" or the "organizational field" (Dimaggio & Powell, 1983), transmit explicitly codified rules and sanctions without primary embodiment in a formal organizational apparatus. In the third structure, culture, rules, procedures, and goals are seen as customary in character and are followed without primary representation in formal organization, and without monitoring and sanctioning by some central authority. Hence, the institutional environment controls and empowers actors through different types of coercive organizational powers and professional norms (Jepperson & Meyer, 2021). Dimaggio & Powell (1983) later elaborated on an additional, yet crucial, element of the institutionalization process which accounted for the incorporation of institutional rules by taking them for granted without much decision or reflection and naming it "mimetic isomorphism".

3.3.3. Isomorphism

Institutionalized sets of practices, derived from rationalizations, are recognized, and incorporated by organizations, which respond 'strategically' to their institutional pressures. This movement, in turn, produces a 'homogenization' of organizational behaviour. As organizational fields mature, there is an inherent tendency towards homogenization since field-specific practices become consolidated. Dimaggio & Powell (1983) called these similarities of form and structure "organizational isomorphism".

Under this concept "*actors are no longer actors in the realist sense, and we are in the domain of more phenomenological institutionalism (...) And the actors in this institutional system are conceived as constructed and constituted by it, deriving much of their purpose, technical rationality, boundedness, and sovereignty from the institutional environment. So, the line of thought is centrally sociological in character,*

in its analysis of the modern system, conceiving not only of social action as highly constructed, but social actors too: we will thus call the line of argument sociological institutionalism, or just institutionalism" (Jepperson & Meyer, 2021, p. 250).

In a similar fashion to the institutionalization process described by Meyer & Rowan (1977), there are three mechanisms of diffusion in which institutionalization, as suggested by Dimaggio & Powell (1983), occurs: coercive diffusion happens when external constituents force organizations to adopt an organizational element; normative diffusion arises mainly from professionalization projects; and mimetic diffusion, which ensues when uncertain organizations copy others they perceive as rational and/or successful, to avoid appearing non-standard (Dimaggio & Powell, 1983). Each of these mechanisms may explain the motivations for the isomorphic adoption of certain practices. Hence, coercive isomorphism materialises when organizations are motivated to avoid possible sanctions, while normative isomorphism occurs when organizations are motivated to respect social obligations. Finally, organizations that are motivated by their interpretation of others' successful behaviours and adopt them are described as undertaking mimetic isomorphism (Dimaggio & Powell, 1983).

In the two-stage model of diffusion of institutionalized ideas idealized by Tolbert & Zucker (1983), organizations of each stage have different motivations for the adoption of practices. The early adopters of an idea are driven by pragmatic reasons, such as to improve operations, while later adopters are motivated to secure social legitimacy by appearing modern, efficient, and rational, even if the ideas are not necessarily beneficial to the organization. These following, or lagging, organizations may be driven by mimetic isomorphism, when they interpret the leading adopters' movement as successful, by normative isomorphism, motivated to secure social approval in the form of legitimacy, or, in some cases, by coercive isomorphism, through regulations. The adopted changes are not necessarily advantageous to these following organizations (Tolbert & Zucker, 1983), but do at least conform to the newly established status quo.

Organizations are, thus, influenced by their institutional contexts, which are defined by the rationalization of myths of appropriate conduct, and organizations especially sensitive to institutional contexts are described as institutionalized

organizations (J. W. Meyer & Rowan, 1977). When institutionalized practices are involved, they are widely adopted and resilient to change. In this setting, organizations become isomorphic with their institutional context to secure a perceived legitimacy, which provides firms survival resources in a competitive market. The isomorphic process, however, is not linear. Organizations confront institutional contexts containing multiple and inconsistent myths through varied forms of practices. By navigating these inconsistencies and managing to successfully choose socially accepted practices, organizations can attain the desired legitimacy that leads to societal acceptance.

3.3.4. Seeking legitimacy

The incorporation of institutionalized elements protects the organization from having its conduct questioned, making it, thus, legitimate (J. W. Meyer & Rowan, 1977, pp. 349, 351). Legitimacy can be defined as the acceptance by the general public and other relevant associations of an organization's right to exist and to pursue its affairs in its chosen manner (Knoke, 1985). Organizational legitimacy refers to the degree of cultural support for an organization, to the point that established cultural accounts provide explanations for its existence, functioning, and jurisdiction (J. W. Meyer & Scott, 1983). Ultimately, legitimacy also refers to the adequacy of an organization in its conceptual being.

Legitimacy holds significance for organizations due to its impact on their operations. For organizational researchers, one notable consequence is its influence on social and economic transactions. Legitimate organizations are more likely to attract stakeholders, as most individuals and entities prefer to engage with reputable entities. Conversely, illegitimate organizations may struggle to garner support, with many stakeholders opting to avoid or disassociate from them altogether (Deephouse & Suchman, 2008).

Legitimacy also indicates an incomprehension of alternatives. In this case, legitimacy can be conceptualized as the presence or absence of questioning (Deephouse & Suchman, 2008). These two types of legitimacy, presence and absence, challenges occur when organizations are perceived by relevant actors as having failed

to perform their objectives and when the values organizations hold are challenged (Hirsch and Andrews, 1984). Moreover, legitimacy can have a "negative definition", meaning its absence is more noted than its presence (Pfeffer & Salancik, 1978). Deephouse & Suchman (2008) propose four scholarly levels of legitimacy. "Accepted" legitimacy reflects a taken-for-granted-ness evaluation of legitimacy, whereas "proper" legitimacy means organization have, to a level, been appraised and accepted by a few stakeholders, such as a state agency (Bitektine & Haack, 2015). "Debated" legitimacy reflects a degree of active disagreement between different stakeholders within the social system and the organization. Lastly, "illegitimate" legitimacy indicates an evaluation by the social system that the organization is inappropriate and needs to change or dissolve (Deephouse & Suchman, 2008). Legitimacy is conferred by internal and external stakeholders who observe organizations and make legitimacy evaluations, by comparing them to particular criteria or standards (Deephouse & Suchman, 2008; Ruef & Scott, 1998)98).

By distinguishing these four states of legitimacy, one can assess an organization's legitimacy at the level of a social system. On one hand, an organization is legitimate because it has demonstrated its appropriateness, either being accepted or proper or perhaps even debatable, by stakeholders and is unchallenged regarding societal rules, norms, values, or meaning systems (Hirsch & Andrews, 1984; J. W. Meyer & Scott, 1983; Suchman, 1995a). On the other hand, illegitimate organizations are those so questioned by stakeholders that they are broadly viewed as lacking a right to exist (Deephouse & Suchman, 2008). This evaluation, conferring or not legitimacy, affects social and economic exchange, as most stakeholders will preferably, or sometimes exclusively, engage with legitimate organizations, thus, granting market access to those deemed legitimate (Deephouse & Suchman, 2008).

3.4. Stakeholder theory

While the dominant view on organizations has traditionally been geared towards shareholder value maximization (Stout, 2012), Stakeholder theory suggests that for organizations to successfully navigate society, a more complex approach is required as they need to create value (only some of which is financial) for all key

stakeholders (R. E. Freeman et al., 2010). Stakeholder theory (R. E. Freeman, 1984) concerns the dynamics of stakeholder influences on the corporate decision-making process, helping organizations develop strategies to manage stakeholder expectations that ensure the organisational goals are achieved.

The Stakeholder Theory of organizational management and business ethics was originally conceptualized by Freeman (1984). It identified stakeholders of an organization, and both described and recommended methods by which management could give due regard to the interests of those groups. Since its inception, there has been a substantial rise in the theory's prominence, with scholars continuing to question the sustainability of focusing on shareholders' wealth as the most fundamental objective of business.

In the general management literature, Stakeholder management is becoming increasingly considered in the context of sustainable development (Jensen & Sandström, 2011; Porter & Kramer, 2011). The management-for-stakeholders, for example, approach offers an inclusive and holistic perspective which aims to engage with a broader group of stakeholders, who could be adversely affected by the organization's strategy (R. E. Freeman, 1984). This can be applied to sustainability within organizations, which can be achieved by fulfilling or surpassing its needs and expectations, while concurrently maintaining equilibrium among the economic, ecological, and social interests of the projects (Di Maddaloni & Davis, 2017). Therefore, there is a clear need for considering the implications of global, regional, and local stakeholders when discussing sustainable projects (Eskerod & Huemann, 2013).

3.4.1. Stakeholder definition

A stakeholder is "*any group or* individual *who can affect or is affected by the achievement of the organisation's objectives*" (R. E. Freeman, 1984, p. 46). These stakeholders have a valid interest in the activities and outcomes of a firm and are essential for organizations to achieve their objectives (R. E. Freeman, 1984; R. E. Freeman et al., 2007). This implies that the concept of stakeholders implies a two-way relationship, at a minimum (Freeman et al., 2018). Primary stakeholders are those who are directly involved in the value-creating processes of the organization, such as

employees, customers, suppliers, shareholders, and investors. Public or secondary stakeholders do not contribute directly to the value-creating processes of the firm (R. E. Freeman et al., 2007; Phillips, 2003) and have an "influencer" role within the organization's context (R. E. Freeman, 1984). They comprise governments, communities, markets, media, unions, and public interest groups (Clarkson, 1995; R. E. Freeman et al., 2018). These groups, both primary and secondary, have a *stake* and provide vital support for the organization (R. E. Freeman & Reed, 1983). Hence, an organization's survival and continuing success depend upon its ability to create sufficient wealth, value, or satisfaction for its primary stakeholders (Clarkson, 1995).

Organizations are unlikely to fulfil all the responsibilities they have toward each primary stakeholder group, much less to all their public stakeholders. Instead, they are likely to fulfil the economic and non-economic responsibilities of some primary stakeholders but not others and, over time, accomplish the responsibilities relative to each stakeholder to varying extents (Jawahar & Mclaughlin, 2001). As organizations face different pressures and threats at different stages in their life cycle, different stakeholders become critical for organizations at different stages. Accordingly, depending on who the critical stakeholders are at each stage, an organization is likely to place an emphasis on certain strategies to focus on the demands of those critical stakeholders (Jawahar & Mclaughlin, 2001).

3.4.2. Stakeholder value creation

The first purpose of business organizations is, arguably, the creation of value primarily for stakeholders and, in a wider sense, for society as a whole (R. E. Freeman et al., 2018). To do so, firms rely on resources controlled by various stakeholders, motivated by their individual interests and goals (R. E. Freeman et al., 2018). Stakeholder theory understands how companies and people create value and trade with each other and describes what managers actually do (R. E. Freeman et al., 2010, 2018). Moreover, all corporate value creation activity depends on the willing participation of stakeholders to enhance materials into products or services (R. E. Freeman et al., 2020). The first step in developing a value-creating, stakeholder-based approach within organizations is for them to understand fully what is important to each of its primary stakeholders (R. E. Freeman, 1984).

In fact, Strand & Freeman (2015, p. 67) argue that "*long-term profitability is a by-product of a well-run company that effectively engages with its stakeholders*". Business executives manage stakeholders (R. E. Freeman, 1984) and the way those stakeholders are managed influences the value a business firm creates (R. E. Freeman et al., 2018). Stakeholder management, in turn, is based on a moral foundation that includes respect for humans and their basic rights, integrity, fairness, honesty, loyalty, freedom to choose, and assumption of responsibility for the consequences of the actions an organization undertakes (R. E. Freeman et al., 2010; Phillips, 2003). In general terms, the purpose of a firm can be described regarding how it affects its stakeholders (R. E. Freeman & Gilbert, 1988).

From the perspective of the organization, stakeholders may provide valuable information, expertise, and insights that can support this organization to design and deliver better value-creation strategies, as well as understanding where the major sources of value are going to come from in the future (Harrison et al., 2010). On the other hand, stakeholders determine their own utility functions and evaluate the amount of utility they receive from interacting with an organization, which subsequently influences their assessment of opportunity costs and shapes their decisions on whether and how to engage with it (Harrison & Wicks, 2013). Beyond financial measures, the value an organization creates for its stakeholders can include a wide variety of other benefits. These can be related to personal development, freedom to choose, esteem, happiness, and other subjective factors (Harrison & Wicks, 2013). Most commonly, these factors tend to be associated with an organization's employees, but they also extend to other stakeholders such as customers, suppliers and community that can experience feelings through affiliation with a firm (R. E. Freeman et al., 2018). This is particularly important to stakeholder theory since these non-economic factors need to be included in discussions of stakeholder welfare (R. E. Freeman et al., 2018).

When managing the value provided by stakeholders, managers need to assess the amount of value provided to one stakeholder in relation to the amount of value available to other stakeholders (R. E. Freeman et al., 2010, 2018). Although changes in value to one stakeholder do not necessarily imply a change in the overall value available to an organization, as the amount of value a firm creates is not fixed, trade-

offs between different stakeholders are a common occurrence as decisions that are beneficial to one or more stakeholders but harmless to others will be preferable (R. E. Freeman et al., 2018). However, in reality, stakeholders inherently interact with each other placing the organization at the centre of an interconnected value-creating network (Rowley, 1997).

In a sense, all stakeholders have customer-like power since they decide whether to engage with an organization based on their own perceptions of the value provided to them against the value received from the organization. This is then evaluated in the context of their opportunity-cost if they were to engage with a competing firm (R. E. Freeman et al., 2018). Organizations need to allocate resources efficiently across their varied stakeholders, granting additional value to stakeholders so that they perceive that they are better off dealing with the organization than with a competitor. So, if the total utility received from an organization is above the stakeholder's opportunity cost, and assuming that trust and respect are a part of the relationship, the benefits of reciprocity are likely to be evident to both parties (R. E. Freeman et al., 2018). This logic acknowledges the rational boundaries present in stakeholder theory. Fundamentally, it recognizes that fair principles should be at the base of an organization's engagement with stakeholders, often focusing on decisions that aim to lead to the creation of more stakeholder value (R. E. Freeman et al., 2018).

3.4.3. Stakeholders and legitimacy

Legitimacy is a fundamental aspect of stakeholder theory, because the social values associated with or implied by organizational practices are aligned with the norms of acceptable behaviour in the larger social system in which organizations are inserted (Dowling & Pfeffer, 1975). According to Lindblom (1994, p. 2), legitimacy "*is a condition or status which exists when an entity's value system is congruent with the value system of the larger social system of which the entity is a part. When a disparity, actual or potential, exists between the two value systems, there is a threat to the entity's legitimacy*". Organizations continually seek to operate within the bounds and norms of their respective societies, requiring social approval to operate, which comes through the influence of its stakeholders (Gray et al., 1995). Organizations also earn their legitimacy through the reputation they build by way of their treatment of

stakeholders (Fombrun, 1996), which, in turn, affects how attractive the organization is to both existing and future stakeholders (R. E. Freeman et al., 2007; Harrison et al., 2010; T. M. Jones et al., 2018).

To assess the perceived legitimacy of an organization in the eyes of its stakeholders, the concepts of normative and derivative legitimacy are used (Phillips, 2003). Normative legitimacy refers to the degree to which an organization's actions, behaviours and practices align with societal norms, values, and expectation. Organizations should operate in accordance with ethical and moral standards, and stakeholders, influenced by cultural, social, and moral considerations, assess the legitimacy of an organization by evaluating its adherence to these norms (Phillips, 2003). Derivative legitimacy, in turn, is based on the perceived legitimacy of an organization derived from the perception of other entities or sources, based on its association or alignment with other legitimate actors, institutions, or systems. This indirect form of legitimacy may be achieved, for example, through the endorsement or recognition from other legitimate entities or by conforming to industry standards and regulations (Phillips, 2003). Both types of legitimacy influence the perceived credibility and acceptance of an organization by its stakeholders. By addressing both aspects, organizations can enhance their overall legitimacy, building its credibility and acceptance, and strengthen their relationships with stakeholders.

In addition, there are four main strategies, organizations can employ to generate legitimacy (Lindblom, 1994). The first concerns informing its public about changes in its performance and activities, while the second occurs when they attempt to change the public's perception of the organization's behaviour without actually changing it. Another strategy happens when organizations try to deflect attention away from contentious issues by raising the profile of positive related activities. The last involves organizations trying change the public's expectations about its performance (Lindblom, 1994). Thus, by recognizing stakeholders' expectations and actively engaging with them, organizations can enhance their legitimacy within their institutional context, which contributes to their long-term achievements.

3.5. Systematic literature review

Considering the scarcity of urban farming project studies in management literature, utilising a Systematic Review of Literature (SRL) represents an essential step in assessing the existing research landscape on Urban Farming within the context of management. This approach not only facilitates the identification of the current research scope but also helps to identify theoretical gaps in the literature. Conducting this review implies that the PhD research is well-informed, innovative, and aligned with the current state of knowledge in the field, signalling pathways to address the research questions at hand effectively.

Thus, a systematic review of literature aims to design a replicable approach for collecting, analysing, and synthesising the available literature that allows a clear audit trail about what is known and what is not known regarding a research subject or set of subjects (Denyer & Tranfield, 2009). In management research specifically, SRL is not traditionally well established, as the earliest examples are less than 20 years old (Rojon et al., 2021).

To conduct the SRL, a research protocol was developed, which served as a guideline for the structured collection, evaluation, and synthesis of empirical studies (Massaro et al., 2016). Starting with two of the largest academic online databases, Scopus and Web of Science, a search was made for all years until September 2022. Using Boolean logic, articles' titles, abstracts, topics, and keywords were searched through either the terms "urban farm*" *or* "urban agriculture" *or* "vertical farm*" as these are the most common synonyms associated with the research topic.

In Scopus, the initial search returned (5,092) documents. Results were then filtered through Scopus' subject areas "Economics, Econometrics and Finance", "Business, Management and Accounting" and "Decision Sciences", reaching (435) results. After further narrowing the results to show entries in English (417) and then to only include articles, books, book chapters, editorials and reviews, the search returned (400) results. Finally, results published in journal titles that contained the keywords "management", "innovation", "entrepreneurship", "business", "organizations", "economics" and related terms were selected, numbering (42) results.

This first search using Web of Science amounted to (4,179) entries. The next filter included relevant Web of Science categories ("Behavioral Sciences", "Business", "Business Finance", "Management", "Social Sciences Interdisciplinary" and "Political Science"), numbering (150) results, of which (139) were in English. By selecting articles, books, book reviews and book chapters, the search resulted in (101) entries. Then publications in journals in management, business and organizational fields were selected based on publication titles, returning (48) results.

The results from both platforms were extracted into two Microsoft Excel files containing relevant information related to descriptive data (title, authors, journal, year, etc.) and then combined into one spreadsheet. Double entries were excluded totalling (77) unique articles. This process is illustrated in **Figure 9**.
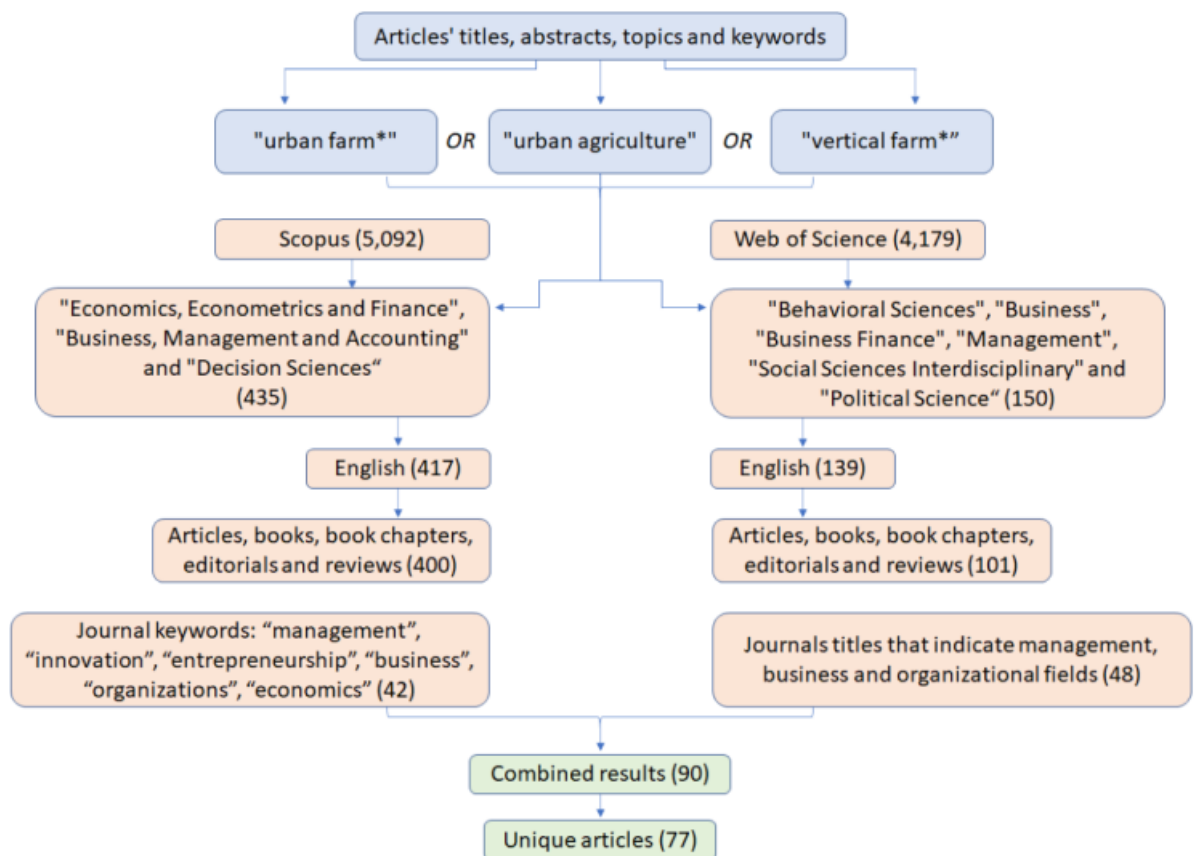
Figure 9. Systematic literature review process diagram.

Titles and abstracts of articles were then analysed searching for mentions and indications of the theoretical frameworks used. The full description of the extraction

spreadsheet is shown in **Appendix A**. After analysing their titles and abstracts, several of the (77) unique articles were found to be outside of this research's scope. Hence, (35) articles were suitable for a deeper analysis, with (20) being moderately related to the research topic and (15) correlating strongly.

The analysis shows that the 35 selected publications have appeared in 25 journals. Of these publications, 8 have appeared in the International Political Economy Series, and the remaining articles appeared in individual publications. The International Political Economy Series is a book series that "examines a variety of capitalisms and connections by focusing on emerging economies, companies and sectors, debates and policies" (e.g., Binns & Nel, 2020). All the eight selected articles from this publication belong to its 2020 issue titled "*Urban Food Democracy and Governance in North and South*". This explains why a single publication concentrates so many articles while the remaining entries are distributed to different publications.

The analysed studies were published between 2010 and 2022. This is in line with the growing discussion featuring urban farming over the last decade, as well as the increasing number of farms that have arisen in this period. An authorship evaluation shows that a total of 84 different authors have published in these 35 articles, and none have published more than once.

Therefore, this SRL has not found any indications that any one researcher or group holds a dominant position in the topic of Urban Farming within management publications. The topics assessed in these studies varied greatly. The studies that come the closest to this thesis' topic deal with issues such as: diffusion of innovation theory to explain the adoption of this sustainable development innovation in the face of financial challenges applied to the adoption of commercial aquaponics; how consumers engage with global socio-ecological issues through the adoption of lifestyles that comprise consumption; and production activities using urban food cultivation as an illustrative case. Although adoption of Urban Farming has been analysed by two of these three studies, these studies have not interviewed different internal stakeholders of urban farms to better understand their motivations, views, experiences, challenges, and successes in designing, implementing, and operating these farms and, thereby, answering the research questions pertaining o the adoption and survival of urban farms. Hence, the SRL reveals that, although urban farming has

been a recent topic of study in management, this has been limited and there is a research gap in studies that consider the adoption and survival of urban farms within the organizational literature.

3.6. Theoretical research gap

Despite increasing attention received by Urban Farming in general, a systematic literature review in the field of management studies reveals a research gap in the examination of the adoption of Urban Farming and survival of urban farms. Thus, the use of social movement theory, stakeholder theory, and institutional theory is a promising way to answer this thesis' research questions. Moreover, existing studies often overlook the perspectives of internal stakeholders within urban farms, thereby failing to capture their motivations, views, experiences, challenges, and successes throughout the design, implementation, and operation phases.

The integration of social movement theory, stakeholder theory, and institutional theory as theoretical frameworks in this research is a strategy to address this research gap. The potential of social movements to influence a change of the perception of the value of sustainability is often neglected in built environment studies. The application of Institutional theory may also contribute to explaining the normative expectations and institutional pressures compelling organizations to adopt Urban Farming. In turn, stakeholder theory is pertinent here because of the multitude of interests, expectations, and power dynamics among stakeholders involved in urban farms, ranging from managers and consumers to local communities and regulatory bodies.

The empirical data collected through interviews with various internal stakeholders of urban farms, together with the application of these theoretical frameworks, not only fills the existing research gap but also provides a robust foundation for answering the research questions. These elements will further enhance the analysis and contribute to a comprehensive understanding of the adoption of Urban Farming and survival of urban farms.

Chapter 4. Research methodology

This section focuses on the research methodology employed in this thesis after identifying the research problem and theoretical frameworks. The chapter begins by discussing the author's philosophical assumptions, including their ontological and epistemological positions, applied to the context of the research. This thesis applies qualitative research methods and this chapter discusses why this is the most suitable approach for addressing the research questions. Furthermore, it showcases the research process, outlining the steps taken from data collection to data analysis. By describing how the study was conducted, this section offers insights into the methodology as well as the methods adopted by the author.

4.1. Introduction

The concept of 'research' is understood in multiple yet similar ways. It can be seen as a systematised effort to gain new knowledge (Redman & Mory, 1933, p. 10), as the manipulation of things, concepts or symbols to extend, correct or verify knowledge (Slesinger & Stephenson, 1930), or as an original contribution, through objective and systematic methods, to the existing stock of knowledge, thus making for its advancement (Kothari, 2004). Methodology, in turn, describes the principles, procedures, and practices that govern research (Kazdin, 1992). Hence, the research methodology is the systematic theoretical analysis of the body of methods and principles associated with a branch of knowledge (Patel & Patel, 2019) that translates ontological and epistemological principles into guidelines that show how research is conducted (Sarantakos, 2005). It provides a detailed and traceable plan that keeps researchers on track, legitimises the study, and allows the reader to understand the approach and methods used to reach conclusions. Research methods refer to the specific techniques, procedures, and tools used by researchers to collect, analyse, and interpret data (Wacker, 1998).

This chapter is divided into three main parts. Firstly, the methodology of the research will be described. This consists of the philosophical assumptions, divided between ontology and epistemology, the research approaches, strategies, and the data collection methods. The second part depicts the data collection process

conducted by the researcher, the ethical considerations, the interview structure, and the interview transcription process. Finally, the analysis method is described before a summary of this thesis' research methodology is provided.

4.2. Research philosophy

A research's philosophy can be perceived according to either its ontological or epistemological nature (Hatch & Cunliffe, 2013). These two views' interconnection offers the basis for shaping the appropriate research methodology (Hatch & Cunliffe, 2013; Smyth & Morris, 2007). Having a clear and appropriate research methodology is fundamental since it "*affects what we come to know*" (Smyth & Morris, 2007, p. 423) about the reality and, ultimately, how knowledge is constructed and how the frameworks, or paradigms, are created (Smyth & Morris, 2007). Moreover, it helps to clarify the most appropriate research design based on the researcher's objective (Easterby-Smith et al., 2002). Hence, how a researcher chooses a methodology demonstrates a commitment to a version of the world and how the researcher understands that world (Moon & Blackman, 2014).

4.2.1. Ontological assumption

An ontology, or the "study of being" (Crotty, 2003, p. 10), is a philosophical belief system concerned with the nature of social entities (Bryman, 2012) and whether social phenomenon and their meanings exist independently of social actors (Bell & Bryman, 2007, p. 22; Dainty, 2008, p. 3; Runeson & Skitmore, 2008, p. 76). This helps researchers recognise how certain they can be about the truth, the nature of reality and the existence of the topics they are researching (Guba & Lincoln, 1989, p. 83). Ontological assumptions impact topic selection, formulation of research questions, and strategies for conducting research. Hence, the researcher must decide whether reality is external to the social world or whether the perceptions and actions of social actors create social-constructed phenomena (Wilson, 2014).

To understand 'what is reality?' and comprehend its nature, researchers may adopt either a 'realist' or 'relativist' ontological position (Coghlan & Brannick, 2014). Realist ontology sees reality as one single axiom, a tangible and fixed phenomenon

independent of human experience and interaction with it (Coghlan & Brannick, 2014). The relativist view, in turn, views reality as a subjective, non-universal phenomenon shaped by how individuals experience it (Easterby-Smith et al., 2002). The most common paradigms associated with ontology are objectivism and subjectivism. Objectivism (or positivism) asserts that social phenomena and their meanings have an existence independent of social actors (Bryman, 2012), whereas subjectivism (also known as constructionism or interpretivism) recognises social phenomena and their meanings as continually being shaped by social actors (Bryman, 2012).

The chosen ontological assumption for this thesis is in rooted in a relativist and subjectivist/constructionist perspective, aligning with the research questions regarding the adoption of Urban Farming and survival of urban farms. By embracing the idea that reality is shaped by the interpretations and meanings constructed by social actors, the thesis acknowledges the complexity of human interactions within the context of Urban Farming. In respect of the research question of why Urban Farming is adopted, this ontological perspective recognizes that the decision-making processes of individuals and organizations are influenced by their unique interpretations and understandings of the phenomenon. It acknowledges the diverse motivations, beliefs, and values that drive the adoption of Urban Farming practices by farms' stakeholders, highlighting the subjective nature of their adoption decisions. Similarly, for the research question of how urban farms survive, the subjective ontology acknowledges that factors contributing to survival are not solely determined by objective measures but are also influenced by the perceptions, experiences, and interactions of various stakeholders involved in urban farms. This perspective therefore considers not only tangible outcomes of survival, but also the subjective evaluations and interpretations of different actors of urban farms in how these farms survive. In essence, the chosen ontological assumption provides a suitable approach for answering both research questions related to understanding the complex social realities and meanings inherent in the adoption and survival of Urban Farming initiatives.

4.2.2. Epistemological position

Epistemology, or the theory of knowledge (Hamlyn, 1995), is form of understanding and explaining knowledge (Crotty, 2003) that questions its validity and

how it can be obtained (Easterby-Smith et al., 2002; Guba & Lincoln, 1994). It provides a *"philosophical grounding for deciding what kinds of knowledge are possible and how we can ensure that they are both adequate and legitimate"* (Maynard, 1994, p. 10). The adopted epistemological approach affects how researchers frame research in their attempts to acquire, claim and transfer knowledge.

The epistemological stance can be viewed from multiple angles. For example, objectivist epistemology assumes that reality exists outside, or independently, of the individual mind (Hiller, 2016), prioritizing methods that aim to uncover objective truths about the world. Consequently, research conducted from an objectivist standpoint often seeks to enhance reliability and validity by minimizing bias and ensuring replicability grounded in empirical evidence, logical reasoning, and a commitment to uncovering objective truths about the world. While objectivist epistemology does not directly guarantee reliability and validity, it does emphasize the importance of rigorous methods and systematic approaches to data collection and analysis. Subjectivist epistemology, in contrast, advocates that reality can be expressed in multiple forms and are assigned meanings according to the individual's interpretation (Grix, 2018). Researchers operating from a subjectivist perspective recognize the influence of personal interpretation and context on knowledge construction. Although subjectivist research may not prioritize reliability and validity in the objectivist sense, it does emphasize understanding the diverse perspectives and lived experiences of individuals, which can contribute to the richness and depth of qualitative inquiry.

In addition, the epistemological research paradigms can be categorised between positivism, constructivism, and pragmatism (Van de Ven, 2007). Positivists believe there is a single reality that can be measured and known and, therefore, is more likely to use quantitative methods to measure this reality (Antwi & Hamza, 2015). Constructivism argues that, as there is no single reality or truth, and knowledge production can never be free of one's prior information or experiences (Guba & Lincoln, 1994), realities are produced through social interactions. Finally, pragmatists suggest that there are many ways of interpreting the world and that reality is constantly debated, emphasizing the importance of considering diverse methodologies and approaches to understanding the phenomena under investigation (Biesta, 2010).

