

Innovative Frameworks for Sustainable Urban Farming: Problem Solution Trees and 5R Canvases

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DOI: <https://doi.org/10.5281/zenodo.12819249>

Published Date: 25-July-2024

Abstract: This task investigates the methodologies for developing trouble wooden and their sensible applications in business hassle-solving. The introduction underscores the importance of systematic strategies in addressing complex organization disturbing conditions, emphasizing the role of based methodologies like the hassle solution tree. A complete literature evaluation examines gift studies on trouble-solving techniques, with a particular awareness of the evolution and practical utility of the hassle answer tree in several business contexts. The segment detailing the steps to create a problem answer tree offers a thorough, step-through-step manual for identifying and analyzing troubles, formulating capability answers, and evaluating their feasibility. This segment is enriched with real-international references to ensure the method is aligned with modern-day high-quality practices. The talk severely evaluates the effectiveness of the hassle answer tree in fostering present-day solutions and enhancing choice-making strategies in industrial employer settings. Furthermore, the undertaking explores the improvement of the startup enterprise mind, highlighting the importance of modern wondering and strategic making plans in entrepreneurship. The introduction to the round commercial corporation model and the 5R canvas presents a sustainable commercial enterprise technique that specializes in decreasing waste and maximizing useful resource efficiency. The section on designing the 5R canvas for city vertical farming exemplifies the practical software of those standards in an emerging company. Overall, this task offers an in-depth and structured method for problem-solving in industrial corporations, supported by a robust theoretical foundation and practical examples.

Keywords: Innovative Frameworks, Sustainable Urban Farming, 5R Canvases.

1. INTRODUCTION

1.1 The Urgency of Addressing Climate Change

Climate change represents one of the most critical and worrying situations facing humanity these days. Characterized through giant changes in worldwide climate styles, together with developing temperatures, multiplied frequency of excessive climate activities, and moving precipitation patterns, weather change has a manner-accomplishing effect on ecosystems, human societies, and economies. Its impacts are pervasive, affecting the whole thing, from biodiversity and water assets to public health and infrastructure. As the global network grapples with those consequences, there may be an urgent need for complete strategies to mitigate and adapt to weather change.

1.2 The Complexity of Climate Change

Understanding climate exchange calls for a nuanced technique because of its complex and multifaceted nature. It is driven via a combination of herbal techniques and human sports. The number one human activities contributing to climate change include the burning of fossil fuels, deforestation, business approaches, and agricultural practices. These sports launch

greenhouse gases (GHGs), including carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), into the surroundings, which trap warmth and cause global warming. This warming influences various factors, such as the surroundings and human lifestyles, sea degrees, climate patterns, and the health of ecosystems.

1.3 Systematic problem-solving approaches

Given the complexity of weather trade, addressing it calls for systematic problem-solving processes. Traditional methods of trouble-solving frequently fall short when performed to worldwide troubles with more than one interrelated component. In this context, equipment along with the Problem Solution Tree (PST) grows to be valuable. The PST technique offers a primarily based framework for reading complex problems, breaking them down into manageable components, and identifying effective solutions.

1.4 The Problem Solution Tree (PST) Method

The Problem Solution Tree is a visible and analytical device designed to address complex problems by deconstructing them into their root reasons and growing focused answers. It involves developing a tree-like diagram in which the number one trouble is positioned at the top, and its contributing elements and ability solutions are mentioned in a hierarchical form. This technique permits understanding the relationships between unique elements of the trouble and figuring out leverage factors for intervention.

The PST technique is especially useful in addressing climate change because of its capability to capture the interplay among several contributing factors and their impacts. Using this approach, stakeholders can develop complete strategies that address a couple of dimensions of the trouble concurrently. This is vital for climate alternate, in which answers want to be multifaceted and deal with each mitigation and edition needs.

1.5 Climate Change Mitigation and Adaptation

Climate exchange mitigation and modeling modeling are primary strategies for addressing the influences of climate change. Mitigation entails efforts to reduce or prevent the emission of greenhouse gases, thereby slowing the rate of global warming. Key mitigation techniques consist of transitioning to renewable-strength property, improving electricity performance, and enhancing carbon sequestration through reforestation and soil manipulation.

Adaptation, on the other hand, specializes in adjusting to the effects of weather exchange, which are probably already going on or are expected to arise. This consists of growing infrastructure resilient to immoderate climate sports, enforcing water conservation measures, and adjusting agricultural practices to cope with changing climatic situations. Both mitigation and edition are essential additives of a complete weather approach, and the PST method can assist in growing included techniques that address each element.

1.6 The Role of Systematic Approaches in Climate Policy

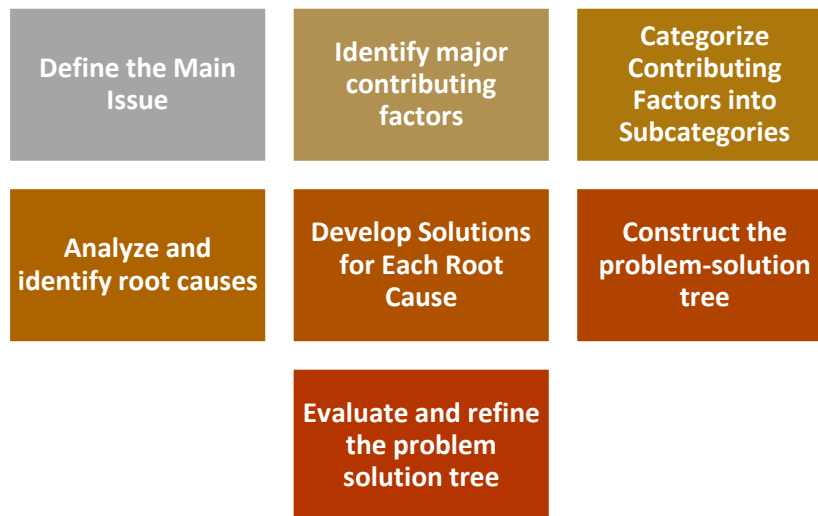
Systematic processes, just like the PST, are increasingly recognized as critical for effective weather insurance. Traditional coverage-making strategies regularly lack the intensity of analysis required to cope with complex international problems comprehensively. By the use of structured frameworks, policymakers and stakeholders can better apprehend the underlying motives of weather alternate and increase more focused and powerful interventions.

For example, a scientific method can help grow to be privy to key areas wherein interventions may have the finest impact, prioritize actions based totally on their effectiveness and feasibility, and make certain that resources are allocated successfully. Additionally, those strategies facilitate stakeholder engagement by supplying a clear and prepared technique for discussing and addressing the difficulty.

