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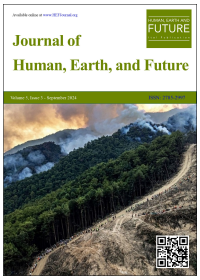

Cultivating Change: Empowering Communities Among Elderly Through Social Innovation and Entrepreneurship in Smart Urban Farming

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Abstract

Malaysia is gradually experiencing a demographic shift, evolving into an aging society. The problem arises concerning the economic sustainability of urban farming ventures undertaken by elderly individuals. Limited attention has been given to incorporating social science perspectives to understand its broader social and cultural implications, especially for the intergenerational aspects of urban farming, specifically among the elderly. This research investigates the adoption of smart urban farming (SUF) to enhance senior citizens' social and economic well-being (SEW). The study involved 130 elderly participants from Klang Valley, Malaysia. Data was collected through surveys and subsequently analyzed using the SPSS statistics tool. The study reveals that while Social Entrepreneurship alone may not be enough to encourage elderly adoption of SUF when combined with social innovation, it significantly increases adoption. The study also indicated that the adoption of SUF enhances the elderly SEW. This study represents a valuable addition to the existing body of literature on the adoption of SUF, particularly in its impact on the social and economic aspects of elderly individuals' lives. This study further advances the current understanding of SUF adoption, utilizing established theories such as the Resource-Based View Theory (RBT) and Social Cognitive Theory (SCT) to reinforce its conclusions. The findings offer practical insights for governments and local authorities in developing policies to promote and facilitate SUF.

Keywords: Social Entrepreneurs; Social Innovations; Social and Economic Well-Being; Smart Urban Farming; Elderly.

1. Introduction

Urbanization is the percentage of a nation's population that lives in cities. Malaysia is now one of the most urbanized countries in East Asia and one of the world's fastest-urbanizing regions, with a 74 percent (in 2014) urban population, up from 66 percent in 2004 [1]. 77.7% of Malaysia's population, as of 2021, lived in urban areas [2]. Modern cities face various problems, including the degradation of the natural environment and the urban heat island effect brought on by excessive carbon dioxide emissions. Along with social polarization, other contemporary urban concerns include limited access to fresh and nutritious food and missed economic opportunities. Urban farming is gaining popularity as a solution to these urban problems, and several nations are testing it out in various ways.

Urban agriculture, also referred to as smart urban farming (SUF), is a method of farming that is done in cities and is frequently used to connect food production with the built environment [3]. Recently, there has been a lot of interest in SUF because it can help local communities grow, foster social harmony, and make cities more attractive and comfortable [4]. It also contributes to food security and safety, as well as improving environmental quality and greening the country [5]. On the other hand, the study of urban aging is an expanding area within the social and health sciences, and its

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implications reach beyond these specific fields [6]. This field focuses on the intersection of population aging and urban living. Malaysia is gradually experiencing a demographic shift, evolving into an aging society where the population aged 65 and above is 7.9% in 2022 [7]. The remarkable increase in life expectancy among the general population is one of the significant accomplishments of modern society. In comparison to earlier generations, people in Europe and the Western world are living longer and in better health. As the peak of human development in terms of population aging and urbanization, the aging of society is a complex concept with both advantageous and difficult aspects [8].

Understanding the acceptance of technology among older adults who are aging is a complex task, as it is important to recognize the vast diversity within the older adult community. The older population varies not only in terms of their values, attitudes, needs, and preferences but also in how they are influenced by factors such as age, life experiences, and alterations in their social and physical environments. These differences are reflected in the ways they utilize various technologies that can potentially support them in aging in place within their own homes [9].

The field of Smart Urban Farming (SUF) has witnessed a surge in research activity in recent years. These studies are driven by concerns about food security, sustainability, and the rapidly growing urban population. Numerous studies have delved into various aspects of SUF, revealing its potential while highlighting key challenges. Researchers have explored several technologies, including sensors, automation, vertical farming systems, hydroponics, and LED lighting, to improve efficiency, yield, and precision in SUF [10–14]. Some studies have even focused on using data analytics and machine learning to optimize environmental conditions, predict crop health, and automate farm management tasks [15–17]. Other areas of study involve minimizing water and energy consumption through efficient irrigation systems, rainwater harvesting, and renewable energy integration [18, 19].

Additionally, some research has examined how SUF can promote social inclusion, access to fresh produce, foster social cohesion, community gardens, and urban agriculture education [20-22]. There are also studies exploring the economic viability [23, 24], challenges, and future directions of SUF [25-28]. A critical aspect of SUF research is incorporating social science perspectives to understand its broader social and cultural implications. Overall, the existing research portrays a promising picture for SUF while highlighting crucial research gaps that need addressing to unlock its full potential for building more sustainable, resilient, and equitable urban food systems.

Social innovation (SI) plays a crucial role in creating an environment conducive to senior citizens learning from one another and receiving guidance in implementing intelligent urban farming techniques through community-based initiatives and educational sessions. Research demonstrated that the involvement of older individuals in urban farming can be significantly enhanced through the use of peer-to-peer learning and support networks [29]. However, uncertainty exists regarding the extent to which SI contributes to the adoption of SUF [30]. While the concept itself is not fully developed, researchers have emphasized the need to establish a framework for SI in the context of urban farming for the elderly [31]. On the other hand, social entrepreneurs (SE) can create novel business plans and solutions that address the particular requirements and difficulties experienced by the elderly in implementing intelligent urban farming. To successfully involve seniors in urban farming, SE can develop user-friendly and accessible technology, offer specialized training programs, or set up cooperative networks [32]. Despite being recognized as practical approaches to tackling social exclusion, both SI and SE still lack sufficient research evidence on how they fit into the broader theoretical context of adopting SUF to enhance the well-being of elderly individuals.