The chosen epistemological position of this thesis, rooted in subjectivism and a constructivism paradigm, was used to address the research questions. By embracing the notion that knowledge is constructed, interpreted, and experienced by individuals within their social contexts, the research acknowledges the diverse perspectives, meanings, and realities inherent to the stakeholders experiencing the phenomenon of Urban Farming. For the research question of why Urban Farming is adopted, this epistemological perspective recognizes that individuals and organizations interpret and construct their understanding and importance of Urban Farming based on their unique experiences, values, and social interactions. It acknowledges the subjective nature of knowledge acquisition and the importance of understanding diverse motivations and interpretations that drive adoption of Urban Farming practices. Similarly, in respect of the research question of how urban farms survive, the subjective and constructivist epistemology underscores the importance of exploring the diverse meanings and interpretations of factors that lead to urban farms' survival, as held by different stakeholders within urban farms. This allows for an exploration of subjective experiences, values, and interactions that contribute to an understanding of the factors that lead to the survival of urban farms, which may go beyond objective measures. In essence, the chosen epistemological position is suitable for acknowledging and exploring the nature of knowledge and understanding apropos Urban Farming.

4.3. Research approaches

The research approach can be considered as a general plan and procedure for conducting the study. It lays fundamental aspects on which the research will build, namely how theorisation and data analysis relate to each other. The two main research approaches are inductive and deductive.

4.3.1. Deductive and inductive approaches

Deduction implies a movement from the general to the particular (Locke, 2007). It usually develops based on an existing theory, deriving hypotheses from it, testing those hypotheses, and revising the theory (Nola & Sankey, 2007). A deduction

is usually employed when there are existing views, previous research findings, theories, or conceptual frameworks concerning the phenomenon of interest (Elo & Kyngäs, 2008; Hsieh & Shannon, 2005; Mayring, 2014). The researcher begins the analysis using these pre-existing categories of thought imposed by the previous theory or research findings (Armat et al., 2018) and builds onto it with collected data, making these studies' approach confirmatory in nature. In case some segments of the research do not fit the pre-existing categories, it is possible for new categories to be "inductively" created (Elo & Kyngäs, 2008).

Induction, in turn, entails the opposite movement, going from the particular to the general (Locke, 2007). With inductive research, theory is generated from the collected data, and therefore, these studies tend to be exploratory in terms of their approach. Thus, it is an approach utilised when researchers make empirical observations about a phenomenon of interest and, from there, forms concepts and theories (Locke, 2007), most appropriate for when there is a lack of or limited previous theories or research findings in the research field of interest (Elo & Kyngäs, 2008; Hsieh & Shannon, 2005; Mayring, 2014). At the outset, the researcher must have the research question(s), aim(s) and assumptions directing the analysis (Harding, 2013; Schreier, 2013), and as the research develops, new categories will emerge inductively, requiring the testing of tentative hypotheses during the rest of the analysis process (Bernard, 2017; Neuendorf, 2002; Thorne, 2000). Hence, the inductive approach is also, to a lesser extent, a deductive one (Armat et al., 2018).
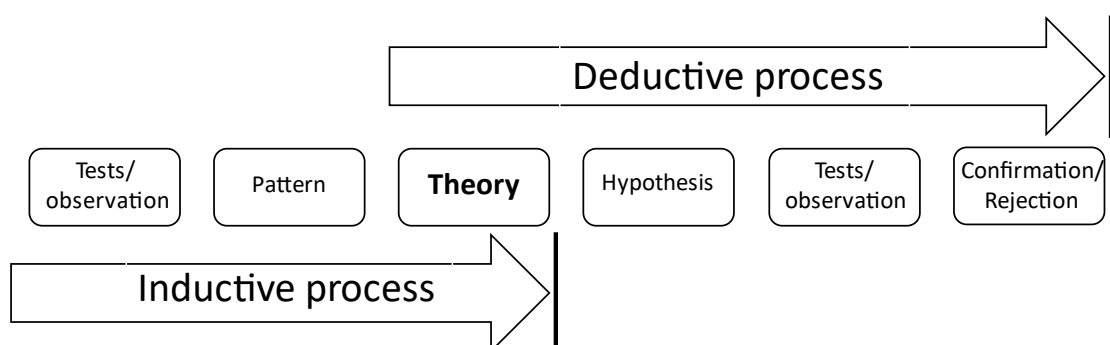
Figure 10. Research approaches illustration, adapted from Dudovskiy (2022)*.*

Therefore, whichever approach is adopted in research, there will always be a level of interchangeability between deduction and induction. This is due to the researcher's mind constantly switching between the induction and deduction modes of reasoning during a study (Harding, 2013). Nevertheless, studies tend to identify primarily with one of the aforementioned research approaches.

On their own, the established theories explored in Chapter 3 cannot fully account for, or explain, the adoption and survival of urban farms. Due to its exploratory nature, ability to capture diverse perspectives, contextual understanding, theory-building potential, and adaptability to the dynamic nature of the topic, an inductive research approach is appropriate to this research's objectives. Therefore, the theory generated from the collected data will be used to develop a framework that accounts for the adoption and survival of urban farms.

4.4. Research strategy

A research strategy is an overall plan for conducting a research study that guides a researcher in planning, executing, and monitoring the study (Johannesson & Perjons, 2014). While the research strategy offers high-level guidance as to which direction the research should point to, research methods tell the researcher how to collect and analyse data (Johannesson & Perjons, 2014).

4.4.1. Qualitative approach

To explore the factors that influence the adoption and survival of urban farms, a thorough understanding of the experiences of members of those farms is fundamental. The data required to address this research inquiry necessitates the utilization of qualitative methods, which will be elaborated upon in this subsection. Qualitative research, associated with constructivist paradigms, acknowledges the subjective and multiple realities constructed by participants (Bryman, 1984; Guba & Lincoln, 1994; Krauss, 2005; Lincoln & Guba, 2000), which are subject to interpretation by researchers (L. Cohen et al., 2000). Researchers deeply engage with participants' lived experiences and perspectives, recognizing their own influence on the research process and becoming integral to data collection. In a qualitative study, the researcher

relies on the views and experiences of participants, who construct their own realities and develop knowledge through practice (L. Cohen et al., 2000).

Qualitative research methods are diverse and flexible, encompassing ethnography, interviews, oral history, focus groups, case studies, discourse analysis, grounded theory, content analysis, and narrative inquiry (Antwi & Hamza, 2015). Inductive reasoning from the analysis of the data is often employed, allowing themes and patterns to be interpreted as researchers immerse themselves in the material. Consequently, findings in qualitative analysis are not objective truths inherent in the data but rather interpretations constructed by the researcher through their interaction with the material, reflecting their own perspectives and biases.

Although qualitative strategy is adopted in this thesis, research strategies can be differentiated based on how they view the nature of reality, i.e., their differing ontological and epistemological perspectives. For example, quantitative research, aligned with a positivist paradigm, operates on the premise of a singular, objective reality that can be reliably measured using scientific principles (Tubey et al., 2015). Researchers adopting this approach perceive reality as external to the research context and seek to uncover its underlying laws and patterns through systematic observation and statistical analysis (L. Cohen et al., 2000). Quantitative research employs statistical analysis to make logical connections between what is known and what the research can reveal about the unknown, and quantitative data requires the reduction of phenomena to numeric labels, necessitating careful consideration of how constructs are operationalized.

In identifying the most appropriate research approach for the examination of urban farming adoption and survival, qualitative research is preferable for this research. This conclusion is rooted in the fundamental characteristics of the two research questions posed and the foundational ontological and epistemological principles guiding the investigation. By contrast, quantitative approaches, rooted in positivist paradigms, may oversimplify the complexity of the dynamics seen in urban farms by attempting to reduce them to singular, objective realities. Qualitative methods allow for a more nuanced exploration of the diverse perspectives and subjective evaluations that shape urban farming initiatives. By embracing subjectivism

and constructivism, a qualitative research approach provides a suitable means to answer the research questions regarding the adoption and survival of urban farms.

4.5. Data collection methods

The data collection method describes the techniques or tools by which the researcher gathers the evidence or data that will be analysed hard (Harding, 2013; Johannesson & Perjons, 2014). Choosing the appropriate research method is fundamental for the successful achievement of research goals, as different tools are better suited to different research objectives. This research requires the analysis of detailed experiences of urban farm participants. Hence, semi-structured interviews are the most suitable data collection methods for this research due to their ability to capture individual perspectives, uncover contextual nuances, examine complex interactions, probe motivations and decision-making processes.

4.5.1. Interviews

An interview is a communication session between a researcher and a respondent in which the researcher controls the agenda by asking questions of the respondent (Johannesson & Perjons, 2014). The purpose of the research interview is to explore the views, experiences, beliefs and/or motivations of individuals on specific matters (Gill et al., 2008). Interviewing is helpful for gathering complex and sensitive information (Johannesson & Perjons, 2014) and can inform us about the nature of social life, such as the experiences that constitute the human condition, the challenges people confront as they live their lives and the cultures and the values, they uphold (Weiss, 1994). Qualitative methods, such as interviews, are believed to provide a 'deeper' understanding of social phenomena than would be obtained from purely quantitative methods, such as questionnaires (Gill et al., 2008; Johannesson & Perjons, 2014). Interviews are, therefore, most appropriate where little is already known about the study phenomenon or where detailed insights are required from individual participants (Gill et al., 2008), as they are effective for eliciting emotions, attitudes, opinions, and experiences from people who have access to privileged information (Johannesson & Perjons, 2014). In an interview, the researcher also becomes part of

the research instrument, shaping the context, communication, and cues that facilitate respondents' sharing of experiential data (Poggenpoel & Myburgh, 2003).

There are three fundamental types of research interviews: structured, semi-structured and unstructured (Gill et al., 2008). Structured interviews are, in essence, verbally administered questionnaires in which a list of predetermined questions are asked, with little or no variation and with no scope for follow-up questions to responses that warrant further elaboration. Unstructured interviews follow little or no structure and usually start with an opening question in which the progress will be based primarily upon the initial response. Semi-structured interviews consist of several key questions that help to delimit the areas to be explored, but their flexibility allows the participants to diverge to further pursue an idea or response in more detail (Gill et al., 2008).

According to Patton (1990), semi-structured interviews are an appropriate method of acquiring information that reflects complex events, processes, and interactions (Patton, 1990). This is a valuable and reliable method designed to acquire a deeper understanding of social studies and people's emotional involvement as it emphasises subjectivity (Bryman & Bell, 2011) and enables respondents to reflect on their own realities that they have perceived and constructed (Stake, 1995). In preparation for the interview, McNamara (2023) suggests a setting with little distraction, an explanation of the purpose and format of the interview to the respondents, addresses the terms of confidentiality, indicate how long the interview is expected to last and asks them if they have any questions before starting with the interview.

Designing an effective research questionnaire is one of the most crucial components of the interview process (Turner, 2010). It is essential to ask questions that are likely to yield as much information about the study phenomenon as possible and be able to address the aims and objectives of the research. Thus, the wording of the questions must allow the examiner to dig into the experiences and/or knowledge of the participants to gain maximum data from the interviews (Turner, 2010), preferably open-ended (McNamara, 2023). It is usually best to start with questions that participants can answer easily, to put respondents at ease and build up their confidence and rapport, and then proceed to more complex topics (Gill et al., 2008).

In addition, questions should be as clear, sensitive, and neutral as possible and be asked one at a time (McNamara, 2023). Finally, the answers provided by a respondent need to be recorded and transcribed so that the researcher can further interpret and analyse them.

Qualitative interviews, while valuable, come with certain limitations. It demands a substantial amount of time and can be financially demanding, with the transcription of interviews being a labour-intensive process. Recruitment of participants poses challenges, as it requires a more substantial time commitment compared to methods like closed-ended questionnaires.

Thus, the qualitative research interview is an important method to assess the meanings of life experienced by respondents. The main advantage of conducting interviews as a data collection method, perhaps, is that they allow the researcher to go into depth to gather detailed and complex information from specialized participants. However, they can be subjected to the researcher's personal attributes, which may influence the outcome, and the process is time-consuming.

4.6. Data collection process

The data collection process subsection describes the procedure by which the data were collected. It depicts the participant selection process and addresses its potential bias and ethical considerations. It also details the interview structure and how the transcription process was conducted.

4.6.1. Data collection

The aim of this data collection is to understand the factors that lead to the adoption and survival of urban farms. The qualitative data were collected based on interviews with participants of urban farms across different countries to capture the meanings particular experiences hold for participants in different Urban Farming contexts. An initial overview of some organisations in the sector provided insights that helped set the preliminary conditions to select the research's sample group and which are explained below.

4.6.1.1. Participant selection process

The search for eligible urban farms was undertaken based on three principles. The first principle was that the farms must be in urban or peri-urban areas, following FAO's definition of urban agriculture (FAO, n.d.). Most of the participating farms were situated in large urban areas (<100,000 population), although there were four exceptions.

Secondly, the research focused on specific urban farms rather than on Urban Farming organisations. Some Urban Farming organizations are focused on developing farming technologies (such as containers, hydroponic systems/ components, etc.) and only provide the structure of the farm, while other clients/ partner organisations operate them. Focusing specifically on urban farms presented a higher chance that a more accurate picture of the farms' operational characteristics would be captured, as some organisations manage multiple production sites with significant differences between each farm.

Third, a wide variety of different types of urban farms were actively sought to portray the multiple different experiences in running urban farms. Hence, many different production methods, business models, products and building structures were featured in diverse urban settings. Almost all farms were in operation at the time of their interview. In three instances, the farms had been shut down at the time of the interview. On two occasions, the urban farms studied were conceptual (i.e., were unrealised at the time of the research). Yet, these designs provided valuable insight into some of the problems that urban farms need to tackle. In this case, the interview approach was significantly modified in comparison to the interviews of the other urban farms.

The selection of participants was made through online research of urban farms that have appeared in media, by their geographical location or according to farms specificities using corresponding keywords (e.g., farms located in hospitals, urban farms in London, urban production of mushrooms, etc.). More than 300 urban farms were initially screened. Upon the first analysis through their websites and publicly

available information, 185 farms were effectively approached through a letter of invitation (**Appendix B**) sent via email to the available contact found online.

Of these, 98 farms did not reply, despite multiple attempts at contact. Another 35 urban farms did reply, although they declined to participate. Around half of these, 17 farms, stated that their participants were too busy and did not have the time to concede an interview. A further 14 farms agreed initially to participate in the research but stopped replying to the messages exchanged with the researcher.

Ultimately, 38 urban farms spanning 30 cities across 19 different countries agreed to participate in the research by allowing interviews with their representatives. Additionally, two of the farms voluntarily offered an extra interview each, which was conducted with an additional member of their respective teams. Regarding stakeholders, they were either the initial established contact or other collaborators referred by the farm's communications team. Each project included only one stakeholder, except for the aforementioned two farms with an additional interview. Finally, 40 interviews were conducted, which totalled 42:41 hours of recorded data.

4.6.1.2. Sample descriptions

As explained, 40 interviews were conducted, pertaining to 38 different urban farms, as Interviews 21 and 40, and Interviews 09 and 16 revolved the same farms. The names of the farms, their cities and the respondents' names were omitted to preserve the respondents' anonymity. **Table 2** presents a description of the urban farms based on their countries of operation, their status and age as of the date of the interview, whether they operated indoors and/or outdoors, their site, production method, types of food produced and the respondent's role in the farm.

Interview	Country	Status	Years	Venue	Site	Production	Food	Role
01	Thailand	Closed	6	Out	Hotel rooftop	Acquaponics	Spirulina	Operations manager
02	Brazil	Active	5	In	Shopping centre	Hydroponics	Leafy greens	CEO
03	Hungary	Active	4	In	Office building	Hydroponics	Microgreens	Co-founder/ CTO
04	The UK	Active	7	In	Tunnel	Hydroponics	Microgreens	Head of R&D and data
05	Hungary	Active	1.5	In	Container	Soil substrate	Microgreens	Co-founder
06	Germany	Active	1.4	In	Lab	Substrate	Mushrooms	Founder
07	Brazil	Active	2	Out	Land	Soil	Leafy greens/ vegetables	Manager
08	Poland	Active	8	Out	Building rooftop	Beehives	Honey	Co-founder
09	Sweden	Concept	-	In	Office building	-	-	Founder
10	Brazil	Active	6	In	Warehouse	Hydroponics	Microgreens/ lettuce	Co-founder
11	France	Active	1.5	In	Container	Substrate	Mushrooms	Co-founder
12	The UK	Closed	3	In	Greenhouse	Hydroponics	Vegetables	Head of R&D and data
13	The UK	Active	0.5	In	Restaurant	Hydroponic wall	Herbs	Founder
14	Italy	Concept	-	In	Tower	Acquaponics	-	Architect
15	USA	Active	6	In	Greenhouse	Hydroponics	Tomatoes/ microgreens	VP operations
16	Sweden	Concept	-	In	Office building	-	-	Head of engineering
17	Denmark	Active	1.7	In	Warehouse	Hydroponics	Leafy greens	CFO
18	USA	Active	2.5	Out	Hospital	Soil	Leafy greens/ vegetables	Farm manager
19	Singapore	Active	0.5	In	Shopping centre	Aeroponics	Vegetables/ leafy greens	Founder/resident farmer
20	The UK	Active	1.5	In	Container	Aeroponics	Vegetables/ herbs	Research associate
21	Japan	Closed	7	In	Office building	Various	Vegetables/rice	General manager
22	Brazil	Active	6	In	Container	Substrate	Mushrooms/ microgreens	Co-founder
23	The UK	Active	6	In	Container	Substrate	Mushrooms	Founder
24	Canada	Active	4	In	Greenhouse	Hydroponics	Strawberry	Head mkt/comms
25	The UK	Active	7	Out	Dry dock	Soil	Leafy greens/ vegetables	Site manager
26	The Carribean	Active	12	Out	Greenhouse	Acquaponics	Leafy greens/tilapia	Founder
27	Lebanon	Active	1.4	In	Container	Hydroponics	Leafy greens	Project manager
28	The UK	Active	1	In	Historic warehouse	Hydro/ aquaponics	Lettuce/ microgreens	Co-founder/tech director
29	Singapore	Active	2.5	Both	Deactivated school	Hydroponics	Leafy greens/ rice/fruits	Co-founder
30	The UK	Active	10	Out	Office building	Soil	Vegetables	Environmental manager
31	USA	Active	80	Out	Park	Soil	Vegetables	VP of administration
32	Indonesia	Active	1	In	Warehouse	Hydroponics	Microgreens	Co-founder/ operations/mkt
33	Singapore	Active	5	Out	Hotel rooftop	Acquaponics	Tilapia/leafy greens	Director of culinary
34	Argentina	Active	6	In	Lab	Cell-based meat	Meat	Business development
35	Singapore	Active	4	In	Lab	Cell-based meat	Fish	Co-founder/CEO
36	USA	Active	5	In	Lab	Cell-based meat	Meat	CTO
37	France	Active	4	Out	Theatre rooftop	Soil	Tomatoes/ vegetables	Co-founder
38	Romania	Active	2	In	Office building	Hydroponics	Microgreens	Founder/gen manager
39	USA	Active	7	Out	Stadium rooftop	Compost soil	Vegetables/leafy greens	President
40	Japan	Closed	7	In	Office building	Various	Vegetables/rice	Architect

Table 2. List of participating farms.

Most urban farms were still active when interviews took place, with 7 exceptions. The average age of the farms is 6.3 years, although, by excluding the rather exceptional 80-year-old farms, this average decreases to 4.3 years. Most of the farms are indoors and the sites and production methods are varied. Although there are diverse food production methods, most urban farms are centred around leafy greens, vegetables, and microgreens. Many of the respondents are founders/co-founders, while also being involved with operations/farm management capacities. Thus, the data sample for this research is quite diverse, indicating a heterogeneous variety of answers.

4.6.1.3. Participant selection bias

As pointed out earlier, over 300 urban farms were initially screened. While some were deemed unfit due to the nature of the farm, others could not be contacted. This was mainly due to the fact that these urban farms had been shut down and, therefore, their contact information was outdated. Some closed urban farms were among the 185 initially contacted, but these overwhelmingly did not respond to the interview requests. Only three of the participating farms are no longer in operation: one was destined to be a temporary farm since its inception; another closed due to the parent company moving out of the building; and the last closed the site that was the subject of the interview but continues to operate other Urban Farming sites.

Therefore, it is reasonable to infer that the data sample is subject, to some extent, to participant selection bias. Farms that continue to survive, either because they have been successful and are currently operational or are relatively recent and have had less time to encounter setbacks, were more inclined to engage in this research. Engaging participants from urban farms that have been closed presents challenges, as individuals associated with these ventures might be more apprehensive about discussing their failures compared to those linked to successful endeavours. Consequently, this scenario tends to omit urban farms that have not survived and ceased operations due to the complexities encountered when seeking interviews with members of farms classified as "unsuccessful."

4.6.2. Ethical considerations

Researchers must adhere to ethical norms to ensure trust, accountability, mutual respect, and fairness (Resnik, 2015). As the data collection involves direct interactions with human subjects, this research must, therefore, be subjected to University College London's ethical requirements. Conforming to these policies is paramount, as negligence to do so risks the eligibility of the collected data for publication, imposes ethical risks to the researcher and exposes the individuals participating in the research. In line with the University's policy, ethical clearance was obtained from UCL's Research Ethics Committee via a Low-Risk Application for Ethical Review (**Appendix C**).

There are some ethical considerations that this research must be conscious of, particularly during the gathering and presentation process of the research data (Saunders et al., 2009, p. 184). These include the voluntary, consensual, confidential, and anonymous nature of the subject's participation, their right to withdraw partially or completely from the process as well as the behaviour and objectivity of the researcher. Thus, before each interview, respondents were given an information sheet explaining the background and objectives of the research (**Appendix D**), as well as a consent form to be signed (**Appendix E**).

In addition, a verbal explanation about the research study and use of data collected was provided as well as consent to being recorded was asked at the beginning of each interview. To ensure anonymity to the participating farms and respondents, their identity was masked. Each respondent was assigned a code name (e.g., "Interview 09", "Interview 23"), which ensured that respondents remained unidentified while still granting readers the ability to interpret the findings.

4.6.3. Interview structure

An interview questionnaire was developed to be used as a primary interview blueprint. However, as the interviews were undertaken, the interviewer made some slight modifications to reflect the specific characteristics of the farms as well as to account for the fact that respondents might include answers to questions that had not yet been asked. In addition, extra questions outside the questionnaires were

sometimes asked to clarify answers (i.e., probes) and/or to further develop respondents' answers that were outside the initial scope and were deemed of interest to the research. Hence, the interviews followed a semi-structured set of questions that could change and adapt depending on the development of the interview. The questions asked for the two conceptual farms were significantly modified but followed the basic guidelines outlined by the original questionnaire.

The questionnaire's basic structure started with a general introduction, inviting respondents to introduce themselves and describe the farm and their role in it. There were also asked to provide a brief description of their weekly activities in the farm, as well as the ownership structure. Lastly, in this introductory section, the main factor that motivated the urban farm was discussed.

The second section of the questionnaire considered the physical site on which the urban farm is based. Questions about the facility's characteristics, how it was found, its rental agreement and the modifications that were made to the space were asked. The main benefits and drawbacks of operating in that facility were discussed, as well as how they saw the potential to integrate their production method into new builds, both residential and commercial.

Then, food was highlighted, centring on the reasons for the crop and production method choices. The questions in this part explored their customer base characteristics as well as the way in which the final product enters the food supply chain and disposal of waste. Lastly, their perceptions of their competitive advantage were assessed, and they were asked whether they believe their products have gains in flavour (compared to traditionally farmed crops).

The fourth and final section of the questionnaire posed general questions. These ranged from how regulations and the COVID-19 pandemic have affected the farm's activities, to the respondent's views on sustainability, their interaction with the built environment, the main challenges they have faced, and the lessons learned throughout the farm's history. The full questionnaire can be found in **Appendix F**.

4.6.4. Interview transcription process

All 40 participants were interviewed by the researcher via Zoom calls between January and November 2022. The majority of interviews were conducted in English (33), with additional interviews conducted in Portuguese (3), French (2), and Spanish (1). Since the researcher is fluent in all these languages, no interpreter was required for these interviews. However, one interview was conducted in Japanese (1), necessitating the assistance of an interpreter.

After the completion of each interview, the audio file was retrieved from Zoom Recording and processed using Otter.ai, for the audio in English, and Trint, for the remaining languages to obtain its transcription. Then, the transcription file was compared with the audio to ascertain its accuracy and the original audio file was then deleted. To maintain consistency for analysis, transcripts originally in Portuguese, French, and Spanish were translated into English using Google Translate. However, while this translation tool is generally accurate, it may not always capture nuanced language and cultural expressions accurately. Therefore, the translated transcripts from these languages were carefully reviewed and revised as needed to ensure accuracy and fidelity to the original meaning.

Even though most respondents conducted their interviews in English with a certain level of fluency, nuances in communication and cultural expressions might not always translate accurately. Additionally, in the case of the Japanese interview, conducted through an interpreter, the indirect conversation between the researcher and respondent could have introduced an additional layer of complexity. This indirect communication may have affected the flow and depth of the interview, potentially impacting the richness of the data obtained. Moreover, certain interviews were conducted with careful consideration of cultural sensitivities. This involved adapting the level of formality or informality based on the cultural context and being mindful of addressing topics or questions that might be sensitive within specific cultural frameworks.

Each interview was given an individual and anonymised code name such as "Interview 13" and "Interview 24". For the two farms that had provided two separate

interviews each, all four interviews were considered independently during the coding phase, thus having individual code names. An example of a fully anonymised interview transcript is presented in **Appendix G**.

4.7. Analysis method

Each of the (40) transcripts were reviewed several times and coded using NVivo software to extract quotes that were deemed meaningful. Through an inductive reasoning, a total of (672) quotes were selected from the material for the coding stage of the analysis. The coding method involves developing codes from the data and gradually abstracting their meaning through distinct stages. Codes are defined as the key themes, issues, and ideas that appear in the research (M. Jones & Alony, 2011), which are constantly compared to each other until strong patterns form among the findings (Allen & Davey, 2018). Once the codes have been identified, they are organized into overarching categories, as outlined in Chapter 5. These categories will serve as the basis for conducting the analysis using the Gioia method, which are featured in Chapters 6 and 7.

4.7.1. Gioia method

The analysis of qualitative data has the inherent challenge to find a justifiable balance between simplicity and richness in the explanations to ensure a comprehensive and representative understanding of the phenomenon under study (Harley & Cornelissen, 2022). The Gioia method, a qualitative grounded-theory-based interpretive research approach (Gehman et al., 2018), prioritizes the former, by inferring a more elementary, abstract, and transferable model from a case (Gioia et al., 2012). As a template, the Gioia method offers protocolized ways of conducting and analysing qualitative research, which provides qualitative scholars with general protocols for the analysis and presentation of their data (Harley & Cornelissen, 2022), enabling derivation of theoretical claims from the data in a warranted and grounded manner (Gioia et al., 2012). By adopting this methodology, the classic epistemic virtues of parsimony and transferability are ensured, as it allows the researcher to develop transferable constructs or a process model from the data (Amis & Silk, 2008).

Furthermore, the Gioia method's protocolized nature provides a systematic series of coding steps that guide the analysis, enhancing rigour in the reasoning and decision-making process (Gioia et al., 2012). This not only adds credibility to the findings but also enhances the transparency of the research, allowing readers to better understand and assess the analytical choices.

The Gioia method follows an inductive organization across various stages (Gioia et al., 2012). The data are analysed inductively, adhering to the guidelines of naturalistic inquiry methods (Guba & Lincoln, 1985) and constant comparison techniques (Glaser & Strauss, 1967). These methodologies provide a robust collection and analysis of qualitative data, guiding subsequent data collection samples and content focus while facilitating the clear delineation of themes and aggregate dimensions (Gioia et al., 1994) by examining and comparing key events (Isabella, 1990) and informant ideas.

First-order concepts, systematically derived from the data, cluster into 2nd order themes, and further evolve into aggregate dimensions (Gioia et al., 2012), as illustrated in **Figure 11**.
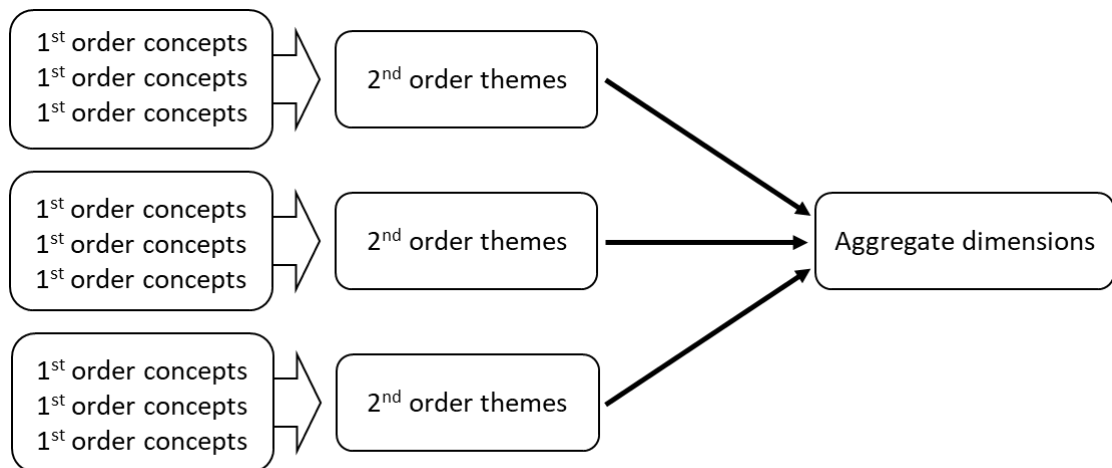
Figure 11. Data structure example for analysis using the Gioia method based on Corley & Gioia (2004).

This data structure is a way to tell an increasingly parsimonious story about the observations made by the researcher (Gehman et al., 2018). It is a systemized way to inform the findings from the data, through distilling the meaning of the most

representative quotes captured in 1st order concepts, without resorting to a lengthy analysis of the interview transcription. 1st order codes are descriptive, capturing the responses given by respondents and assigning a summarized code that makes precise references to the quotes. 2nd order themes are a step further in abstraction. These are the conceptual building blocks for the grounded model. The transition from 1st concepts to 2nd order themes is a transition between a descriptive representation of the findings in terms easily understandable by the informants to a description of the findings which are theoretical and meaningful to researchers (Ravasi, 2021). This step represents the critical progression from raw data to first-order codes and further to second-order theoretical themes and dimensions and showcases the rigour and depth of analysis undertaken to derive meaningful insights from the data (Gehman et al., 2018). The arrows used to represent the transition from one stage to the other relate to the existential link from the concepts to the themes and, finally, to the aggregate dimensions. When all the first-order codes and second-order themes and dimensions have been assembled, the basis for building a data structure is formed, culminating in the elaboration of the aggregate dimensions. The theory is, thus, developed by illustrating the dynamic relationships among emerging concepts, effectively showcasing the data-to-theory connections and the transformation from data structure to grounded theory (Gehman et al., 2018).

4.8. Research methodology summary

To fulfil the research's objective of examining the factors that influence the adoption and survival of urban farms, a research methodology has been developed. It is driven by a subjectivist/constructionist ontological position, an interpretivist epistemological position, and an inductive research approach is adopted. After the philosophic assumptions and research approach are established, a qualitative research strategy will be employed, using interviews as the data collection method, which will be subjected to an analysis based on the Gioia method. **Figure 12** illustrates the thesis' methodology process.

Ontological position	→	**Subjectivist / Constructionist**
Epistemological position	→	**Interpretivist**
Research approach	→	**Inductive**
Research strategy	→	**Qualitative**
Data collection methods	→	**Interviews**
Analysis	→	**Gioia method**
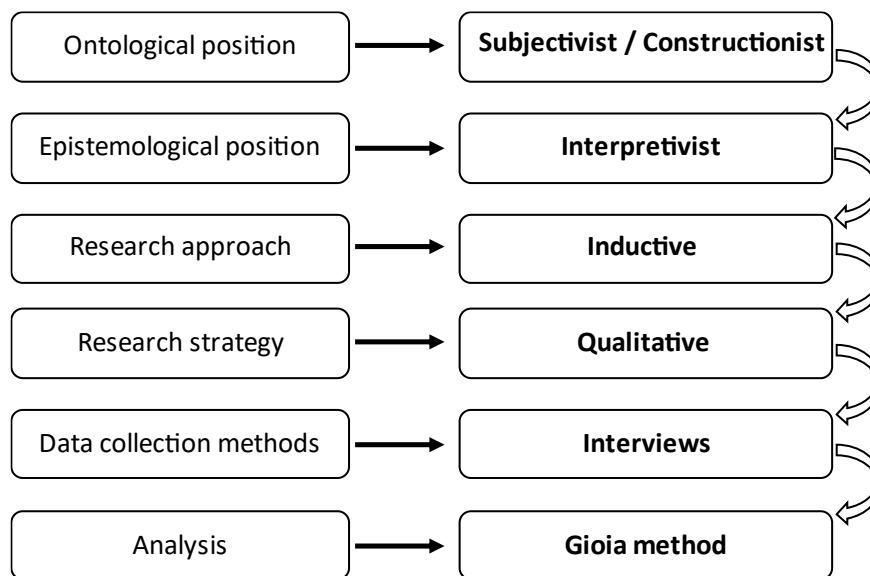
Figure 12. Illustration of the methodology and methods used in this research.