1.7 The Importance of Integrated Strategies

Integrating various strategies and answers is important for addressing the multifaceted nature of weather change. The PST technique supports this by making sure that one-of-a-kind components of the hassle are considered and addressed in a coordinated way. For instance, efforts to reduce greenhouse gas emissions may be complemented by techniques to enhance resilience to weather effects, developing an improved and adaptive reaction.

2. STEPS TO CREATE A PROBLEM SOLUTION TREE



The Problem Solution Tree (PST) is an essential device for systematic trouble-fixing, supplying a based method to know-how, and addressing complicated troubles. By mapping out issues, their contributing factors, and ability solutions, the PST facilitates corporations developing ability-centered interventions. This segment info the stairs worried in creating a PST, supported by using relevant academic literature.

2.1 Define the Main Issue

The initial step in growing a problem-solving tree is to outline the primary difficulty truly. This involves specifying the hassle in specific phrases to ensure that all stakeholders have shared information. A nicely articulated problem definition is critical because it unites the bounds for the evaluation and publication of the identification of contributing factors and capacity answers (Bertalanffy, 1968). A clear definition of hassle helps establish the order of goals and enables the alignment of PST with organizational dreams (Checkland, 2000).

An exact definition of a hassle needs to encompass the nature of the issue, its effect on the organization, and any relevant contextual statistics. This step ensures that the PST specializes in addressing the root of the difficulty in preference to peripheral concerns, thereby increasing the likelihood of powerful solutions (Morris, 2013).

2.2 Identify major contributing factors

After defining the primary difficulty, the subsequent step involves identifying major contributing elements. These elements are the primary factors that contribute to the occurrence or staying power of the trouble. Recognizing those elements is critical for knowing the broader context of the problem and for pinpointing regions where interventions may be simplest (Pidd, 2004).

To become aware of those factors, it's very helpful to apply techniques, which include brainstorming classes with stakeholders, reviewing historical data, and reading associated strategies. This step requires a radical evaluation to make sure that all relevant elements are considered and that the PST remains complete (Jackson, 2003). Identifying contributing elements also includes distinguishing between direct and indirect causes to prioritize recognition areas efficiently (Turner and Cochrane, 1993).

2.3 Categorize Contributing Factors into Subcategories

Once the predominant contributing elements are recognized, categorizing them into subcategories is essential. This step involves breaking down every issue into greater specific components, which simplifies the problem and enhances the granularity of the evaluation (Berg and Lune, 2017). Categorization enables in organising the trouble-fixing procedure and lets in for a greater targeted exam of each contributing aspect.

For example, if a primary contributing component is diagnosed as "inefficient communication," subcategories may include "verbal exchange channels," "frequency of conversation," and "readability of messages." By structuring the factors in this way, the PST can more effectively address each factor and develop targeted answers (Checkland, 2000).

2.4 Analyze and identify root causes

An important step in the PST method is studying and identifying the basis causes of the hassle. Root reasons are the fundamental troubles that result in the major contributing elements. This analysis includes delving deeper into why each important factor exists and what underlying problems make a contribution to its presence (Morris, 2013). Identifying root reasons facilitates addressing the middle problems in place of simply the symptoms, leading to extra-sustainable answers.

Techniques that include root purpose evaluation (RCA), the five Whys approach, and fishbone diagrams are useful for uncovering root causes. These strategies help in systematically tracing the problem back to its origins, presenting insights into the systemic troubles that need to be addressed (Pidd, 2004). Understanding root reasons guarantees that interventions are directed in the direction of casting off the underlying issues instead of merely mitigating their results (Jackson, 2003).

2.5 Develop Solutions for Each Root Cause

Once the foundation reasons are identified, the next step is to expand solutions tailored to every motive. This includes brainstorming ability interventions and comparing their feasibility and effectiveness. Solutions want to be specific, realistic, and aligned with the general dreams of the commercial enterprise organization (Turner and Cochrane, 1993). Effective answers address the main reasons at once and provide a clear course for resolving the principal difficulty.

In developing answers, it's vital to recollect factors, including useful resource availability, potential effects, and implementation challenges. Solutions need to be evaluated for his or her capability, blessings, and drawbacks, and pilot sorting can be carried out to refine the methods before complete-scale implementation (Berg and Lune, 2017). This step guarantees that the solutions are nicely acceptable to the context and capable of addressing the identified root reasons effectively.

2.6 Construct the problem-solution tree

With answers evolved, the subsequent step is to gather the problem solution tree. This entails visually representing the trouble, contributing elements, subcategories, root causes, and answers in a based format. The PST usually starts off evolved with the primary trouble at the top, branching out into important contributing factors, which might be in addition divided into subcategories and root reasons. Solutions are then mapped to the corresponding root causes (Bertalanffy, 1968).

A properly constructed PST facilitates visualizing the relationships between exceptional factors of the trouble and the proposed answers. This visible representation aids in communicating the trouble-fixing strategy to stakeholders and enables the implementation of solutions (Checkland, 2000). The PST has to be clean, prepared, and smooth to apprehend, making sure that each element is appropriately represented and related.

2.7 Evaluate and refine the problem solution tree

The final step inside the PST procedure is to evaluate and refine the tree. This entails reviewing the PST for completeness, accuracy, and practicality. Feedback from stakeholders and specialists is worthwhile on this step, supplying insights into capacity enhancements and making sure that the PST efficiently addresses the hassle (Jackson, 2003). The evaluation must recognize whether or not the PST accurately displays the hassle and whether or not the proposed answers are viable and powerful.

Refining the PST can also involve revising the problem definition, adjusting the contributing elements and subcategories, or editing the answers primarily based on remarks. Regular review and refinement make sure that the PST stays applicable and maintains to provide fee as new facts and insights emerge (Morris, 2013). This iterative process facilitates preserving the effectiveness of the PST and complements its utility in hassle-fixing.

3. LITERATURE REVIEW: PROBLEM SOLUTION TREES AND THEIR APPLICATIONS

3.1 Introduction

Problem Solution Trees (PSTs) are analytical frameworks designed to simplify and address complex troubles by breaking them down into smaller, more plausible additives. By visually mapping out the relationships amongst troubles, capability reasons, and solutions, PSTs offer a systematic method of trouble-fixing. This literature evaluation explores the theoretical foundations of PSTs, their numerous packages, and the blessings and limitations related to their use. It moreover consists of a comparative evaluation with specific trouble-fixing techniques supported by current instructional research and case studies.

3.2 Theoretical Foundations of Problem Solution Trees

3.2.1 Systems Theory

The theoretical foundations of PSTs are deeply rooted in the structure idea, which asserts that complicated phenomena are first-rate understood through the relationships and interactions among their components. Von Bertalanffy (1968) laid the premise for the structure precept, emphasizing that systems need to be analyzed as wholes in areas of remoted elements. This holistic method is crucial for PSTs, which is motivated by seizing the interconnected nature of troubles and solutions. Von Bertalanffy's structure precept underscores the significance of viewing troubles in the broader context of their related factors and influences.