The implications of finding answers to these questions extend beyond mere academic curiosity, as they have the potential to impact the adoption of urban farming. Therefore, this study aimed to investigate how SE and SIs can act as market-driven mechanisms to encourage the elderly population of Malaysia to adopt SUF. Additionally, the study aims to assess the impact of the adoption of SUF on the social and economic well-being (SEW) of senior citizens. The study's findings offer useful information to a variety of stakeholders by emphasizing the roles that SI and social entrepreneurship play in encouraging elderly people to adopt SUF practices and by demonstrating how these practices impact elderly people's SEW. This study provides evidence of the positive impact of SUF on senior citizens' well-being and supports existing studies. The study also investigates the connection between SUF adoption and the SEW of the elderly, thereby presenting a framework for future research in this area.

2. Literature Review

2.1. Theoretical Foundation

Several theories can be used to investigate the role of SUF in enhancing the social and economic well-being of the elderly. Resource-Based View Theory (RBT) centers on the strategic management of resources in social enterprises. It proposes that SE can gain a competitive edge by effectively utilizing and capitalizing on its distinct resources, including social capital, human capital, and financial capital [33, 34]. Initially, when exploring resource-based theory (RBT), the entrepreneur's significant role was acknowledged within the context of resource-based analysis. However, despite RBT becoming prominent in strategic management research in 1993, its integration with entrepreneurship has been mostly limited to serving as a "research setting for empirical work" [35].

Both Kirzner [36] and Schumpeter [37] define the entrepreneurial role as the decision-making process of allocating inputs to specific processes. Hayek [38] extends this discussion by highlighting the importance of learning and knowledge in the entrepreneurial process, where entrepreneurs identify and acquire undervalued resources while effectively utilizing and leveraging them. The vital contribution of linking the entrepreneur to resource-based theory (RBT) lies in recognizing that certain factors, such as entrepreneurial alertness, insight, knowledge, and resource coordination abilities, can be considered resources in their own right. For social entrepreneurs looking to make a positive impact on society or the environment while producing lasting results, the RBT theory is an indispensable tool. It involves locating resources, determining their uniqueness, effectively developing them and utilizing them. This strategy may entail collaborations with businesses, NGOs, or authorities. The principles of RBT can be used to assess social impact, promote sustainability, stimulate innovation, push for legislative changes, and involve local communities. This perspective allows for the identification and acknowledgement of these elements as valuable resources within the framework of RBT.

On the other hand, the Social Cognitive Theory (SCT) developed by Bandura [39] focuses on the significance of observational learning and social influences in behavior change and adoption. It proposes that individuals acquire and embrace new behaviors by observing others and evaluating the consequences of their actions. According to the social cognitive theory (SCT), people can imitate and learn from various models, including parents, friends, or even well-known figures. The crucial requirement for learning is the act of observing another person or being exposed to someone setting an example through their behavior. When we apply this theory to the context of entrepreneurs and programs, we can infer that when elderly individuals observe and actively engage with entrepreneurs, it can encourage and stimulate entrepreneurial behavior among them. In addition, the Theory of Planned Behavior (TPB) by Ajzen [40] encompasses all behaviors that individuals can regulate themselves. The TPB proposes that external factors influence a decision-maker's intention to adopt certain behaviors. Within these external factors, TPB places significant emphasis on relationship-related issues, considering them as part of the construct of social norms. Numerous studies demonstrate that individuals are more inclined to adopt particular actions when they perceive that others in their social network, including influential figures like entrepreneurs, are also engaged in these behaviors [41]. These studies underscore the importance of social norms, the influence of entrepreneurs, and how they shape individuals' inclination to adopt specific behaviors. They further highlight the essential role of models, peer support, and the perception of social norms in encouraging and facilitating the adoption of certain behaviors.

2.2. Development of Hypothesis

2.2.1. Importance of Social Entrepreneurs (SE) in the Adoption of Smart Urban Farming (SUF)

A SE is an individual who identifies business opportunities intending to benefit their local community, society, or even the global community [42]. There are substantial differences between traditional business practices and social entrepreneurship. SEs are primarily driven by creating social value, in contrast to typical entrepreneurs who focus on financial gains [42]. Described as agents of change, SE provides innovative solutions to address technological, environmental, and social challenges [43]. SE play a crucial role in raising awareness and advocating for the advantages of SUF among the elderly. They take on the responsibility of educating seniors about the benefits of sustainable food production, encouraging healthy dietary habits, and the integration of technology in agricultural practices [44].

Through the creation of inclusive and supportive communities, SE has the potential to encourage social interaction and cooperation among elderly individuals engaged in SUF. They can establish networks, forums, or online platforms that facilitate connections between seniors, enabling them to share knowledge, seek advice, and support one another. This nurturing environment fosters a sense of belonging and mutual assistance, empowering seniors in their SUF pursuits [45]. Moreover, SE can play a pivotal role in helping the elderly embrace SUF by improving their access to resources and funding opportunities [46]. Collaborating with government agencies, foundations, or corporate sponsors, they can secure financial support, grants, or subsidies that assist seniors in obtaining the necessary equipment, technologies, or infrastructure for urban farming [46].