The subjectivist/constructionist ontological position recognizes that reality is socially constructed and acknowledges the importance of individuals' subjective experiences and interpretations. Taking an interpretivist epistemological position acknowledges that knowledge is socially constructed through subjective interpretation. It, thus, emphasizes the need to capture and understand the diverse meanings and motivations, perspectives, and understandings in the context of urban farms. The research approach employed is inductive, allowing for the generation of new insights and theories based on the data collected. This approach is well-suited for exploring complex phenomena and identifying patterns, which is appropriate when investigating the factors that play into the adoption and survival of urban farms. Regarding data collection, interviews were conducted with collaborators of these farms, providing an opportunity to engage in comprehensive conversations with individuals, enabling a rich understanding of their experiences, motivations, and perceptions. Finally, the data analysis utilizes the Gioia method to identify and interpret significant and recurring themes and patterns. These themes and patterns serve as the foundation for the ensuing discussion, providing insight into the findings and their implications.

Chapter 5. Data analysis

The preceding chapter presented an account of the research methodology employed in this thesis, focusing on the qualitative research approach chosen to understand the adoption and survival of urban farms. This chapter, in turn, aims to present a synthesis of the data analysis outcomes. Following an analysis of relevant quotes obtained from the interviews, 9 distinct overarching relevant topics were identified, revealing underlying topics, trends, and relationships that surfaced during the data collection phase. These key points will serve as the foundation for developing themes that will be further explored in subsequent chapters.

5.1. Introduction

This chapter presents and analyses the collected data. Firstly, a brief description of the data sample is provided to understand the context in which the farms operate. Then, the data analysis is presented, organised according to the research questions they help answer. Each relevant topic identified in the interviews is presented together with relevant quotes from the respondents, as well as an analytic statement pertinent to their related research questions. Finally, a summary of the analysis is presented. **Figure 13** describes the chapter's structure, from the sample description to the summary.
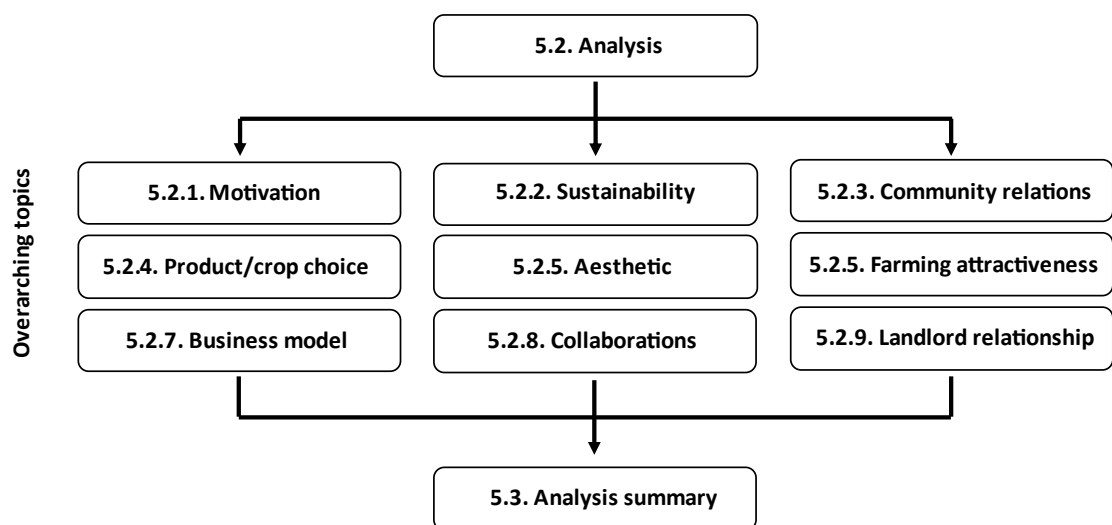
Figure 13. Diagram illustrating the structure of Chapter 5.

5.2. Data results

The data analysis yielded fifteen overarching topics as emergent themes. However, not all of them directly contribute to addressing the research questions or offer the necessary depth of exploration to provide novel insights beyond existing literature. Therefore, a selection process was conducted, resulting in the identification of 9 key topics. These topics, organized according to the research questions they address, are illustrated in **Figure 14**.

RQ I: why is Urban Farming adopted?

Motivation   Product/crop choice   Sustainability   Community relations

RQ II: how do urban farms survive?

Aesthetic   Farming attractiveness   Product/crop choice   Business model   Collaborations   Landlord relationship
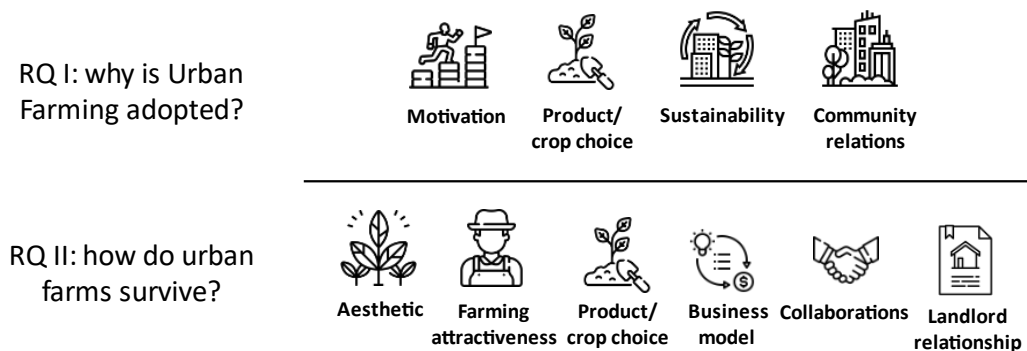
Figure 14. Illustration of the selected topics, organized by research questions.

Each overarching topic encapsulates significant themes derived from the data, providing insights into the adoption and survival of urban farms. Topics such as Motivations, Product/crop choice, Sustainability, and Community relations offer valuable insights into how institutionalization practices influence the adoption of Urban Farming. Conversely, topics like Aesthetic, Farming attractiveness, Product/crop choice, Business model, Collaborations, and Landlord relationship provide insights into the tactics and attractiveness utilized by urban farms to survive.

The following subsections present and describe these topics, incorporating direct quotes from the respondents, represented by their interview code name (e.g., '07'). The organization of the 9 overarching topics in the data results throughout the section aligns with the systematic exploration of the research questions. It's worth noting that the topic 'reasons for product/crop choice' was utilized to answer both research questions.

5.2.1. Motivation

Various reasons were listed as motivating factors for the implementation of the urban farms. Many cited product features, such as its higher nutrition, food quality and its attractiveness to children (*"The underlying motivation was linked with our own kids' experience with the product" - 22*), production factors, like the possibility of farming in a city, and product/production sustainability. The latter was cited in numerous instances through the aspects of environmental food cost and degradation (*"Urban Farming would definitely be one of the ways of stopping the excessive harvesting nature. That was the main reason why we started the project" - 17*), educating and enabling people to grow food sustainably and improve building/built environment sustainability (*"Our project was built to reduce the heat island phenomenon in urban areas, absorbing CO_2 to reduce the environmental load and reduce power consumption" - 21*). Food security was discussed, such as the ability of year-round production in countries with harsh climates, as well as the autonomy of and higher control over food supply (*"Urban Farming certainly won't replace arable land or conventional farming altogether but will be an important substitute or supplement to those farming methods. A resilient food system must be diversified so it is resilient to crisis, whatever they may be" - 04*).

Market-based motivations were mentioned, including prototype testing, marketing purposes (*"It was great for getting attention to the company because rooftop gardens look beautiful, so the marketing factor was great because of imagery. Having these tanks filled with green liquid and the Bangkok skyline in the background with a sunset is great for any type of documentary article or anything" - 01*) and seeing Urban Farming as a market opportunity. Other factors include the interaction with the built environment, the use of empty space, the need for a locus to connect people with food (*"We wanted to bring a vertical farm to a place combining sustainability and bringing food closer and how we produce food closer to consumers" - 20*) and a welcoming and open space for the community. Finally, respondents brought up personal reasons to undertake Urban Farming, as there was interest in entering the agricultural business through non-traditional ways (*"We wanted to demolish the entry barriers of agriculture, because we youngsters do not go into the agriculture business*

because it is not a sexy industry. They also don't believe they can make a successful business in agriculture" - 03) and they found the activity attractive.

Hence, a combination of product features, market considerations, and personal motivations influences organizations' decisions to adopt urban farming initiatives. Product-related factors demonstrate a commitment to sustainability, while market-based motivations reveal an awareness of opportunities and a drive for innovation. Additionally, personal reasons highlight individual agency and entrepreneurial spirit. Therefore, the discussion on motivations for collaborators of urban farms directly addresses the first research question concerning the adoption process of Urban Farming. Chapter 6 delves into factors identified by respondents that illustrate the incentives driving adoption, including their motivations.

5.2.2. Sustainability

Sustainability can be defined as the joint actions that safeguard the protection of the Earth or the biosphere, in such a way that its viability is not threatened (Schaefer & Crane, 2005). However, the widespread use of the term sustainability has led to a multitude of interpretations and definitions, reflecting the diverse perspectives and interests of different individuals and groups and the complexity of sustainability as a concept (Salas-Zapata & Ortiz-Muñoz, 2019). The loose definition of sustainability used in the interview allowed the respondents to interpret and define sustainability according to their own understanding and its relevance to their urban farming activities, acknowledging the diverse perspectives and interpretations associated with the concept.

Urban farms' external sustainability relates to both consumer and business relations. Although consumers tend to have a lack of awareness of the environmental food costs (*"We have no metric in the agricultural world and food production world that that details all the costs of production, unlike, for example, the automobile industry, in which all the small nails are accounted for" - 16*) and Urban Farming is a way to get customers engaged in sustainability (*"We haven't got a particularly big set up here and the amount of produce we make is tiny. To have an impact on the amount of food we buy, and be able to supply all of our herbs, we would need a huge amount*

of space. Yet, this is a very effective way to get customers engaged, they love it" - 13),
there is a challenge in measuring and communicating sustainability to consumers
(*"Our great challenge now is how we measure these impacts. And how do we
communicate this impact in a way that gives clarity and visibility to people" - 02*). In
relation to business activity, sustainability is often seen as an underlying value for all
production aspects (*"Sustainability is always an underlying value in the sense that
when we look at yield improvement, obviously, we're not going to increase it by
compromising on the sustainability value of the business." - 04*), being part of the
business strategy and legitimizing practices ("*Nowadays, companies will decide
whether they work with you based on what your sustainability story is" - 33*). The
internal aspects of sustainability incorporate the sustainable features of UFs, such as
using renewable energy, water conservation and waste management, and their ability
to be part of climate change adaptations. These include their resilience, or even
immunity, to climate-adverse effects on production (for the indoor sites) and the
opportunity to improve the current food system.

Concerns about energy consumption were quite common, especially for urban
farms that rely on heating and lighting. The high energy costs to maintain a closed
environment ("*The energy costs of the farm will range from 40 to 60%." - 20*) is a cause
for worry and energy management is regarded as an important component of an urban
farm's survival ("*the main challenge is energy management; it consumes a lot of energy
and this can break a project" - 24*). However, if UFs become more energy efficient, they
can become more popular due to the transportation costs of industrial farming *("Most
of the salad in the UK comes in flown from Europe. I think energy pricing is not going
to ever go back down again. And I think this will push it Europe to use this sort of
technology, rather than relying on transportation so much" - 14*), although this is still
not true for most farms ("*The business modelling is still extremely immature because,
if you can't recover the energy used in the project, then of course the food is going to
be too expensive if you don't sell it directly to consumers" - 09*). Finally, many UFs
designed a production process that is entirely compostable (*"Everything that comes
out the farm is compostable. The boxes can either be taken to a cardboard recycling or
they can be chucked in the compost. Everything else that comes out of the farm is
compostable. When we sell in bags, the bags are compostable. So, there is nothing*

really that comes out the farm that's not compostable" - 28) or had a mindful disposal of operational waste. Yet, disposable means, such as growing mediums, are often preferred over reusable ones due to intensive cleaning effort (*"We got so frustrated with the coconut fibre because we knew we had to sterilize it"* - 22), as there is a significant added labour to clean reusable production materials, thus making the product more expensive (*"Ideally, we would find an innovative way to make a silicone-based bag that you could reuse. But to recycle your bag, you've got to clean it, which requires you to increase product price. So, while it becomes sustainable, it also prices out the people that really need these foods"* - 06).

The discussion on sustainability in Urban Farming highlights its significance in both external and internal aspects. Externally, it engages consumers and guides business practices, despite challenges in communication and measurement. Internally, urban farms employ sustainable features like renewable energy and waste management. Overall, sustainability concerns significantly shape Urban Farming practices and motivations, thus impacting its adoption. This will be examined in the discussion, with a specific focus on sustainability values.

5.2.3. Community relations

The relationship between the urban farms and their surroundings was mentioned throughout the interviews. Amongst the subjects mentioned were the importance of understanding the space and its needs (*"We invite people to a community panel that then advise us on the activities that we're doing and how they could benefit their local community, soliciting information from the community to find out what they want"* - 28) when designing the farm ("*We knew that we would be next to a nursing home and childcare. The bigger goal was to explore how having a farm in this compound could create a bridge between the seniors and the kids"* - 29), the need for communities to realize that urban farms are a necessary component of their built environment (*16*) and that the farm's sense of community and its ability to manage different stakeholders is essential for its continuity (*"If you're going to implement this urban agricultural approach anywhere, there has to be a fostered sense of community, because that's what keeps people coming back, keeps people interested, and keeps the stakeholders happy"* - 31).

There are instances of misconceptions about the UF's place within the built environment. This happens through both an agricultural disassociation with the urban environment, with a lack of agricultural expertise/infrastructure in major city centres (*"a business like ours requires contractors from time to time that know about horticultural equipment. That is very difficult to come by in the centre of the city because that is not where they normally operate." - 04*), as well as a lack of understanding of how UFs might impact the built environment. The former concerns problems with supply as "*in agriculture buying bulk means 30 tons plus, but when you're talking in the city, bulk is 2 tons plus and I would pay a lot more per kilo*" (*06*), while the latter is due to the novelty of UFs and their impacts, which may include legislation, the possible long-term effects ("*Not many people, unless they have a construction background, start thinking about the chemicals that they use, and how they interfere with the infrastructure of the building." - 06*) and the overall reception from the community. One respondent listed common exchanges with the community, such as: *"people start thinking smells, rotten food, waste products, they start thinking along these lines. Then they start thinking rodents, they start thinking heavy electricity bills, heavy water bills"* (*06*).

UFs are also regarded as a space to enhance the community's relationship within the city and the community's relationship with food and nature. Many farms perceive themselves as a welcoming and open space for the community (*25*), acting as a place in the community that ties the urban ecosystem together where citizens could relax and escape the urban environment: *"One of the comments that people make about us is that it's like a little oasis. We're just on the edge of the city centre, we are surrounded by an industrial area, a river, bridges, and busy traffic. And people say when they come on the site, that something happens, they just feel calmer"* (*25*). The communities, in general, are interested in understanding the UFs and connecting with them, given their positive perception, which is reciprocated by the farms ("*The part about visits is surely something we will make in our next project since a lot of people want to know more about it. We didn't think about this when we built the farm" - 10*).

Thus, many UFs propose a direct interaction with their surroundings, prioritizing community engagement activities. The contact with UFs helps people develop relationships with food and nature by reconnecting with their childhood,

bringing a sense of familiarity in a big city through green spaces, and by having conversations about food and their own personal nutrition (*"If you're talking about food in a relational way, like sharing recipes with someone, food is a common trait that we all share and it humanizes the relationship for people" - 18*).

The relationship between urban farms and their communities provides insights into the dynamics driving Urban Farming adoption, a key focus of investigation in the first part of the discussion. Urban farms prioritize community engagement, tailoring activities to local needs through feedback. Despite misconceptions, they foster connections with food and nature, aligning with sustainable values. This emphasis underscores the significance of community relationships in shaping the adoption of Urban Farming initiatives, as explored in the first research question.

5.2.4. Reasons for product/crop choice

When it came to discussing the product itself, the answers were divided between those which highlighted the product features and others which cited a more pragmatic approach to crop choice. Amongst the product features, the UFs' product consistency (*"in the restaurant sector, the chefs really require the same quality at the same price with a very flexible delivery. And that was our value proposition" - 03*) and quality, exemplified by its freshness *(15)*, quality, product, and supply consistency, were highlighted as their main value proposition as a main selling point. As one farm puts it: *"our competitive advantage is taste, texture, colour and consistency in supply" (27)*. On that note, almost all urban farms have emphasized significant gains in flavour from their consumers' perspective *(19)*. The local connection of consumers with food (such as product labelling that highlights the location in which the food was produced), the uniqueness of the product/production method *(23)* as well as the belief that their method of production is better than the alternatives *(10)*.

However, some urban farms also had a pragmatic approach to crop choice. Environmental reasons, such as the fast turnaround and reduction of waste, were listed as reasons for crop choice *(02)*. Amongst the many references made to the more objective product features and justifications for demand, producers cited short production cycles (*"Instead of harvesting three times a year, we get to harvest twice*

every month" - 27), nutrition (07), customers' familiarity (22), local diets (19), freshness, and, especially, demand (26) as reasons for crop choice.

Furthermore, it is important to underline microgreens' appeal as a crop and as a product. Many urban farms focus on the production of microgreens mainly due to their inherent qualities, such as their convenience ("*The product is easy to handle. You open and you eat it. People like to have it easy. They don't want to have to wash it. And the taste is better than you are used to. And the durability is really long*" - 17) and aesthetic appeal (*"The visual appeal of micro grains is incredible in the supermarket"* - 22) for customers, especially among children. One producer recalled: *"the reason my business partner and I got interested in microgreens was that we both had stepsons that were not enthusiastic about eating vegetables. My partner called me up one day and said that he tested the microgreens with his stepson and he ate it. And the same thing happened with my stepson. It is a combination of texture and a bit of flavour of adult vegetables that turn kids off. We had kids showing up in our tastings later that would eat mustard microgreens, which is bitter. So, we figured out that it wasn't the bitter flavour and the texture. That, combined with the gap of the market, put us on the path or microgreens"* (22).

Furthermore, the fast production cycle, long shelf-life, and its perceived market gap, being a high-value product and having higher margins when compared to other greens, made for an attractive crop. However, due to their novelty, microgreens as a product need more consumer education for demand to thrive (32) due to product novelty: "*we really had to go out and educate the consumer on and create the market for microgreens*" (15).

Urban farms prioritize product consistency and quality, meeting consumer preferences sustainably. Pragmatic considerations include environmental sustainability and market demand. Microgreens, with their convenience and market appeal, exemplify innovative tactics adopted by urban farms. Hence, the analysis of product/crop choice in Urban Farming provides insights into both adoption motivations and survival factors in urban farms.

5.2.5. Aesthetic

This overarching category concerns the aesthetic of urban farms. Aesthetic presentation of both the product and the farm itself appears to play a significant role. Production display, for instance, provides the farm's visibility, both to the public (*"the production display has a big effect on people, consumers come over just to see it" - 22*) and the media ("*the unusual location is important for the media*" *- 10*). However, to optimize operations, a balance between display and efficiency would be optimal ("*I would keep part of the operation in display for the public and then, behind the scenes, I would have a setting designed to be more efficient for operations" - 13)*. The product display, on the other hand, is also highly regarded. One respondent claims it is their main competitive advantage, due to the *"super sexy display (…) our product is live, we don't pre-cut it, and we harvest in front of the consumer and sell in a recyclable carton box" (06)*. This may explain why, despite being wasteful, clear plastic packaging is preferred because *"it is the cheapest packaging and, since the product is beautiful, producers want to show it" (05)*.

The aesthetic presentation of urban farms is a significant factor in their survival, as emphasized in Chapter 7's exploration of factors contributing to urban farming survival. Respondents illustrate how the aesthetic appeal, encompassing both the presentation of the farm itself and its products, influences the visibility and marketability of urban farms. Production display serves as a key mechanism for attracting public attention and media coverage, with respondents emphasizing the importance of striking a balance between display and operational efficiency. Moreover, the product display is identified as a competitive advantage, with one respondent attributing their success to a visually appealing presentation that includes live product demonstrations. Despite potential drawbacks such as waste, the preference for clear plastic packaging underscores the emphasis on showcasing the aesthetic appeal of the product. This analysis underscores the importance of aesthetic considerations in urban farms, aligning with the research question regarding the factors that contribute to the survival of urban farms.

5.2.6. Farming attractiveness

One respondent describes how *"happily surprised (we were) that the people that came to us were very young" (24)*. Also *"young people have more consciousness about the damages of traditional agriculture" (34)*, which may explain Urban Farming's appeal to younger audiences, with one farm using this trend to its advantage (*"The face of the company has become young farmers. You don't see this very often anywhere in the world, and people are more inclined to support younger farmers" - 19*). This generational topic is present in many interviews, as one farm wanted *"to get younger people interested in agriculture and, thus, increase the declining and ageing agricultural population" (21)*. The convenient location of these farms, mostly located in large cities, also improves the attractiveness of this activity to younger professionals, who tend to be more urban *(03)*. Volunteering and interning are also used by young professionals to 'test the waters`, see how the farm works, and gain experience *(03)*.

In some instances, urban farms have had support from the government, engaging in discussions such as *"how to make farming interesting? Or how do you make it cool? Because the kids didn't want to go and do a job interview in farming, but now you see the number of people who are building urban farms, on old car parks, and they're making decent businesses out of it" (33).* However, one manager pointed out that *"some countries want to create employment, but the technology uses very low employment levels" (12)*. Regarding technology, *"it is key because it can help attract young people. The conditions of an indoor farm are much better than being in the field, exposed to the elements" (24).* The emphasis on ergonomics was mentioned, as the *"employment model focused on being able to take away some of the barriers of entry to traditional agriculture, where there's a lot of heavy lifting, there's a lot of bending over, there's a lot of time on your feet. We try to do it in a more enjoyable and safer manner" (15)*.

The attractiveness of urban farming, highlighted in discussions, contributes significantly to its survival. Younger audiences are drawn to its novelty and environmental consciousness, actively engaging and supporting it. Urban farms' convenient city locations appeal to young professionals seeking hands-on experiences. Government support and technological advancements also enhance urban farming's appeal. Efforts to improve ergonomics and working conditions attract and retain

talent. Thus, analysing farming attractiveness offers insights into the factors that influence urban farms' survival.

5.2.7. Business model

Creating a successful business model is a challenge for urban farms general: *"that was the biggest challenge of the farm, combining all the things that we want to combine in this business model and making this work" (20).* There are difficulties competing via price (*"things like leafy greens and microgreens, are homogenous products and the differentiation only takes you so far" - 04*) and some farms focus on the volume of sales due to tight margins on the market (*"Any kind of food production is a very low-margin business. (…) it's not feasible to do fancy things just because it looks nice, or because it's the best you can achieve, you always have to go back to what has to do in terms of yield or the number of growing days or in terms of product uniformity or quality or tastes" - 04*). Many UFs, in fact, are not profitable (*39*). Thus, there is an inherent need to be creative in terms of the adopted business model. Some of these are not based entirely on food production, such as ones that use a parallel activity, like grants, educational work and compost selling, to generate revenue. Others use their accumulated knowledge to build their own proprietary technology, develop growing systems software, and some even make forays into consulting.

Because this is an incipient field, farms have habitually undertaken an exploration or creation of their market niche (*22*), resulting in rather diverse business models. One farm, for example, is only active during the off-season to compete only with imported products, where the food production on site is a service rendered to site occupiers who target markets that are well suited for the product. The pioneering production methods often means struggling to build a network of buyers and conducting market research, preferably before starting operations (*22*). Many farms prefer to sell their produce B2B (business-to-business), benefitting from the more consistent demand from restaurants and markets (*"Our system of production requires a constant flow in terms of planting, harvesting planting again, like a factory. That's why we moved our model to do it directly to clients and restaurants, because they have a more consistent demand" - 26*). In addition, adaptability of the business model is important (*22*). This was evident during the Covid-19 pandemic, in which many of the

traditional buyers, such as restaurants, had to be closed, making urban farms repurpose their operations: *"we were lucky that we were diversified and that enabled us to keep going. If we had relied solely on restaurants, we probably would have gone under, but we had supermarkets and supermarket demand actually increased during that time for obvious reasons. The lesson was that diversification is better" (04)*.

Finally, farms also alluded to the importance of consumer relationship building. This includes gaining consumer trust through food safety, labelling that highlights the location in which the food was produced, understanding customer needs and packaging that conveys a sustainable message. On a related note, challenges were reported in relaying the value of Urban Farming to consumers. They lack awareness of environmental food costs (*"If we can start putting the right number on the right box, we will be able to look at the correct cost of food. Today we believe that UF is a more expensive system to produce food but it can be equally costly to do on traditional agriculture, if you take into account the value of the land that is disregarded" - 16*), while farms experience difficulties explaining the growing methods and articulating and communicating the product differentiation to consumers (*"One of our biggest difficulties is to pass on to the consumers everything I'm telling you in 1 hour only with photos of the product. So those who don't know about it and have never heard of it, will arrive at the market, see the product, and will not know what it is and how it differentiates from other products" - 10*).

Therefore, urban farms navigate challenges such as pricing competition and low profit margins by adopting diverse business models. These models often include alternative revenue streams like grants and educational programs. During crises like the Covid-19 pandemic, business model adaptability becomes crucial for survival, as farms must quickly pivot operations to meet changing demands. Additionally, building consumer trust and effectively communicating the value of urban farming are essential for urban farm survival. These factors directly address the second research question by indicating forms in which urban farms maintain their competitiveness and, therefore, survive.

5.2.8. Collaborations

The collaborations forged by urban farms are divided between those within the industry and some cross-sectional ones. Urban farms seem open for collaboration with competitors. This may be due to the perception that, since the size of the market is significant, no farm will be able to *"single-handedly cater for all of the demand"* (*35*). As one farm puts it: *"we will share, we want other projects to be successful because our thinking is long-term. Microgreens still aren't well known, so we feel that with more growers around the country, more people will have experience with the product, and eventually, it will become a standard food category" (22).* Hence, this sort of collaboration between competitors is important to educate consumers, to shorten the learning curve of a new urban farm and, perhaps, even *"finding a local place where they can create a delivery depot so that they can get together and buy things in bulk" (06).* When it comes to collaborations within the supply chain, an emphasis was placed on finding trustworthy long-term building and maintenance partners (*04*). Also, this interaction goes both ways, *"by giving them inputs because we have already tested and know what makes sense and what works. The collaboration is more in the sense that if you have a draft of a project, the supplier helps do the detailing. I can say what and how I want and the supplier says which solution is the best" (10).*

Likewise, institutional collaborations are also well regarded. These can be with academic partners to exchange data, with international organizations to provide training, or with architectural offices to experiment within the site. Yet, the main point conveyed through the interviews was the need for knowledge sharing from multiple areas, especially with other industries. This is because *"mechatronics, sensors, lighting, glass manufacturing is now part of the food industry, and they see that it's profitable" (16).* However, this movement must *"mature rapidly, otherwise, food inflation will hit us really hard and there will be a very clear demarcation between sets of people who will eat sushi and sets of people who will be left with beetroot and potato" (16).* Hence, the need to *"rebrand, recreate, and synergize, making sure that food becomes a part of city planning. (…) architecture and real estate have already formed a lot of very good sustainable platforms, but they still kept food outside. I think now people are realizing that growing food, even when is done in small-scale, it may be a very fashionable thing" (16).*

The collaborations urban farms engage in, both within and across industries, are crucial for their survival, as per the second research question. These collaborations involve working with competitors to expand market awareness and consumer education, forming reliable partnerships within the supply chain, and engaging in institutional collaborations for knowledge sharing and innovation. The ability of urban farms to create and maintain these collaborative efforts underscores a broader shift towards recognizing the importance of urban farming practices, thus contributing to the evolving role of Urban Farming in sustainable urban development.

5.2.9. Landlord relationship

The relationships that urban farms have with landlords usually translates into establishing partnerships with them. Respondents mentioned several instances in which farms had personal connections with landlords (*01*). This meant, in some cases, cheaper rents (*06*) and overall support from the landlords (*"The landlord really wanted us to come and to build something because he is massive supporter new projects and young people" - 05*). However, this close relationship with landlords may also become a disadvantage (*"Part of the reason for closing the site was that the general manager of the hotel changed and he told us that the hotel would not renew our contract" - 01*). More common were cases in which this relationship was formed based on an opportunity, such as when landlords proactively found the the farms (*"It was actually the mall that chose us. We were at an organic fair and the mall manager invited us to set our site at the mall, which was not our first thought" - 02*) or when landlords and farms found each other by chance (*"The land came about through a little bit of serendipity and someone just hearing about the idea and connecting us to the landowners" - 25*) or when farm founders found the site by chance (*"We found it by chance. The founder was originally doing another project and found the site and then he approached the landlord and pitched the idea" - 04*). Landlords can also be involved in the farms' business models. Usually, these involve paying the rent through food production or through services to the site owner, such as via educational programs to their landlords (*"We provide them with educational programs. We've costed up the value of the programs and that more than covers the range" - 28*).

Therefore, landlord-farm partnerships often emerge from opportunities or chance connections. These relationships often evolve into partnerships, with some farms benefiting from personal connections with landlords, resulting in advantages like cheaper rents and overall support. However, such close ties can also pose risks, as seen when changes in management lead to contract non-renewal. Additionally, landlords may play a role in the farms' business models, such as through payment in food production or services like educational programs. Hence, the relationships between urban farms and landlords are integral to understanding how urban farms survive, as highlighted in the second research question.

5.3. Summary of the data analysis

This chapter is dedicated to presenting the results of the thesis's data analysis. Through an analysis based on the Gioia method, nine overarching topics were identified from the dataset (aesthetic, attractiveness of farming activity, community relations, product/crop choice, motivations, sustainability, business model, collaborations, and landlord relationship), all deemed relevant to address the research questions and potentially provide fresh insights into urban farms beyond the existing literature in the organizational field. These selected topics are subjected to further theorization and discussion, which are elaborated upon in the subsequent two chapters.

Chapter 6. The institutionalization of Urban Farming

In this inaugural discussion chapter, the adoption of Urban Farming by organizations as an institutional response to societal pressures for embracing sustainability is examined. Urban farms can be seen as organizations themselves or as as part of an organization's activities. The discussion focuses on the latter, more specifically on Urban Farming as a non-core business activity within organizations engaged in non-food production. This section establishes an empirical model illustrating the institutionalization of Urban Farming, focusing on its sustainable and relational value to organizations. Insights from interviews with urban farm practitioners inform the development of this model.

6.1. Introduction

Organizations are uniquely placed in their social context to connect processes of sustainability transitions, the radical, structural change of society resulting from the coevolution of economic, cultural, technological, ecological, and institutional developments (Pesch, 2015). The significant social and cultural influence exerted over their more comprehensive socioeconomic and physical environments through direct and indirect activities along their value chain (Lozano, 2015; Schaltegger & Wagner, 2011) influences change across different levels (Goggins & Rau, 2021).

This prominent role has been acknowledged by the organizations themselves, who are not only recognizing sustainability as a strategic priority that involves significant business risks and opportunities but also are adopting initiatives emphasizing the social and environmental goals of their organizations (Bansal, 2005; GRI, 2010; Hoffman, 1999). These initiatives reflect substantive changes in the business processes incurred and provide long-term competitive opportunities (Eccles et al., 2014). Hence, the environmental, social, and governance (ESG) of organizations is increasingly affecting how companies do business (De Smet et al., 2021) and making them aware of the need to broaden their goals beyond traditional financial expectations (de Lange et al., 2012). This evidences how organizations have evolved to embrace economic aspects and natural and social capital. Through this path, firms seek to become sustainable, satisfying eco-efficiency, socio-efficiency, eco-

effectiveness, socio-effectiveness, sufficiency, and ecological equity (Dyllick & Hockerts, 2002), achieving what is known as sustainable development (Parris & Kates, 2003).

Innovations in business models, products or processes are common pathways to achieving sustainability for organizations, with additional diversification, value co-creation opportunities and competitive advantage (Nidumolu et al., 2009). However, technological advances towards sustainability are increasingly incremental (Söderholm et al., 2019), and many companies find it challenging to meet their sustainability targets. Thus, few have the proper organizational structures to treat sustainability as a material business issue (De Smet et al., 2021). Consequently, organizations become drawn to sustainability through non-core activities, focusing on sustainable initiatives centred on investor relations, PR, and corporate social responsibility, among others (De Smet et al., 2021). Non-core activities are those that do not directly contribute to the value proposition or competitive advantage of the organizations, being supportive, administrative, or operational functions that external providers often perform. Yet, most of these non-core sustainable initiatives do not present straightforward financial returns for these organizations. Thus, there is still no consensus on the type of value these farms have and how they become institutionalized.