Systems precept is superior to structure thinking, which specializes in comment loops and dynamic interactions within internal systems. Meadows (2008) elaborates on structures, wondering through highlighting the significance of information how one of the type elements of a device has an impact on every different. PSTs leverage this concept by mapping out causal relationships and dependencies, thinking of an extra-whole assessment of problems. This technique aids in identifying capability leverage elements for intervention and solution development.

3.2.2 Soft Systems Methodology (SSM)

Checkland's (2000) soft systems methodology (SSM) gives a complementary attitude to structure precepts by means of addressing the subjective and qualitative elements of troubled situations. SSM emphasizes the importance of incorporating multiple stakeholders' viewpoints to recognize and deal with complex issues. This approach aligns with PSTs by advocating for an installed assessment that considers particular perspectives. Checkland (2000) argues that SSM's interest in stakeholder views complements problem information, a precept that allows the powerful use of PSTs in various contexts.

3.3 Applications of Problem Solution Trees

3.3.1 Business Management

In industrial, commercial enterprise agency employer control, PSTs are used to cope with strategic traumatic conditions and beautify preference-making techniques. Slywotzky (1996) explores how PSTs can be applied to investigate enterprise employer organization problems and growth techniques. For instance, PSTs can help companies recognize approximately key issues affecting their regular, normal performance and prioritize obligations based totally on their effect. By visually representing troubles and solutions, companies can better recognize the relationships among various factors and make more informed alternatives.

3.3.2 Engineering

In engineering, PSTs help manage technical stressful conditions and optimize strategies. Sage and Rouse (2014) speak about using PSTs in engineering systems to enhance layout and commonplace universal standard performance. PSTs allow engineers to break down complicated technical troubles into smaller components, facilitating a greater-based technique for hassle-fixing. This technique is especially useful in figuring out and addressing issues related to the system's regular everyday ordinary, normal performance and commonplace, ordinary overall performance.

3.3.3 Social Sciences

The software program of PSTs in social sciences, which includes public fitness and network development, demonstrates their versatility. Cresswell (2014) highlights how PSTs can be employed to cope with health disparities and extremely good social troubles. By mapping out contributing elements and functionality interventions, PSTs help researchers and practitioners in developing centered techniques to decorate social consequences. This approach allows for recording complicated social issues and designing effective solutions.

3.4 Benefits and Limitations of Problem Solution Trees

3.4.1 Benefits

The number one advantages of PSTs include superior clarity in hassle assessment and dependent solution improvement. Anderson and Tushman (1990) argue that PSTs provide a clear framework for studying problems through visualizing relationships among elements. This readability enables higher verbal exchange amongst stakeholders and allows extra strategic selection-making. Additionally, PSTs offer a scientific method for hassle-fixing, supporting companies and those who discover and deal with crucial troubles successfully.

3.4.2 Limitations

Despite their advantages, PSTs have terrific obstacles. One huge problem is the ability for oversimplification. Lichtenstein and O'Hara (2007) talk about how PSTs might also reduce complex troubles to overly simplistic fashions, possibly overlooking important nuances. This simplification can cause incomplete problem evaluation and insufficient answers. Therefore, it is critical to complement PSTs with one-of-a-kind analytical techniques to make sure a whole know-how of issues.

Another predicament of PSTs is the risk of bias in element choice and evaluation. Turoff et al. (2011) spotlight that the views of stakeholders can affect the identity of factors and solutions, doubtlessly affecting the objectivity of the PST. To mitigate this risk, it's essential to contain a multitude of viewpoints and validate the assessment via rigorous examination approaches.

3.5 Comparative Analysis with Other Problem-Solving Methods

3.5.1 Fishbone Diagrams

Fishbone diagrams, or Ishikawa diagrams, are a related method used to categorize elements that contribute to a hassle. Ishikawa (1985) advanced this method to offer a visible example of capacity motives and their results. While fishbone diagrams have similarities with PSTs in their absolute method, PSTs provide an extra framework for linking elements to answers. PSTs provide a broader view of the problem, facilitating a more protected evaluation.

3.5.2 Root Cause Analysis

Root Cause Analysis (RCA) is a one-in-all type of theoretical approach that intersects with PSTs. RCA, as described by Runcie (2010), includes figuring out the crucial motives of troubles to cope with them efficiently. While RCA focuses on keeping apart root reasons, PSTs offer a broader framework for studying associated elements and functionality solutions. Both techniques cause problem choice, but PSTs offer an extra-seen and integrative technique.

3.5.3 5Whys Technique

The five Whys approach, as defined by the resource of Ohno (1988), includes iterative wondering to discover root motives. This approach is robust for figuring out underlying troubles; however, it lacks the visible instance and set-up framework of PSTs. PSTs provide a more particular and organized method to troubleshoot evaluation, helping to map out relationships and functionality answers comprehensively.

3.5.4 Comparative Analysis

Comparing PSTs with the techniques highlights their specific benefits. While fishbone diagrams and the 5 Whys method provide precious insights into problem motives, PSTs provide an extra holistic view with the aid of integrating elements and solutions proper into a seen framework. This complete approach lets in more powerful hassle evaluation and answer development, making PSTs a treasured device in numerous contexts.

3.6 Case Studies and Practical Examples

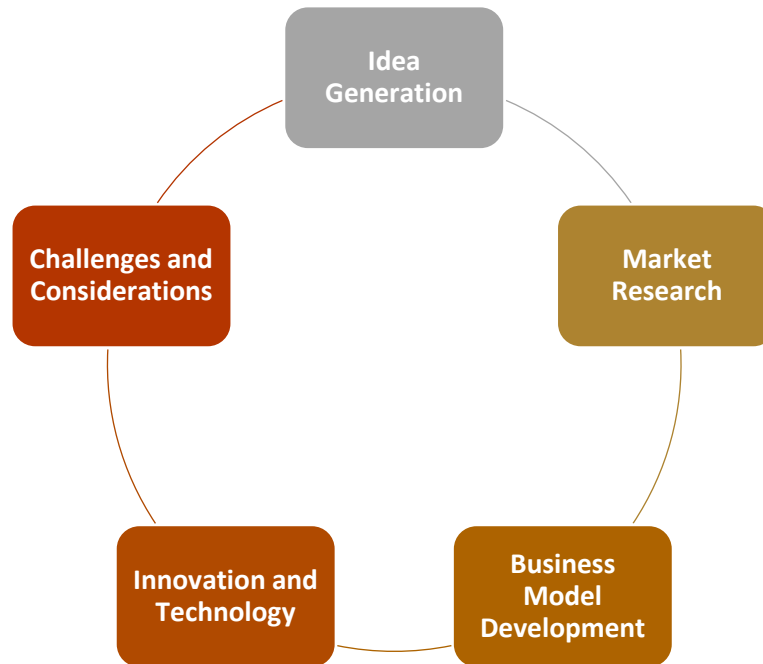
3.6.1 Business Case Study

A realistic example of PST software programs in enterprises is demonstrated in the case of a study by Latham and Egan (2002), which examines the advent of commercial enterprise organizations' use of PSTs to cope with undertaking delays. The PST helped the business organization end up privy to key troubles and extend strategies to improve mission control. This case check illustrates the effectiveness of PSTs in improving commercial enterprise overall performance and resolving complicated, disturbing conditions.