Furthermore, SE can facilitate intergenerational collaboration and knowledge exchange in the context of SUF. By organizing mentorship programs or forging partnerships between younger generations and the elderly, SE can create valuable learning and skill-sharing opportunities where seniors can benefit from the technological expertise of younger individuals [47]. To foster the advancement of SUF, Taiwan's government is actively promoting and supporting farmers and agribusinesses to embrace the role of SE and leverage cutting-edge technologies [48]. The government's emphasis lies in the integration of digital technology and smart mobile devices within the SUF sector. Collaborating with the Certificate of Analysis (COA) and National Taiwan University, various SUF training programs have been established to empower individuals engaged in smart agriculture. By leveraging smart sensors, data-driven predictive analytics, and innovative high tunnels, the collaboration aims to revolutionize urban farming practices, making them more efficient, sustainable, and resilient to climate change [49]. These educational initiatives aim to enhance entrepreneurs' knowledge of SUF-related subjects while instilling them with a positive mindset and practical skills [50].

2.2.2. Importance of Social Innovation (SI) in the Adoption of SUF

SI is a process of altering social practices (i.e., attitudes, behaviors, and networks of collaboration) and is always associated with the involvement of civil society actors [51]. The concept of SI has been employed during the past ten years to shed light on intricate processes of socioeconomic and spatial reorganization that have evolved at many levels, particularly as answers to the difficulties marginalized rural communities face. Some people even believe that SI can bring about potentially game-changing improvements in the direction of sustainability.

Investigating SIs in urban farming communities shows the potential role of empowering communities as well as how evolving relationships between community actors could have positive social and environmental effects [52]. Another study highlighted the importance of SI initiatives in developing user-friendly technologies and educational materials specifically designed for the elderly [53]. This approach increased their confidence in utilizing SUF systems. A review emphasized the role of SI in mobilizing funding and providing grants or subsidies to support the elderly in establishing and maintaining SUF projects [54]. Hence, collaboration between SI organizations and local governments can lead to the development of financial incentives and resources for elderly individuals.

SI empowers SE to achieve greater outcomes while using limited resources within the context of SUF [55]. This approach also facilitates intergenerational collaborations and partnerships, fostering the exchange of knowledge. Younger generations actively support the elderly in adopting and utilizing SUF technologies, while seniors contribute their invaluable experience in traditional farming practices [56]. Despite entrepreneurs being recognized as a means to address unmet societal needs, there has been limited scholarly discussion about how this process will unfold. When participatory urban farming is viewed through the lens of social entrepreneurship, different expectations for the project arise. Thus, this study suggests that SIs play a moderating role in the relationship between SE and the adoption of SUF.

H1: *SI moderates the relationship between social entrepreneurs and the adoption of SUF.*

2.2.3. SUF and Social and Economic Well-being (SEW) of the Elderly

The implementation of agricultural digitization has proven beneficial for elderly farmers residing in remote regions, as it enables them to easily access agricultural extension information and advice. Previously, they faced obstacles due to the high expenses and technological difficulties involved [57]. Recently, there has been a noticeable trend towards the widespread acceptance of SUF. However, embracing technology-related knowledge, skills, and novel approaches requires the support of social entrepreneur SI programs. The influence of SE and SI has sparked interest among urban residents, encouraging them to seek improved quality of life, enhanced cultural diversity, and healthier urban developments. This endeavor has also captured the attention of researchers, leading to increased investigation in this research domain.

The process of embracing and consistently utilizing an invention is termed adoption [58]. It is essential to understand that not every innovation acquired will lead to adoption. The decision of urban dwellers to adopt SUF will be influenced by their unique characteristics. Various factors will play a role in shaping the adoption behavior of urban farmers. According to Ntshangase et al. [59], factors such as the lack of involvement of young people, elderly individuals with limited education, perceptions, and insufficient community engagement may hinder the adoption of farming practices.

SEW of the elderly refers to an individual's state of health encompassing physical, social, and mental aspects, achieved through the fulfillment of basic needs. This includes having financial security, supportive personal relationships, fulfilling employment, community empowerment, a healthy environment, and good health. In contemporary times, a majority of elderly individuals live independently, but some experience feelings of loneliness and financial hardships. Urban farming has gained increasing popularity due to its potential to contribute to the development of local communities, promote social harmony, and generate income for urban residents [60]. Therefore, this study suggests that the adoption of urban farming can positively impact the SEW of elderly individuals.

H2: *Adoption of SUF enhances the SEW of the elderly.*

3. Research Methodology

The population of the study is the elderly, who are estimated to be 3.5 million, or 7% of the Malaysian population. The research focuses on studying elderly individuals living in the Klang Valley, a significant urban hub in Malaysia. Within the Klang Valley, community organizations are devoted to the practice of SUF. These groups operate with collaboration between their leadership and residential members, working together to promote and mobilize the urban farming initiative. The community areas covered in the study include Ampang, Bandar Tun Razak, Keramat, Putrajaya, Pandan Jaya, Pandan Perdana, Cheras, Setapak, Bangsar, Kepong, and Kajang. The reasons for choosing these regions are that these areas are responsible for monitoring the development of this SUF community. A snowball sampling

technique was employed to expand the sample data collection to a wide range of individuals, aiming to attain the necessary number of respondents. Moreover, participants in the sample groups demonstrated willingness and generosity in dedicating their time and sharing their ideas to contribute to the study.

This study employed a quantitative analysis approach, and a survey technique was used to collect the data. The survey was administered to individuals aged 50 years and older who reside in the aforementioned regions. The sample size of the study was 130. The questionnaire consisted of four sections: SEW, which included five items adapted from Duclos et al. [61]; adoption of SUF, which was measured by five items adapted from Ivascu et al. [62]; SI, comprising four items adapted from Bulut et al. [63]; and social entrepreneurship, consisting of three items adapted from Satar and Natasha [64]. A 5-point Likert scale with the options "strongly disagree" and "strongly agree" was used to gauge the respondents' level of agreement or disagreement with each statement.