Using Urban Farming as an example of a sustainable initiative, this chapter examines how do institutionalization practices influence the adoption of Urban Farming, focusing on organizations in which farming is not directly related to their core business-activity. Specifically, the research question is: why is Urban Farming adopted? The discussion initiates with an exploration of the concept of sustainability, seeking to clarify how its value can be reshaped through paradigmatic shifts driven by social movements. These shifts play a crucial role in altering institutional logics and promoting recognition of sustainability's value among diverse societal stakeholders, thereby facilitating the adoption of sustainable initiatives like urban farming. Then, the results of the interview analysis, derived from empirical data collected from collaborators at urban farms, are presented. This is followed by a discussion of the sustainable and relational value of Urban Farming and the formulation of a theoretical

model elucidating the process by which Urban Farming becomes institutionalized within organizations.

6.2. Sustainability, sustainable development, and sustainable values

Sustainability can be defined as the joint actions that safeguard the protection of the Earth or the biosphere, in such a way that its viability is not threatened (Schaefer & Crane, 2005). It is often thought of as a long-term goal (Diesendorf, 2000), with the negative consequences to the environment accumulating over time and increased impacts over future generations. Similarly, organizations may refer to sustainability as the process of "achieving success today without compromising the needs of the future" (Boudreau & Ramstad, 2005). In more objective terms, sustainability in this context is mostly related to the survival of the firm, exemplified by "keeping the business going" (Colbert & Kurucz, 2007) or as "future proofing" of organizations (de Waal & Linthorst, 2020).

Sustainable development refers to the many processes and pathways to achieve sustainability (Sartori et al., 2014). Its objective is to manage the relationship between the needs of the present population and their environment (biophysical and social) in such a way that minimizes the potentially negative environmental effects of human activity, while also ensuring the ability of future generations to meet their own needs (Brundtland, 1987; Du Plessis, 2007; Hill & Bowen, 1997). Sustainable development also aims to balance economic, ecological, and social development. A popular framework that has been applied to analyse sustainable development is the Triple Bottom Line (Elkington, 1997). In this framework, the ecological aspect and social equity are primary goals, while any type of social or economic development is welcome, provided that it protects and enhances the environment and social equity (Diesendorf, 2000). For organizations, sustainable development is "the ability to meet the needs of present customers while taking into account the needs of future generations" (Wales, 2013). In other words, achieving sustainability in organizations often focuses on replacing the needs of 'the population' for the needs of 'the customers'.

Sustainable values are the strategies and practices that contribute to a more sustainable world and, simultaneously, drive shareholder value (Hart & Milstein, 2003). These values highlight the opportunities associated with sustainable development and connect them to dimensions of value creation for the firm. Products and services, thus, should be provided in forms that benefit these values, such as reducing consumption, energy use, distribution costs and economic concentration (Morfaw, 2011). In addition, since these measures also affect external actors, organizations must adopt a multi-stakeholder perspective when establishing their sustainable values (Brozović et al., 2020). Hence, organizational strategies to progress towards sustainable development need to account for organizations' diverse stakeholders, each defending their own, often conflicting, interests for engaging in sustainability collaborations (Hörisch et al., 2014). Organizational stakeholders expect organizations to develop capabilities to sustain themselves through future time, while additionally contributing to the improvement of society (E. Cohen, 2010). To effectively integrate sustainability into their business models, companies must consider benefits to the environment and to society as valuable—that is, they must integrate sustainable value into the other sources of value they consider (Yang et al., 2017).

6.3. Sustainability and paradigmatic changes

Sustainability has evolved into a pervasive societal theme, becoming a fundamental consideration across sectors, from individual lifestyles to corporate strategies, governmental policies, and international relations (Roberts, 2010). In the development debate, for example, the notion of sustainability has been consolidated following the adoption of the Sustainable Development Goals (SDGs) in 2015 by the United Nations (UN) (Ala-Uddin, 2019). This transformation is indicative of a broader societal shift toward acknowledging the critical interplay between human activities and the environment, and the need to address pressing global challenges (Linnér & Wibeck, 2020). Amidst this backdrop, the traditional understanding of value, rooted primarily in economic considerations, has gradually given way to a broader framework that includes environmental and societal concerns. This is evidenced by the increasing emphasis on sustainability in business practices, with for-profit companies

incorporating sustainable elements into their business models (Bocken et al., 2014a; Ilyas & Osiyevskyy, 2022; Schaltegger et al., 2016a). The momentum building around the possibility for paradigm shifts towards this transformation (Blythe et al., 2018) is one which depends on a favourable institutional context in which the value dimension is expanded to incorporate sustainability as one of its pillars.

One form of understanding societal changes towards the adoption of sustainable practices by organizations is via the influence of social movements. These are societal forces rooted in a set of opinions and beliefs in a population which demonstrate preferences for changing some elements of social structure (McCarthy & Zald, 1977). Social movement theory studies how these groups organize into formal organizations to generate organizational and institutional change (K. Weber & King, 2014) and how they influence stakeholders' paradigm shifts. Paradigms are assumptions and perceptual orientations shared by members of a community (Given, 2012). A shift in paradigms signifies a change in hegemonic ideologies rooted in social coalitions (Kagan & Burton, 1995), as the cause pushed by social movements becomes gradually accepted as potentially hegemonic by parts of society (Schneiberg & Lounsbury, 2008).

Thus, by campaigning to change the paradigms of *value* in favour of sustainability, social movements can lead to a transformation of the understanding of what *value* means in the societal, field, and individual levels (Amenta & Polletta, 2019; Stern et al., 1999). Value, often equated with monetary worth, predominantly reflects the economic perspective of market exchange (Thyssen et al., 2010). However, perceptions of value vary widely among different stakeholders, who may differentiate between use-value and exchange-value. Use value represents the subjective appreciation of a user, whether an individual, organization, or society (Bowman & Ambrosini, 2000; Lepak et al., 2007), which correlates with the monetary amount the user is willing to exchange to obtain that value (Lepak et al., 2007). With sustainability, the notion of value requires a more comprehensive view that includes social and environmental benefits (Evans et al., 2014).

The paradigm shift enabled by social movements generates significant implications for organizations, as they will tend to adopt sustainable values to signal strong conformity of social, economic, and environmental factors within its

institutional context. Social movements that are positioned in favour of social, economic, and environmental policies, for example, tend to pressure societal actors to embrace sustainability. Hence, this institutional pressure might lead them to invest in initiatives outside their traditional activities, which instigates new opportunities for value creation. As exposed previously, these may include changes in business models, processes, products and other, non-core, activities.

Once they are supported by organizations, social movements' campaigning becomes institutionally validated. Therefore, social movements and organizations are considered mutually reinforcing actors. While organizations adopting the innovations put forward by social movements understandably helps to legitimize the latter's goal and diffusion, once an organization adopts a social movement's agenda that is perceived as successful or beneficial, other organizations within the same field tend to converge on the same response, given a shared institutional environment, as *per* the isomorphic process (Dimaggio & Powell, 1983). Hence, the probability of an organization supporting the agenda of social movements increases exponentially as other organizations, especially within the same field, follow suit, further expanding the diffusion mechanism.

6.4. Institutional logic in the institutionalization process

An institutional framework provides insight into the factors facilitating the survival and legitimacy of organizational practices. It analyses how groups and organizations establish their positions and legitimacy by aligning with the rules and norms of the institutional environment, encompassing regulatory structures, governmental agencies, laws, professions, and cultural practices (Dimaggio & Powell, 1983; J. W. Meyer & Rowan, 1983; Scott, 2008). Within this context, legitimacy pertains to the adoption of sustainable practices by organizations, recognized as appropriate by stakeholders (Dimaggio & Powell, 1983). As such, external social, political, and economic pressures shape firms' strategies and decision-making as they strive to embrace legitimate practices and gain stakeholder approval (Jennings & Zandbergen, 1995).

Consequently, institutions establish acceptable behavioural norms (Scott, 2008), significantly influencing organizational decision-making. The institutional perspective emphasizes conformity and the impact of regulatory and social pressures on organizational actions (Westphal et al., 1997). Moreover, Institutional Theory helps to elucidate how shifts in social values, technological advancements and regulations influence decisions related to environmentally sustainable activities (Ball & Craig, 2010; Escobar & Vredenburg, 2011; Lounsbury, 1997; Rivera, 2004).

Institutional Theory also explains why certain practices are chosen without an apparent economic return (Berrone et al., 2010; Dimaggio & Powell, 1983; J. W. Meyer & Rowan, 1977). This is particularly important when considering the institutionalization process of organizations, which involves the gradual adoption of practices, structures, and behaviours consistent with the prevailing institutional logic. This alignment is driven by organizations' efforts to gain legitimacy and acceptance within their social context, as non-conforming organizations risk being seen as deviant or illegitimate.

Institutional logic as a perspective and concept offers a bridge between institutions and agency (Thornton & Ocasio, 2008). Logics are the "*socially constructed, historical pattern of material practices, assumptions, values, beliefs, and rules by which individuals produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality*" (Thornton & Ocasio, 1999, p. 804). Institutional logics, in turn, is defined by Friedland & Alford, (1991) as "*a set of material practices and symbolic constructions [that] constitute organizing principles*" (p. 248) for institutions or "*supraorganizational patterns of human activity*" (p. 234). Thus, logics, which guides institutions and social meaning, are more powerful than the institutions they shape and infuse with meaning (Gümüsay et al., 2020).

However, institutional logics also provide a rationale and justification for why certain practices are considered desirable and acceptable. They also serve as a broader framework that influences organizational behaviour, guiding the decision-making processes and determining what is considered legitimate and appropriate within a given societal context (Thornton & Ocasio, 2008). As conformity grows, the logic becomes entrenched and normalized, eventually altering the dominant logic by

reshaping societal values through collective adoption of new behaviours (Thornton & Ocasio, 2008).

By examining how organizations navigate their positions and legitimacy through alignment with prevailing institutional rules and norms, institutional logics offers insights into organizational behaviour. As sustainability become institutionally embedded, organizations need to balance the adoption of sustainable practices with the need to gain approval and acceptance from stakeholders. The notion that logics hold transformative power in reshaping institutional values and organizational behaviour becomes particularly relevant in understanding how the value of Urban Farming is recognized and pursued by organizations to the point in which it becomes institutionalized.

6.5. Data analysis results

Using the Gioia method, the aggregate dimensions found concerned the sustainable and relational value of Urban Farming. The sustainable value dimension was realised through the assessment of the motivations concerning product/production, the interaction with surroundings, the promotion of agricultural activity and food security. The relational value of Urban Farming, in turn, was established by acknowledging its influence in the organization's relationships with the built environment, within itself and with food. Each of these dimensions is discussed below.

6.5.1. The sustainable value of Urban Farming

1st order concepts	2nd order themes	Agregate dimension
Business based on a sustainable product/production method Healthy product is attractive to younger consumers Development of a new production method that boosts food quality Product quality as a motivation for the project	Product/ production based motivations	
Productive use of idle urban space Use of UF to connect people with the field and their food UF to act as a welcoming and open space for the community Hub for innovation and training	Interaction with surroundings as motivation	Sustainable value
Innovative form of doing agriculture Desire to go back into farming Popularization of agriculture to a new audience	Promotion of agriculture activity as motivation	
Search of autonomy from the food supply chain Food security concerns in relation to the projects locality Pioneer food production technology due to food security concerns	Food security motivations	
Educate and enable people to grow food sustainably Improve building sustainability and make better use of space Use of a waste product as primary source of production	Sustainability motivations	

Table 3. Data structure for sustainable value.

Organizations adopt Urban Farming due to various non-financial motivations. One example are farms that highlight either the sustainable product or production method ("*I believe that what motivated the project the most, was that it was a very complete project. It is beyond the economic side of introducing something in the market. It is a solution for many problems, present and future, that we need to be taken care of*" - *34*) and emphasizing the product quality ("*the growth system that we use mostly came from the motivation of doing something that is higher quality and a more controlled environment*" - *01*).

The surroundings of the farms were also mentioned, as organizations want to help people reconnect with food and nature ("*I think the motivating factor was bringing green into the city. People will not return to the field. And then you have children who have never seen a lettuce being planted, they think it comes from the fridge*" - *02*), make better use of urban space ("*think one reason was the general thought of 'let's try to make unusable spaces in cities productive'*" - *01*) and open the farm to the general public ("*the leadership (…) had previously been to the previous farm project and saw what an impact that had. So, they decided they wanted to have this space to be something that could give back to the community, where they could walk through this space to go to the main street where the bus stops are*" - *18*).

The promotion of agricultural activity was another point that was brought up by respondents. One respondent said that "*one of the purposes was to increase the*

number of new farmers by getting them interested in agriculture in order to increase the agricultural population, which is declining due to the birth-rate and aging population declining" (*21*), while another emphasized the pioneering aspect of the farm ("it *was an opportunity to change the agricultural area and do something that was not done before and for which there was no demand*" - *10*).

Concerning grand challenges, respondents mentioned food security and sustainability as motivating factors. In one case, "*the motivation came from the limited resources we have as a nation (…) So it was a perfect match, where we could use our small space and start to produce the food that we require locally*" (*26*), while for another accounted for the need to diversify the food system ("*vertical farming certainly won't replace arable land or conventional farming altogether, but will be important substitute or supplement to those farming methods. And to have a resilient food system, the food system has to be diversified so that you no stresses or crisis whatever they may be. As well as building a sustainable, secure, safe food system*" - *04*). A farm that operates in a cold environment added that "*we import around 80 to 90% of our food during the winter. So, if we could grow food 12 months a year, we could change the commercial deficit that we have and develop a sustainable model*" (24). Sustainability-related motivations were featured in the interviews, with some farms citing objective measures they have taken "*one of our goals was to reduce the heat island phenomenon in urban areas, absorbed CO_2 to reduce the environmental load, and reduced power consumption*" (*21*), while others focused the farm's motivations in general terms aims (e.g., "*Urban Farming would definitely be one of the ways of stopping this constant exploitation of nature*" - *17*) and how the physical area of the farm has adapted throughout time ("*we have to adapt and be resilient to the warming climate, that's our purpose. The building has been designed to captured that and it's also enabled us to retrofit as we evolve, recognizing the opportunities and risks*" - *30*). One organization summarised these concerns as: "*the motivation, from our perspective, is to grow food on site and to be directly involved in educating the community about local food production and healthy eating and other sort of environmental, social, and sustainability goals*" - *39*.

6.5.2. The relational value of Urban Farming

1st order concepts	2nd order themes	Agregate dimension
UF open space for the community to relax in the urban environment Well received by community due to the UFs positive perception Strengthening of client and community relationship through UF UF as a community piece that ties the urban ecosystem together	UF enhancing organization's relationship with the built environment	
Growing food as a binding agent bringing people together UF as a part of the organizations's corporate philosophy UF as a proposition of a lively new office for workers Organizations' realization that UFs are necessary and feasible Site designed for well-being and reffited for UF	UF enhancing organization's relationship within itself	UF's relational value
UF helps people have conversations around food/nutrition UF as a way for people to reconnect with farming, food and nature	UF enhancing organization's relationship with food	

Table 4. Data structure for relational value.

Regarding the relational value[1] of Urban Farming, three main themes were identified. The first concerns the role Urban Farming has enhancing organizations' relationship with the built environment. This is exemplified by farms interacting with the community, highlighted by social aspect of the farms ("*the project has grown into this lovely sort of community space now, which is used by lots of different people, so it's a good example of the social aspects, like community and sharing and solidarity and these sorts of things*" - 25) and how people appreciate the experience ("*people are conditioned to think that the city is made only of buildings, of tarmac. So they have a big surprise when they arrive to the farm, they have a moment of inspiration, they are amazed by the place, they want to be there, they want to bring other people and they take pictures as if it were an oasis*" - 07; and "*there is an increasing focus on having, not just green spaces and new environments, but also public spaces, as a city surrounded by buildings can be an stressful environment and how the therapeutic benefits of bringing in green spaces could affect our mental wellbeing*" - 29). There are, however, obstacles to fostering this relationship, as there is a need for a strong community sense to manage different stakeholders: "*moving forward, one lesson I'll take is how to appease the many stakeholders that exist within the gardens, and how to foster a sense of community within the gardens. I think if you're going to implement this sort of urban agricultural approach to any other city, there has to be a fostered sense of community, because that's what keeps people coming back, keeps people*

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[1] Defined by Chan et al. (2018) as "preferences, principles, and virtues associated with relationships, both interpersonal and as articulated by policies and social norms" (p. 1462). Relational values, therefore, concern the relation between entities, such as between people, institutions, and nature.

interested and, keeps the stakeholders happy, it's being able to be part of that community" (*31*). Yet, organizations can take part of the process of "*institutionalizing the notion that food production can be part of every community, every household and from which the knowledge building is driven by the public domain*" (*16*).

The second theme is related to Urban Farming enhancing the organizations' relationships within themselves. With food being an "*amazing unifier*" (*16*), organizations can leverage UFs to its own benefit by, for example, establishing "*an environment where we could work lively and where employees could eat the vegetables they had grown*" (*21*) themselves, "*embody(ing) the concept of building a structure to improve the health of our employees*" (*21*). Organizations can "*have an old shipping container that talks about germination, that talks about the value of food, that talks about agriculture, horticulture, etc. (…) Because this is fundamental that people understand (…) from where they get the energy in their body and how the whole mechanism is related to food*" (*16*) or adapt their site to include UFs ("*Our building was retrofitted to include the urban garden. It's about educating people on the importance of food security, but also about health and wellbeing, which are part of our values*" - *30*). Furthermore, organizations may even "*incorporate (Urban Farming into) our corporate philosophy, to give solutions to social issues. Our company wanted people more interested in agriculture and to know more about it, due to the declining of the agricultural population. So, we have embodied the idea that agriculture could be done indoors, without sunlight*" (*21*).

Lastly, an organization's relationship with food and nature is also heightened by Urban Farming. These farms help people have conversations around food/nutrition ("*if you're talking about food in a relational way, like seeing it grow before you or sharing recipes, food is a common trait that we all share humanizes the relationship for people*" - *18*) and may act as a form of people reconnecting with food and nature ("*the connection with nature and the rural setting is something natural that everyone has in some hidden corner, some in a more superficial manner, others less. But I think that it's a yearning that you always see. And when a person enters the farm, there seems to be a sort of reunion*" - *07*), especially in a time in which this connection is becoming increasingly more appreciated ("*the last 20 years are showing us that people are caring more about where their food comes from, how their food is processed, and*

understanding that a little better" - *31*). Finally, it creates the opportunity to deliver greener cities ("*it is very distressing to see a modern city without trees, without green areas because, looking from above on satellite maps, it seems that the city is a fungus which is parasitizing the planet. So, I see a futuristic city as one in which there is a symbiotic association between built and natural environments, in which a city is dispersed more into nature*" - *07*).

6.6. Discussion

The chapter's discussion features two subsections. One discusses the sustainable and relational value Urban Farming brings to organizations, while the other presents a theoretical model illustrating the institutional logic for Urban Farming adoption.

6.6.1. Social movements and the sustainable and relational value of Urban Farming

Social movements play a pivotal role in reshaping organizational perceptions of value and facilitating the adoption of sustainable practices. Despite the absence of direct financial benefits, for-profit organizations are increasingly encouraged to integrate sustainability elements into their business models (Bocken et al., 2014b; Martí, 2018; Sánchez & Ricart, 2010; Schaltegger et al., 2016b). For instance, through the adoption of Urban Farming as a sustainable practice, organizations not only enhance their sustainability and internal relations but also bolster their legitimacy and prospects for survival. The adoption of sustainable values by the organizations signals strong conformity of social, economic, and environmental factors within its institutional context. This shift towards recognizing the value of sustainability compels organizations to integrate sustainable values into their strategies, aiming to embrace legitimate practices and secure stakeholder approval (Jennings & Zandbergen, 1995). Consequently, the adoption of urban farms is acknowledged as appropriate and legitimate by stakeholders (Dimaggio & Powell, 1983). The institutionalization of Urban Farming within organizations also sheds light on why these farms are implemented despite unclear financial returns (Berrone et al., 2010; Dimaggio & Powell, 1983; J. W. Meyer & Rowan, 1977). Not only are they an easy way to adhere

to sustainable values, potentially as a non-core business activity, but they are also consistent with the prevailing institutional logic, thereby enhancing the organization's legitimacy and acceptance within its social context.

This process underscores how organizations can translate the principles of sustainable development (Sartori et al., 2014) into tangible, sustainable values (Hart & Milstein, 2003) that accentuate opportunities for value creation. These can encompass both the products and production methods employed, improving the physical space and helping people reconnect with food and nature and fostering a deeper appreciation for sustainable living practices. Other significant sustainable values include the promotion of agricultural activity, addressing food insecurity issues and promote access to fresh, locally grown produce, while also aligning with sustainability-related motivations, and promoting social equity, environmental resilience, and economic viability within urban settings.

Moreover, urban farming also exerts relational influence within organizations, providing practical means for them to embrace sustainable values. These farms enhance organizations' relationships, both with the built environment and internally, while fostering a deeper connection with food and nature. This occurs by strengthening organizations' ties with the built environment through active engagement with the community. Urban farms serve as hubs for social interaction and environmental stewardship, thereby enhancing the overall urban landscape. Urban farming also contributes to improving organizations' internal relationships by fostering a sense of unity and well-being among employees. By providing opportunities for employees to actively participate in food production and consumption, urban farms not only promote employee health and well-being but also strengthen team cohesion and morale. Furthermore, urban farming facilitates organizations' relationships with food and nature, sparking meaningful conversations around nutrition, sustainability, and the importance of reconnecting with the natural world. The implementation of sustainable values and promotion of relational value within organizations showcase the process of institutionalization facilitated by urban farming.

6.6.2. Model for the institutional logic for Urban Farming adoption

After sustainability has been socially diffused by social movements and organizations have recognized its significance, another internal process begins to transform sustainability into part of the organization's set of values. Using the example of urban farms, **Figure 14** illustrates how sustainability-related initiatives that are non-core business are institutionally embedded by, and can provide advantages to, organizations.
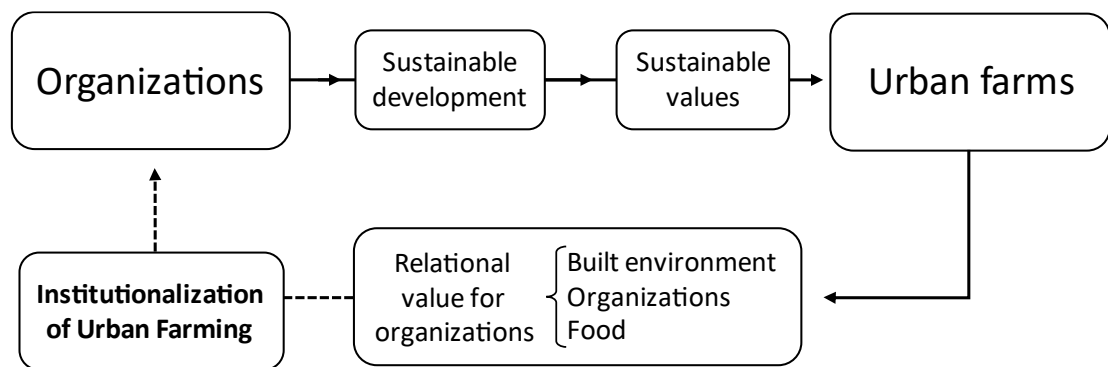
Figure 15. Institutionalization of Urban Farming leading to its adoption in organizations.

Applying this model for organizations whose activities, for example, do not have a direct influence in the food system, it becomes apparent that engaging in sustainability, through Urban Farming or otherwise, translates into benefits for the organizations. When acknowledging the importance of sustainability, organizations seek its adoption through sustainable development. This process will lead to the strategies for its implementation, the 'sustainable values', which were revealed in the interviews as motivating factors for Urban Farming implementation. This process leads to new forms of value creation for organizations. The interviews also revealed three dimensions in which Urban Farming has a relational value on an organization: within itself, with the built environment, and with food. Urban Farming, thus, heighten and enrich the exchange of an organization with its surroundings, while improving and bringing closer the organization stakeholders' relationship with food and nature. Additionally, it also upgrades its own working environment for its employees. Therefore, through these three channels, the sustainable value of Urban Farming is transformed into relational value for its host organizations.

6.7. Conclusion

As societal pressures mount for organizations to embrace sustainability, they acknowledge this institutional change. One form of organizations incorporating sustainable value is through the adoption of Urban Farming. Urban farms offer several distinct features that contribute to an organization's overall sustainability and stakeholder engagement. By incorporating Urban Farming as a non-core business activity, for example, organizations can conform to sustainable development by adhering to sustainable values without having to undertake massive changes to their products, services, or processes. This not only aligns with the growing societal demand for sustainable practices but also enhances the organization's reputation as a socially and environmentally conscious entity.

Therefore, the institutionalization of Urban Farming comes as a direct response to these pressures, driven by the imperative to integrate sustainable practices into organizational frameworks. This process of institutionalization is steered by prevailing institutional logics, which shape organizational decision-making and facilitate the adoption of sustainable values. Urban Farming, therefore, assumes a pivotal role as a practical tool for organizations to embrace sustainability and cultivate stronger relationships, both internally among employees and externally with their surrounding communities and environments.

Through empirical data and theoretical insights, this chapter elucidates the process by which Urban Farming brings value to organizations, both in terms of sustainable and relational aspects. The discussion highlights the role social movements have in reshaping organizational perceptions of value and facilitating the adoption of sustainable practices, ultimately leading to the institutionalization of Urban Farming.

Additionally, Urban Farming offers significant relational value to organizations by fostering improved relationships with food, the built environment, and within their own ranks. Internally, employees can actively participate in the farming process, fostering a sense of connection to nature and to the office, promoting a positive work environment, well-being, and pride in the organization's sustainability efforts. Externally, by opening their farms to the public, organizations can provide

opportunities for community involvement, education, and interaction, further strengthening relationships with their surroundings. It showcases a forward-thinking approach to addressing societal challenges, such as food security, sustainable agriculture, and urbanization. This also can set organizations apart from their competitors by offering a unique organizational proposition, adding further differentiation in the market, and attracting environmentally conscious consumers who value sustainable practices. Urban Farming becomes a distinctive feature that may enhance the perception of the organization, increase customer loyalty, and create a competitive advantage.

By promoting sustainable development and fostering deeper connections with food, nature, and the built environment, Urban Farming contributes to organizational resilience, legitimacy, and competitive advantage. The presented theoretical model illustrates how sustainability-related initiatives, such as Urban Farming, become institutionally embedded within organizations, leading to tangible benefits and value creation.

Chapter 7. The tactics and attractive features used for the survival of urban farms

In this chapter, the tactics undertaken by urban farms and the farms' attractiveness are examined. Empirical data collected from interviews is analysed, and two dimensions of attractiveness, namely the competitive and aesthetic appeal of Urban Farming, are discussed, as well as the tactics used by urban farms. Furthermore, a theoretical model of the attractiveness of urban farms is elaborated, providing an understanding of the underlying factors that contribute to its survival.

7.1. Introduction

The market demand for local, safe, sustainably produced food has recently led to an increasing interest in urban agriculture (O'Sullivan et al., 2019a). This has been accompanied by a rise in media coverage and attention from the general public, academics (Audate et al., 2019) and decision-makers (Baker & de Zeeuw, 2015) towards urban agriculture, with expectations that it will play a vital role in feeding densely populated urban areas in the future (Benis & Ferrão, 2018; Chang & Morel, 2018; Despommier, 2011). Furthermore, these initiatives provide other benefits, such as helping to mitigate the environmental impacts of agriculture (Martellozzo et al., 2014), health improvement and overall well-being of urban city dwellers (Poulsen et al., 2017), lowering the carbon footprint of food production (Coelho et al., 2018) and improving food security (Despommier, 2011).

For urban farms to survive, support from their surroundings is vital. Grebitus et al. (2020) analysed consumer perception regarding Urban Farming and discovered that most opinions were positive, with words such as "fresh, local, and green" being frequently mentioned while, to a lesser degree, negative terms like "expensive, possible disease, and pollution" were also mentioned. Thus, highlighting positive aspects linked to sustainability could incite a more favourable perception and willingness to accept Urban Farming. This is particularly important as sustainability is a driver of consumer action, motivating purchase decisions in the short term and influencing brand perception over the longer term, with over half of consumers being

influenced by the sustainability practices of brands and organizations (Frame et al., 2022).

To sustain their position and ensure survival, urban farms must remain competitive. This entails not only the capacity to innovate and create new markets (Montalvo et al., 2011), but also to address sustainability challenges through innovative practices and business models (Porter & Kramer, 2019). The increasing interest in sustainable innovation, including within the Urban Farming sector, emphasizes the necessity for urban farms to adopt distinctive and sustainable approaches. This enables them to stay competitive and responsive to evolving market demands, while also addressing environmental issues and meeting consumer preferences for sustainability.

Recognizing this trend and having in mind the increasing challenge to feed urban societies, organizations are investing in Urban Farming (O'Sullivan et al., 2019). The expansion of commercial farms, for example, has given rise to a trend in environmentally friendly food production, usually cultivated in highly efficient installations situated atop or within buildings (Benis & Ferrão, 2018). In 2022, there were estimated to be more than 2,000 vertical farms in the US (Namkung, 2022), with industry reports projecting the global Urban Farming market to grow from USD 2.77 billion in 2019 to USD 16.14 billion by 2027 (iNSnet, 2023). Meanwhile, with specialized funds such as AgFunder, Localize and Blue Horizon seeking to invest in farms aiming for a systemic change to our food system, indoor farms alone raised over USD 1 billion in 2021 (Namkung, 2022), which exceeded the combined funding generated in 2018 and 2019 (iNSnet, 2023).

To date, however, there is a gap in the literature regarding the organizational dynamics of Urban Farming. Thus, this chapter examines factors that contribute to urban farm survival by exploring the competitive and aesthetic appeal, as well as organizational tactics, employed by urban farms. Consequently, this chapter's research question is: how do urban farms survive?

To answer these questions, participants of urban farms were interviewed and two 'attractiveness' sources were identified from the data: the competitive and the aesthetical appeal of Urban Farming. In addition, tactics used by urban farms that contribute to their survival were revealed. This chapter, then, will focus on these three

dimensions, paying special attention to the aesthetical appeal due to its novelty. While organizational aesthetics has been studied extensively, it has not been thoroughly explored within the context of Urban Farming.

Hence, this chapter starts by addressing the aesthetic literature, including organizational and institutional aesthetics. The results, divided between the competitive and aesthetic appeal, as well as the tactics used by urban farms, are then presented. Finally, the discussion addresses these topics and a theoretical model is proposed, succeeded by the concluding remarks.

7.2. The aesthetic dimension

The study of the aesthetic ways of knowing, based on the "*subjective, sensory or inexact*" (Gagliardi, 2006, p. 704) experiences, gained traction in the 18th century. Acknowledging the importance of direct sensory knowing, the German philosopher Alexander Baumgarten advocated for a science of 'sensible cognition', which he called aesthetics (Creed et al., 2020). Originally a Greek word meaning the "*perception of the external world by the senses*" (Degen, 2008, p. 38), aesthetics was interpreted by Baumgarten as referring directly to the way in which humans appreciate beauty (Palacios & Kim, 2016). However, more broadly, aesthetics is understood to refer to the sensory, which is the relation between the embodied and the material environments (Degen & Rose, 2022). It is a spatially extensive relationship that draws on more than appearance, focusing on the feeling that emerges through bodily capacities, sensations, and imaginaries, between it and its surroundings and its inhabitants (Degen & Rose, 2022).

For example, the aesthetic value of a landscape depends on both the physical features of the landscape and the perceptual processes that those features evoke in the viewer (Daniel, 2001). This valuation is, thus, associated with thoughts and feelings people affiliate with a landscape (Greider & Garkovich, 1994). In rural settings, therefore, studies of visual appreciation have demonstrated that the public holds a very positive image of industrial farming practices, preferring landscapes that are not fully natural but do have a significant natural component and display form diversity (Burton, 2012). These perspectives are consistent across different demographic

subsets, including rural and urban populations (Kaplan & Kaplan, 1989), meaning that landscape evaluations are the result of perceptual and judgemental mechanisms which are shared by all humans (Hull & Revell, 1989).