3.6.2 Social Sector Case Study

In the social area, O'Neill et al. (2013) present a case study of a fitness intervention that employed PSTs to address healthcare get-right-of-way disparities. The PST facilitated the identification of factors affecting healthcare transport and guided the development of targeted techniques. This case highlights the rate of PSTs in enhancing social effects and addressing complicated troubles in public health.

4. DEVELOPING STARTUP BUSINESS IDEAS



Developing a startup enterprise idea consists of a mounted and strategic method to translate creativity into a likely agency model. This technique is essential to entrepreneurial success and consists of several key steps, including concept technology, marketplace research, company model improvement, and leveraging innovation and technology. Understanding those components is vital for entrepreneurs looking to navigate the complexities of beginning a new commercial enterprise corporation. This section checks into everything about developing startup enterprise thoughts, imparting insights and strategies supported via recent research and case studies.

4.1 Idea Generation

4.1.1 Creativity and Innovation

The basis of any achievement startup begins off evolved with the technology of the current mind. Creativity is a critical element of this system, permitting marketers to take a look at novel answers to offer problems or unmet desires. Amabile (1996) emphasizes that creativity is normally advocated through all of our attributes and organizational environments, suggesting that fostering a cutting-edge lifestyle can beautify the concept era.

4.1.2 Techniques for Idea Generation

Several strategies are normally employed to stimulate creativity and generate a large array of minds. Brainstorming, a way introduced with the aid of Osborn (1953), encourages the free go along with the float of thoughts internally, a difficult and speedy putting. This technique promotes the generation of numerous minds without proper judgment that might later be sensitive and evaluated. The effectiveness of brainstorming lies in its capacity to harness collective creativity and find a large number of potential answers.

Mind Mapping, advanced through Buzan (2006), is another powerful technique for organizing and visualizing ideas. By developing a diagram that shows numerous factors of an idea and its connections, marketers can better recognize and expand their thoughts. Mind mapping permits a set-up exploration of thoughts, aiding in the identification of contemporary possibilities and relationships among one-of-a-kind factors of an industrial employer concept.

Lateral thinking, as proposed via De Bono (1995), consists of coming close to problems from unconventional angles to find innovative solutions. This method demands conventional thinking patterns and encourages the exploration of possibility tactics. Lateral thinking is particularly useful for breaking through intellectual limitations and discovering creative answers that won't be right away obvious.

4.2 Market Research

4.2.1 Understanding Market Needs

After generating preliminary mind, wearing out marketplace research is vital for assessing their feasibility and identifying capability opportunities. Kotler and Keller (2016) describe market studies as a scientific process of collecting and studying records to recognize customer dreams, alternatives, and trends. This study offers precious insights into marketplace demand and allows entrepreneurs to refine their ideas to better meet consumer expectations.

4.2.2 Primary and Secondary Research

Market studies consist of both primary and secondary research techniques. Primary studies include accumulating new statistics right away from capacity customers through surveys, interviews, and awareness groups (Saunders, Lewis, and Thornhill, 2016). This direct comment allows marketers to validate their thoughts and gain insights into purchaser picks and ache points.

Secondary studies, instead, consist of analyzing present facts from organization critiques, academic journals, and marketplace evaluations (Bryman and Bell, 2015). Secondary studies offer a broader knowledge of marketplace developments and the competitive landscape, helping entrepreneurs find gaps and possibilities within the industry.

4.2.3 Competitor Analysis

An essential aspect of market research is competitor assessment, which incorporates comparing the strengths and weaknesses of current-day opposition. Porter (1985) emphasizes the importance of expertise in aggressive surroundings to pick out capability threats and opportunities. By analyzing opposition, startups can find out their specific charge propositions and boom techniques to distinguish themselves within the market.

4.3 Business Model Development

4.3.1 Value Proposition

The price proposition is a critical element of the employer model, representing the specific charge that a startup gives to its clients. According to Osterwalder and Pigneur (2010), the fee proposition addresses client wishes and problems through a manner of offering solutions that deliver enormous advantages. Developing a compelling price proposition includes information-patron pain elements and designing products or services that offer clean advantages over present options.

4.3.2 Business Model Canvas

The Business Model Canvas, added through Osterwalder and Pigneur (2010), is a strategic device that permits marketers to visualize and boom their organization's fashions. The canvas includes 9 building blocks: price proposition, patron segments, channels, client relationships, income streams, key belongings, key sports, key partnerships, and fee shape. This framework offers an entire view of the industrial enterprise organization version, allowing marketers to map out key components and understand areas for development.

The Lean Startup approach, advanced by using the usage of Ries (2011), emphasizes iterative development and examines studying. This method consists of growing a minimum possible product (MVP), sorting it out with actual clients, and the use of feedback to refine the product and commercial corporation version. The Lean Startup method permits startups to reduce hazards and uncertainty by specializing in purchaser comments and non-stop development. By adopting this technique, marketers can all at once take a look at their minds and make information-pushed choices to decorate their organization model.

4.3.3 Business Planning

Effective industrial agency company-making plans are crucial for defining goals, techniques, and monetary projections. Hill and Jones (2012) spotlight the significance of properly superior advertising and marketing techniques as a roadmap for carrying out company targets and securing funding. Whole advertising and marketing and advertising and marketing techniques commonly include sections on marketplace assessment, aggressive assessment, advertising strategies, operational plans, and monetary forecasts. Developing an in-depth advertising and marketing method lets marketers smooth out their vision and share their business enterprise ideas with capable customers and stakeholders.

4.4 Innovation and Technology

4.4.1 Role of Innovation

Innovation is the usage of stress within the other time of fulfillment of startup organization ideas. Schumpeter (1934) underscores the significance of innovation in producing financial growth and growing new markets. In the context of startups, innovation includes growing new products, services, or strategies that offer a particular rate to customers. Embracing innovation permits startups to distinguish themselves from the opposition and address rising market desires.

4.4.2 Technological Advancements

Technological upgrades play a big role in the development of startup industrial organizations. Christensen (1997) discusses the concept of disruptive generation, which has the ability to create new markets and redecorate modern-day industries. Startups that leverage developing technology, which embodies synthetic intelligence, blockchain and the Internet of Things, can gain an aggressive element and strain innovation.

4.4.3 Case Studies of Successful Startups

Examining case research of fulfillment startups gives precious insights into the application of innovation and technology. For example, Airbnb revolutionized the hospitality agency with the resource of leveraging generation to attach travelers with hosts through an online platform (Guttentag, 2015). Similarly, Uber transformed the transportation employer by offering an available enjoy-hailing provider the usage of cell technology (Cramer and Krueger, 2016). These case studies display how startups can harness technological improvements to develop revolutionary answers and gain extensive fulfillment.

4.5 Challenges and Considerations

4.5.1 Risk Management

Developing startup company thoughts involves navigating numerous dangers, together with market uncertainty, monetary demanding situations, and operational problems. Timmons and Spinelli (2004) emphasize the importance of effective hazard control in addressing those worrying situations. Entrepreneurs should find out functionality dangers, increase mitigation strategies, and constantly display and modify their plans to reduce terrible influences. Implementing threat management practices enables startups to navigate uncertainties and grow their possibilities of prolonged-term fulfillment.

4.5.2 Funding and Investment

Securing investment is a common undertaking for startups. Blank (2013) notes that marketers regularly face issues in acquiring investment due to elements consisting of loss of traction, constrained assets, or inadequate market validation. To overcome these demanding situations, startups need to focus on building a strong employer case, demonstrating market functionality, and appealing to capability investors through pitch shows and networking possibilities. Exploring numerous investment options, together with venture capital, angel investors, and crowdfunding, can also enhance a startup's chances of securing the necessary capital.

4.5.3 Legal and Regulatory Considerations

Legal and regulatory issues are important for startup improvement. Entrepreneurs want to take a look at criminal recommendations and rules associated with business employer operations, intellectual property, and employment. Kuratko and Morris (2018) emphasize the importance of searching for prison recommendations and ensuring compliance with applicable regulations to keep away from functionality criminal issues and defend company pursuits. Addressing jail and regulatory requirements early in the startup method saves you complications and guarantees clean company operations.

5. DISCUSSION

Developing startup enterprise employer minds consists of complicated tactics that embody innovation, market assessment, financial planning, institution dynamics, and scaling techniques. Each element plays an essential role in shaping the trajectory of a startup and its ability for prolonged-term fulfillment. This communication delves into these components, integrating present-day educational theories and empirical proof to provide an entire understanding of the way startups can efficaciously grow and execute their employer thoughts.

5.1 The Role of Innovation in Startups

Innovation is crucial to the achievement of startups, serving as the strain in the back of developing new rate propositions and disrupting established markets. Schumpeter (1934) added the concept of “innovative destruction,” which underscores the importance of innovation in fostering a financial boom by way of displacing preceding commercial organization fashions with novel ones. In the context of startups, innovation includes not only high-quality technological enhancements but also new commercial enterprise fashions and procedures.

Recent research verifies that startups with a strong recognition of innovation will be inclined to outperform their opposition. For example, Hill and Jones (2012) decided that progressive startups frequently obtain superior average overall performance metrics, such as higher income growth and superior marketplace percent. This achievement is attributed to their capability to address unmet desires and adapt to changing market situations. Furthermore, the Lean Startup method, proposed by Ries (2011), emphasizes the iterative nature of innovation by constantly finding out and refining industrial employer ideas through minimal possible products. By continuously testing and refining business ideas through minimum viable products (MVPs) and pivoting, startups can validate their concepts and reduce the risk of failure.

5.2 Developing a robust business model

A properly described enterprise version is vital for a startup's sustainability and growth. Porter (1985) defines a commercial enterprise model as a framework that outlines how a company creates, offers, and captures value. Key factors of a commercial enterprise version encompass the price proposition, goal market, revenue streams, and price structure. Timmons and Spinelli (2004) argue that a clean business model facilitates startups to articulate their market positioning and operational techniques, which are important for attracting buyers and clients.

The iterative method to improve the corporation's version, as endorsed by Ries (2011), includes growing MVPs and adjusting strategies based totally on marketplace comments. This technique lets startups check their assumptions, validate their organizational models, and make statistics-driven decisions. Additionally, Osterwalder and Pigneur (2010) advocate the Business Model Canvas as a strategic manipulation tool that permits startups to visualize and look at their business company models. By mapping out key additives, startups can better recognize their cost propositions, patron segments, and revenue streams.

5.3 Importance of Market Research and Customer Insights

Market studies and patron insights are critical for developing feasible startup thoughts. Kotler and Keller (2016) highlight that marketplace research presents precious data about consumer behavior, market dispositions, and aggressive dynamics. This record is vital for identifying goal markets, assessing calls for, and finding possibilities for differentiation.

Engaging with clients directly through surveys, interviews, and cost-finding presents startups with actionable insights that would manual product development and advertising and marketing techniques. According to Kuratko and Morris (2018), startups that incorporate consumer feedback into their improvement approaches are better placed to meet consumer desires and construct strong customer relationships. By providing information on patron options and pain factors, startups can create products and services that resonate with their target audience.

5.4 Risk Management and Financial Planning

Effective danger control and economic planning are critical for the achievement of startups. Schumpeter (1934) emphasizes that entrepreneurship involves navigating uncertainties and making strategic alternatives under hazard. Startups need to end up aware of capability risks, broaden contingency plans, and secure suitable funding to control these uncertainties.

Financial planning is a critical factor in risk control. Hill and Jones (2012) advise that special financial projections, together with sales forecasts, price budgets, and cash go together with flow statements, are critical for beneficial aid allocation and fee management. Startups with nicely advanced financial plans are more ready to address operationally demanding situations, manipulate coins to go with the flow and obtain economic stability. Additionally, securing investment from buyers, together with challenge capitalists or angel investors, can offer startups the belongings needed to scale and develop.

5.5 Leadership and Team Dynamics

Leadership and crew dynamics extensively impact the achievement of startups. Effective control includes setting a clear, imaginative, and prescient goal, motivating group members, and making strategic choices. Timmons and Spinelli (2004) spotlight that a successful entrepreneur has personal traits on the side of resilience, adaptability, and strategic foresight. These traits permit leaders to navigate stressful conditions and force their startups in the direction of success.

The composition and dynamics of a startup group, moreover, play an essential role in its performance. Kuratko and Morris (2018) emphasize that a nicely coordinated and expert institution can energy innovation, execute strategies successfully, and gain organizational goals. Building a strong group requires recruiting humans with complementary abilities, fostering a collaborative lifestyle, and offering opportunities for professional development. Effective organization dynamics contribute to higher problem-solving, creativity, and normal productivity.

5.6 Strategic partnerships and networking

Strategic partnerships and networking are vital for startup growth and development. Collaborations with extraordinary groups, employer professionals, and mentors can offer startups treasured assets, information, and marketplace opportunities. Porter (1985) indicates that strategic alliances can help startups leverage complementary strengths, get the right of entry to new markets, and acquire aggressive advantages.

Networking plays a critical feature in organizing relationships with functionality customers, customers, and organization buddies. Kotler and Keller (2016) spotlight that taking part in enterprise sports, meetings, and online agencies can facilitate valuable connections and open up new commercial enterprise organization possibilities. Building a sturdy network can offer startups access to mentorship, funding, and strategic advice that can support their growth and development.

5.7 Scaling and Expansion Strategies

Scaling a startup includes increasing its operations, client base, and marketplace presence. Ries's (2011) Lean Startup method emphasizes the significance of validating increased techniques through experimentation and iterative improvements. Startups want to expand scalable strategies and systems to control and help increase demand.

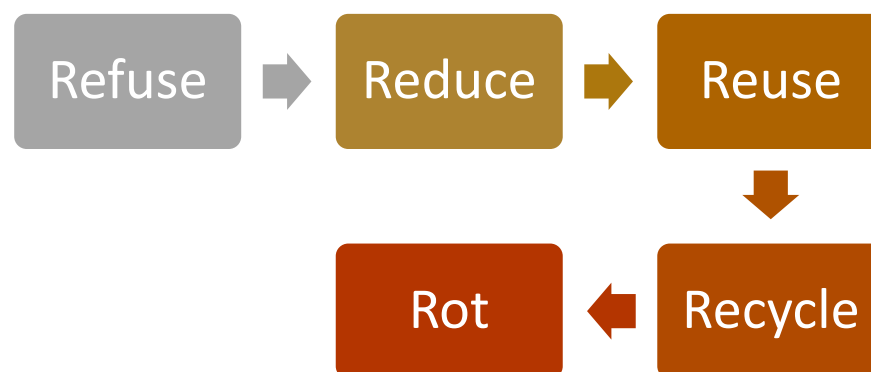
Expansion strategies may additionally encompass entering new markets, diversifying product offerings, or pursuing acquisitions. Hill and Jones (2012) argue that success scaling calls for cautious planning, resource control, and adaptability to new market conditions. Startups that successfully control those aspects are better placed for lengthy-term success. Additionally, imposing scalable technology and systems can guide green operations and facilitate an increase.

5.8 Ethical Considerations and Social Impact

Ethical considerations and social impact are increasingly more essential inside the startup ecosystem. Entrepreneurs are predicted to function with integrity and social duty. Kuratko and Morris (2018) highlight that startups that prioritize moral practices and make a contribution to social causes can build high-quality logo reputations and benefit purchaser trust.

Addressing problems inclusive of environmental sustainability, honest labor practices, and facts private, is vital for maintaining a responsible business method. Startups that combine social effect into their challenge and values are much more likely to attract socially aware purchasers and stakeholders. Emphasizing moral practices can also differentiate startups from competition and enhance their long-term success.

6. INTRODUCTION TO CIRCULAR BUSINESS MODELS AND THE 5R CANVAS



In recent years, the idea of circular commercial enterprise fashions has won giant traction as a sustainable opportunity for traditional linear enterprise procedures. Traditional linear models, characterized by a “take-make-dispose” paradigm, have

led to extended resource depletion and environmental degradation (Ellen MacArthur Foundation, 2015). In evaluation, circular enterprise models aim to reduce waste, decorate resource efficiency, and sell sustainability with the aid of creating closed-loop systems where sources are continuously reused, repaired, and recycled (Geissdoerfer et al., 2017). This phase explores the principles of circular business fashions and introduces the 5R Canvas as a strategic tool for enforcing circularity in enterprise operations.

6.1 Principles of Circular Business Models

Circular commercial enterprise models are grounded within the ideas of the round financial system, which emphasizes extending the lifecycle of merchandise, minimizing waste, and maximizing the value extracted from assets. Ellen MacArthur Foundation (2013) defines the circular economy as a financial device geared towards disposing of waste through the continual use of sources. This contrasts sharply with the traditional linear economy, where assets are used as soon as possible, after which they are discarded.

A key precept of round business fashions is the design for toughness, which entails growing products that are long-lasting, repairable, and upgradeable. By designing products with longer lifespans, organizations can lessen the frequency of replacements and related waste technology (Bocken et al., 2016). Additionally, round fashions sell the use of renewable resources and the improvement of closed-loop delivery chains. For example, corporations might also put into effect take-lower back schemes where used merchandise is lowered for refurbishment or recycling (Kirchherr et al., 2018).

Circular business models additionally emphasize the innovation of the commercial enterprise model. Traditional revenue streams, along with selling products outright, are complemented or changed with the aid of models that include product-as-a-service, where clients pay for the usage of a product in place of possession. This shift encourages organizations to be conscious of keeping and lengthening the life of merchandise, aligning their pastimes with the ones of the client (Mont, 2002). By adopting circular business fashions, groups no longer only make a contribution to environmental sustainability but also find new financial opportunities and enhance their competitive advantage.

6.2 The 5R Canvas

The 5R Canvas is a strategic framework designed to assist businesses in imposing round standards effectively. Developed via De Angelis and Dall'ara (2020), the 5R Canvas integrates the core concepts of a circular financial system into a sensible device for business method development. The 5Rs stand for Refuse, Reduce, Reuse, Recycle, and Rot. Each component represents a strategic method for minimizing waste and optimizing resource use. The following sections detail how the 5R Canvas can be applied to enterprise operations.

6.2.1 Refuse

The "Refuse" component of the 5R Canvas emphasizes the importance of averting useless aid use and waste. This principle encourages businesses to assess and reject practices or materials that make contributions to environmental harm or inefficiency. For instance, groups may refuse to apply single-use plastics or choose extra sustainable options (Lacy et al., 2014). By prioritizing the refusal of non-essential merchandise and approaches, organizations can reduce their environmental footprint and promote extra sustainable consumption styles.

6.2.2 Reduce

"Reduce" makes a specialty of minimizing aid consumption and waste manufacturing. Businesses can put into effect discount strategies by optimizing their manufacturing approaches, reducing cloth inputs, and enhancing electricity efficiency. For instance, lean manufacturing techniques can be used to streamline operations, reduce waste, and enhance overall productivity (Womack et al., 1990). Additionally, corporations can undertake practices such as reducing packaging or minimizing extra stock. The purpose is to create prices while using fewer resources, thereby contributing to an extra sustainable and aid-efficient business version.

6.2.3 Reuse

The "reuse" aspect encourages businesses to extend the lifecycle of products and substances by means of reusing them in their original or modified shape. Reuse can be carried out through strategies that include remanufacturing, refurbishment, and resale. For instance, agencies that refurbish and resell used electronics or furnishings not only reduce waste but also create new sales streams (Rashid et al., 2013). Reuse additionally consists of the layout of merchandise for multiple

existence cycles, making it simpler to repurpose or improve components. By integrating reuse into their operations, organizations can lessen the demand for brand-spreading new sources and reduce environmental impact.

6.2.4 Recycle

“Recycle” involves processing used materials into new products or materials. Recycling enables closing the loop inside the product lifecycle by making sure that materials are recovered and reused rather than disposed of as waste. Companies can implement recycling programs within their operations, which include setting apart waste streams and partnering with recycling facilities (Zhang et al., 2018). Additionally, organizations can design merchandise with recyclability in mind, which means the usage of substances that can be easily disassembled and processed. Effective recycling strategies contribute to aid performance and reduce the reliance on virgin materials.

6.2.5 Rot

The “rot” factor refers back to the organic decomposition of natural substances, contributing to the introduction of compost or other natural fertilizers. This precept is particularly relevant for groups that address natural waste, along with meal manufacturing or agriculture. By composting natural waste, businesses can enhance the soil, reduce landfill waste, and assist sustainable agricultural practices (Ellen MacArthur Foundation, 2015). Incorporating composting into enterprise operations aligns with round economy principles and promotes the return of nutrients to the ecosystem.

7. DESIGNING THE 5R CANVAS FOR URBAN VERTICAL FARMING

Urban vertical farming, with its capability to convert food production in urban environments, needs a comprehensive technique for sustainability. Implementing the 5R Canvas Refuse, Reduce, Reuse, Recycle, and Rot gives an established framework for optimizing resource use and minimizing environmental effects. This phase explores how each element of the 5R Canvas may be successfully applied to urban vertical farming, with a focus on layout and operational strategies.

7.1 Refuse: Eliminating Harmful Practices

7.1.1 Refusing Synthetic Inputs

A number one factor of the "refuse" precept is keeping off artificial pesticides and fertilizers. These chemical compounds can result in environmental infection and fitness dangers. Vertical farms can put in force Integrated Pest Management (IPM) strategies, which consist of organic controls like beneficial insects and natural insecticides (Jensen, 2020). IPM now not only reduces reliance on dangerous chemical substances but additionally complements the protection and sustainability of the produce.

7.1.2 Rejecting Non-Renewable Energy Sources

Another important reason for refusal is the use of non-renewable energy sources. Vertical farms must aim to integrate renewable energy structures such as solar panels or windmills to strengthen operations. Solar panels may be established on rooftops or included in farm structures to offer clean strength for lighting and weather manipulation (Santos et al., 2021). Additionally, adopting power-green technology, which includes advanced LED lighting fixtures and weather control structures, can lessen power intake (Olsen et al., 2017).

7.1.3 Avoiding Non-Recyclable Materials

Refusal also extends to the substances utilized in farm creation and operations. Vertical farms need to avoid non-recyclable plastics and prioritize materials with lower environmental influences. Sustainable construction materials, which include recycled metals and glass, can be utilized in construction to decrease environmental footprints (Panse, 2018). By adopting these practices, vertical farms contribute to a round economic system and decrease typical resource intake.

7.2 Reduce: Minimizing Resource Use and Waste

7.2.1 Reducing Water Consumption

Water management is an essential aspect of reduction in vertical farming. Hydroponic and aeroponic systems, which recirculate water, are more efficient than conventional soil-primarily based strategies. These systems can notably decrease water consumption and waste (Grewal et al., 2015). Implementing extra techniques together with rainwater harvesting and greywater recycling can similarly decorate water efficiency.

7.2.2 Cutting Energy Use

Energy reduction is another key awareness place. Vertical farms should hire electricity-green technology to lower electricity intake. LED-developed lighting, which uses much less strength compared to standard lighting, is critical for lowering strength use (Olsen et al., 2017). Moreover, integrating passive solar design and high-overall performance insulation can decrease the need for artificial heating and cooling (Despommier, 2013).

7.2.3 Minimizing Waste Generation

Waste discount techniques are important for sustainability. Vertical farms can decrease waste by optimizing manufacturing methods and preventing crop loss. Precision farming strategies, which involve real-time tracking of plant health and environmental situations, can lessen overproduction and spoilage (Kozai, 2013). Additionally, implementing green packaging practices and decreasing unmarried-use substances can contribute to waste reduction.

7.3 Reuse: Extending Material Lifecycles

7.3.1 Reusing Construction and Operational Materials

The principle of reuse includes extending the lifecycle of materials and resources. Vertical farms can use reclaimed or recycled materials, along with metallic and glass, in constructing structures to assist sustainability (Jansen et al., 2020). Additionally, reusing additives like hydroponic structures and developing trays can lessen the need for brand-spanking new materials and decrease waste.

7.3.2 Repurposing Organic Waste

Organic waste generated in vertical farms, consisting of plant trimmings and spent growing media, can be repurposed into compost or organic fertilizers. This practice reduces waste and offers treasured inputs for different agricultural applications (Raviv et al., 2019). Efficient collection and processing systems for organic waste ensure that these materials are correctly reused in the farming system.

7.3.3 Reusing Water and Nutrients

Reusing water and nutrients is vital for optimizing resource performance. Closed-loop hydroponic structures, recirculate water and vitamins, reduce waste and decrease ordinary consumption (Aldrich et al., 2021). Integrating these structures allows vertical farms to decorate sustainability and operational efficiency.

7.4 Recycle: Managing Waste Materials

7.4.1 Implementing Comprehensive Recycling Program

Recycling is essential for managing waste materials. Vertical farms ought to establish complete recycling applications for numerous waste streams, which includes packaging substances consisting of plastics, glass, and metals. Setting up detailed recycling stations on the farm and taking part in neighbourhood recycling centres guarantees powerful waste management (Morse et al., 2016).

7.4.2 Recycling Organic Waste

Recycling natural waste entails composting plant residues, using growing media, and different natural materials to supply treasured compost. This system not only reduces waste but also enhances soil health and productivity in other agricultural systems (Huang et al., 2020). Closed-loop structures for nutrient recycling in hydroponic setups similarly aid waste reduction and sustainability.

7.4.3 Recycling Farm Components

Recycling other farm substances, including developing lights and climate control components, is vital for assisting a circular economy. Proper recycling of those materials at the end of their lifecycle facilitates minimizing environmental impact and promotes sustainability (Panse, 2018).

7.5 Rot: Biological Decomposition of Organic Materials

7.5.1 Composting Organic Waste

The "rot" precept specializes in managing natural waste via composting. Composting involves breaking down plant residues and other organic materials into nutrient-rich compost, which can be used to complement the soil or implemented in other agricultural structures (Hargreaves et al., 2013). This process reduces waste and helps sustainable agricultural practices.

7.5.2 Implementing Vermicomposting

Vermicomposting, which makes use of worms to decompose natural waste, complements the nutrient content of compost and improves plant increase (Buckerfield et al., 2017). Integrating vermicomposting systems within vertical farms can provide extra blessings, consisting of lowering waste and producing great compost for plant vitamins.

7.5.3 Supporting a Circular Approach

By adopting the "Rot" principle, vertical farms can convert organic waste into treasured sources, supporting a circular method to sustainability. This exercise now not only reduces waste but also contributes to the general productivity and resilience of the farming machine. Effective composting and vermicomposting structures can enhance soil fitness, guide plant boom, and decrease the environmental footprint of city vertical farms (Hargreaves et al., 2013; Buckerfield et al., 2017).

7.6 Integration and Implementation

7.6.1 Developing a Comprehensive Sustainability Plan

Integrating the 5R Canvas into the operational framework of city vertical farms requires a comprehensive sustainability plan. This plan should outline techniques for each of the 5R principles, which include precise actions, desires, and overall performance metrics. A precise plan facilitates ensuring that all aspects of sustainability are addressed and presents a roadmap for non-stop improvement (Grewal et al., 2015).

7.6.2 Engaging stakeholders and building partnerships

Effective implementation of the 5R Canvas also entails enticing stakeholders and constructing partnerships. Collaboration with nearby governments, network businesses, and sustainability professionals can offer treasured insights and aid in enforcing sustainable practices. These partnerships can help stable sources, share information, and beautify the general impact of vertical farming projects (Benke and Tomkins, 2017).

7.6.3 Monitoring and Evaluating Performance

Ongoing monitoring and assessment are crucial for assessing the effectiveness of the 5R techniques. Regular overall performance reviews can pick out regions for improvement and ensure that sustainability desires are being met. Utilizing metrics consisting of aid intake fees, waste generation, and environmental impact can provide treasured insights into the effectiveness of the applied strategies (Morse et al., 2016).

7.6.4 Adapting to Technological Advances

The field of urban vertical farming is hastily evolving, with new technology and innovations rising regularly. Staying abreast of technological advancements and adapting the 5R Canvas for that reason can help vertical farms maintain their sustainability desires. For instance, improvements in recycling technologies or electricity-green structures may provide new opportunities for enhancing resource management and decreasing environmental impact (Olsen et al., 2017).

7.7 Case Studies and Examples

7.7.1 Case Study: Singapore's Vertical Farms

Singapore recognized for its confined land resources, has been at the vanguard of urban vertical farming. The United States's vertical farms have implemented numerous 5R strategies, inclusive of the use of renewable energy resources, closed-loop water structures, and comprehensive recycling packages. These tasks have confirmed the feasibility and blessings of making use of the 5R Canvas in urban agriculture settings (Despommier, 2013).

7.7.2 Case Study: AeroFarms

AeroFarms, a main vertical farming organization, has adopted quite a number of 5R concepts in its operations. The agency utilizes superior aeroponic systems to lessen water and nutrient usage, implements electricity-green LED lighting, and has set up robust waste management practices. AeroFarms' method highlights the realistic software of the 5R Canvas and its capability to enhance sustainability in city vertical farming (Kozai, 2013).

7.7.3 Case Study: The Plant, Chicago

The Plant in Chicago exemplifies the mixing of the 5R Canvas in a vertical farming context. This city farm operates on a zero-waste philosophy, reusing and recycling substances and composting organic waste. The plant's success demonstrates how a holistic method of sustainability may be efficaciously carried out in city farming environments (Hargreaves et al., 2013).

8. CONCLUSION

In precis, the mixing of the 5R Canvas into urban vertical farming represents a significant advancement in achieving sustainable and efficient agricultural practices. This model emphasizes a comprehensive method of sustainability through the concepts of refuse, reduce, reuse, recycle, and rot, which together make contributions to minimizing environmental effects and improving useful resource efficiency.

8.1 Summary of Findings

Urban vertical farming systems, via making use of the 5R ideas, can address key demanding situations associated with traditional agriculture, together with limited land availability, excessive resource intake, and waste technology. The recognition of refusal of non-sustainable practices enables putting the degree for an extra green farming paradigm. The reduction of useful resource use and waste via progressive technology and practices no longer most effectively conserves vital inputs but additionally contributes to reducing operational prices.

The reuse of substances and recycling of waste in urban vertical farms facilitate a closed-loop device that minimizes the need for external assets and reduces waste output. This technique aligns with the wider dreams of circular financial system ideas, enhancing the general sustainability of the farming operation. Additionally, the exercise of composting natural waste (Rot) enriches the soil and helps plant health, in addition to contributing to the device's sustainability.

8.2 Implications for Urban Agriculture

The software of the 5R Canvas in city vertical farming gives several key blessings. It supports the development of resilient agricultural structures that may thrive in urban environments with restricted space. By optimizing aid use and minimizing waste, these systems can help cope with food protection problems in swiftly developing cities. The integration of superior technology and revolutionary practices also paves the way for more sustainable city agriculture fashions that can adapt to evolving environmental and monetary situations.

Moreover, the emphasis on stakeholder engagement and partnerships underscores the significance of collaborative efforts in achieving sustainability dreams. Effective communication and cooperation amongst farmers, policymakers, community companies, and different stakeholders are vital for the successful implementation of the 5R strategies. The case research presented in this analysis illustrates how those concepts may be practically implemented, supplying valuable insights and benchmarks for destiny projects.

8.3 Future Directions

Looking forward, I see that research and development are important to refine and increase the software application of the 5R Canvas in urban vertical farming. The emerging era, together with improvements in energy-inexperienced systems, waste processing strategies, and useful resource control answers, will play an essential role in enhancing the effectiveness of the 5R principles. Additionally, studies of the lengthy-term effects of these practices on environmental and economic sustainability will provide a deeper understanding of their benefits and obstacles.

It is also essential to find out the scalability of the 5R Canvas model to extremely good metropolis contexts and farming structures. Customizing the requirements to fit numerous close-by situations, useful resource availabilities, and technological capabilities is probably important for maximizing their impact. Engaging with several stakeholders and incorporating comments from ongoing tasks will help in adapting and optimizing the 5R strategies.

8.4 Final Thoughts

The 5R Canvas offers a mounted and sensible framework for designing and handling sustainable metropolis vertical farming structures. By addressing the stressful situations of beneficial resource consumption and waste era and fostering innovation and collaboration, this version can notably contribute to the development of sustainable agriculture in town settings. As cities continue to grow and face growing pressures on food systems, the thoughts of the 5R Canvas offer a precious roadmap for growing resilient, inexperienced, and environmentally responsible farming practices.

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