This study hypothesized that SI moderates the relationship between SE and the adoption of SUF and subsequently leads to enhanced SEW of the elderly, as depicted in Figure 1. SPSS (version 26) was used to analyze the information gathered. The conceptual framework utilized in this study is presented below.

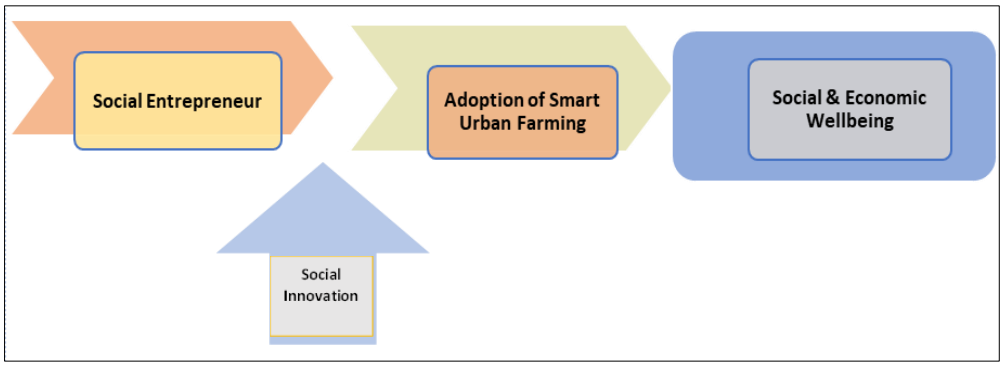

Figure 1. Conceptual Framework

4. Results

In this study, a total of 200 questionnaires were distributed, out of which 130 responses were collected. This yields a response rate of 65%. According to the results obtained from analyzing the characteristics of the participants, it was observed that 55.4% of the respondents were female, while 44.6% were male (Figure 2). When considering the income level, a significant portion of the respondents fell within the RM2501 to RM3000 range. The next largest group consisted of 37.7% of respondents with incomes between RM2001 and RM2500, and only a small percentage (2%) had incomes below RM1500.

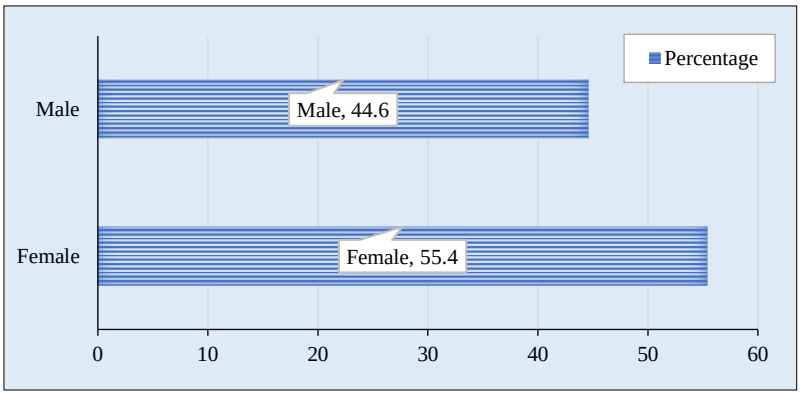

Figure 2. Respondent profile

Appendix I presents the descriptive statistics for the variables. Based on the results obtained from analyzing the mean and standard deviation (SD) of responses from SE, it was found that a majority of the respondents expressed the need for someone who can provide information about SUF. The average rating for this affirmation was 3.8472, with an SD of 0.66426. This suggests a collective desire among respondents for individuals who can provide information on smart urban farming. Additionally, when the respondents were asked about the importance of SI, most of them believed that SI programs could effectively address the challenges faced by elderly individuals in adopting SUF practices. The average rating for this claim was 3.8462, with an SD of 0.66428. Figure 3 presents the items of measurement for each variable used in the present study.

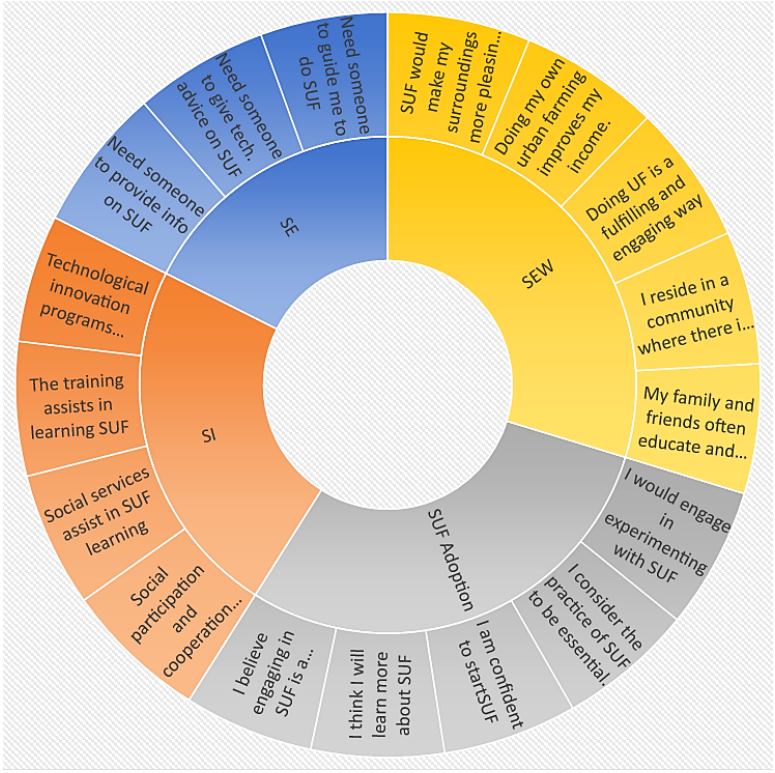

Figure 3. Items of measurement for different variables

Figure 4 presents the mean response of the respondent on different items on different variables i.e. SE, SI, adoption of SUF and SEW.