Within the urban realm, the aesthetical experience, according (Böhme, 2003) and Degen & Rose (2022), incorporates elements of the production and consumption of goods, in what they call "aesthetic economy". The global industry's identity is moving away from emphasizing the characteristics of mass-produced goods towards the emphasis on the experiential quality of objects as components of brands. This concept relates, for instance, to the construction of sets of associations, establishing particular meanings and lifestyles that are linked to the consumption of a product, which operate at the level of intensified experiences (Lash & Lury, 2007). A similar movement is being observed in the cityscape, where the consumer culture has transformed the urban environment to such an extent that urban space becomes a locus of "*multimodal experience (…) and intensities that actualise themselves not as objects but as events*" (Lash & Lury, 2007, p. 15). Degen & Rose (2022) describe what they call "new urban aesthetics" as being conceived, lived, and perceived. While perceived urban space refers to directly experienced concrete physical and social materiality of the surroundings, lived urban space refers to consistent and habitual enactions of urban life. In turn, conceived urban space refers to the rationally abstracted forms of urban spatiality which are mentally conceived in verbal, visual, or written representations (Degen & Rose, 2022). As cityscapes are increasingly perceived as marketable commodities, judged "*by their ability to transform the sensation of the subject*" (Klingman, 2007, p. 6), their appeal must be defined by the creation of a space identity, evoking embodied feelings of place through urban aesthetic (Degen & Lewis, 2020; Degen & Rose, 2012). The "*deliberate and purposeful approach to place creation*" (Lew, 2017, p. 450) aesthetic, which shapes the physical, social, and sensory urban character (Nicodemus, 2013) is an expanding trend in contemporary placemaking. As institutions are partially defined by their physical space and are part of the urban environment, they are therefore consequently subjected to the parameters that describe an aesthetic experience.

7.3. Institutional aesthetics

Institutional theory usually emphasizes the cognitive dimensions of social actors, prioritizing their analytic rationality. The focus is placed on the action formation entailing symbolic interactions and reciprocal typification among people as they engage cognitively and socially with their institutional environment, both enabling and constraining people's cognitions (Creed et al., 2020). Institutional theory has, however, largely ignored an essential form in which participants of institutions engage with their world: i.e., through their innate sensory capacities, which operate in conjunction with their learned capacity to evaluate what they encounter – including all manner of institutional arrangements (Creed et al., 2020).

The institutional processes of sensory and evaluative forms of knowledge forms a 'personal aesthetics', which is the individual internalization of the institutional aesthetic codes of the communities in which they are embedded (Creed et al., 2020). This institutionalized 'aesthetic code' (Gagliardi, 2006) within a community or field, establishing distinctions between the 'beautiful' and the 'ugly', affects legitimacy assessments in various institutional contexts (Bitektine & Haack, 2015; R. E. Meyer et al., 2013; Tost, 2011). The institutional aesthetic legitimacy also includes an emotional component, which draw upon emotions through, for example, visual elements that evoke emotional responses (Haack et al., 2014).

7.4. Organizational aesthetics

In organizational studies, aesthetics concerns the experiences and understandings that originate from all types of the perceptive-sensorial capacities of individuals to the material components of organizing (Baldessarelli et al., 2022), as well as the knowledge that originates from such sense experiences (Taylor & Hansen, 2005). The field's interest in the role of materiality (e.g., artefacts and physical settings) in organizations and institutions (Boxenbaum et al., 2018; Jones C. et al., 2017), has led to increasing attention to the study of how images, products, logos, work objects, physical settings, and virtual environments are both reflective and constitutive of organizations (Beyes & Holt, 2020; Boxenbaum et al., 2018). Hence, there is a recent recognition that aesthetics plays an important role within and around

organizations, serving as a directed stimulus that guides the evaluation and understanding of the material components of organizing, including artefacts, workplaces, and individual and collective behaviour (Baldessarelli et al., 2022).

For organizations, understanding the sensory experiences of consumers and employees has become a priority, especially when taking into consideration the "experience economy" (Pine & Gilmore, 1998). The need for meaningful sensorial experience for customers leads companies to prioritize offering delightful experiences, delivering appealing and engaging services and products to them (Baldessarelli et al., 2022; Cober et al., 2004; Gruber et al., 2015). The appearance of products, for example, acts as a cue that guides consumers' evaluations, including their novelty (Goode et al., 2013) attractiveness (Truong et al., 2014), quality (Sands, 2020), perceived market value (Sgourev & Althuizen, 2014) and purchase intentions of such products (Celhay & Trinquecoste, 2015). In addition, aesthetics can serve as a knowledge tool developed through sensory reactions and used to carry out everyday tasks, fomenting creativity, and the enactment of organizational work (Baldessarelli et al., 2022), such as the management of interactions with external audiences or the construction of legitimacy (Tracey et al., 2018). In fact, aesthetically pleasing work environments, such as those that provide restorative and calming visuals, sounds, textures, and scents, have been shown to influence employees' creativity and productivity as well as newcomers' perceptions of organizations (Baldessarelli et al., 2022; Elsbach & Pratt, 2007).

7.5. Results

By employing the Gioia method, the aggregate dimensions revealed insights into the competitive and aesthetic appeal of Urban Farming, alongside an exploration of the tactics employed by urban farms. The first dimension regarded the exploration/creation of market niche, business models not based on food production, collaboration with competitors, personal connections with landlords, and landlords involved in the business models. The competitive dimension was realised through the assessment of an interest in farming among younger generations, an increase in the attractiveness of farming, attractive forms of employment, and practical advantages

of production and the product. The aesthetic appeal, in turn, was established by recognizing: the importance of production display, the importance of product display, sensorial advantages of production and product, and the activities to increase product demand. Each of these dimensions is discussed below.

7.5.1. Competitive appeal of Urban Farming

1st order concepts	2nd order themes	Agregate dimension
Project designed to be attractive workplace for young people / External support for projects that attract young farmers / Higher awareness and curiosity of younger people towards UFs	Interest in farming in younger generations	Competitive appeal
Support for projects that makes UF an attractive activity / City location attractive to agricultural workers / New farmers to increase agricultural workers	Increase of farming attractivity	
Emphasis of ergonomics to make agricultural work less tiresome / Attractive and inclusive agricultural labour in UF	Attractive forms of employment	
Environmental features of production / High margins and short production cycle / Choice of crops based on customer's demands / Consistency, shelf-life, convenience as product qualities	Practical advantages of production/ product	

Table 5. Data structure for competitive appeal of Urban Farming.

Farms were designed to be an attractive workplace for young people ("*We discussed with the government how to make farming interesting (…) with urban farms, most of the people involved are younger folks*" - *33*) and counted with external support for urban farms that attract young farmers: "*There aren't many young farmers around, so people are more inclined to support them*" (*19*). In addition, higher awareness, and curiosity of younger people towards Urban Farming ("*We were happily surprised that all who came to our project were young growers*" - *24*) indicated an interest in farming in younger generations. Secondly, the increase in the attractiveness of farming was supported by identifying that there is support for farms that makes Urban Farming an attractive activity ("*We want it to be a fun job so that we have people to feed us*" - *24*), the attractive urban location to agricultural workers ("*university graduates (…) come to me for an internship (…) it is convenient for them*" - *27*) and the need to have new farmers to boost the overall number of agricultural workers ("*One of our problems as a society is the declining of the agricultural population. So, we wanted to make people more interested in agriculture*" - *21*).

Attractive forms of employment were also uncovered through an emphasis on ergonomics to make agricultural work less tiresome ("*The working conditions are much*

better than in the field (…) it's more fun and less risky" - 24) and making agricultural labour in UFs more attractive and inclusive ("*urban agriculture can make employment in agriculture attractive, goes very high tech and draws attention*" - 12).

Finally, the practical advantages of production/product were highlighted, with environmental features of production ("*One of the benefits is the conservation of the water resources*" - 26), and high margins and short production cycle being mentioned ("*Traditional agriculture has one season. In our type of growing, if you make a mistake, you can correct it in the next week*" - 05). Also, the choice of crops based on customer's demands ("*We decided to concentrate on producing things that were easy to cook and that people were familiar with*" - 25) and the consistency, shelf-life, and convenience as product qualities were cited by the respondents ("*Our concept is Farm to Fork. We don't want people to clean their produce*" - 27).

7.5.2. Aesthetic appeal of Urban Farming

1st order concepts	2nd order themes	Agregate dimension
UF aesthetic as a marketing tool Importance of display of UF for customers Project interest peaked by building's architecture Visual expression of project's concept to the surroundings	Importance of production display	Aesthetic appeal
Packaging differentiation to convey sustainable message Packaging to highlight product	Importance of product display	
Taste, texture, color as sensorial qualities Significant gains in flavour from consumers perspective	Sensorial advantages of product	
Events on-site for consumers to familiarize and interact with product	Activities to increase product demand	

Table 6. Data structure for aesthetic appeal of Urban Farming.

Regarding the aesthetic appeal, one topic that arose in the interviews was the importance of production display. Farms use the Urban Farming aesthetic as a marketing tool ("*From a marketing standpoint, it was great for getting attention to your project. Having these tanks filled with green liquid and the Bangkok skyline in the background with a sunset is great for any type of documentary or article*" - 01) and have mentioned the importance of the display of UF for customers ("*We call our site 'the aquarium'[2] and it is inside the supermarket. It has a big effect on people*" - 22). The external visual of the building also helps to arouse interest and the visual

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[2] This project (22) operates a mushroom and microgreens production site within a supermarket. The name 'acquarium' refers to the glass box-shape structure in which the public can see the farm's activities.

expression of the farm's concept to the surroundings is important ("*because you can express to the surroundings the concept of the project and what's happening inside the building*" - *15*).

Product display, in turn, is also significant, as packaging can be a differentiation factor to convey a sustainable message ("*we differentiate by using carton boxes to encourage our customers to bring them back in their next visit, refill it and get a discount*" - *05*) and can highlight the product's beauty ("*Competitors use plastic packaging because it's the cheapest alternative and because the product in itself is beautiful so they want to show it*" - *05*).

Respondents also stressed the sensorial advantages of the product, with many claims of significant gains in flavour from a consumer's perspective ("*The overwhelming feedback of our consumers is that it tastes better*" - *04*) and featuring taste, texture, and colour as sensorial qualities ("*Our wasabi clients said that the colour is much better, brighter and tastier than all the other suppliers that they've had*" - *20*). Lastly, farms promoted activities to increase product demand, such as on-site events for consumers to familiarize themselves and interact with the product.

7.5.3. Tactics and collaboration in urban farms

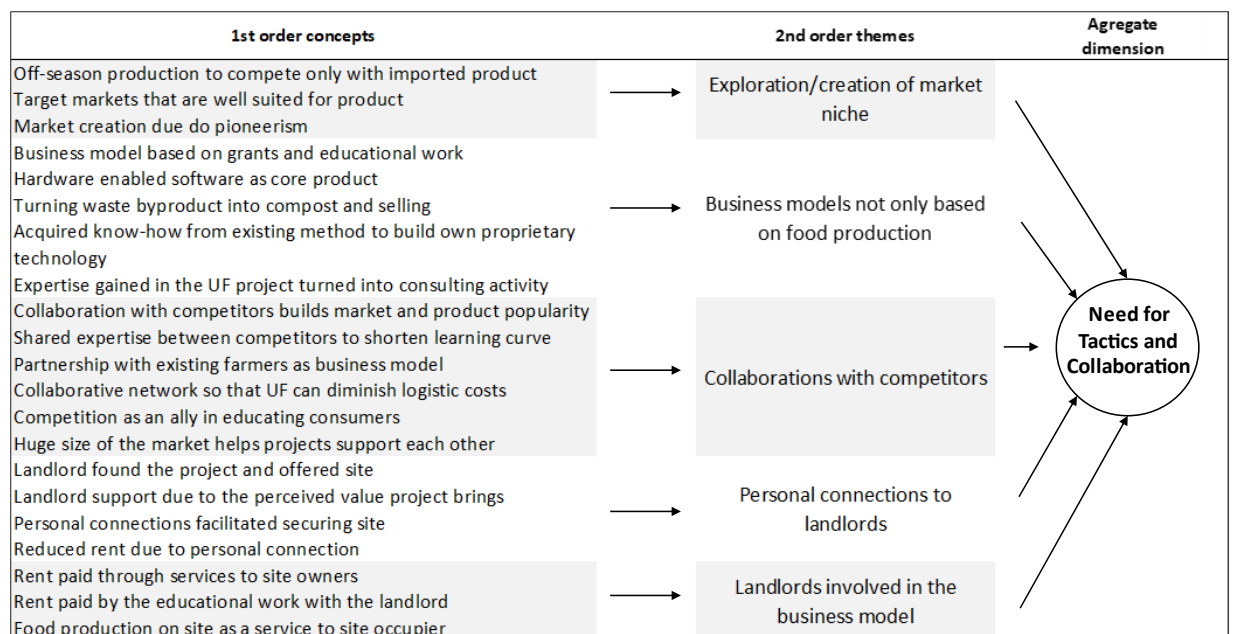| 1st order concepts	2nd order themes	Agregate dimension
Off-season production to compete only with imported product Target markets that are well suited for product Market creation due do pioneerism	Exploration/creation of market niche	
Business model based on grants and educational work Hardware enabled software as core product Turning waste byproduct into compost and selling Acquired know-how from existing method to build own proprietary technology Expertise gained in the UF project turned into consulting activity	Business models not only based on food production	
Collaboration with competitors builds market and product popularity Shared expertise between competitors to shorten learning curve Partnership with existing farmers as business model Collaborative network so that UF can diminish logistic costs Competition as an ally in educating consumers Huge size of the market helps projects support each other	Collaborations with competitors	Need for Tactics and Collaboration
Landlord found the project and offered site Landlord support due to the perceived value project brings Personal connections facilitated securing site Reduced rent due to personal connection	Personal connections to landlords	
Rent paid through services to site owners Rent paid by the educational work with the landlord Food production on site as a service to site occupier	Landlords involved in the business model	

Table 7. Data structure for Tactics and collaboration in urban farms.

The novel nature of Urban Farming requires, in many cases, UFs to develop tactics and to collaborate to survive. The creation or exploration of a market niche, hence, becomes important. For example, due to their technology, they can avoid direct competition with local products by producing crops during off-seasons, so that its only competitive is with imported products. As one interviewee emphasized, *"We don't want to compete with the local farmers of strawberries. That's why we don't produce during summer. So, during the winter, our main competitors are imported strawberries"* (*24*). Strategic market selection is another characteristic of their approach, targeting markets that align well with their product offerings and business objectives (*"These markets were selected because they had consumption metrics, they had a very well-educated, affording consumer middle class, they had high rises infrastructure-wise" - 16*). In addition, pioneerism is also important for emerging markets, with organizations often creating demand through innovative offerings. One respondent said: *"There was no market for urban beekeeping, there was no market for urban honey, so we have created the market. Now we are the most visible company in the market." - 08).*

Many business models in Urban Farming extend beyond traditional food production. For instance, one organization operates as a commercial farm, yet its revenue streams diverge from traditional profit generation, relying on its educational outreach and grant funding (*"It's a commercial farm, but it's not currently generating profit. We largely keep going through grants and the education work that we're doing and being self-sustaining and generating fresh local produce to the local community." - 28*). The expertise gained through the development and operation of urban farming projects can often evolve into consulting opportunities. Other feature for UFs that have invested in technological innovation involves leveraging proprietary technology as a core product offering (*"Our core product is the farm's hardware-enabled software. We want to sell our software and hardware to our competitors so that they can connect it to their infrastructure." - 03*). Additionally, some organizations capitalize on waste byproducts, transforming them into valuable commodities, as one responded said: *"Once the composite blocks are spent, they make good compost. I was giving composite blocks away to garden projects so that I didn't have to pay for their disposal.*

But I also saw there was a massive opportunity money-wise to sell this byproduct." - 06).

Collaborations with competitors, such as sharing expertise and resources with existing farmers to enhance collective innovation *("We can integrate our solution into whatever existing infrastructure. Our main mission is to partner with local farmers because they have some technical know-how from their own greenhouses." - 24*) are important and serves to amplify market presence and product popularity: *"We want other growers to be successful because our thinking is long term. We learned that microgreens still weren't well known and, if we could get a bunch of people growing microgreens, eventually this will become a standard food category. And then we can grow our scalable, replicable system." (22)*. Similarly, collaborative competition can be an ally in consumer education and market development *("Our biggest struggle, our biggest hurdle in the market is educating, letting people know what microgreens are, what you can do with them, how to eat them, how to cook them. And with our competitor, there's another microgreen producer and seller there assisting in that development in the education." - 32)*. Shared expertise among competitors also facilitates knowledge exchange and accelerates learning curves *("One guy served as a guide to us. Later, we learned things that he didn't know. And so we turned around and we would share information with him. We felt that not only do they work for him well, but for other people." - 22)*. Moreover, collaborative networks among urban farms hold the potential to mitigate logistical challenges and reduce operational costs *("Maybe all urban farms can connect together in a city to find a local place where they can create a delivery depot so they can buy things in bulk." - 06)*. Thus, the overall perception among the interviewed urban farms is that there is a collaborative ethos within the urban farming community that transcends traditional competition. One respondent encapsulated this sentiment, observing: *"I would say that the whole industry has a lot more kind of supporting each other rather than competing and that is because of the huge size of the market." (35)*.

Personal connections with landlords play a crucial role in facilitating urban farming projects, influencing site selection and operational arrangements. In some instances, landlords actively seek out urban farming initiatives, recognizing the value they bring to their properties *("It was actually the mall that chose us. The mall*

manager saw what we were doing, found it interesting and invited us to develop the farm at the mall." - 02), which can also lead to favourable terms and reduced rent for urban farms. Moreover, personal connections and networking can significantly impact the process of securing suitable sites for urban farming ventures *("There is a networking component to it because we knew the general manager of the hotel, so it does open the door a little bit easier. To do this from scratch, you might need to go around a little bit more to convince hotel manager." - 01)*. Landlord support is often driven by the perceived value that urban farming projects bring to unused or underutilized spaces *("They've been very supportive throughout the years because they see tremendous value in utilizing the space that they own towards some productive end because, otherwise, it would be empty." - 04)*.

Finally, urban farm-landlord relationships can develop into the urban farming business model itself, often engaging in arrangements that blend rent payments with mutually beneficial services. In some cases, urban farmers offer services in exchange for reduced or waived rent *("We pay a rental that is not very expensive. And, in exchange, we do the communication part for our city (site landlords), doing the marketing for our project, advertising that the city is investing in these sorts of things." - 11)*, or provide educational programs for their landlords *("We don't currently pay rent, because we provide them with educational programs. We've costed up the value of the programs that we developed for them, and that more than covers the rent." - 28)*. Urban farms may provide services to site owner/occupants, generating revenue through food production, garden maintenance, and harvest management *("We are paid a service fee to maintain the garden, and managing harvest and bring it to a finished good to the food service concession." - 39)*.

7.6. Discussion

The chapter's discussion features three subsections about the competitive and the aesthetical appeal and the tactics of urban farms. The competitive appeal is divided between the Urban Farming's appeal to individuals, the competitive appeal to the farms themselves and the Urban Farming's competitive appeal to workers. The second subsection, concerning the aesthetical appeal of Urban Farming, discusses its

production/building aesthetic, product aesthetic appeal and sensorial appeal. The tactics concern the ways in which urban farms collaborate and innovate in their business models to build legitimacy and acceptance. Finally, a theoretical model based on the discussion is developed in the last subsection.

7.6.1. Competitive appeal of Urban Farming

UFs entice consumers through some of their competitive features. One of the most striking characteristics of Urban Farming is the way in which it promotes the environmental impact of the production method. Individuals concerned with sustainable values are likely to connect with these urban farms. As becoming a consumer of Urban Farming products fulfils both an individual's personal values (i.e., the altruistic, biospheric and egoistic values) and its consumption values (e.g., the functional, psychological, economic, or social perceived benefits of consumers) (Sivapalan et al., 2021), farms may explore this link to further Urban Farming's appeal to this group. However, while egoistic values may influence pro-environmental behaviour to some extent, urban farms can enhance consumer engagement by emphasizing their altruistic and biospheric values, as suggested by De Groot & Steg (2009). This approach could not only strengthen connections with individuals concerned about environmental sustainability but also establish a more stable basis for sustainable actions, aligning with the principles of urban farms.

Food quality, which is related to food health, also provides a draw to Urban Farming. Despite higher prices being associated with healthier foods (N. R. V. Jones et al., 2014), individuals worried about their health habits are likely to be attracted to Urban Farming products regardless of their price (Alsubhi et al., 2023). Moreover, food safety is an important issue for all stakeholders in food production (Beulens et al., 2005). Knowing the origin, the production methods and being able to trace the food from production to purchase, dramatically improves food transparency and is relevant to these stakeholders (Astill et al., 2019) and, particularly, to consumers who are usually less aware of the food supply chain. Similarly, the proximity between consumers and their food source means not only that Urban Farming is more in evidence, but also that there is a higher degree of public scrutiny of food origin, safety and the positive claims of the food/production method made by urban farms.

There are competitive advantages to this type of food production for the UFs themselves. The start-up capital required to start an urban agricultural business, when compared to rural ones, can be decidedly lower, encouraging agricultural entrepreneurship. This is especially significant for young farmers, who are less likely to become entrepreneurs in the agricultural sector (Pindado & Sánchez, 2017) due to the cost barriers associated with setting up industrial farms. As one respondent puts it: "*Indoor farming brings the opportunity to lower the entry barrier into agriculture (…) Here, agriculture is very centralized. So, if you want to build a profitable agriculture business, you need to invest 2 or 3 million Euros to make it a viable farm*".

In addition, as younger farmers are more productive and achieve higher profitability, investment, and engagement in Agri-environmental schemes (W. Hamilton et al., 2015; Sutherland et al., 2016), they are more likely to further develop the agricultural sector. By attracting these young entrepreneurs, who better identify and explore farming opportunities (Dias et al., 2019), there are benefits to Urban Farming's adoption, as young farmers have higher visibility and incentives. Here, Urban Farming, due to its intensive-technological nature, may have higher margins and shorter production cycles, depending on crop and production method choices. Finally, Urban Farming's sustainable approach to food production, usually reliant on the 'zero-mile' concept and decreased use of resources for food growth, is not only a powerful marketing approach but also a compelling organizational 'myth' (J. W. Meyer & Rowan, 1977). This myth helps these organizations position themselves as environmentally friendly within their institutional context, while also providing organizations external legitimacy (Acquah et al., 2021) by adopting an 'appropriate' practice within this industry. This is because the farms are automatically regarded as 'better' and 'greener' than industrial farms, despite, for example, using more electricity and their products costing more.

Concerning the attractiveness of farms to workers, cities are convenient locations for them to live, offering infrastructure that is often lacking in the countryside. The decreasing number of agricultural workers is a serious problem many societies are facing. By having this type of employment within cities, that would otherwise only be available in rural areas, more workers are drawn to the agricultural sector. Also, with Urban Farming, the aforementioned tendency to migrate to urban

locations does not mean, necessarily, that a career in agriculture is unattainable in cities. In developed countries with a shrinking rural agricultural population, Urban Farming can be an alluring form of employment, attracting workers to the sector. In addition, UFs offers a more comfortable setting/workplace. The improved ergonomics and working environment, usually protected from the weather, is another appealing factor. In respect of younger workers, Urban Farming is also particularly attractive. Working in such environments connects with their values, which are, in many cases, linked with their interest in sustainability. One respondent highlighted that "*I once interviewed a person who said she wanted to work with us because 'the more, the better'. She meant that the more we produced and operated the farm, the better it would be for the world*". This links with both environmentally friendly production methods, but also producing food that is perceived as healthy. Furthermore, Urban Farming usually has more technological inputs in the growing process than industrial agriculture, which makes daily operations more interesting and engaging for younger people: "*We were happily surprised that all the people that came to work with us were very young. I think that's where technology is key because it can help attract and interest people (into farming)*".

Hence, Urban Farming attracts people through its competitive features, capitalizing on its values to connect with them. For managers of UFs, their workers, and other stakeholders (such as consumers, investors, and society) there are palpable advantages in this kind of operation, stemming not only from functional and pragmatic standpoints (e.g., higher margins, location, ergonomics, consistency, etc.) but also from their beliefs (e.g., quality/healthy product, environmentally friendly, inclusiveness, etc.). Working in an environment that aligns with these stakeholders' values is quite appealing, which indicates why these types of farms are attractive.

The competitive aspects of Urban Farming, documented above, have been studied exhaustively, as evidenced by the literature devoted to the topic (e.g., Ghazalli et al., 2019; Ilieva et al., 2022; Orsini et al., 2013; Poulsen et al., 2017). Yet, beyond the values that UFs draw out from individuals, there is another aspect which is not commonly addressed when discussing Urban Farming: their aesthetic appeal, which is featured in the next subsection.

7.6.2. Aesthetic appeal of Urban Farming

Aesthetic concerns have been thoroughly discussed in food presentation and experience. Classical aesthetic principles, such as order, symmetry, and balance influence food healthiness judgments, as these features make it appear more natural and, thus, 'prettier' (Hagen 2021). Likewise, rural food production aesthetics has been extensively discussed (e.g., Burton, 2012). However, an overtly aesthetic approach to urban food production is unusual. In identifying general principles that lead to the successful implementation of urban agriculture, Palacios & Kim (2016) acknowledge the importance of UFs spatial and physical appearance and argue that aesthetic values are transmitted through the combination of context, design, materiality, plant selection, and functionality. But no other research has been undertaken on the matter.

Nonetheless, the visual aspect of urban food production is a topic which warrants attention. The Urban Farming site itself can spark the interest of passers-by and potential consumers, using it to transmit the concept of the farm (e.g., 'clean', 'futuristic', 'technologically intensive' production). The building and production area are usually the key elements that compose the visual identity of the urban farms. Therefore, UFs that operate in buildings that are visually striking and/or can showcase the production, posses a higher capacity to draw attention and increase their visibility. Ultimately, an organization may employ the architecture of its offices, for example, to support corporate branding goals that shape an attractive environment for investment (Vanolo, 2017)and improve organizational identity (Foroudi et al., 2019).

One farm which operates in a multi-storey glass building highlighted: "*Our site architecture is very different from our surroundings. It always struck me how, no matter what time of day, whether it's night or day or winter or summer, there are always people with their hands against the glass looking and wondering what's going on inside this glass box. I think that was really important for us to bring the community into what we're doing. The structure was not only meant to be a centrepiece of our community, but the systems are intentionally designed to be people-forward and accessible*".

This is further corroborated by searching 'urban farms' on architectural news websites, with many concept designs featuring prominently, usually consisting of grandiose and future-like structures. The Urban Farming building aesthetic used by

these farms, real or conceptual, usually utilize glass and white-painted structures and, when possible, incorporates natural green to the facades. Relating to the material and embodied environments (Degen & Rose, 2022), the Urban Farming building aesthetic, more than the appearance of the construction itself, centres on the spatially extensive relationship that the object elicits on its surroundings and to the viewer. This is likely to make the viewer bring out, through their bodily capacities, sensations, and imaginaries (Degen & Rose, 2022), responses akin to the farm's conceptual designs, as exemplified by said future structures. Examples of completed Urban Farming buildings that convey these messages are included in **Appendix H**. However, due to the costs and general difficulty in securing such sites, many farms operate from buildings that have facades that are rather unassuming to outsiders, especially those that utilize indoor food-growing systems.

Therefore, production is perhaps more significant as a way for urban farms to build their aesthetic identity. Through its different manifestations, whether having coloured lighting, being stacked vertically, being in an unusual site, etc., the production areas of UFs can arouse curiosity and engagement. The association of the imagery of food production and its beauty, as well as the values it inspires (green, healthy, grown close to home, etc.), are crucial elements of Urban Farming when considering its incorporation into the built environment. The visual style of the building in which they operate, and their production area can be instrumentalized in the UFs marketing campaigns, making these elements central to the farm's visual identity. In many cases, in fact, the UF's name is directly related to either the site/location/building or to the production method, which, in turn, helps to integrate the visual expression of the farm into the brand's identity.

However, urban agricultural initiatives are often criticized for their lack of appropriate aesthetic values, being often considered visually disturbing, unkempt, and inconvenient (Palacios & Kim, 2016). Although some UFs prioritize site beauty ("*We do tours and there is an aesthetic aspect which is important*"), many focus on the business aspect of production, thereby relegating their visual appeal – deliberately or otherwise. **Appendix I** includes examples of Urban Farming production images that are instrumentalized through their use in farms' visual identity for marketing and promotion.

Product display, in turn, also holds relevance in Urban Farming. Through packaging, producers can display the beauty of their product and highlight characteristics that will add value to the product. Packaging was traditionally understood as a means of protecting a product in the process of distribution, transport, or storage (Wyrwa & Barska, 2017). However, the growing health and nutritional awareness on the part of consumers has elevated food packaging to be an important element of food products. It provides the public with information regarding traceability, convenience, and shelf-life, ensures food safety and quality from initial production to consumption and has a key role in consumers' first impressions and generating expectations of the product (Marsh & Bugusu, 2007; Norton et al., 2022). Packaging, thus, is an essential marketing tool, the importance of which is reflected both in the performed functions and the role in the process of making decisions on purchases by consumers (Wyrwa & Barska, 2017). Moreover, food products that can convey a perceived 'naturalness' to consumers through their packaging, leading to increased buying intentions, can be further promoted by other initiatives centred on marketing communication (e.g., advertising, point-of-purchase displays, brand name) (D'astous & Labrecque, 2021).

Although these elements are not particular to Urban Farming products, they become especially important for this type of novelty product. As Urban Farming products can claim superior sensorial properties from traditional ones and evoke a higher sense in sustainability to the consumer, urban farms will therefore stand to critically benefit from an improved packaging experience for the consumer. Examples of Urban Farming packaging that have successfully done so are included in **Appendix J**.

In addition, the extended shelf-life of Urban Farming products, mainly attributed to their shorter logistics and higher level of freshness, means the products tend to exhibit more vivid colours and their visual appeal tends to last longer. Concerning the non-visual appeal, food lifetime extension also means longer periods without changes in texture, unpleasant odours, and undesirable tastes.

UFs can instrumentalize the human senses. Aside from the taste, the visual appeal, the odour, and the texture, even hearing can be used by UFs in tasting sessions, with the sizzling sound of food in a pan fryer or in educational events: "*We are planning*

to make an interactive experience, with motion sensors, with audio talking about mushrooms. Mushrooms grow often well after a lightning storm. So, we'll create an experience on the lightning storm inside the visiting area where people will learn about the production process and start to build an affinity relationship with that place as a source of food for them, where they can actually see it being grown". However, the other four senses can be especially targeted by promotional tools done on-site. Consumer sales promotions at retail points include demonstrations and tasting activities (Kotler & Keller, 2012), and are usually used to introduce a new brand or a new product. These in-store demonstrations that, in the case of food products usually involve tastings, are considered to be amongst the most effective forms of sales promotion tools (Shi et al., 2005). This not only increases consumers' product awareness but also plays into an impulse buying behaviour, as it has the capability to lead customers to try the product and buy it at that moment without pre-planning (Choudhary, 2014). The taste, colour, texture (influenced by freshness) and odour of the Urban Farming products are regarded as aesthetically better, which represents a differentiating factor to other traditionally grown products and an added value to consumers (de Chermay et al., 2016). This is aided by the events held on-site on a few of the farms. Not only can UFs display their product 'in action' and show consumers how to cook/eat them, but they can also 'hook' them to the product through smell and taste.

7.6.3. Tactics, collaboration, and legitimization in urban farms

Organizations navigating the early stages of a burgeoning industry encounter distinct challenges compared to those continuing established traditions within the same field (Aldrich & Fiol, 1994). When organizations venture into a new area of activity, especially one with few established precedents, they often encounter the challenge of gaining acceptance for both the activity itself and their own legitimacy as participants. This "liability of newness" (J. Freeman et al., 1983, p. 692) presents at least two key challenges. Firstly, if the new operations are technically complex or not well-established, early adopters must invest significant effort in building the sector, establishing a sense of objectivity and independence from individual incumbents (Aldrich & Fiol, 1994). The second challenge of legitimacy building applies equally to

both emerging sectors and new participants in established ones. This challenge involves a dual outreach effort to attract new, loyal followers and to persuade existing legitimate entities to offer their support (Suchman, 1995b), especially when organizational technologies are uncertain or risky, and objectives are contested or unconventional (Ashforth & Gibbs, 1990).

Scott (2008) examined tactics as part of the institutional change process, emphasizing that institutional tactics are specific actions and manoeuvres used by organizations to navigate institutional constraints and opportunities. Tactics for gaining legitimacy involve proactive actions, ranging from passive conformity to active manipulation, because managers anticipate the need for approval in advance. Organizations must either align with existing expectations of stakeholders, seek support from different environments, and create new audiences and beliefs (Suchman, 1995b).