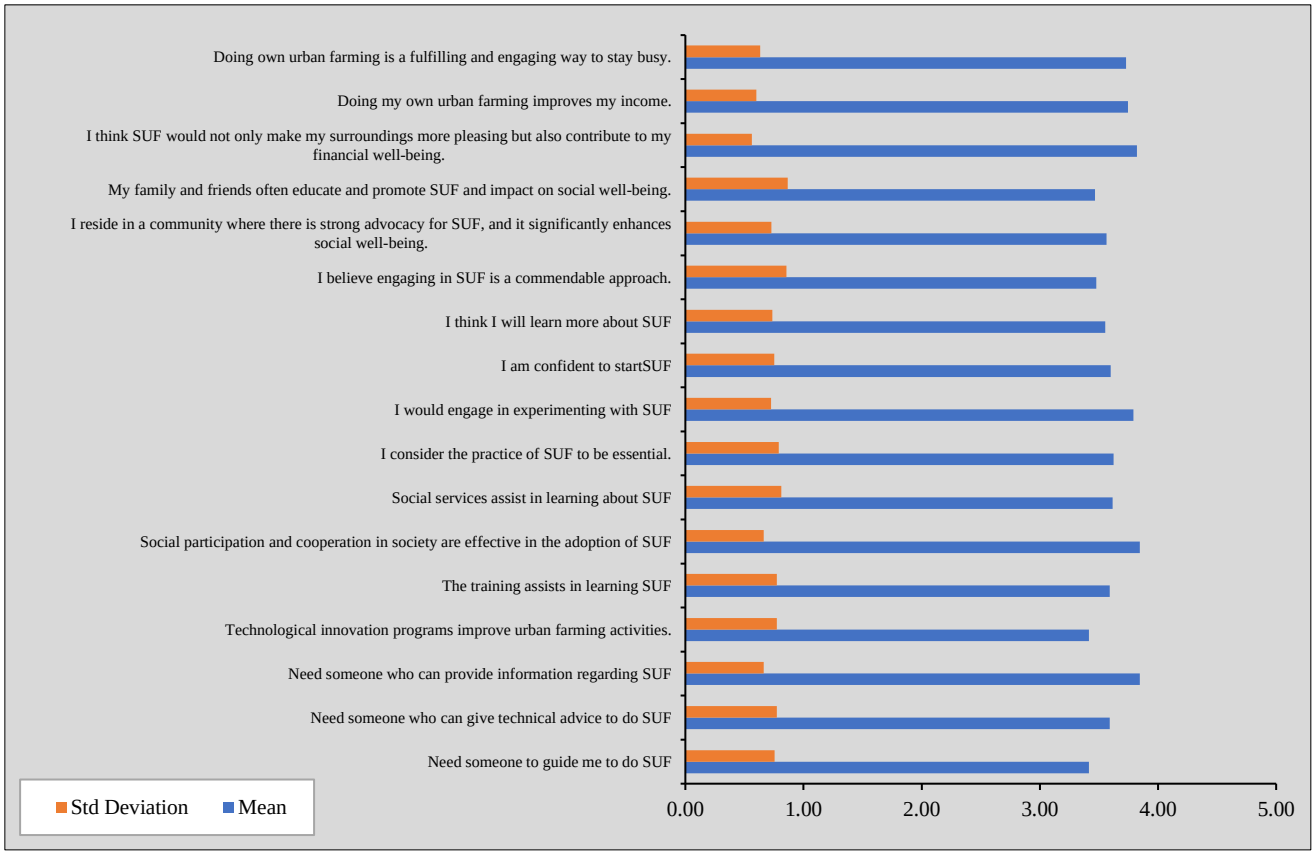

Figure 4. Mean Response on Different Variables

Furthermore, the data revealed that a significant number of respondents agreed that they were inclined to adopt SUF practices in their community. The average rating for this statement was 3.7923, with an SD of 0.7243 implying

that most respondents express an interest in experimenting with smart urban farming if given the opportunity. Finally, the majority of the respondents strongly believed that implementing SUF practices could substantially improve the well-being of their community. The average rating for this argument was 3.8231 and a standard deviation of 0.56329.

4.1. Reliability

All variables, namely social entrepreneur, SI, adoption, and SEW, demonstrated Cronbach's alpha values exceeding 0.85. Cronbach's alpha values of 0.70 or higher indicate satisfactory reliability [65]. The reliability analysis results for these variables can be found in Table 1.

Table 1. Reliability analysis

Sl.	Variables	Number of items	Cronbach ∞	AVE
1	Social entrepreneur (SE)	3	0.854	77.67
2	Social Innovation (SI)	4	0.891	75.70
3	Adoption of SUF	5	0.922	76.29
4	Social and Economic Wellbeing (SEW)	5	0.913	7.03

4.2. Correlation

The findings presented in Table 2 indicate correlations between various variables. Specifically, there is a strong positive correlation between SE and SI ($r = 0.981$, $p < 0.05$), as well as between SE and the adoption of SUF ($r = 0.764$, $p < 0.05$). Moreover, a significant positive correlation was observed between SI and the adoption of SUF ($r = 0.796$, $p < 0.05$), and between the adoption of SUF and SEW ($r = 0.934$, $p < 0.05$).