As a result, a high degree of collaboration becomes essential in this niche and evolving industry, as it becomes a key source of new knowledge and innovation (Audretsch et al., 2023). Collaborations, including with competitors, become a catalyst for growth, as they fuel innovation, knowledge exchange, and industry-wide standards (Beninger & Francis, 2021; Bjerke & Johansson, 2015; Chen & Yu, 2022; Ko et al., 2020). A collaboration between competitors, known as coopetition, might involve the design of new business models in order to align the customer value proposition with how value is created and captured (Velu, 2017; Velu & Stiles, 2013). Shorter product lifecycle, convergence of multiple technologies and increasing costs of conducting R&D require firms to share resources with their competitors in order to improve the delivery of existing customer value proposition or develop new propositions (Gassmann, 2006; Gnyawali & Park, 2011). Often the basis for coopetition is to grow existing, or create new, markets, to share resources in fast-changing environments in order to achieve efficiency and also to enhance innovation capabilities (Velu, 2017). Unlike in mature industries, where competition often breeds exclusivity, the Urban Farming sector requires collaboration to foster mutual growth and collective advancement, amplifying the sector's impact and reach.

Moreover, the evolving landscape of the nascent Urban Farming sector requires distinctive business models that heavily rely on partnerships and

collaborations. The business models of urban farms diverge from the established norms and expectations typically found in traditional industries, where stakeholders are accustomed to adhering to well-defined paths (Morris et al., 2015). More often than not, urban farms need to pursue innovation in their business models by exploring new ways to define their value proposition, and how they create and capture value for customers, suppliers and partners (Bock et al., 2012; Gambardella & McGahan, 2010; Teece, 2010). Innovation in business models is of vital importance to organizational survival, business performance and as a source of competitive advantage (Amit & Zott, 2012), with the integration of resources with stakeholders (customers, suppliers, intermediaries) being at the centre of the value (co-)creation process (Agrawal et al., 2015).

In addition, the absence of familiar cognitive legitimacy (Shepherd & Zacharakis, 2003) in the nascent urban farming landscape means there are no formal or pre-made norms and expectations. Legitimacy is a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions (Suchman, 1995b). Legitimacy may involve either affirmative backing for an organization or mere acceptance of the organization as necessary or inevitable based on some taken-for-granted cultural account (Jepperson, 1991; Suchman, 1995b), based on cognition (Aldrich & Fiol, 1994). To provide legitimacy, an account must mesh both with larger belief systems and with the experienced reality of the audience's daily life (DiMaggio & Powell, 1991). Urban farms must, then, evolve organically, developing distinctive tactics in response to the challenges they encounter and to seek legitimacy grounded in cognitive definitions of appropriateness and interpretability (Aldrich & Fiol, 1994).

Landlord relationships play a crucial role in determining urban farming survival due to the diverse objectives of building owners. These partnerships form a symbiotic relationship where both parties rely on and benefit from each other. Urban farms offer landlords a pathway to legitimacy and sustainability by leveraging their assets to contribute positively to the urban environment. In return, landlords provide urban farms with physical space and opportunities to expand their business models, adding value to their activities. This symbiotic relationship exemplifies the integration of

sustainability principles into business practices, where value creation extends beyond economic metrics to encompass social and environmental dimensions.

In conclusion, as urban farms navigate the early stages of their emerging industry, they face challenges in establishing legitimacy and gaining acceptance. The "liability of newness" presents hurdles in building sectoral recognition and organizational credibility, necessitating proactive tactics to overcome this lack of cognitive legitimacy. This translates into the development of distinctive business models, where partnerships and collaborations play a pivotal role. These collaborations, including coopetition among competitors, enable urban farms to innovate, share resources, educate the market, and collectively advance the sector. Furthermore, landlord relationships significantly influence urban farming survival, forming symbiotic partnerships that contribute to both parties' objectives. By leveraging these relationships, the innovative business models observed in urban farms extend beyond mere food production, offering a broader value proposition that integrates the urban farm with its surroundings.

7.6.4. Model of the Attractiveness of Urban Farms

Based on the empirical observations and the theoretical insights from the previous sections of the Discussion, **Figure 15** is presented as the theoretical model looking at the factors that contribute to the survival of urban farms.

It consists of two sets of societal actors (Organizations and Stakeholders, which are subdivided between Consumers, Investors, Employees and Society), three mechanisms (Competitive, Aesthetic and Tactics and collaborations), four competitive elements (Farming attractivity, Interest in farming, Attractive employment, and Practical advantages) and four transmission channels (Benefits, Values, Legitimacy and Attractiveness). The model operates in different streams, each being represented by one arrow.
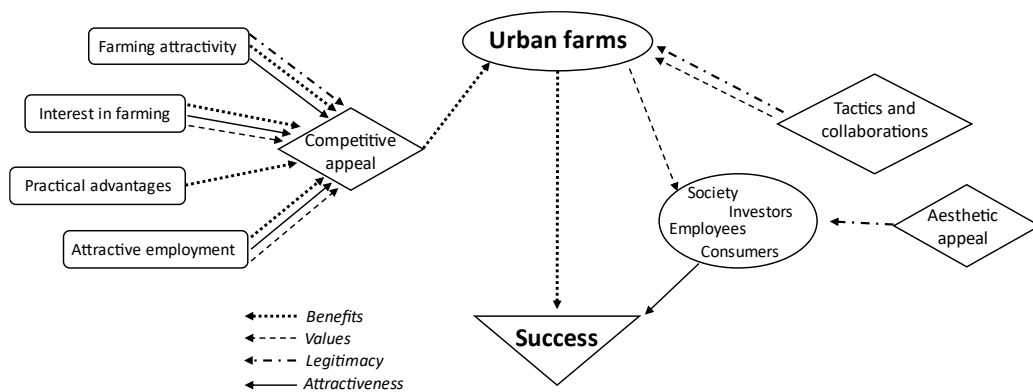
Figure 16. Theoretical model describing how tactics, collaborations and competitive and aesthetic appeals that contribute to the survival of urban farms.

The upper left part of Figure 15 represents the elements that grant the competitive appeal of urban farms. These factors, such as those mentioned in the interviews, attribute benefits, value, attractivity and legitimacy to Urban Farming that renders it an attractive activity. For example, the 'interest in farming' and 'attractive employment' in Urban Farming refers to the values, attractiveness and benefits this activity elicits from people, rendering it an attractive activity. Meanwhile, more objectively, the practical advantages of Urban Farming are defined by its benefits.

After urban farms internalize these competitive appeal benefits mentioned above and translate them into meaningful values for its stakeholders. Consumers, investors, employees, and society will each register and incorporate these values in their own way. Originating from organizations, the values, internalized by consumers and later by society in general, concern the personal beliefs heightened by Urban Farming properties. Exemplified by the 'greener approach' and transparency to food production, product quality, convenience, lack of pesticides, etc., these values make Urban Farming more attractive to consumers, who then are prone to urban farms by purchasing their products. Urban Farming's relation with society, in turn, is represented by the recognition of Urban Farming as necessary and integral to cities and to the food supply chain. For employees, the opportunity to work in agriculture while being located within cities, with improved ergonomics under a controlled environment and with technological production inputs, is alluring. This comes in addition to the values incorporated by consumers, as it is logical that employees of UFs would share similar values to people who are aligned with Urban Farming through

their beliefs and consume its products, leading them to desire to work on these sorts of farms. Finally, for investors, the narrative of investing in and funding quality, health-oriented, 'green' food production in urban environments is particularly appealing in a corporate world compelled to follow CSR and SDGs, encouraging them to invest in urban farms. Therefore, after this set of stakeholders absorbs these values, Urban Farming become attractive to them, which further bolsters the chances of survival for urban farms.

Concurrently, urban farms also use an 'UF aesthetic' to acquire organizational legitimacy by appealing to the same aforementioned stakeholders. By applying an aesthetic that evokes specific ideals, such as 'sustainable', 'futuristic', 'hygienic', 'natural', etc., farms acquire such positive ideals through validation from its stakeholders. This 'UF aesthetic' also grants urban farms legitimacy. Due to the almost laboratory-like growing environment of UFs, consumers view these farms as a clean, tidy, and elegant food source. Investors can visually have the tangibility of their investments, and employees are inspired to work in these stimulating environments. Finally, society sees urban farms that adhere to this aesthetic as 'good' and, given the nature of the food supply chain and environmental crisis, 'needed'. This aesthetic legitimacy makes Urban Farming comprehensively attractive to stakeholders, who view Urban Farming as better than industrial farms.

Additionally, tactics and collaborations provide value and legitimacy, contributing to an urban farm's survival. These elements are essential for urban farms to overcome challenges associated with nascent sectors, foster innovation, expand reach and impact, and enhance their value proposition. Ultimately, relaying the competitive and aesthetic appeal to stakeholders coupled with these distinctive tactics contribute to the survival of urban farms.

7.7. Conclusion

Urban farms survive through a combination of tactics and collaborations and by attracting built environment stakeholders through a combination of competitive and aesthetic features. Urban Farming offers competitive features that align with these stakeholders' values and needs, including sustainability, food quality, and

transparency. It also provides an attractive and comfortable working environment for farmers, particularly younger ones who are drawn to its values and technological aspects. Urban Farming's sustainable approach to food production, often based on the "zero-mile" concept and reduced resource usage, serves as a powerful marketing approach, and contributes to the organizational myth of being environmentally friendly. This positioning enhances external legitimacy and distinguishes urban farms from industrial farms despite some increased resource usage.

However, while urban farms have traditionally been discussed in terms of their competitive appeal, such as practical advantages and farming attractiveness, their aesthetic appeal is not often emphasized, even when the focus is placed on their general attractiveness as an activity. Aesthetics, nonetheless, plays an important role in the urban environment, attributing meaning, identity, and value to objects and underlining the sensorial qualities surrounding its inhabitants. Thus, this chapter proposes that, in addition to the competitive appeal that these farms have to the organizations undertaking Urban Farming and their stakeholders, the aesthetical appeal is also a valuable factor that influences their attractivity and, therefore, their survival.

The visual aspect of Urban Farming, including the Urban Farming site and building design, serves as a powerful marketing tool, capturing the attention of passers-by and potential consumers. Visually striking buildings and the visual identity of urban farms contribute to their visibility and increase their appeal. Additionally, the production areas of urban farms can arouse curiosity and engagement through their design and manifestation. The visual representation of food production and its association with values like sustainability and healthiness further enhance the aesthetic appeal of Urban Farming.

Similarly, product display and packaging also play a significant role in the aesthetic appeal of Urban Farming. Packaging serves as more than just a protective measure, conveying information about traceability, convenience, and shelf life. Urban farms can leverage packaging to showcase the beauty of their products and highlight their unique qualities. Furthermore, urban farms can engage the human senses through on-site tasting sessions and demonstrations, creating multisensory experiences that further enhance the aesthetic appeal of their products.

Furthermore, the inherent novelty of Urban Farming poses challenges beyond typical concerns about financial sustainability. Establishing legitimacy and gaining acceptance become paramount in this context, requiring proactive tactics from urban farms to garner sectoral recognition. These imperative drives the development of distinctive business models, where partnerships and collaborations play pivotal roles in fostering innovation and fostering growth. Coopetition among competitors cultivates a culture of resource sharing, market education, and collective progress, bolstering the sector's overall impact. Moreover, the symbiotic relationships cultivated with landlords wield significant influence over urban farms' survival, emphasizing the fusion of sustainability principles into business practices. These alliances transcend conventional roles, transforming urban farms into holistic entities that contribute value not only as food producers but also as enriching components of their urban environments.

The theoretical model presented in this chapter demonstrates how tactics and both competitive and aesthetic appeals contribute to the survival of urban farms. The distinctive tactics and collaborations adopted by urban farms provide them value and legitimacy, which are essential for urban farms to overcome challenges associated with nascent sectors, foster innovation, expand reach and impact, and enhance their value proposition. The competitive benefits of Urban Farming make it attractive to organizations, while the values associated with Urban Farming are internalized and incorporated by consumers, investors, employees, and society. The aesthetic appeal of urban farms, including their visual identity and sensory experiences, further adds to their overall attractiveness and strengthens their appeal to stakeholders.

By focusing on the aesthetic value of Urban Farming through the production, the product, the sensorial advantages they possess and on the farm activities, there is an opportunity for organizations to harness the sensorial experience these types of farms can potentially deliver to the public and increase its value to their built environment. If UFs manage to capitalize on their aesthetic value to their consumers, employees, investors, and the society, they can inspire and enhance urban life, enabling inhabitants to develop sensorial connections to the natural world (Alkon, 2008), create recreational opportunities (Vejre et al., 2016) and encourage practical environmental sustainability (Thayer, 2003). These 'intangible' ecosystem services

provided by UFs may even outweigh more tangible benefits such as the production of agricultural products (Vejre et al., 2016).

Therefore, this chapter examined the often-overlooked aesthetic dimension of Urban Farming, revealing its profound value. Aesthetics holds a crucial importance for urban farms, harnessing numerous positive aspects that have not been previously explored in academic literature. By emphasizes the significance of aesthetics in various aspects of urban farming, such as production, products, sensorial experiences, and farm activities. By leveraging aesthetics, organizations can capitalize on the emotional and cognitive connection that emerges between the urban farm and the observer (Degen & Rose, 2022) and potentially enrich the built environment, resonating deeply with its stakeholders. This shift towards aesthetics not only enhances urban farms' allure but also fosters environmental sustainability and promotes healthier urban ecosystems. Therefore, aesthetics should be given greater consideration in the discussion of urban farms, as they play a pivotal role in their overall attractiveness by individuals and stakeholders, further increasing their chances of survival. Moving forward, a comprehensive understanding of the aesthetic dimensions of Urban Farming can lead to the development of more appealing and engaging urban farms that positively impact urban environments and communities.

Chapter 8. Conclusion

In the two previous chapters, a discussion was made based on the literature and the data collected from the interviews. The first part of the discussion centred on how institutionalization practices influence the adoption of Urban Farming. The second part of the discussion explored the tactics and attractiveness affect the survival of urban farms.

This final chapter combines all the knowledge collected and generated in the thesis to arrive at conclusions relating to the role of Urban Farming in the built environment, focusing on the adoption and survival of urban farms. It encompasses a research summary, theoretical contribution, practical recommendations, limitations, future research directions, and closing remarks from the author.

8.1. Research summary

Feeding the world's growing population has become an increasingly complex task due to the current structure of the global food system. This problem has been exacerbated by factors such as the increasing proportion of urban residents, increased demand for food in urban areas, and limited access to fresh and nutritious food, contributing to food insecurity and health disparities. In addition, the environmental degradation caused by conventional agriculture practices, including deforestation, water pollution, and greenhouse gas emissions, have also worsened the effects of climate change and pose long-term threats to food production. These challenges call for the implementation of alternative forms of producing food. Hence, urban agriculture has been presented as a way of mitigating this adverse situation.

Urban agriculture, encompassing various forms such as rooftop gardens, vertical farming, and community gardens, offers several benefits in addressing the challenges posed by the global food system. For example, it enables the production of fresh, nutritious food near urban populations. Reducing the distance between production and consumption enhances food security, reduces reliance on long supply chains, and minimizes transportation-associated carbon emissions. Urban agriculture optimizes land use by utilizing underutilized spaces such as rooftops, vacant lots, and vertical structures. It efficiently uses limited urban space to increase food production

per unit area compared to industrial agriculture. Finally, urban agriculture can employ sustainable practices such as organic farming, hydroponics, and aquaponics, reducing the need for chemical inputs and water consumption and contributing to environmental sustainability. Despite criticisms due to its costs, both energy and food-wise, these farms have the potential to become not only an essential source of food for urban populations but also a fundamental part of cities themselves – an integral part of places and the fabric of a city, i.e., in its buildings and social spaces. Therefore, this research sought to study the relationships between various stakeholders, organizations, and social movements involved in Urban Farming to elucidate the mechanisms driving urban farms within the built environment.

To accomplish this, from a theoretical perspective, social movement, institutional and stakeholder theories were used to analyse the social dynamics, organizational behaviour, and the interactions between various actors in relation to urban farms. Social movement theory focuses on understanding the emergence, development, and impact of collective action aimed at social change towards addressing relevant social matters. Institutional theory, on the other hand, explores the rules, norms, and beliefs that shape organizations and social systems, highlighting how formal and informal institutional arrangements influence organizational behaviour and outcomes. It examines the processes of institutional isomorphism, the role of legitimacy, and the influence of institutional pressures on organizational behaviour and change. Lastly, stakeholder theory is concerned with understanding the relationships between organizations and the various individuals, groups, and entities with a vested interest in the organization's activities. It emphasizes the importance of considering all organisational stakeholders' diverse needs, expectations, and value creation, recognizing their significant role in influencing an organization's decisions, performance, and legitimacy. Therefore, these three theories provide a robust theoretical framework for understanding social dynamics, organizational behaviour and its institutional context, and the interactions between organizations and their stakeholders.

The thesis' methodology uses a subjectivist/constructionist ontological position, recognizing that social reality is constructed through subjective experiences and meanings, exploring individuals' diverse interpretations and understandings.

Adopting an interpretivist epistemological position, the study acknowledges that knowledge is socially constructed and influenced by the researcher's subjective interpretation. It recognizes the significance of understanding participants' context, values, and beliefs to gain a rich understanding of the research topic. This leads to an inductive research approach, allowing for new theories and insights from the data. Thus, the research methods were qualitative in nature, employing interviews for an extensive exploration of participants' perspectives, experiences, and insights. The data analysis employs the Gioia method, involving systematic coding, categorization, and analysis to uncover meaningful patterns and connections within the collected information. This approach emphasizes narrative inquiry, focusing on how individuals interpret their experiences within organizational contexts through in-depth interviews and narrative analysis.

The analysis of the data revealed fifteen overarching topics that emerged in the interviews. After the significance of each topic was evaluated according to its compatibility with the research questions, nine topics were selected. The chosen overarching themes (aesthetic, attractivity of farming activity, community relations, product/crop choice, motivations, collaborations, landlord relationship, business model, and sustainability) were then subjected to a theorization using the Gioia method. The ensuing discussion was structured into two parts: the first discusses the institutionalization of Urban Farming and how it influences its adoption; the second analyses the tactics and attractive features used by urban farms that contribute to their survival. The primary focal points of the discussion chapters are highlighted in the following subsection, which covers the research findings presented here as responses to the two research questions set out in Chapter 1.

8.2. Conclusions to the research questions

Question I: *why is Urban Farming adopted?*

As societal pressures mount for organizations to embrace sustainability, they acknowledge this institutional change. One form of organizations incorporating sustainable value is through the adoption of Urban Farming. Urban farms offer several distinct features that contribute to an organization's overall sustainability and

stakeholder engagement. By incorporating Urban Farming as a non-core business activity, for example, organizations can conform to sustainable development by adhering to sustainable values without having to undertake massive changes to their products, services, or processes. This not only aligns with the growing societal demand for sustainable practices but also enhances the organization's reputation as a socially and environmentally conscious entity.

Additionally, Urban Farming offers significant relational value to organizations by fostering improved relationships with food, the built environment and within their own ranks. Internally, employees can actively participate in the farming process, fostering a sense of connection to nature and to the office, a positive work environment, well-being, and pride in the organization's sustainability efforts. Externally, by opening their farms to the public, organizations can provide opportunities for community involvement, education, and interaction, further strengthening relationships with their surroundings. It showcases a forward-thinking approach to addressing societal challenges, such as food security, sustainable agriculture, and urbanization. This also can set organizations apart from their competitors by offering a distinctive organizational proposition, adding further differentiation in the market, and attracting environmentally conscious consumers who value sustainable practices. Urban Farming becomes a distinctive feature that may enhance the perception of the organization, increase customer loyalty, and create a competitive advantage.

Question II: *how do urban farms survive?*

Urban farms enhance their survival through various strategies, one of which involves tapping into their competitive and aesthetic appeal. For the former, Urban farming presents a compelling competitive edge by offering advantages such as increased profit margins, shorter production cycles, and optimized resource utilization. Moreover, these farms address broader societal concerns about sustainability and food quality through environmentally friendly practices, transparent food production methods, and the provision of healthier food options. This sustainability focus and emphasis on improved food quality resonate with societal values, bolstering the farms' competitiveness and ensuring sustained operations.

However, and perhaps more interestingly, aside from these evident benefits, urban farms have an aesthetic appeal that significantly adds to their attractiveness and enhances their desirability. The visual aspect of Urban Farming, including the design of urban farms and buildings, can create a visually striking presence that captures attention and increases the farm's visibility. The production areas of urban farms can also be designed in visually appealing ways, utilizing elements such as coloured lighting, vertical stacking, or unconventional locations. Packaging and product display further enhance the aesthetic appeal by showcasing the beauty and quality of Urban Farming products. Beyond the visual aspect, urban farm engages the human senses, offering sensorial advantages to consumers. Urban Farming products are often perceived as having superior taste, texture and colour compared to traditionally grown products. On-site events and tasting sessions provide opportunities for consumers to experience the qualities of Urban Farming products first-hand, creating a multisensory connection and enhancing the overall appeal. Therefore, the exploration of the aesthetic appeal enhances these farms attractiveness, which further contributes their survival.

In industries such as urban farming, organizations face distinct challenges compared to those in established fields. These challenges include building sector recognition and organizational credibility. Urban farms must, therefore, implement proactive tactics and the development of distinctive business models, often involving partnerships and collaborations, to survive. Hence, employing tactics such as coopetition fuels innovation and helps educate the market about Urban Farming. Landlord relationships also play a crucial role, forming symbiotic partnerships that contribute to both their own and their tenants' objectives. Through these collaborations and the development of distinctive business models, urban farms extend their value proposition beyond food production, integrating with their surroundings and addressing social and environmental dimensions, which bolsters their chances of survival.

8.3. Contributions to knowledge

This research's theoretical contribution is divided between its major and minor contribution to the academic field.

8.3.1. Major contributions to knowledge

1. *How Urban Farming transforms sustainable development into sustainable values for organizations*: This research offers empirical evidence that demonstrates how organizations can translate the principles of sustainable development (Sartori et al., 2014) into tangible sustainable values (Hart & Milstein, 2003) that highlight the sustainable opportunities for value creation. These constructs not only elucidate the sustainable opportunities for value creation but also provide a theoretical foundation for understanding how organizations can integrate sustainability into their core strategies and practices. By examining the theoretical underpinnings of how organizations operationalize sustainable development and sustainability through the adoption of urban farms, this research contributes to the development of a framework that contemplates novel avenues for value creation within and beyond the organization's boundaries.

2. *How Urban Farming generates non-financial value to organizations*: This study contributes to the theoretical understanding of value creation in organizational contexts by examining the multifaceted benefits of Urban Farming beyond financial considerations. The findings demonstrate that Urban Farming can generate non-financial value to organizations in a number of ways, such as improving sustainability, stakeholder engagement, marketing, and employee well-being. This suggests that organizations can create value by incorporating non-financial dimensions, such as sustainability, into their strategies and decision-making processes.

3. *How the institutionalization process of Urban Farming within organizations is enacted:* This study contributes to organizational studies by providing a novel process description of the institutionalization of Urban Farming within organizations. The

study identifies a sequence of steps that organizations go through as they adopt Urban Farming, beginning with the acknowledgement of sustainability and culminating in the alignment of organizational practices with sustainable values and prevailing institutional norms. This process description provides a valuable framework for understanding how Urban Farming becomes embedded in organizational culture, operations, and strategic objectives.

4. *The importance of Urban Farming aesthetics to the built environment*: With the exception of Palacios & Kim (2016), the aesthetic dimension of Urban Farming has received limited attention from scholars. Yet, aesthetics holds a crucial importance, as it capitalizes on the emotional and cognitive connection that emerges between the urban farm and the observer (Degen & Rose, 2022). This association can be explored to harness numerous positive aspects of urban farms that have not been previously explored in academic literature. For instance, this research has demonstrated that Urban Farming initiatives hold the potential not only to secure legitimacy among stakeholders but also to shape the built environment and enhance urban aesthetics. Furthermore, urban farms can effectively repurpose underutilized spaces, like rooftops or vacant lots, into vibrant green areas that significantly enhance the visual allure of urban landscapes. Hence, through the incorporation of elements that enhance the aesthetic appeal, Urban Farming initiatives actively contribute to the revitalization of urban spaces, the promotion of biodiversity, and the creation of healthier, more sustainable urban environments.

5. *How urban farms overcome challenges associated with being from a nascent sector*: As previously discussed, urban farms face the challenge of establishing acceptance for both their activities and their own legitimacy as participants in an unfamiliar sector. Consequently, they must cultivate cognitive legitimacy in an environment where formal norms and expectations are lacking. This necessitates the exploration of strategies aimed at building legitimacy and gaining acceptance in this nascent sector. Key tactics include developing distinctive business models, expanding innovative approaches to value creation and sustainability, and fostering partnerships and collaborations, which are fundamental for growth and mutual advancement.

8.3.2. Minor contributions to knowledge

1. *The competitive appeal of Urban Farming*: Although this is a recurring theme in the academic literature (e.g., Ghazalli et al., 2019; Ilieva et al., 2022; Orsini et al., 2013; Poulsen et al., 2017), this research further identifies and elaborates on the competitive advantages associated with Urban Farming. Moreover, it also offers valuable insights into how these advantages influence the perception of urban farming by organizations and various societal stakeholders, which in turn influences its adoption.

2. *Urban Farming as a non-core business activity:* Surprisingly, the concept of non-core business activities, in general, is not very prevalent in the academic management literature (with Mohiuddin & Su (2013) being an example of the exception), as the concept is more present in general management publications. While extensive research on core competencies directly relates to an organization's primary or core business functions has been extensively undertaken (e.g., Jonker & Faber, 2021), the attention given to non-core activities is notably limited despite their practical significance in the business world. Applying the non-core business activity approach to Urban Farming in management studies is an unprecedented proposition and highlights a promising form in which organizations can potentially address their sustainable goals without significantly transforming their core activities and business models.

3. *Urban Farming's relational value for organizations*: Although Keeffe and Jenkins (2017) have highlighted the restorative qualities of urban farming for cities, no research has explicitly examined the relational values that urban farming has for organizations. These types of benefits are often a primary focus of initiatives centred on urban community agriculture. Thus, this research reveals the positive ways in which Urban Farming can improve an organization's relationships with its surroundings, food, and itself, uncovering additional value Urban Farming has to organizations.

8.4. Implications for practice

Based on the findings and the discussion of this research, a set of contributions with implications for practitioners is presented.

Firstly, it acknowledges the significance of aesthetics to the survival of urban farms. While there may be costs involved in establishing and upkeeping an aesthetically pleasing setting in an urban farm, the benefits it brings are substantial. Therefore, it is crucial for farms to carefully consider their visual appeal whenever feasible. An attractive farm is more likely to secure support and effectively convey the concept to its stakeholders, whether they are consumers, employees, investors, or the local community and, therefore, survive.

Externally, this can be accomplished by designing sites and buildings that are visually captivating and make a bold statement in the urban environment. Furthermore, incorporating elements of architectural design, materiality, and thoughtful plant selection can effectively convey the desired aesthetic values. Internally, production areas can ignite curiosity and interest through innovative design, creative lighting, and unconventional locations. Through these intentional design choices, urban farms can showcase their unique character and contribute to the overall beauty and charm of the urban landscape.

This principle also applies to engaging the other senses. The multisensory nature of Urban Farming presents an opportunity to create captivating experiences for consumers. Wherever food security parameters can be upheld, organizing on-site events, tasting sessions, or demonstrations where consumers can interact with and fully experience the sensory qualities of Urban Farming products are effective methods to achieve this. By utilizing sound, smell, taste, and touch, memorable and immersive experiences can be crafted, further enhancing the perception of Urban Farming products. Additionally, the strategic utilization of packaging to elevate product presentation can accentuate its beauty and provide added value. Packaging serves as a vehicle to convey a message that aligns with consumer values, effectively showcasing the freshness, quality, and distinct attributes of Urban Farming products. Furthermore, opting for eco-friendly packaging further reinforces the commitment to sustainability and resonates with environmentally conscious consumers.

Although the emphasis on the competitive advantages of Urban Farming is the main flagship when communicating these farms to the public, it is essential to continue highlighting their importance. These advantages encompass practical benefits, including higher profit margins, shorter production cycles and more efficient resource utilization. Strengthening communication efforts should focus on the positive environmental impact of sustainable production methods, as well as the transparency and quality associated with Urban Farming. By effectively conveying these messages, a broader range of stakeholders will become familiar with and engaged in Urban Farming. Deepening collaboration among these stakeholders is crucial, encompassing consumers, investors, employees, and the wider society. Building relationships and fostering the adoption of Urban Farming can be achieved through engaging with educational institutions, community organizations, and media outlets. This collaborative approach aids in raising awareness about sustainable food production, highlighting the environmental impact of industrial agriculture, and promoting the advantages of local and fresh produce.

This research also underscores the significance of urban farms collaborating with competitors, implying knowledge exchange and innovation stemming from collaborations. It also highlights the importance of fostering partnerships to overcome industry challenges and promote sustainability. Additionally, the findings underscore the symbiotic nature of landlord relationships, emphasizing their role in providing urban farms with physical space and opportunities for expansion, while offering landlords pathways to legitimacy and sustainability. These insights offer practical guidance for stakeholders, informing decision-making processes and facilitating the growth and sustainability of urban farming initiatives.

For organizations, this research has demonstrated that, even as a non-core business activity, implementing urban farms is a form to address sustainable development and transform it into sustainable values. This can be a vehicle to strengthen the organization's relation with its surroundings, community, food and within itself, and can be a central part of an organization's identity. When implementing an urban farm, it is crucial to underscore the importance of fostering cooperation among competitors and recognizing the symbiotic nature of landlord relationships, while also prioritizing strategic innovation in business models. By doing

so, organizations can effectively navigate the inherent challenges associated with operating within this nascent industry.

This research also has practical implications for the built environment stakeholders, highlighting the potential for collaboration, innovation, and sustainable initiatives within the construction industry. Architects, designers, construction, and development companies have a fundamental role in shaping the built environment. Integrating Urban Farming into construction initiatives presents several opportunities, primarily revolving around helping them achieve sustainable development. Through the sustainable value Urban Farming brings, construction stakeholders can improve their sustainability metrics. By further understanding the significance that urban farms have to the urban landscape, including forms in which it may add value to building projects, this research is a step forward in bringing this practice to the attention of these stakeholders.

8.5. Limitations and future research directions

Throughout the course of this research, certain limitations have come to light, hinting at potential avenues for future research directions. Subsequent studies should focus on gathering additional empirical data and case studies to validate and extend the findings discussed. This could involve conducting surveys, interviews, or observational studies to gather further and diverse data on the value and attractiveness of urban farms.

As highlighted in section 4.6.1.3., there is a degree of participant selection bias from the data set. Successful farms displayed a greater willingness to participate in this research, while 'failed' farms either proved elusive or declined to participate altogether. While it is undoubtedly valuable to gather data from successful farms, it's equally crucial to capture the reasons behind farm failures. A comprehensive understanding of farms' lack of success is vital because it can provide insights into the challenges and pitfalls faced by Urban Farming initiatives, which may offer valuable lessons for improving future urban farms.

In addition, the data collected mainly focused on direct participants of urban farms such as practitioners (founders and managers) and organizations, brings

valuable yet limited empirical evidence on the perspectives of other stakeholders, including consumers, employees, investors, and society. Moreover, the data set utilized was purposefully broad, encompassing various types of Urban Farming activities. Although this approach has brought a breadth of different experiences from collaborators with diverse backgrounds in urban farms, a more targeted data collection process could uncover specific insights unique to different types of urban farms. This approach would enable unearthing more precise experiences and, consequently, engaging in more detailed discussions. For instance, a relatively small subset of the interviewed urban farms operates as part of an organization's non-core business activity. Given the promising yet largely unexplored nature of research in this area regarding organizations' non-core business activities, it presents significant research potential. Also, during the investigation of non-core business activities within organizations, a notable gap emerged in the literature regarding organizations that engage with such activities, particularly when they encompass sustainable practices.

Furthermore, while the findings highlight the importance of incorporating sensory and evaluative dimensions in institutional theory, the mechanisms, and processes through which these dimensions interact are not fully explored. Future research could also delve deeper into how sensory experiences and evaluative judgments shape individuals' engagement with institutions and their decision-making processes.

Finally, this research does not extensively address ethical considerations associated with institutional theory and organizational aesthetics. Future studies could, therefore, usefully explore the ethical implications and challenges related to the use of aesthetics in organizational practices, such as considerations of inclusivity, cultural sensitivity, and the potential unintended consequences of aesthetic choices.

8.6. Closing remarks

Over the past four years, whenever I have shared my research topic, I have been met with enthusiasm and curiosity. Urban Farming is a topic that elicits divided opinions regarding its impact and practical outcomes. While some argue that it has the potential to "feed the world," others perceive it as an ineffective and expensive trend.

Nevertheless, Urban Farming is undeniably a fascinating and captivating subject. Throughout this thesis, I have sought to underscore the fact that Urban Farming is already an integral part of our reality and, most likely, will continue to grow in importance.

Despite its shortcomings, Urban Farming has a lot to contribute to cities. Although food and food production are the central elements, this activity offers multiple other benefits, which places improved urban coexistence, well-being, and harmony with the built environment. Hopefully, this research is a step forward in recognizing this and will become part of a body of work that will propel Urban Farming to be considered as a viable alternative for urban food production among various societal stakeholders, such as social movements, organizations, governments, and individuals as we collectively strive for sustainable and resilient urban landscapes.

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Appendix

Appendix A. Table of academic articles extracted from the SRL process

Authors	Year	Title	Publication
Ayerakwa H.M., Dzanku F.M., Sarpong D.B.	2020	The geography of agriculture participation and food security in a small and a medium-sized city in Ghana	Agricultural and Food Economics
Benna A.	2018	Collaborative consumption as a tool for agricultural expansion in developing countries: Enriching farmers by delivering value to consumers	Advances in E-Business Research Series
Binns T., Nel E.	2020	Reconceptualizing urban agriculture in africa: Issues of scale, class and institutional support in zambian copperbelt towns	International Political Economy Series
Blasi E., Cicatiello C., Pancino B., Franco S.	2015	Alternative food chains as a way to embed mountain agriculture in the urban market: the case of Trentino	Agricultural and Food Economics
Bousbaine A.D.	2020	The emergence of the food land belt in wallonia: An innovative system to feed local populations?	International Political Economy Series
Bousbaine A.D., Nguendo-Yongsi H.B., Bryant C.	2020	Urban agriculture in and around cities in developed and developing countries: A conceptualization of urban agriculture dynamics and challenges	International Political Economy Series
Branduini P., Perrin C., Nougarèdes B., Colli E.	2020	Cultural heritage preservation and resilience in urban agriculture through the lens of social justice: A case study in milan	International Political Economy Series
Broad, GM	2020	Know Your Indoor Farmer: Square Roots, Techno-Local Food, and Transparency as Publicity	american behavioral scientist
Bustamante M.J.	2020	Using sustainability-oriented process innovation to shape product markets	International Journal of Innovation Management
Carey, R; James, S	2018	Peri-urban agriculture in Australia Pressure on the urban fringe	routledge handbook of landscape and food Agribusiness
Chenarides L., Grebitus C., Lusk J.L., Printezis I.	2021	Who practices urban agriculture? An empirical analysis of participation before and during the COVID-19 pandemic	
Clarke, K; Jimenez, V; O'Riordan, T	2018	Cities to the Rescue: A New Scale for Dealing with Climate Change	realistic hope: facing global challenges
Constantin, M; Strat, G; Deaconu, ME; Patarlageanu, SR	2021	Innovative agri-food value chain management through a unique urban ecosystem	management research and practice
De Bernardi P., Azucar D., Forliano C., Franco M.	2020	Innovative and sustainable food business models	Contributions to Management Science
DeMarsh N.	2022	Redefining the role of young farmers: participatory action youth-led urban agriculture	International Journal of Sociology and Social Policy

Authors	Year	Title	Publication

Dobernig, K; Stagl, S	2015	Growing a lifestyle movement? Exploring identity-work and lifestyle politics in urban food cultivation	international journal of consumer studies
Dorneanu, M	2017	intensive farming versus-agriculture environmentally sustainable	quality-access to success
Eatmon T.D., Piso Z.A., Schmitt E.	2013	Perception is reality: Factors influencing the adoption of commercial aquaponics in the Great Lakes region	Cases on the Diffusion and Adoption of Sustainable Development Practices
Ghisellini P., Casazza M.	2016	Evaluating the energy sustainability of urban agriculture towards more resilient urban systems	Journal of Environmental Accounting and Management
Giacchè G., Porto L., Nagib G., Nakamura A.C., Ranieri G.R.	2020	Typological diversity of agriculture in a densely urbanised region of são paulo, Brazil	International Political Economy Series
Gittins, P; Morland, L	2021	Is 'Growing Better' ripe for development? Creating an urban farm for social impact	international journal of entrepreneurship and innovation
Glowa, M	2017	Urban Agriculture, Food Justice, and Neoliberal Urbanization	new food activism: opposition, cooperation, and collective action
Gray H., Nuri K.R.	2020	Differing Visions of Agriculture: Industrial-Chemical vs. Small Farm and Urban Organic Production	American Journal of Economics and Sociology
Hearn A.H., Mauad T., Amato-Lourenço L.F., Ranieri G.R., Williams C.	2020	Urban agriculture and the battle for history in melbourne and são paulo	International Political Economy Series
Henderson J.V., Storeygard A., Deichmann U.	2017	Has climate change driven urbanization in Africa?	Journal of Development Economics
Hernandez-Garcia, J; Caquimbo-Salazar, S	2018	Urban Agriculture in Bogota's informal settlements Open space transformation towards productive urban landscapes	routledge handbook of landscape and food
Hunt R.A., Townsend D.M., Korsgaard S., Naar A.	2021	Urban farmers and cowboy coders: Reimagining rural venturing in the 21st century	Academy of Management Perspectives
Kalantari, F; Tahir, OM; Joni, RA; Aminuldin, NA	2018	the importance of the public acceptance theory in determining the success of the vertical farming projects	management research and practice
Kanosvamhira T.P.	2021	Urban Agriculture and the Organisation of Urban Farmers in African Cities: The Experiences of Cape Town and Dar es Salaam	CSR, Sustainability, Ethics and Governance
Kassa E.T.	2021	Determinants of the continuous operations of micro and small enterprises during COVID-19 pandemic in Ethiopia	Journal of Innovation and Entrepreneurship
Keech D., Reed M.	2020	Urban agriculture as a field: Governance, communication and collective action	International Political Economy Series
Lanfranchi, M; Giannetto, C; De Pascale, A; Hornoiu, RI	2015	an application of qualitative risk analysis as a tool adopted by public organizations for evaluating green projects	amfiteatru economic

Authors	Year	Title	Publication
Luehr G., Glaros A., Si Z., Scott S.	2020	Urban agriculture in chinese cities: Practices, motivations and challenges	International Political Economy Series
Malan N.	2020	Service learning and stakeholder action: Technology and education for urban agriculture in johannesburg, south africa	International Political Economy Series
Mancebo, F; Certoma, C	2019	Urban Planning for Sustainability and Justice Lessons from Urban Agriculture	urban climate politics: agency and empowerment
Manikas I., Malindretos G., Abeliotis K.	2020	Sustainable Cities through Alternative Urban Farming: The Case of Floriculture	Journal of International Food and Agribusiness Marketing
McClintock N.	2010	Why farm the city? Theorizing urban agriculture through a lens of metabolic rift	Cambridge Journal of Regions, Economy and Society
Mobbs M., Lynch H., Fry J., Richards B.	2020	Identifying and solving regulatory issues and solutions through some case studies of urban farming in australia	International Political Economy Series
Moghimi F.	2021	Vertical farming economics in 10 minutes	Rutgers Business Review
Mohammed I., Kosa A., Juhar N.	2020	Economic linkage between urban development and livelihood of peri-urban farming communities in Ethiopia (policies and practices)	Agricultural and Food Economics
Mumenthaler C., Schweizer R., Cavin J.S.	2020	Food sovereignty: A nirvana concept for swiss urban agriculture?	International Political Economy Series
Nettle, C	2014	Community Gardening as Social Action	community gardening as social action
Nguyen P.L., Nguyen T.T., Nguyen M.D.	2020	An analysis of factors affecting residents' perception of peri-urban agriculture in Hanoi, Vietnam	Management Science Letters
Ngwenya T., Mashau P.	2020	Repurposing support tendered youth owned Small, Medium, and Micro-Enterprises in urban agri-business sector in Durban	Problems and Perspectives in Management
Odudu C.O., Omirin M.M.	2012	Evaluating the constraints affecting land access among urban crop farmers in metropolitan Lagos	Journal of Agribusiness in Developing and Emerging Economies
Omondi S.O.	2019	Small-scale poultry enterprises in Kenyan medium-sized cities	Journal of Agribusiness in Developing and Emerging Economies
Pineda-Escobar M.A.	2017	Urban agriculture as a strategy for addressing food insecurity of BoP populations	Base of the Pyramid 3.0: Sustainable Development through Innovation and Entrepreneurship
Rizal, AM; Punadi, RP; Salam, ZBSA; Husin, MBM	2019	Babylon Vertical Farms: Toward Sustainable Green Organization	green behavior and corporate social responsibility in asia

Authors	Year	Title	Publication
Ryymin, E; Lamberg, L; Pakarinen, A	2020	How to Digitally Enhance Bioeconomy Collaboration: Multidisciplinary Research Team Ideation for Technology Innovation	technology innovation management review
Semegn A.A., Bishnoi N.K.	2021	Analysis of Effect of Microfinance on the Performance of MSEs in Amhara National Regional State, Ethiopia	Journal of Entrepreneurship
Shahda M.M., Megahed N.A.	2022	Post-pandemic architecture: a critical review of the expected feasibility of skyscraper-integrated vertical farming (SIVF)	Architectural Engineering and Design Management
Shamsudin M.N., Rezai G., Kit Teng P.	2014	Public Attitude Toward Urban Agriculture in Malaysia: Study on Values and Knowledge in Klang Valley	Journal of Food Products Marketing
Suwanmaneepong S., Fakkhong S.	2020	Factors influencing the adoption of urban commercial vegetable production in the Bangkok Metropolitan, Thailand	International Journal of Entrepreneurship and Small Business
Thornton A.	2020	Introduction	International Political Economy Series
Turker D.	2018	Global Challenges: Aligning Social Responsibility and Sustainable Development Goals	CSR, Sustainability, Ethics and Governance
Usman I., Nanda P.V.	2017	Green business opportunity of coffee ground waste through reverse logistics	Journal for Global Business Advancement
Yoshida S., Yagi H., Garrod G.	2020	Determinants of farm diversification: entrepreneurship, marketing capability and family management	Journal of Small Business and Entrepreneurship
Zeunert, J	2018	Dimensions of urban agriculture	routledge handbook of landscape and food

Appendix B. Letter of Invitation for Research Participation

Dear **Name**,

My name is Guilherme Duch Crosta and I am a PhD student at the Bartlett School of Sustainable Construction, University College London (UCL). I am conducting research about urban farming projects and their relationship with their built environments. The research aims to better understand the challenges, opportunities, risks and successes associated with a range of urban farming projects.

I am quite interested in **Project X**'s approach to **Specify Project's Activity** in **City's Name** and I would love to hear more of your experience in the project. Hence, I would like to enquire if you would be interested in taking part in this study. It would consist of an online interview which would not take more than one hour and will be used as (anonymized) data for academic papers and a PhD thesis. The results can be shared with you in case you are interested.

Before the interview, you will receive a document with information regarding the study as well as a consent form. I can sign an NDA form, in case this is necessary.

I would be grateful if you could let me know of your interest in participating in this research. If you have any queries or concerns, please do let me know and we can arrange a phone call or Zoom meeting, as you prefer.

I appreciate your attention and am looking forward to your participation.

Yours faithfully,

Guilherme Duch Crosta

Appendix E. Interview Participant Informed Consent Form

Informed Consent Declaration

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Title of Study: Urban Farming in the Built Environment
Department: Bartlett School of Sustainable Construction, UCL
This study has been approved by the UCL Research Ethics Committee: 2021-PhD-GDC-001
Data protection registration number: Z6364106/2021/07/21

Thank you for considering taking part in this research. The person organising the research must explain the project to you before you agree to take part. If you have any questions arising from the Information Sheet or explanation that was already given to you, please ask the researcher before you decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

I confirm that I understand that by ticking/initialling each box below I am consenting to this element of the study. I understand that it will be assumed that unticked/initialled boxes mean that I DO NOT consent to that part of the study. I understand that by not giving consent for any element I may be deemed ineligible for the study.

I confirm that I have read and understood the Information Sheet for the above study. I have had an opportunity to consider the information and what will be expected of me. I have also had the opportunity to ask questions that have been answered to my satisfaction and would like to take part in the interviews for this study.	
I understand that I will be able to withdraw my data until that data has been incorporated into a broader dataset and is no longer separately identifiable.	
I consent to participate in the study. I understand that there is no intention to collect any personal information beyond this consent form and contact details, but that any such information collected will be anonymised. I understand that according to data protection legislation, 'public task' will be the lawful basis for processing.	
I understand that any of my data gathered in this study will be stored anonymously and securely. It will not be possible to identify me in any publications.	
I understand that my information may be subject to review by responsible individuals from the University for monitoring and audit purposes.	
I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason. I understand that if I decide to withdraw, any personal data I have provided up to that point that is separately identifiable will be deleted unless I agree otherwise.	
I understand the potential risks of participating in this study.	

I understand the direct/indirect benefits of participating described in the information sheet.	
I understand that the data will not be made available to any commercial organisations but is solely the responsibility of the researcher(s) undertaking this study.	
I understand that I will not benefit financially from this study or from any possible outcome it may result in in the future.	
I agree that my anonymised research data may be used by others for future research.	
I understand that the information I have submitted will be published as a report and I wish to receive a copy of it. Yes/No	
Where I consent to my interview being audio/video recorded, I understand that the recordings will be destroyed immediately following transcription. If you do not want your participation recorded you can still take part in the study.	
I hereby confirm that I understand the inclusion criteria as detailed in the Information Sheet and explained to me by the researcher.	
I hereby confirm that I understand the exclusion criteria as detailed in the Information Sheet and explained to me by the researcher, and I do not fall under the exclusion criteria.	
I hereby confirm that I am aware of whom I should contact if I wish to lodge a complaint.	
I voluntarily agree to take part in this study.	
Use of information for this project and beyond I would be happy for the data I provide, once anonymised, to be archived in the UCL Research Data Storage Service. No personal information will be uploaded to the Research Data Storage Service. I understand that other researchers will have access to my anonymised data.	

_____   _____   _____

Name of participant   Date   Signature

_____   _____   _____

Researcher   Date   Signature

Appendix F. Interview Questionnaire

INTRODUCTION (5 questions)

- Could you introduce yourself and what is your role in the project?
- Could you describe the project?
    - o E.g., date implementation, area size, production output, number of employees, etc.
- Could you give us a brief description of your daily activities in the project?
- Could you describe the ownership structure?
- What was the main factor that motivated the conception and implementation of the project?
    - o E.g., was it a market opportunity, for marketing, sustainable purposes, etc.?

FACILITY (8 questions)

- Could you describe the facility where the project operates?
- Do you own or rent the space?
    - o If rented, could you describe the rental agreement?
- Why was this facility chosen?
    - o How did you find it? Did you actively search for it?
- For how long have you been operating you operate there?
    - o If closed: Why was the facility shut down? Would you still be operating there if you could?
- How have you built the facility? What were the construction/adaptations made?
    - o Did you partner with/hire another organization?
    - o How did you decide what materials to include in the farm? Where/how do you source them?
- Have you collaborated with any other companies while developing the project? If so, please describe the nature of this partnership, as well as its advantages and challenges.
- What are the benefits and drawbacks of operating in this facility?

- Do you think there is potential to integrate your production method into new builds (residential or commercial)?

- FOOD (8 questions)
- Why were this type of crop and production method chosen for this project?
- How does your final product enter the food supply chain? Who is your customer base?
- What part does R&D play in the project? Are production techniques consistently upgraded to reflect new methods?
    - How has the site changed over time to reflect this R&D changes?
- How do you deal with waste?
- Who are your main competitors or rivals in general?
    - How do you evaluate the competition in the UF field?
- Do you believe your product or your production method provided competitive advantage (i.e., what is your selling point)?
- Does your product present gains in taste due to the production method/technology?
- Did the introduction of new technologies and processes in the farming and/or construction sector affect your project?

- OTHER (11)
- In a general sense, what is sustainability for you?
    - In what way do you think your product or production method addressed sustainability?
- How has Covid affected your project?
- How does regulations affect the project?
- What is the training and educational background of the project's team?
    - Are there volunteers?
- Do you collaborate with any NGO or association?
- How would you define the relationship of the project with the local community and how it related to its built environment?
- What were the main challenges in implementing and operating your project?

- How have you dealt with the challenges?
- What do you believe are the reasons for the success of your project?
- Regarding the learning process, how would you assess the project?
- What things would you have done differently, in hindsight?
- Final remarks?

Appendix G. Interview Example

Project 33 - Fri, 8/19/2022 - 1:02:20 hour

Interviewer 00:02

Can you just introduce yourself and describe your role in the company?

Project 33 00:13

I am the director of culinary for what is called ██ hotels. ██ hotels is two hotels. One is closer to the ██████. The other is in ██████. And then we have a convention center. So between the two, we have just over 2500 guestrooms, we have about 70,000 square feet of convention center. So we can do stand up events for 5000 or sit down events for just over 2000. And we have 36 conference rooms. We have 13 restaurants and bars, which are everything from two-star Michelin to local Singaporean buffet. And pretty much everything in between. It's a very large property in Singapore, after the casinos, it's probably the second largest hotel. I've been here just over 10 years, but I also lived here for two years before. So I knew Singapore and the market. We are one of the biggest food sources in Singapore. So if we sort of decided to change menus or change products or decide to do other products, it tends to have an impact on different pricing and structures within Singapore. ***I also do quite a lot with what is called the NEA, which is National Environment Agency here. We also work with the Singapore food agency, and we do various different panel discussions, whether it's to do with the different types of sustainability that we do here, whether it's to do with students and help to mentor them, etc. So we're very involved, not just in what we're doing, but also in what Singapore is doing as a whole.[4]*** Singapore itself has a very strong ethic towards something called SG 30, which is basically saying that by 2030, 30% of the products that are used in Singapore should be grown within Singapore. Up until this initiative, which was launched about five years ago, about 80 to 90% of the products that were used in Singapore came from outside. So we buy products from Europe, we buy products from America, and we buy products from Australia, we buy from

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[3] Redacted passages indicate elements that could potentially compromise participant's anonymity and that were, therefore, ommited.
[4] Passages in bold and italic indicate quotes that were deemed meaningful and selected to be part of the thematic analysis.

Asia, buy from Japan, we buy pretty much from everywhere. Being such a large property, we can sort of help dictate certain things. So we tend to choose our products and then we make the suppliers agree to them for six months in terms of pricing. But it's based off the volumes that we're obviously going to use. And we all went through the tough times of COVID, but actually, since the borders have sort of reopened and everything's back, Singapore has seen a huge surge in demand, and everyone is struggling to cope, so most hotels are restricted by capacity at the moment because of staffing and the rest of it. We thought it would only start back in July and be a slow trickle. It started in March, April and then has been a flood.

So everyone was much busier than they expected. So obviously it's impacted the supply lanes and everything else, same as everywhere else in the world have been very disjointed. In terms of farm, since I came here 10 years ago, we created an herb garden in our space that is probably about 50 square meters, and we had it for about five years. And then we had to take it out because we had to do the waterproofing, etc. When we took it out, we had a discussion with the gardening team that we had about how to make it more productive, because it was much more decorative than productive. So we restructured it quite a bit at that point. And then we were having a discussion as a senior management team, coming up to four years ago, and my MD had been to someone's house, and they had one of these indoor herb gardens, where you can sort of have it stacked up in your dining room table. So we started a discussion on that. *Singapore already had a few others such as Sky greens. Panasonic, the phone company, they stopped making telephones and they converted their factory here into a hydroponic farm. So we've been seeing quite a few things, and we, obviously, were using different suppliers within Singapore, who were growing different things. But most of them were growing was micro herbs, micro crests, a lot of this. And then some urban farms started springing up. I mean, now there's a lot more than before.* But the thing that we found was that most of them grew the same thing, which wasn't what we were looking for. *So then we started looking at aquaponics, reached out to various different people within Singapore to try and find a partner to do it with. Eventually, we found a partner from Thailand. So we spent about two, three months discussing with them. They came in, had a look at the space, we agreed on what was actually going to be finally built there. And then they spent about just over six weeks building the farm. So we have five tanks for the fish.* And then we have eight of what we call MIT's, eight rows of plants, where the plants are basically floating in the water on specially designed boards. And then we have two rows of vertical towers, which are about the equivalent of probably about four or five of the flat MIT's, that's where we are at the moment. Initially we started with tilapia,

just because they are easier to grow in that sense, and then we added after about six months once the farm was sort of stabilized, then we added Jade perch, which is something they use quite a lot in Asian cuisine. So, the tilapia grows to about one to 1.2 kilos in about nine months, and the jade perch takes slightly longer, it's about 16 months. And what we try to do is we have in different tanks the fingerlings when we buy the baby fishes. When we first did it, we bought them at different stages, so that we would have a continuous finish farming process. So we mostly grow different types of lettuces, we also grow things like Swiss chard, because in the MIT themselves, they have a filtration bead process as well, so in there we grow different types of mints, different types of basil's. On average, we probably get about 100 to 210 kilos of product each month.

Interviewer 10:04

What do you think was the main factor that motivated the conception and implementation of the project?

Project 33 10:26

The whole idea was to improve our sustainability and to make the space that we had more productive. And obviously, doing something that was along the 2030 lines, we realized that we've been here long enough to actually know that there's different local fishermen and they would know there were different projects going on in Singapore, we were always talking to people about what's happening, and we miss a huge barramundi farm in Singapore that we were using eight, nine years ago, we were probably the only one in Singapore using it, because basically people weren't buying it, and they were selling it to Australia. And then, about five years ago, they started doing a lot more media and press etc. and then people were like, "Oh, we've got this farm on our doorstep". So I think we've always liked to try and push ourselves to do different things. And I mean, commercially, it makes sense to us as well. When we started doing it, we were getting about nearly 250, 300 kilos, out of the farm each month, and then it went down a bit, because during COVID, we were doing it ourselves and we're not full-time farmers. And then also the towers that we had built, just because of the fact that the farm is in the open, you have to manage the algae and all of this, because otherwise it blocks the Jets, etc. So it was quite a lot of work. So we've only managed to really get those working again, in the last three, four weeks. So we had the supplier who helped us build the farm come back out in April, and retrain some of our staff, and also a new farm gardener team that we wanted to

work with in Singapore, so that they were fully understanding of the whole process of aquaponics. What jobs did they have to do on a daily basis? What were the concerns, whether one of the fish gets a type of fungus, or the plants get something, what are the steps that you can actually take? Because obviously, you're a bit hindered because of the fact that you can't use chemicals or anything, it's a complete closed system. And also many of the understanding of how much food do you give to the fish based on how many plants you actually have growing, because otherwise, there's a conception that I need to feed the fish every day, when actually, it's based on the percentage of plants you have growing.

So for example, recently we introduced barramundi into the system, because we wanted to try and someone had told us they will only get to a certain size, but we thought okay, we'll try it anyway. And actually, when the fish came in, they had caught something and then these fish passed it on to other fish, so you have to take them out, isolate them and then wash through the system again. But just because of that fact, it killed about 80 to 100 fish that then impacted all the nutrients and the nitrates within the water. So then now we have to go and source more fish to put back in and rebalance the system. *So it's a little bit complicated in that sense, more complicated than doing hydroponics. And, you know, it's been great, we were the first hotel ever in the world to do this sort of project in such a city space as Singapore. So we've had lots of people come and have a look, we had lots of students from different countries come and have a look, we had some great things where we had some guests who came and stayed here. And then their kids came and had a look and got so enthusiastic, they went back to school and created our whole aquaponics thing at school, which is great.* Also, a good thing is that when we were doing it on a day-to-day basis, there are all these group chats on Facebook and stuff that you can take a picture and ask a question, and then someone would say, "Oh, you need to do this, etc.*". And actually, Singapore itself is very good in a sense of supporting these projects, so we have someone who's dedicated from the government agency, and they come probably about every eight weeks, and they'll do testing of the products that we're growing to make sure that they're safe and stuff. But they'll also share information, they'll give you suggestions, and then if you have a pest or a bug or something that you don't know what it is or something you could catch, keep it and give it to them and then they analyze it for you and do all this stuff. And they actually give lots of grants to people to do these sorts of projects.*

Interviewer 16:57

How do regulations affect the project?

Project 33 17:28

So when we started this whole farm project, we weren't quite sure who to talk to. Basically, you have to get your farm licensed, to be able to produce products that you can then sell to the public. So you have to submit all the documents to show the plant of the farm, the location. Obviously for us, it was also a constraint because of the fact that it's on the fifth floor in between the two hotels and on top of the convention center. So obviously, for us weight was also a factor that we have to design into the project. Once that's all been submitted and documented, then they come and look at the whole process and who's working there. And because of how the government is in some other parts of the restaurant business, a lot of us are trained to what is basically food safety level three in the UK, which is quite advanced food safety. So you have to have someone who understands food safety to that level. And then before you can sell anything, you have to have it tested three times. So they come and check that it doesn't have any heavy metals or any contaminants actually in the food. And then that's it from that point, it takes about six to eight weeks to get your farm approved.

Interviewer 19:14

If I understand correctly, is a whole complex. And then you have on the opposite and the round tower, which I think is the ▮▮▮▮ Hotel. And then on the opposite end, you have nine small squares which are green, and I imagine at least part of that is the farm. Am I correct?

Project 33 19:53

No, because in a sense if you look on Google Earth you'll see there are four towers, one is the ▮▮▮▮ Hotel, the very tall tower. There are two small towers next to each other, which is the farm. And then on top of the other tower, which is owned by our landlord, is a shopping center school and after we built our farm, they also built mini farms on top of their tower as well.

Interviewer 20:29

Would you say they were somewhat inspired by your project?

Project 33 20:36

Yes, they came to understand, they knew we had an herb garden for a long time. *And one of the reasons why we chose also to do aquaponics, we couldn't do hydroponics in that location and where the location is, there's a main exhaust for the air conditioning unit for the shopping center. So just because of the exhaust, and the dry air that's coming out there, it always used to make our garden quite dry. So doing aquaponics helped us reduce the amount of water. So it was not only were you getting the goods, very fresh, but it also helped us to reduce the cost of actually running it.* And also, you can speed the process up, especially if you're growing lettuces, because in addition to the water being so nitrate rich, you can also put UV in as well, and you can sort of trick the plants into growing longer. *The challenge for doing aquaponics in this location is obviously it's that Singapore is very humid and the constant temperature is near enough 32 to 36 degrees centigrade, and humidity is about 70, 80%.* So we had to install, a filtration that helps us keep the temperature down. And then we have a unit that is filling the water, so it chills the water down to about 21 to 23 degrees. So it makes it the ideal of growing conditions. So from seeding to getting product lettuce that you can actually use, is about four to four and a half weeks.

Interviewer 23:37

Is the reason why you have chosen these crops and the tilapia the demand from the hotels that you cater?

Project 33 23:55

Yeah, I mean, pre COVID and even now that things are sort of coming back to normal, we would use about 300, 370 kilos of lettuce a month, across the various restaurants and events that we do in the complex. So that was one of the reasons we stopped buying lettuce from Malaysia. So it was coming in like 500 kilometers to Singapore. So by the time we got it, it was a day, two days old. Plus, they also spray preservatives, etc. in it to make it last longer. *So the change was a good impact, and it's also a good marketing angle and story. Obviously, nowadays also, companies will decide whether they work with you based on what your sustainability story is.*

In Singapore, depending on the size, you have to follow lots of rules. One of the reasons why they started this SG 30 is because Singapore is running out of space to put landfill. And part of the challenge that they had was having a lot of food waste, so few years ago, they gave the big properties, different initiatives to do. And now, *for us the next step, we are working with a company in Australia, which has a food digester where you process the food, it takes all the moisture out of it within 24 hours. So if you have 400 kilos worth of food in it, in 24 hours it gives you like 40 kilos of processed food waste, which doesn't have any moisture in it. And they're working with the black soldier flies, where they can give this processed food waste to the soldier flies and they convert it into a different product, which becomes fish food. And then ultimately once it's all been tested and everything else, we can then take that fish food and feed it back to our fish. So for us, it then completes the whole cycle.*

Interviewer 28:09

Do you think there are other competitive advantages that the products have because of the way that they are grown?

Project 33 28:44

Yes, because it's cheaper. For the fish, depending on the market is about three to five Singapore dollars per kilo, it's cheaper to grow it than it is to buy it in the long term. And then initially, when we did the first round of costing for the salads, etc. it was about the same, but, technically it's organic because you're not using any pesticides or anything else, so then when we realized we've made a mistake and then compared it back to organic product and it's about 35% cheaper than buying organic salads. So cost wise, after the initial setup costs of building the whole farm, then you've got the regular maintaining costs of electricity and water and then we have two farm team members who come in five days a week. After all of that, costs were offset in the first couple of years, about 18 months. So now it's cheaper for us to buy. And previously, for some of the restaurants, we weren't buying organic salads, so, obviously, it's giving the guests a better product as well.

Interviewer 30:16

And do you think that the products you grow have gains in taste?

Project 33

Yes, very. We had a lot of media interest and stuff at the very beginning and even now, when we take people to the farm, we grow Italian rocket, and if you go to the supermarket in Singapore and buy rocket that's prepackaged, it has a slightly peppery taste, but it's nowhere near like proper Italian rocket. So when you take them to the farm and you talk to them about the whole process, and then you ask them to try some of the rocket, then the expression on their faces, like "wow, I didn't expect it to be so pungent, so peppery", and you're like "well, this is actually what rocket really tastes like". And also we grow three different types of like little Japanese flowers, which we use all over as garnish in many different restaurants. And we were paying a lot to actually have someone else growing them in Singapore. So obviously, that for us is great, because we don't need to buy two or three plants, and then maybe 30% of them get wasted because it's such a delicate product. ***And of course, it's also great for people to see that it's a slightly different way of growing things, all these different things that have completely different tastes. So yeah, it's interesting for them as well. When we were doing a lot of the discussions with the government, one of the things that they were thinking was how do you make farming interesting? Or how do you make it cool? Because the kids didn't want to go and do a job interview in farming, now if you see the amount of people who are building urban farms, on old car parks, and all these sorts of things, they're making decent businesses out of it. Now, there are more people out there growing different things, you've got more variety.***

But back then, you found most people were growing the same sort of thing, like kangkong, we grew it and it grew fantastically, quickly and well in the farm. But the problem was, is it's not expensive, it's not really worth to spend time to grow it because it doesn't cost so much. And now with the new farm team that we have, they've completely digitalized the farm. So now they've got a complete plan and map and barcodes on everything, so every time that they're planting something, they can go back and use the data to see if the seeds work, were they the best seeds, was this the best plant to grow here, etc. So we basically sat with them and gave them a list of what we grew before, the products that we were interested in growing and how big we wanted them to grow and then you see how much you can actually get to make it 100% productive. So it's taken them about six to eight weeks to digitalize it. But then they've got it all set up in an app, they have all these different tasks that they have to do on a daily basis.

The challenge, I suppose, a little bit with an aquaponics farm is, because of the way that the system works, you've got the fish tanks, and then you've got the

rows of the planting beds, and then the towers, and then it goes back in a circle to an air rating tank to put oxygen back into the water again, if the nitrates are very strong, not everything's likes to grow there. So you have to work out and balanced what plants like, the super rich nitrates and then slowly as it goes through the farm, as the plants are sucking out the nitrates, it sort of changes the composition of the water and so you can have different plants. So it's obviously something that you learn as you go along and that's how you start to know the amount of fish and how much they're producing is affecting the whole plumbing system.

Interviewer 38:19

And the start of the operation itself was when?

Project 33 38:38

We finished the farm in October 2019.

Interviewer 38:46

Can you talk a little bit about what sort of adaptations you had to make on the space to be able to have the farm and who you collaborated with?

Project 33 39:17

When we had the previous garden, we had lots of things growing in pots and not so much planted directly into the soil. So to be able to do the farm we had to take out a certain amount of weight from the space, because otherwise if we didn't we wouldn't have been able to put that many tanks and also all the MIT in there, so we had to remove a percentage of the of the soil that was there to be able to then level it and then put the tanks back on top of that. Then the challenge was getting some of the equipment, it was all imported from Thailand into the hotel and into the farm, was a little bit of a challenge, because you can't just go here and pick up a trailer and put it in. And like I said, it took about six to eight weeks for them to fully install it.

Interviewer 40:47

What do you think are the main benefits and drawbacks of operating in this facility? And if you were to set up in a different city the same kind of system, how would you see this potential to integrate this production method into other hotels or any other buildings in general, residential, commercial?

Project 33 41:19

Probably the biggest drawback that we have is the fact that it is outside. So you're affected by the weather, it's not as easy to control the temperatures. Whereas if you had it inside it would be a much more controlled environment, so you can control the temperature a lot easier, you can control the amount of light, etc, and speed up or slow down the process depending on what you actually want to do. That's probably the some of the biggest challenges. Some of our sister hotels in Singapore, also did aquaponics, but on a much smaller scale. And it's something that has been introduced across the group as a viable way of growing produce. So yes, people have taken it in different ways. I do some stuff with the regional team from Asia and they've tried to introduce it as well into other parts of Indonesia, in Jakarta, they also were looking at it in a new hotel that they're building there. ***And it's also spurred other ideas, we're building a hotel in Tokyo and part of the discussion and design process within that was they didn't have the space to build an aquaponics farm in the location that they had. But then through us sharing what we've done, and then coming up with different ideas and stuff, they actually are building a vertical hydroponic farm in the in the emergency stairwells.*** And we liked the idea, so we went and asked the government here, if we're allowed to do it here. And unfortunately, they said no, because for us, it would have been ideal because the hotel is 72 storeys high, so you have a massive staircases and walls that you could have grown products up that, but who knows? I mean, with the efforts that they're making, and the impact that they're having in some of these car park farms that they're creating here, maybe they'll relax the rules and let us do it as well. ***But yeah, it certainly helped to create a lot of interests, not just for us, but also for other people in our group, etc. as to what you can do.***

Interviewer 44:28

And if you were to put somewhere else or adapt, do you think it would be feasible?

Project 33 44:34

Yes, like I said, we have a couple of GMs come from our group and they saw what we were doing, they already went back and contacted the company that we use to supply us with the products etc. So, you know, benefits others because we made an agreement with them that we will get 10% of whatever projects they got through the group. They already started exploring where to put things and what space they have.

Interviewer 45:49

What is sustainability to you, personally? And how do you think that the company addresses sustainability?

Project 33 46:10

For me it's something that I'm very interested in, I have four younger sons. So it's important to realize the impact that we're having on everything that we do. So we do lots of different things here within the hotel, and also as a family to make our kids understand the benefits and the advantages that they've got. *I think the kids nowadays, probably talk more about sustainability and climate than we did, so they understand it a lot more. I mean, we regularly have different students and groups who come here to ask questions and interviews, that part of it, and as a company, we have two people who are purely employed just to do sustainability projects. So we have a whole sustainability team from various different parts of the business.* Within the hotel, you're sort of given targets that you have to achieve. We're doing one, which has nothing to do with the aquaponics farm, but we're doing one which has taken us nearly two and a half years to complete, which is getting rid of all single use plastics within the hotels. So not just taking away straws and things like that, but actually going through the whole housekeeping kitchens, restaurants, etc., identifying where we use plastics, and then sourcing alternatives, making sure that the alternatives are really sustainable and then slowly implementing them. And to be honest, that's taken us nearly two and a half years, to actually get to the end of nearly completing. What's an alternative to toothpaste in the bathrooms at the hotel? Asking the questions like do you need it? What alternatives can you have? Seeing how practical are they? Do they work? Can people source them? I mean, there's a ton of stuff that you see online or just read about all of them, we will see that they have great ideas and initiatives but unfortunately, depending on location, doesn't always work.

Interviewer 49:24

Are the workers full time there and what are their backgrounds? And do you have any sort of volunteers or do you collaborate with any NGO or associations?

Project 33 49:47

We work with a gardening company and they basically give us two staffs, five days a week, eight hours a day, and they basically manage the farm on a day to day basis. So they do all of the farm work. And then we have different chefs who go and do different harvesting and things like that, but the bulk of it is done by this company. So we employ them on a sort of a 12 month basis for them to come and to do it. They've only been with us for about six to eight weeks. And they've obviously realized the amount of work that is involved. Because, there are a lot of little processes that you do like washing the cups, washing the boards, etc. So we've worked with an organization in Singapore, which is called ESPN and they work with the schools where the kids are a little bit, either more challenged, in terms of the way that they learn things and do different things, so they can go and learn to be a chef, housekeeper, they need to learn some tasks that are very repetitive, in a sense, for them to find employment and be able to do that. And part of that, which we discovered when we built the farm, was they also did horticulture as one of the courses. So we've actually now partnered with them with our gardening partners. So we have two of these students who come also three times a week to also help. So in a sense, it's good for us, because we're also giving back to them and the community as well, by helping the various schools offering different types of employment, which for them is good, because they need to have those sort of repetitive tasks.

Interviewer 52:06

How would you define the relationship of the project with the local community, and how it relates to its built environment?

Project 33 52:42

I mean, *in terms of guests and team members, it has a direct impact for them, because they can see the products, they can understand it. The guests, it was a little bit more complicated because we kept writing in our menus, "grown in aquaponics, farm, etc". So not everyone understood what aquaponics actually means. So for guests, we actually made a little short video, which we then put*

up on our digital TVs in the room, etc., when you check in and stuff, which talks about the farm and what we're doing the whole process, where we use the product, so that they can actually understand it and visualize it. And then even during COVID, obviously people couldn't travel in Singapore. So lots of hotels were doing different types of staycation, where you basically go and stay at a hotel rather than going somewhere else. So we even created like a whole aquaponics staycation, where the guest group can dine in the restaurant, eating the products that we were growing in the farm, they get to come and visit the farm. And then we do a lot with the local schools, where they come as the culinary schools, their local colleges, where they're interested in engineering. So those are sort of direct impact.

Interviewer 54:37

What were the main challenges in implementing and operating the project and how have you dealt with them?

Project 33 54:50

Probably the biggest challenge was understanding aquaponics. We installed the farmer, it was all fantastic, it was growing wonderfully, etc. And then suddenly COVID came along and everyone had to save money. So then we had to learn an awful lot about our farming and about aquaponics, because suddenly we were not paying someone else to do it, we were doing it ourselves. So that was probably one of the biggest challenges, managing the pH levels, checking the plants, checking the water, checking what's been grown, etc. And random things would affect the farm, for example, we had an issue where, in the location before, the team, we call them the property team, they would have their plants in various other parts of the hotel. And sometimes they would store them in the same location where the farm was. And you know, just inputting a houseplant there brought pests into the farm, and then you have to spend the time trying to treat the pests without using chemicals, etc. And then in the end, we ended up having to take about a third of the plants out and throw them away, just because of the fact that someone bought something that wasn't supposed to be there. So that's the challenge and the learning process was going through all of that. And then, getting the team to understand and also managing them and then managing the expectations of the seniors and then other management, etc.

Interviewer 57:01

What do you believe are the reasons for the success of the project so far?

Project 33 57:12

I think we've had a lot of support from different people. And, also the fact that it was a very different project to do. So that helps motivating people into doing it.

Interviewer 57:52

And regarding the learning process, how would you assess the project?

Project 33 58:00

We were doing a lot of remote things with our team, who did the installation from Thailand. So we were a lot of zoom calls and walking about the garden and showing them what was happening in the garden and asking them questions, which was good. I mean, they helped us with some of the stuff we were trying to learn. And then now, because we have certain challenges, and are trying to make the garden as productive as possible, we brought them back to do a full service on it and also have them do a thorough training process, share tips and things like that. It's been good to see the current team and how interested they were and how motivated they were. Now they've taken it to the next level with this farming app that they have and this digital plan of the whole farm. So you can see the progress.

Interviewer 59:27

What things you would have done differently in the project in hindsight?

Project 33 59:37

I think at the very beginning we tried an awful lot of different plants. And that was a bit of a backward step, because not all of them worked. And I think maybe a bit more investigation with some other local farmers because our supplier who helped us in installing, obviously he has a similar project in Thailand, but the environment in Thailand is very different to Singapore. *So I think maybe a bit more background research from our side, and asking a few other people about the challenges that they faced would have probably helped us to reduce the number of*

varieties that we grow. I think it's quite important to spend a little bit more on buying decent seeds, because otherwise, if you buy cheaper seeds, your germination rate can be as low as 60% sometimes. And the effort that is involved in seeding the little sponges to only get 60% of them germinating is a bit of a challenge. Also, to get the seeds to germinate in the humidity in Singapore was a little bit of trial and error. We worked out the way to do it now, but at the beginning it was great when the guy was here because he helped us do it all, but then when we were doing it ourselves, we were spending six, seven hours seeding everything and then only getting 60% year germination from that. So that's probably been a bit of a learning process as well. We've actually been working with different suppliers as well to get really good quality seeds.

Interviewer 1:01:59

Do you have any final remarks, anything you would like to say that I have not asked?
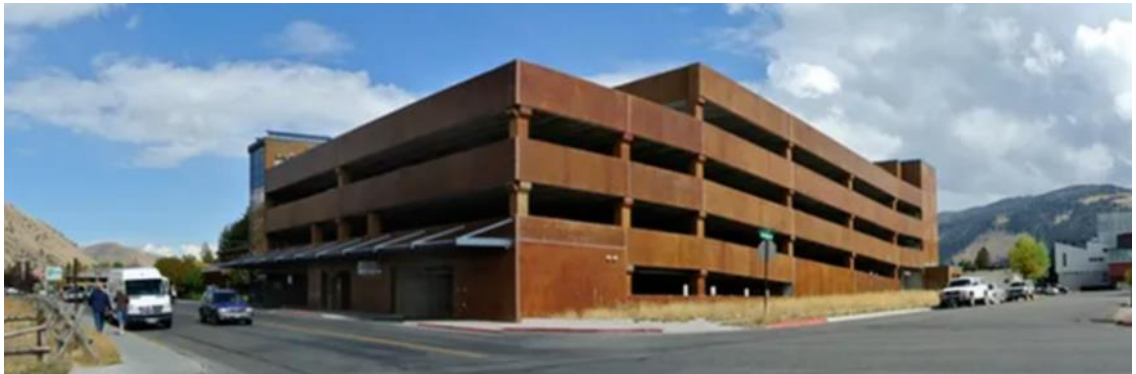
Project 33 1:02:09

No, we are good.
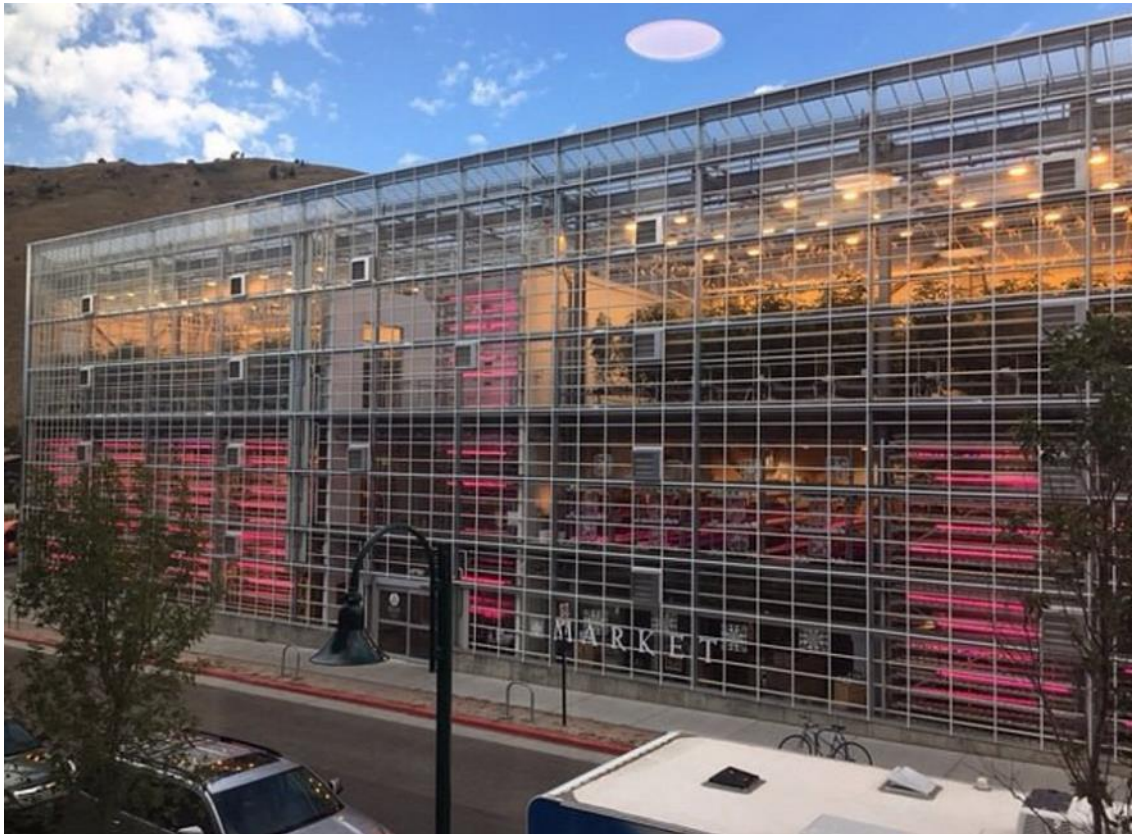
Interviewer 1:02:13

So that's great. Thank you so much. I'm going to stop recording.

Appendix H. Aesthetic of Urban Farming Buildings

Example 1 – Vertical Harvest

Current project's building and the same site before construction

"Located in in downtown Jackson Hole, Wyoming, Vertical Harvest is a ground-breaking, three-story hydroponic greenhouse—built onto the side of an urban parking garage. In collaboration with an experienced team of European greenhouse design engineers, they turned their humble vision into to an impressive $3.7 million glass structure that has been hailed as the future of sustainable, urban agriculture. The building is designed to harvest the maximum amount of natural daylight and the exterior facade is specified to allow the highest light transmission possible. Additionally, an ingenious "carousel" system continuously rotates the plants to ensure that each plant has equal exposure to the warmer and sunnier south side of the building. The three-tier design allows for three distinct microclimates within a single structure. The ground floor is the coolest, and the space is used primarily to host educational programs and a year-round "farmers' market". The second floor is slightly warmer and is dedicated to the cultivation of leafy greens and the propagation of seedlings. Thanks to the glass roof, the third floor boasts the highest light levels and warmest temperatures—providing an ideal environment for growing tomatoes."

Image and text source: www.pllight.com/projects/vertical-harvest/

Text source: www.theverge.com/2015/2/26/8112889/vertical-farm-wyoming-hydroponics-grow-food

Example 2 – Thammasat Urban Rooftop Farm (TURF)

"At first, the images of Thammasat University Rooftop Farm seem like renderings, but they are in fact real. Designed by Landprocess, the 1.7-acre rooftop farm in Bangkok, Thailand, is not only mesmerizing but also a model of sustainable multi-use infrastructure (…) Located at the main axis of the campus, the H-shape architecture symbolizes the university's long-standing representation of egalitarianism and democracy; H stands for humanity. Divided into four equally-accessible sections, each chamber represents a core element of democracy— people, liberty, equality, and fraternity. To realize that spirit of egalitarianism, there are 12 social spaces set within the farming terraces that function as outdoor classrooms. At the ground entrance a terraced amphitheatre welcomes everyone, designed with universal outdoor access

to the second-floor auditorium (…) Another large amphitheatre rewards those who climb to the top, offering a 360-degree panoramic view of Bangkok. Centred in the urban rooftop farm with open sky, the spacious amphitheatre provides an accessible and flexible recreational and educational space for all visitors. As rainwater zigzags down the slopes, each level of TURF harvests runoff from the previous cell, forming unique clusters of micro-watersheds along the terrace to help absorb, filter and purify rainwater while growing food for the campus. At the end of its journey, four retention ponds await on each wing, mitigating and storing excessive rainfall for future use during drought"

Text source: www.dirt.asla.org/2020/09/30/asias-largest-urban-rooftop-farm-is-a-model-of-integrated-design/

Image and text source: www.greenroofs.com/projects/thammasat-university-urban-rooftop-farm-turf/

Example 3 – Urban Farmers

"We transformed the roof and sixth floor of De Schilde, a former Philips factory in The Hague, into one of Europe's largest urban farms. The Swiss company UrbanFarmers (out of business since 2018) commissioned us to complete the design for their second rooftop farm. The construction consists of a 1200 square meter greenhouse on the rooftop and 900 square meters for fish cultivation on the floor below. Together, the two areas create a perfect symbiotic system for the production of fish and vegetables in the city.

The dimensions of the new greenhouse are aligned with the architecture of the existing building. We chose to retain the typical shape of the greenhouse roofline because it simultaneously fit with the UrbanFarmers identity and proudly announced De Schilde's transformation into an urban farming hotspot.

By leaving a distinct gap between the existing building and the new addition, the two entities can be considered separately or together as one new, holistic whole. In this way, we honour the architectural quality and identity of the former telephone and television factory, designed by modernist architect Dirk Roosenburg in 1959."

Image and text source: www.spaceandmatter.nl/work/urban-farmers

Example 4 – The Green House

"(…) The Green House accommodates a 'circular' restaurant concept plus meeting facilities. In accordance with the principles of circularity, the building (including the foundation of prefab concrete blocks) is completely dismountable. In fifteen years, it can be built up elsewhere. The aim was also to implement reusable materials as much as possible. The two-story pavilion is designed as a generic building kit with a removable steel frame made of galvanized profiles. The dimensions are derived from those of the smoke glass facade panels of the former Knoopkazerne; these have been re-used for the second skin and the greenhouse of the pavilion."

Image and text source: www.archdaily.com/915728/the-green-house-architectenbureau-cepezed

Example 5 – Pasona Urban Farm

Located in downtown Tokyo, Pasona HQ is a nine-story corporate office building for a Japanese recruitment company. An existing 50 year old building was renovated, keeping its building envelope and superstructure. The farm consists of a double-skin green facade, offices, an auditorium, cafeterias, a rooftop garden and most notably, urban farming facilities integrated within the building. The green space totals over 4 000 m2 with 200 species including fruits, vegetables and aromatic herbs that are harvested, prepared and served at the cafeterias within the building. Partially relying on natural exterior climate, these plants create a living green wall and a dynamic identity to the public. Pasona focuses on educating and cultivating next generation of farmers by offering public seminars, lectures and internship programs, to promote
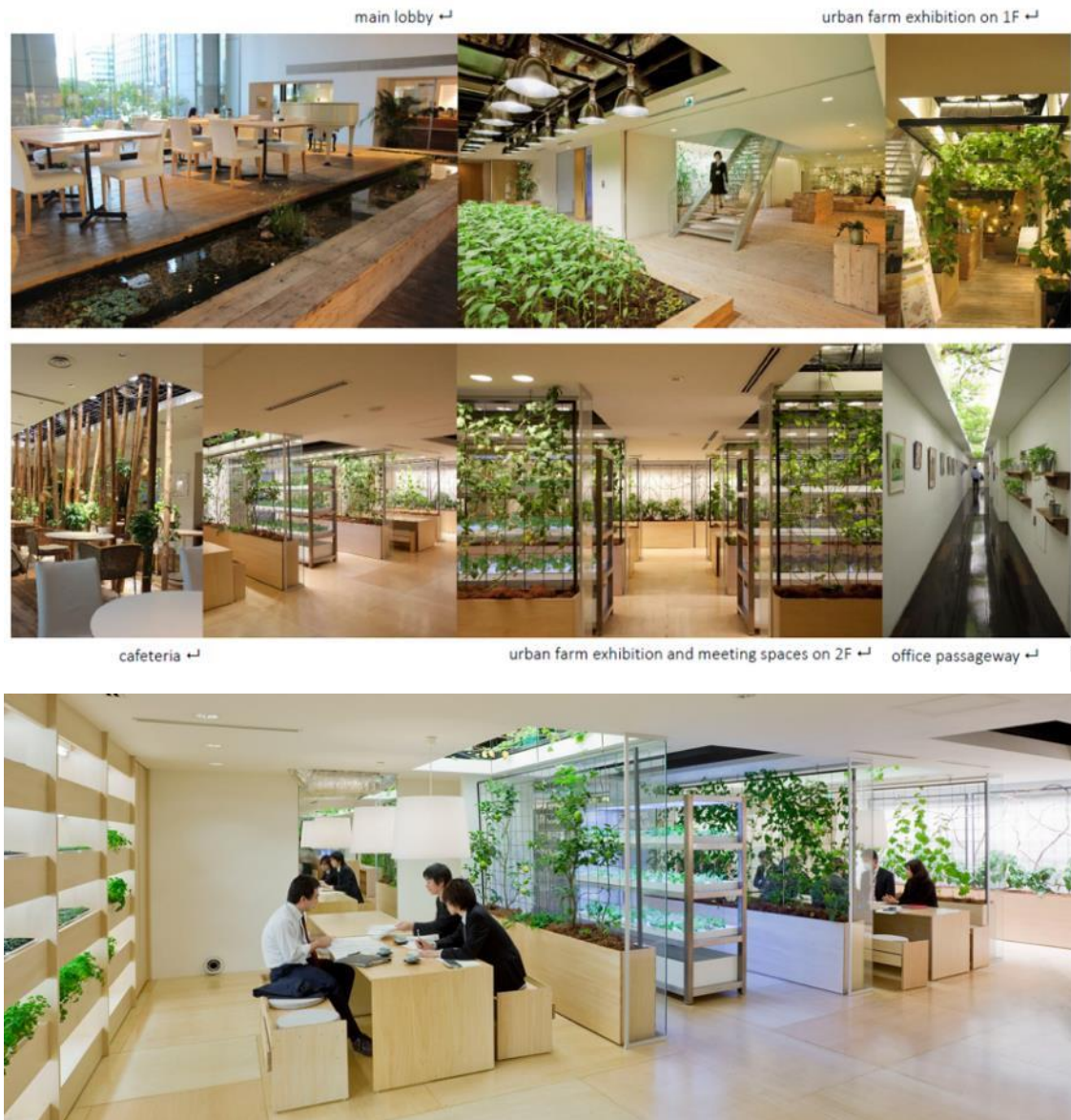
both traditional and urban farming as lucrative professions and business opportunities.

Image and text source: https://konodesigns.com/urban-farm/

Appendix I. Aesthetic of Urban Farming Production

Example 1 – Pasona Urban Farm

"As the crops harvested in Pasona HQ are served within the building cafeterias, it highlights 'zero food mileage' concept of a more sustainable food distribution system that reduces energy and transportation cost. Using both hydroponic and soil-based farming, in Pasona HQ, crops and office workers share a common space. For example, tomato vines are suspended above conference tables, lemon and passion fruit trees are used as partitions for meeting spaces, salad leaves are grown inside seminar rooms and bean sprouts are grown under benches. These crops

are equipped with metal halide, HEFL, fluorescent and LED lamps and an automatic irrigation system. An intelligent climate control system monitors humidity, temperature and breeze to balance human comfort during office hours and optimize crop growth during after hours. Pasona HQ's urban farm exposes city workers to growing crops and interaction with farmland on a daily basis and provides improvement in mental health, productivity and relaxation in the workplace. Employees of Pasona HQ are asked to participate in the maintenance and harvesting of crops with the help of specialists, encouraging social interaction and teamwork. Pasona Urban Farm is a unique workplace environment that promotes higher work efficiency, social interaction, future sustainability and engages the wider community of Tokyo by showcasing the benefits and technology of urban agriculture."

Image and text source: https://konodesigns.com/urban-farm/

Example 2 – The Green House

Image source: www.archdaily.com/915728/the-green-house-architectenbureau-cepezed

Example 3 – Bowery Farming

Image source: https://bowery.co/

Example 4 – Pink Farms

Pink Farms takes its name from the LED light colour of its production facility. In this case, a component of the production method becomes the central element of the organization's identity.

Image source: https://www.bangkokpost.com/world/1985683/in-brazil-pandemic-forces-pink-farm-to-get-creative

Example 5 – AeroFarms

Image sources: https://www.greenbiz.com/article/aerofarms-trying-cultivate-future-vertical-farming and https://newyorkyimby.com/2021/03/jersey-city-housing-authority-and-aerofarms-to-partner-on-citys-first-vertical-farming-program.html

Example 6 – Plenty

One way Plenty Unlimited maintains plant health is by using robotics in nearly every step of the farming process. Proprietary technology grows the company's Spicy Mizuna Mix, shown here, and relies on data to optimize growing conditions.

Image sources: https://www.plenty.ag/farm-gallery/ and https://www.siliconrepublic.com/start-ups/plenty-funding-softbank-investment

Image and text source:
www.nasa.gov/directorates/spacetech/spinoff/
NASA_Research_Launches_a_New_Generation_
of_Indoor_Farming

Example 7 – Mirai

Image source: www.theecologist.org/2018/jun/12/there-simple-blueprint-survival-universal-basic-income- and-half-earth

Appendix J. Aesthetic of Urban Farming Product Packaging

Example 1 – Bowery Farms

"Nessen Co has created a strategic packaging update for growing produce brand Bowery Farming. The modern farming company uses cutting-edge vertical farming techniques to grow produce right outside of cities, so their greens and herbs are always local and always fresh. Because their produce is protected indoors, they have no need to use harmful pesticides. But no one quite understood that. Their updated packaging, strengthens the clarity of their messaging and works harder for the brand on shelf. While the packaging is now more colorful, further differentiating individual products, it also does away with an overly complex system of variable greens and patterns. With a single brand green, a single pattern, and their icon and logotype finally connected, the brand's shelf presence is more pronounced and they can start building valuable equity into a core set of brand elements. A badge speaks to the quality of the product while informing the customer they are about to eat something grown locally. Elegant typographic details set the brand apart from messier, less refined competition. The packaging update was initially created for the brand's entry into Walmart stores and then rolled out nationally encompassing both regular and family-sized produce packs and herbs."

"For Earth Month 2022, Bowery Farming has partnered with The Nature Conservancy to raise awareness about what is at stake when arable land, land suitable to become farmland, is lost to agriculture. Bowery, which grows its produce indoors in vertical farms, has pledged to restore 50 acres of land in partnership with the Nature Conservancy and is using its shelf space in over 1,000 stores, including Whole Foods and Walmart, to feature some of the animal species threatened by the loss of this land. Designed by Nessen Co, the month-long 'Rewild' packaging takeover features cutouts in the shape of six animals native to longleaf pine forests (…) The pack design also pairs Bowery's brand green with a swath of light blue to evoke the colors of Planet Earth. Dedicated to protecting the environment all year long, Bowery Farming's indoor, vertical farms are 100 times more productive than a traditional farm of the same size, save millions of gallons of water over traditional irrigation, and eliminates the application of harmful pesticides. Because these farms are located right outside of urban centers, not only do they provide fresher produce with a smaller carbon footprint, but all the land that would otherwise become farmland is allowed to remain wild. In late spring 2022, Bowery will roll out updated packaging reducing its use of plastic by nearly 50%."

Image and text source: www.worldbranddesign.com/bowery-farming-packaging-update-by-nessen-co/; www.worldbranddesign.com/bowery-farming-earth-month-packaging-by-nessen-co/

Example 2 – Happiness Health

	positive / negative			
	babymix	BABY MIX	BABYMIX	BABY MIX 1 / BABY MIX 2
What's the chance that you buy one of these fresh salad mix if it will be on the shelf of your usual grocery store at an affordable price?	62% / 23%	63% / 20%	91% / 4%	75% / 11%
Overall, how much do you like this design of fresh salad mix line?	52% / 28%	58% / 26%	88% / 4%	86% / 13%
In your opinion, how much this design fits for fresh greenery and salad kits?	55% / 31%	58% / 28%	92% / 3%	71% / 13%

"The chosen package was based on consumer sympathies. Firstly, naturality through transparency is what the consumer wants to see and evaluate in the packaged products. Secondly, the consumer wants to make out what is offered inside the package. Therefore, the maximum readability of the composition of salads is positively accepted. Thirdly, when buying salads, consumers are not ready for a brand-new design that seems to come from the shelf of the future: categorical stereotypes have their effect. There is no denying that simplicity and obvious choice dominate the sense of beauty.

Image and text source: www.worldbranddesign.com/vertical-farm-happiness-health/

Example 3 – Vertigreens

"Vertigreens" is an indoor farming brand, which utilizes modern, revolutionary techniques to address the challenges associated with traditional farming such as growing pressure on arable land, overuse of fertilizers and climate change. With such difference in system, 'Vertigreens' conveys its story through the concept of a vertical glasshouse to symbolize and transparent and seamless integration with nature itself. Therefore, this unique packaging is designed to have distinctive looks of a vertical glasshouse. The packaging comes with ridges and edges to reflect the glass panels of a glass house and reinforces the functional structure. The architecture of the packaging reflects how our produce are protected from harsh environmental conditions, pollution and pathogens. The house-life shape symbolizes that our produce is carefully looked after / well cared for grown at home, which is what we typically serve to our family, friends, close relatives, loved-ones. The label on the front is illustrated with graphics of a window showing each vegetable type. When being arranged on the shelf, it will surely and interestingly communicate the modern vertical farming and stand out among other competitors (…) using a house-shaped package (…) is highly appreciated because it functions well as a means of describing modern vertical farming."

Image and text source: www.worldbranddesign.com/vertigreens-packaging-design-creation-by-prompt-design/

Example 4 – Urban Farmers

"Urban Farmers has revolutionised urban farming by developing its own take on aquaponics. This resulted in an efficient circular system, using nutrient rich wastewater from the production of fish as the core fertiliser of the produce. In turn, letting these plants purify the water for the production of fish. Strongly rational and architectural in its angularity, yet organic in overall shape and use, we created an ever so slightly controversial packaging line. Rebuilding from the ground up, this packaging revolutionises the way we use fresh produce packaging. Join the revolution!"

"The urban production in the roof farm shortens the transport routes and cold chains and makes basil one of the freshest and most fragrant herbs in the region. Everyone is talking about reducing plastic packaging. That's why the Urban Farmers have replaced the plastic sleeve with a stylish bag made from recycled paper. The special thing is that the basil is in the bag even without a plastic pot! Simply cut off all the dotted lines and the bag becomes a pot replacement. Together we save around 7,000 kg of plastic every year. Optionally, clip a paper clip to the right and left of the bag to make it a tight-fitting pot. This way the soil doesn't dry out as quickly."

Image and text source: www.snowdonuts.com/en/work/urban-farmers/; www.urbanfarmers.com/

Example 5 – Plenty

"Plenty's two rebrand goals were to convey the uniquely craveable flavor of its produce and create a warmer and more approachable brand that felt 'accessible to all'. A green color palette might have been a logical choice for a kale and lettuce producer, but the revamp takes inspiration instead from fast food brands with ample use of reds and yellow to fortify brand recognition. They wanted the packaging to look more like overtly flavorful food than leafy greens. The design agency further reveals how designing a custom typography is 'the most significant part of visual language' to strengthen brand recognition.

Having conducted color analysis on produce packaging at local grocery stores, the agency found that 'warmth, accessibility and craveability' would be the key measures for the Plenty farm. Rather than sticking to typical healthy green visual cues, it took inspiration from the vibrant colors of fast-food brands. 'It is a humanist sans serif with leaf-like corners and terminals. The stroke endings are sharp and the curves are as round as a ripe tomato'. The final result was a playful color palette with a welcoming custom font intended to 'look and feel delicious.

In order to convey an effective messaging with elements of packaging aesthetic, brands have to be extremely aware of their target consumer group. Answers to questions such as 'what do you want the consumer to do [with the packaging]' and 'how do you want them to interact' must be agreed upon from the get-go.

FMCG Innovation and Design Consultant Marc Pruijssers observes how packaging designs are increasingly using visual cues to make food propositions look less 'branded' and industrial and more human, authentic and sustainable. He pinpoints matt finishes, more graphic and less photographic visuals are contributing to more modest branding. On the color wheel, fewer colors and less saturated colors bring a more earthy vibe on-pack, as beige and pastel colors come to the fore. Van Mancius

from NowNewNext also sees the ingredient provenance and 'back to nature' themes playing into the sustainability trend."

Example 6 – Skyline Spirulina

Skyline Spirulina produces spirulina in rooftops across Bangkok. For their pasta line, they have chosen a clear plastic cylinder packaging that evokes the city's skyscrapers. When placed together, as exemplified in the picture above, the cylinders allude to the brand's logo and the city's skyline. The clear packaging displays the pasta's unique dark green colour originated by the spirulina's pigment. Furthermore, the label stresses the natural appeal of the product, highlighting the lack of food colouring.

Example 7 – Gotham Greens

"Given the global issues surrounding conventional agriculture, it was important to help differentiate the brand among a field of greens in the produce aisle. Gotham Greens' innovative approach to resource conservation and their brand mission are at the forefront of the design strategy. Gotham Greens' packaging reflects its place in the market as an imaginative, pioneering brand with a focus on quality, innovation and education.

The new packaging, developed by Gander in collaboration with Gotham Greens, was an iterative process, but the result is the union of two central pillars of Gotham Greens' strategy: technology (clean, precise, high quality, intelligent) and humanity (approachable, friendly, humorous, and transparent).

The brand identity reflects that balance at every touchpoint. A straightforward headline typeface made friendly through scale and unexpected orientations. Illustrations that are simultaneously symmetrical and organic. The packaging incorporates a cutout leaf illustration, which draws focus to the quality of the greens in an unexpected way. By making these custom leaves the hero of the packaging, the focus remains on product quality and freshness."

Image and text source: www.thedieline.com/blog/2020/5/6/-gotham-greens