Table 2. Correlation analysis

	SE	SI	Adoption of SUF	SEW
SE	1	0.981**	0.764**	0.769**
		0.000	0.000	0.000
SI		1	0.796**	0.801**
			0.000	0.000
Adoption of SUF			1	0.934**
				0.000
SEW				1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Note: SE -social entrepreneur, SI – social innovation, SUF – smart urban farming, SEW – social &economic well-being.

Item-to-total correlations and inter-item correlation scores of higher than 0.50 and 0.30, respectively, are considered satisfactory to assess construct validity [66]. Hence, these results indicate relationships between social entrepreneurship and the adoption of SUF, SI and the adoption of SUF, and the adoption of SUF and the SEW of elderly individuals.

4.3. Multiple Regression

4.3.1. SI Moderates the Relationship Between SE and the Adoption of SUF

Table 3 displays the regression analysis findings that examine the relationship between the dependent variable, namely the adoption of SUF, and the independent variable SE and SIs as moderators. The standardized coefficient (Beta) is -0.317. This negative coefficient indicates an inverse association between SE and the adoption of SUF. However, the t-value of -4.436 demonstrates that this coefficient is highly statistically significant at the conventional significance level of 0.000 ($p < 0.001$).

Table 3. Regression analysis for SUF

Independent Variable	Dependent variable	Standardized Coefficient beta	T value	Significance
Social entrepreneur (SE)	Adoption of SUF	-0.317	-4.436	0.00
SI (Interaction) *		1.207	16.874	0.00
Adjusted R^2		0.87		0.00
F-value		431.306		

Note: SE -social entrepreneur, SI – social innovation, SUF – smart urban farming.

* Interaction indicates moderating variable.

The standardized coefficient (Beta) for SIs is 1.207. The t-value of 16.874 indicates that this coefficient is highly and statistically significant at the 0.000 level ($p < 0.001$). Adjusted R square for the model is 87% with an F value of 431.306 and P<0.000. According to the regression model, the variable for SE has a statistically significant adverse effect on the adoption of SUF. This means that as the number of SEs increases, the adoption of SUF tends to decrease. However, the "Interaction" variable, i.e., SI, has a statistically significant positive impact on the adoption of SUF. Hence, results concluded that SI moderates the relationship between SE and the adoption of SUF.

4.3.2. Adoption of SUF Enhances the SEW of Elderly

The coefficient for the predictor variable, i.e., adoption of SUF, is 0.824 with a standard error of 0.028. The standardized coefficient (Beta) is 0.934. This means that for each unit increase in the adoption of SUF, the SEW is expected to increase by approximately 0.824 units. The t-value of 29.501 shows that this coefficient is highly statistically significant at the 0.001 level ($p < 0.001$).

In conclusion, the regression analysis indicates that the adoption of SUF is a highly significant predictor of SEW, explaining about 87.2% of its variance (Table 4). Figure 5 illustrates the relationship between SUF and the outcome variable SEW in the regression analysis. The coefficient for adoption of SUF suggests a strong positive relationship with SEW. Table 5 shows the results of a regression analysis with the dependent variable: SEW and the independent variable: adoption of SUF. The coefficient of determination (R^2) is 0.872, which means that approximately 87.2% of the variance in the dependent variable (SEW) can be explained by the predictor variable (adoption of SUF).

Table 4. Regression analysis for SEW

Independent variable	Dependent variable	Standardized Coefficient beta	T value	Sig.
Adoption of SUF	Social and economic well-being (SEW)	0.934	29.501	0.000
Adjusted R^2 (F-value)	0.872 (303.545)			0.000

Note: SUF – Smart urban farming, SEW – Social &economic well-being

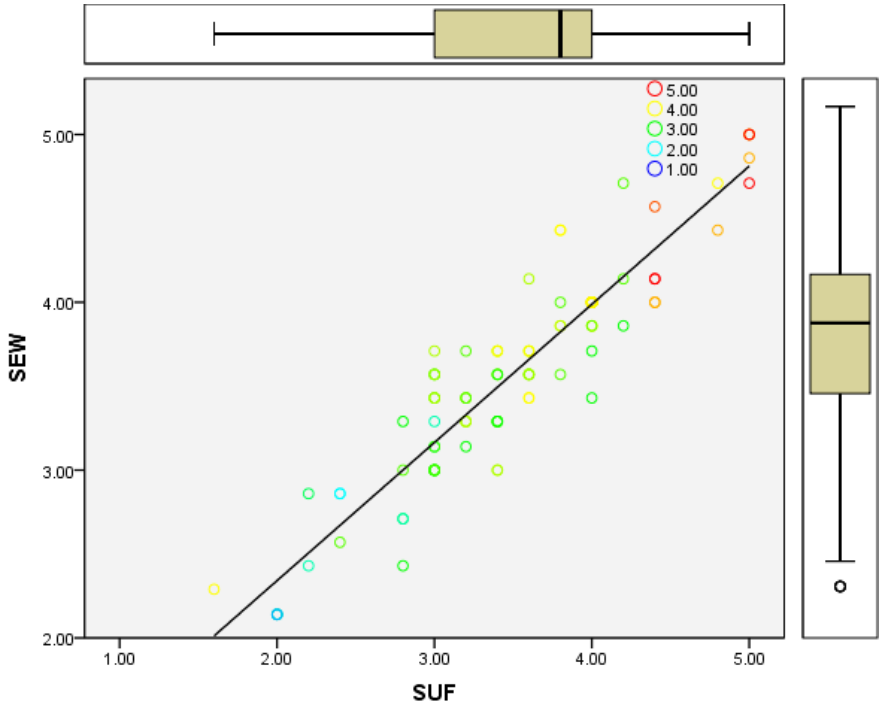

Figure 5. Regression variables Plots for SUF and SEW

5. Discussion

This study's primary goal is to determine how SI and SE contribute to the promotion of SUF adoption, ultimately enhancing the SEW of the elderly. The research explores the motivations behind the elderly's involvement in SUF and identifies the association between SE and the adoption of such farming practices. This study aligned with Yunus's [67] definition of SE as individuals initiating socially impactful projects, prioritizing social benefits over investor profits. The present study sheds significant light on the role of SI in the relationship between SE and the adoption of SUF. Consequently, the results indicate that SE alone may not be sufficient to encourage the elderly to adopt SUF, but when combined with SI, they contribute to an increase in the number of elderly individuals adopting this approach.

Past studies evidence showed that SI initiatives, such as funding, resources, and technological approaches [54], can significantly enhance the adoption of SUF operations. The findings of this study align with the study, which highlights that the integration of user-friendly technology through SI has the most significant impact on increasing adoption rates in urban farming [68]. Social innovation strives to transform interpersonal relationships by incorporating new participants into social dynamics. The empowerment of communities through urban farming has the potential to alter individuals' knowledge, attitudes, and skills. Policymakers and practitioners involved in promoting smart urban farming should consider the potential effects of SE and the interaction effect of SI. They might have to determine whether particular social entrepreneurship techniques encourage or impede the adoption of intelligent urban farming and modify their action plans accordingly.

The model summary indicates that the regression model is a good fit for predicting the SEW based on the adoption of SUF. The regression analysis's findings indicate that SUF adoption and SEW are significantly positively correlated. This finding implies that as the adoption of SUF practices increases, the community's well-being, particularly regarding social and economic aspects, also tends to improve [16, 20, 26]. Existing studies emphasize SUF's potential to enhance productivity, quality of life, and economic growth [20, 23, 27], which matches the present study result. This initiative has stimulated societal transformation by influencing shifts in community practices to optimize land utilization. The economic repercussions of this initiative include generating supplementary income for the elderly associated with the group.

Governments and local authorities can develop policies encouraging and assisting urban farming initiatives (SUF). This could involve providing support, funding, and technical assistance to urban farmers and community gardening projects. Adopting SUF can create economic opportunities through employment generation, support for local businesses, and revitalization of urban neighborhoods. Policymakers should explore ways to utilize SUF for economic development and community empowerment. While research indicates a strong correlation between SUF adoption and SEW, it is essential to delve further into the causal mechanisms of this relationship. Additionally, studies could examine how other factors, such as cultural attitudes and policy interventions, interact with SEW and SUF adoption.

These outcomes have potential implications for policymakers, urban planners, and community development organizations as they highlight the potential benefits of promoting and supporting SUF initiatives for enhancing the community's overall well-being. Specifically, the combination of SE and SI emerges as a pivotal factor in achieving positive social and economic well-being outcomes, emphasizing the importance of integrated and innovative approaches in urban development strategies.

6. Limitations and Contributions

6.1. Limitations of the Study

This study, like many others, has certain limitations that should be acknowledged. Firstly, the use of only online respondents as a sample provides only a partial understanding of the broader communities and cannot be considered representative of all Malaysians. The views of elderly people across the entire nation might not be adequately represented, as the survey was conducted within specific communities. Additionally, the measurement tools employed in this study were adapted versions of existing scales used to assess well-being and did not account for the unique circumstances of each respondent's environment.

6.2. Contributions of the Study

The outcomes of this study hold significant value for academics as it expands the understanding of researchers in the domain of SUF and its impact on improving the SEW of senior citizens. Scholars can draw from these findings and even extend the study by incorporating diverse variables to attain more precise results. Furthermore, this research makes a noteworthy addition to the existing literature on SUF, particularly in its influence on the SEW of elderly individuals. It should also catalyze future research, encouraging further refinement and extension of this study, particularly in the context of Malaysia.

The researcher expects that the findings from this research will contribute positively to various stakeholders, enhancing the adoption of SUF for the well-being of the elderly. This study holds significant importance for various

reasons. Firstly, it provides valuable evidence on how SUF can enhance the well-being of senior citizens. Additionally, it lays a strong foundation for future discussions, supporting the importance of SUF through statistical evidence and reinforcing existing studies that hypothesized the positive impact of elderly individuals adopting this farming approach.

Secondly, the analysis conducted in the study goes beyond merely establishing a link between elderly adoption of SUF and the role of SE and SI. It also investigates the connection between the adoption of SUF and the SEW of the elderly, thereby presenting a framework for future research in this area. Thirdly, this study contributes to the body of knowledge by integrating three independent variables (social entrepreneur, SI, and adoption of SUF) with a dependent variable (SEW of the elderly) in a conceptual model. Furthermore, the study supports its findings with integrated theories, namely Resource-Based View Theory (RBT), Social Cognitive Theory (SCT), and Theory of Planned Behavior (TPB), making a novel empirical contribution to the field.

7. Conclusion

This research examines how Social Innovation and Social Enterprise can facilitate the acceptance of Sustainable Urban Farming (SUF) among the elderly. It establishes a connection between SE and SUF adoption, emphasizing that SE alone may not suffice to encourage elderly adoption. Furthermore, the study underscores the significance of SI initiatives, such as funding, resources, and technological approaches, in enhancing SUF acceptance. The outcomes imply that increasing SUF adoption enhances community well-being, thereby making it a valuable asset for policymakers, urban planners, and community development organizations. SUF is a highly intelligent approach, and the researcher anticipates that the results of this study will bring positive contributions to various stakeholders, leading to further advancements in the adoption of SUF for the well-being of the elderly.

Empowering elderly communities through social innovation and entrepreneurship in SUF could be a game-changer in creating sustainable and inclusive urban settings. More research may be required to comprehend the mechanisms causing this adverse effect of SE on SUF and to find mitigation strategies.

Further investigation is needed to assess the adoption of SUF and expand the study's scope by looking at other age groups or regions. Suggestions for future research entail investigating these groups' economic, social, and health outcomes. It is imperative to comprehend the distinct requirements and difficulties that elderly individuals encounter in smart urban farming. The research must also explore the barriers and facilitators to adoption and implementation. Further research is necessary to explore the policy support and regulatory frameworks for the growth and scalability of these initiatives.

8. Declarations

8.1. Author Contributions

Conceptualization, N.K. and A.Su.; methodology, N.K. and A.Su.; software, A.Su., and S.K.; validation, N.K. and S.K.; formal analysis, N.K. and A.Si.; investigation, A.Su. and S.K.; resources, N.K.; data curation, S.K.; writing—original draft preparation, N.K., A.Si., and N.K.; writing—review and editing, N.K. and A.Si.; visualization, A.Si.; supervision, N.K.; project administration, N.K. and A.Su.; funding acquisition, N.K. All authors have read and agreed to the published version of the manuscript.

8.2. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

8.3. Funding

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8.4. Institutional Review Board Statement

Not applicable.

8.5. Informed Consent Statement

Informed consent was obtained from all subjects involved.

8.6. Declaration of Competing Interest

The authors declare that there is no conflict of interests regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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Appendix I

Table A1. Descriptive Statistics

Variable	Items	Mean	Standard deviation
Social entrepreneur (SE)	I need someone who helps guide me to do urban farming using technology.	3.4154	0.75518
	I need someone who can give technical advice to do smart urban farming.	3.5923	0.77456
	I need someone who can provide information regarding smart urban farming.	3.8462	0.66426
Social Innovation (SI)	Technological innovation programs improve urban farming activities.	3.4154	0.77518
	The training/discussion approach assists in learning about smart urban farming	3.5923	0.77456
	Social participation and cooperation in society are effective in the adoption of smart urban farming.	3.8462	0.66428
	Social services assist in learning about smart urban farming	3.6154	0.81063
Adoption of smart urban farming (SUF)	From my perspective, I consider the practice of smart urban farming to be essential.	3.6231	0.79011
	Given the opportunity, I would engage in experimenting with smart urban farming	3.7923	0.72439
	I am confident to start smart urban farming	3.6000	0.75329
	I think I will learn more about smart urban farming	3.5538	0.73729
	I believe engaging in smart urban farming is a commendable approach.	3.4769	0.85558
Social& economic well-being (SEW)	I reside in a community where there is strong advocacy for smart urban farming, and it significantly enhances social well-being.	3.5637	0.72719
	My family and friends often educate and promote smart urban farming to me, highlighting its positive impact on social well-being.	3.4659	0.86547
	I think smart urban farming would not only make my surroundings more pleasing but also contribute to my financial well-being.	3.8231	0.56329
	Doing my own urban farming improves my income.	3.7462	0.60118
	Doing own urban farming is a fulfilling and engaging way to stay busy.	3.7308	0.63231

Questionnaire

Section A: Demographic Profile

Demographic

1) Gender

- Male
- Female

2) Age (50 years and above)

- Below 49
- 50 - 52
- 53 - 55
- 56 - 58
- 59 above

3) Income

- Below Rm 1500
- Rm 1500 - Rm 2000
- Rm 2001 - Rm 2500
- Rm 2501 - Rm 3000
- Rm 3001 above

4) Place of living

- Klang Valley
- Northern region
- Southern region

5) Experience in smart urban farming

- Yes
- No

Section B: Social Entrepreneurs

Social entrepreneurship is the process by which individuals, startups and entrepreneurs develop and fund solutions that directly address social issues. A social entrepreneur, therefore, is a person who explores business opportunities that have a positive impact on their community, in society or the world.

1) I need someone who helps guide how to do urban farming using technology.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

2) I need someone who can give technical advice to do smart urban farming.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

3) I need someone who can provide information regarding smart urban farming.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Section C: Social Innovations

Social innovation refers to the design and implementation of new solutions that imply conceptual, process, product, or organizational change, which ultimately aim to improve the welfare and well-being of individuals and communities.

1) Technology currently helps smart urban farming activities.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

2) The use of IoT for smart urban farming is environmentally friendly.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

3) The space in my house area influenced my decision towards adopting smart urban farming.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

4) I think the methods of smart urban farming are more sustainable than methods of traditional farming.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Section D: Social and Economic Well-Being

Social and economic well-being means the mix of social and economic factors that produce the best outcomes for a person's health and well-being

1) I reside in a community where there is strong advocacy for smart urban farming, and it significantly enhances social well-being.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

2) My family and friends often educate and promote smart urban farming to me, highlighting its positive impact on social well-being.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

3) I think smart urban farming would not only make my surroundings more pleasing but also contribute to my financial well-being.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

4) Doing own urban Farming improve my income.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

5) Doing own urban farming is a fulfilling and engaging way to stay busy

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Section E: Adoption Of Smart Urban Farming

Smart farming is a management concept focused on providing the agricultural industry with the infrastructure to leverage advanced technology – including big data, the cloud and the internet of things (IoT) – for tracking, monitoring, automating and analyzing operations.

1) From my perspective, I consider the practice of smart urban farming to be essential.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

2) Given the opportunity, I would engage in experimenting with smart urban farming.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

3) I am confident to start smart urban farming

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

4) I think I will learn more about smart urban farming.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

5) I believe engaging in smart urban farming is a commendable approach.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree