JDBIM

Optimizing the Digitalization of Storage and Sales of Urban Farming Products as an Effort for Food Security and Improving the Local Economy

Triantya Wahyu Wirati[1*], Allya Sofiana Assyifa[2], Mochamad Fakhriy Afif[3]

[123]Department of Digital Business, Universitas Logistik dan Bisnis Internasional
Terusan Sari Asih No. 54 40151 Bandung, Indonesia

ABSTRACT

Urbanization is moving the human population from rural to urban areas. In rural areas, more land can be used for farming, while in urban areas, there is not much land for farming. Urban farming is a solution for people moving from rural to urban areas. Urban farming is the cultivation of plants in big cities with limited land. Hydroponics is a method of cultivating plants without using soil but rather using water flow for nutrient distribution; this method has the advantage of more efficient use of water and faster growth to produce quality fruit. Quality fruit is very influential in storage because it can last longer than fruit with poor conditions. The aim of this research is to analyze the design of an e-commerce website system for urban farming to optimize the potential of urban farming through the appropriate and strategic application of information technology. It is hoped that this research will support the growth and sustainability of urban agriculture but also open up new opportunities in marketing, inventory management, and efficient operational management.
Keywords: *Urban Farming, Hydroponics, Storage, Delivery, Website.*

*Corresponding author
Email: triantyawahyu@ulbi.ac.id

INTRODUCTION

In the modern era, urbanization, or population movement from rural to urban areas continues to increase in Indonesia, reaching 56.72% in 2023 (Rizaty, 2021). This is mainly due to more job opportunities in the city and rapid economic growth.

However, urbanization also raises problems like limited land and food security in urban areas. Urban farming is a solution to overcome this problem by moving farming activities to cities, thereby reducing the limited land, and ensuring the availability of fresh food for city residents. Urban farming has developed rapidly due to urbanization and the global food crisis. This trend helps overcome limited land in big cities and reduces the risk of increased food insecurity due to broken supply chains. In addition, urban farming also contributes to local food production, reducing dependence on imported ingredients and food, and reducing the impact of price fluctuations and the global food crisis (Septya et al., 2022).

According to data from BPS, West Java has the largest number of urban farming businesses in Indonesia, showing the great potential for urban farming in this region. However, the market in West Java, which consists of more than 20,000 people's markets, is still unable to meet the available supply (BPS, 2023). Therefore, optimizing the storage of urban farming products is very important to maintain product freshness and quality for longer and maximize harvest yields. The solution that can be taken to overcome this obstacle is to develop a digital-based urban farming program, such as URBANIK. URBANIK is a website that supports MSME-scale agriculture using hydroponic media. With a land area of 5x6 square meters, URBANIK can grow various types of plants, such as Hamigua melons and lettuce. URBANIK also provides direct delivery services to consumers, creates employment opportunities for local communities, and uses a pre-order system to make it easier to calculate profits before harvest. This project proposes optimizing the storage and sale of urban farming products to increase food and economic security in the surrounding environment. By using a digitalization system, this project aims to ensure the availability of fresh food in urban areas, reduce dependence on imports, and open business and employment opportunities for local communities.

Based on the background described previously, the digitalization of urban farming product storage and sales systems is important because urban farmers can manage their inventory more efficiently using digital systems, such as applications or online platforms. They can track inventory, forecast market demand, and better organize delivery schedules. Through digitalization, urban farming results can be more easily marketed to more consumers. Digital platforms can enable farmers to promote their products directly to potential consumers without going through traditional intermediaries. With digital systems, information regarding product quality and safety (such as agricultural methods used, harvest time, and processing) can be easily accessed by consumers. This helps in building consumer confidence in urban farming products. Data collected from digitalization systems can provide valuable insights to urban farmers. They

can analyze market trends, consumer preferences, and the effectiveness of their farming techniques to increase yields and production efficiency. Digitalization can help better monitor and manage resources such as water and energy. This can help urban farmers to adopt more sustainable practices. Digital systems enable urban farmers to stay connected to markets, partners, and knowledge resources. They can access the latest agricultural information, market regulations, and other practical guides. Overall, digitizing urban farming product storage and sales systems can help increase operational efficiency, reach more consumers, ensure product quality, and support sustainable growth in the urban farming sector (Kistyanto et al., 2024; Anggraini et al., 2024; Setyowati & Apriliyanto, 2024).

Urban Farming

Rapid urbanization often brings challenges such as food insufficiency and environmental degradation. Urban farming can increase local food security and improve environmental quality through increasing green space and sustainable agricultural practices. According to Septya et al. (2022), creating a living stall by utilizing people's yards and focusing on plants often consumed by families is one solution. Urban farming integrates agriculture, fisheries, and animal husbandry or in a narrower sense, agricultural activities. The aim is to utilize limited land in urban areas, increase green space, and overcome food scarcity.

Hydroponics and Urban Farming Storage Sheds

According to Sumarni (2021), hydroponics is an agricultural cultivation method that uses water as a substitute for soil, suitable for critical soil conditions and limited water in urban areas. Waluyo et al. (2021) stated that the advantages of hydroponics include guaranteed plant growth and production, practical maintenance, pest control, fertilizer efficiency, easy replacement of dead plants, minimal labor requirements, fast and clean plant growth, sustainable production, higher selling prices, off-season cultivation, and resistance to natural conditions. According to Murti and Nur'aini (2023), fruits and vegetables, as important sources of vitamins, minerals, and fiber, are easily damaged, so proper storage in warehouses with optimal conditions and effective stock management using databases are very important to extend shelf life and ensure product availability.

Food security

According to Government Regulation of the Republic of Indonesia Number 17 of 2015, food security is a situation where people's nutritional needs are met through affordable, adequate quantity and quality, protected, diverse, nutritious, fair, reasonable, and by religion, belief, and culture. local area. With this theory, URBANIK contributes to local, regional food security by providing adequate food in quantity and quality, protected, diverse, nutritious, fair, and following local religions, beliefs, and culture.

Several previous studies discuss the digitalization of urban farming. Surls et al. (2015) first discussed a needs assessment for supporting urban farming in California. It highlights preliminary findings and identifies requirements and challenges specific to urban agriculture in the California context. Then, Saad et al (2021) explore the state of the art of urban smart vertical farming automation systems. It discusses advanced topologies and issues and provides recommendations for improving automation in vertical farming. Hu et al. (2015) focus on designing a web-based application using a coupled multi-agent system and environmental model for watershed management analysis. Although not directly about urban farming, it demonstrates the use of web-based applications and modeling techniques that could apply to urban farming systems. Meanwhile, Kaloxylos et al. (2014) presents a cloud-based Farm Management System (FMS), discussing its architecture and implementation. This system supports agricultural management tasks, potentially applicable to urban farming contexts. Terrible et al. (2015) describes a web-based spatial decision support system (SDSS) for land management and soil conservation. It focuses on integrating spatial data and decision-making tools relevant to urban farming planning and resource management. While Cambra et al. (2019) present a smart decision system for digital farming, emphasizing decision-making support tools and technologies. While not specifically urban, digital farming and decision support concepts are relevant for urban agriculture. These previous studies collectively cover topics ranging from advanced automation systems in vertical farming, web-based applications for agricultural management and decision support, cloud-based farm management systems, spatial decision support systems for land management, smart decision systems for digital farming, and needs assessments for urban farming support. However, not many have discussed in detail the digitalization of urban farming, which is concerned with inventory management, e-commerce features, and sales recaps. So, there is a research gap. It is hoped that this research can provide insights into various technological applications and challenges in digitalized urban farming.

METHODS

In this research, inventory management (storage), e-commerce features and sales results recap in website-based applications were designed and analyzed using the SLDC Waterfall method. This method is a software development model that follows a sequential or ordered flow, starting from requirements analysis, design, implementation, verification, testing, to maintenance. The approach used is qualitative and relies on assessments from experts in the field.

RESULTS AND DISCUSSION

Business Model

Figure 1 explains the business model canvas of an urban farming business that uses a website as a digital shop.
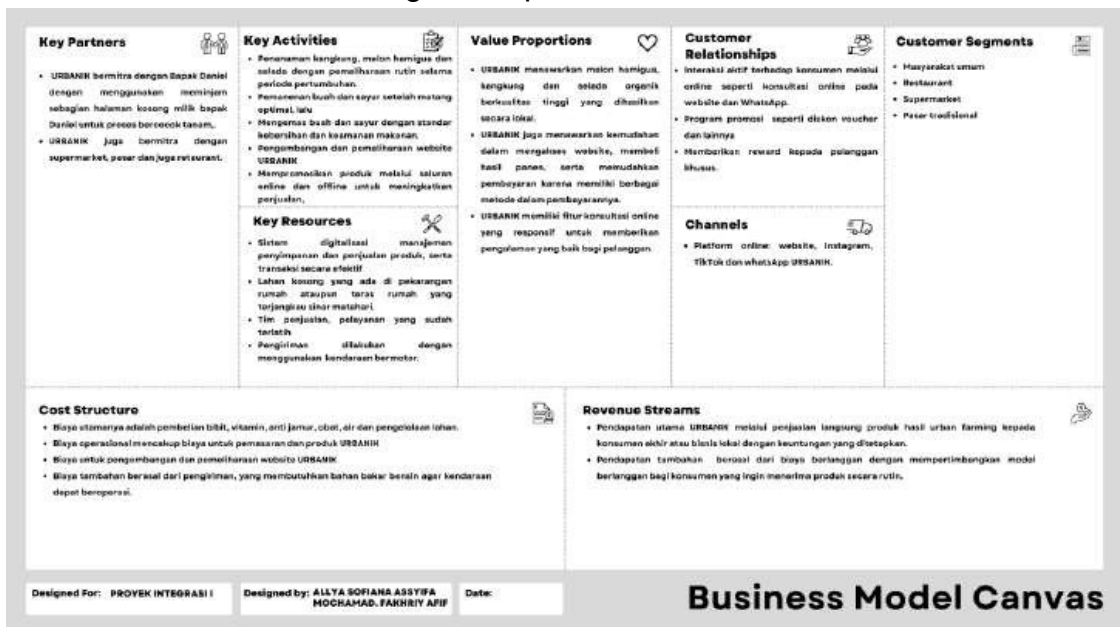

Figure 1 URBANIK Business Model Canvas (BMC)
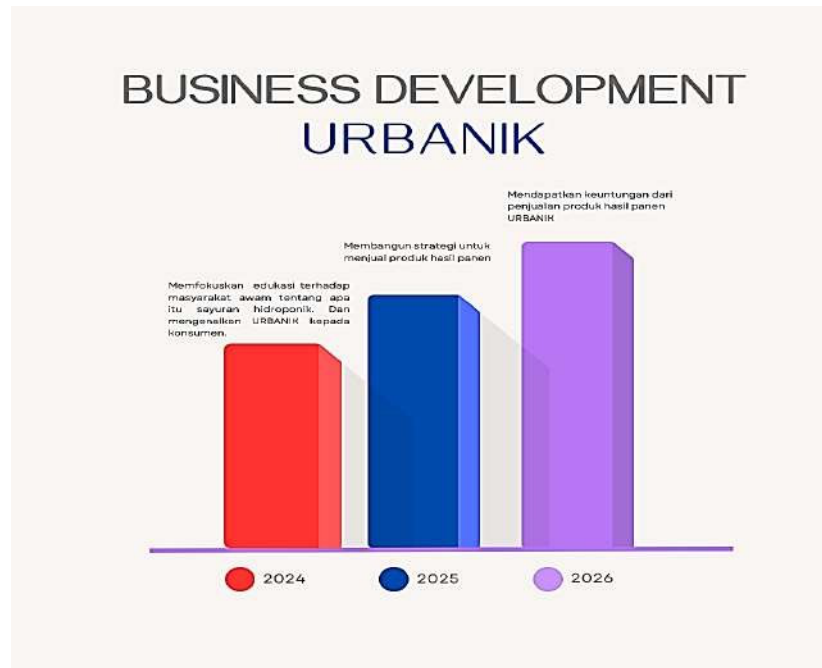
Business Development

Figure 2 URBANIK business development

Figure 2 explains the URBANIK business development plan for the next three years. Business Development creates long-term value for a company through business, market, and customer relationships. It involves strategies to increase market share and brand visibility and build strong customer relationships. URBANIK will focus on educating the public about hydroponic vegetables in the first year (2024), by spreading educational content through social media such as Instagram and TikTok. Only in the second and third years (2025 and 2026) will URBANIK implement its business strategy when the market is ready for the presence of hydroponic vegetables.

Analysis of the running system

Figure 3 explains the flowchart and flowmap of the current system analysis with the aim of evaluating the existing system.
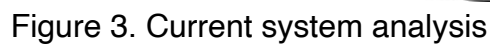
Figure 3. Current system analysis

Analysis of the system to be built.

Figure 4 explains the analysis of the system that will be built if the company wants to develop and design a new system.

Figure 4 Analysis of the system to be built

To cite this document:

Wirati, Triantya Wahyu., Assyifa, Allya Sofiana., Afif, Mochamad Fakhriy. (2024). Optimizing the Digitalization of Storage and Sales of Urban Farming Products as an Effort for Food Security and Improving the Local Economy. *Journal of Digital Business and Innovation Management*, Vol. 3 No.1, pp. 53-61.

Digital Mockup Design

The following is the process of designing and building a digital product for the URBANIK website with a user interface (UI) or user experience (UX) with the aim of making it easy to use, effective and attractive to users. This process uses Figma software.

1. Home Page and Sign In

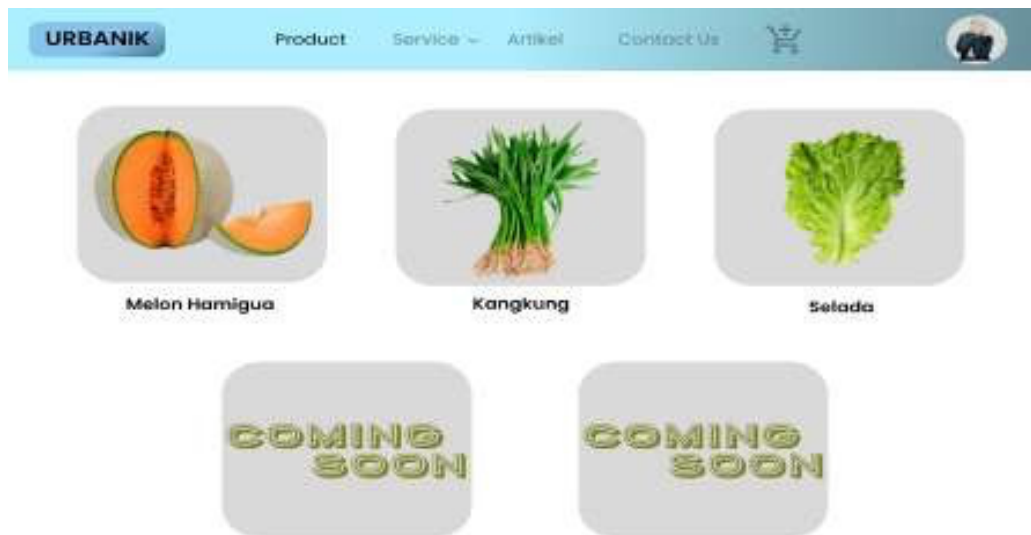Figure 5. URBANIK Homepage   Figure 6. Sign in URBANIK

2. Product Page

Figure 7. URBANIK products
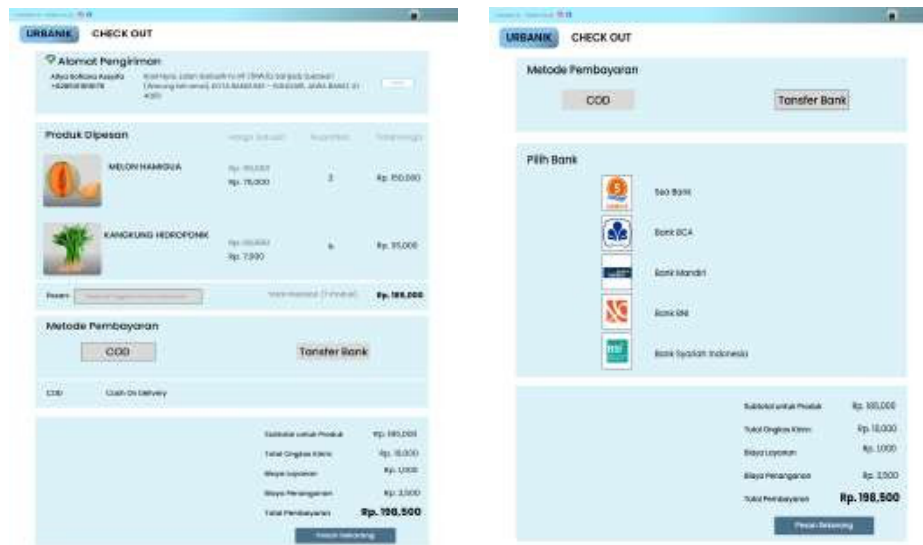
3. Check Out and Payment Method page

Figure 8. URBANIK checkout Figure 9. URBANIK payment method

Figures 5 and 6 show the home page of the URBANIK website and the user registration page. Next, Figure 7 shows the urban farming business product catalogue, and Figures 8 and 9 show the URBANIk product checkout page and payment page which shows partnerships with several bank merchants.
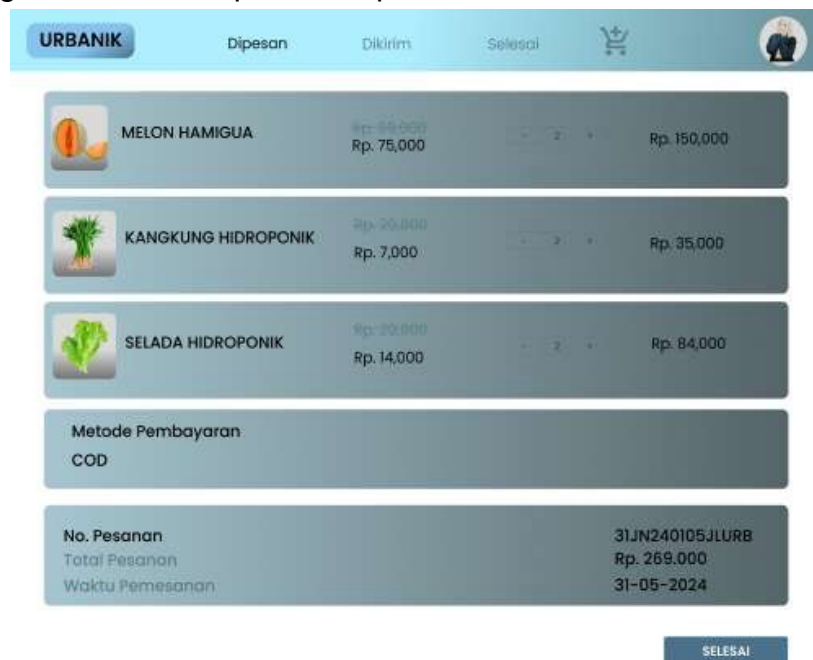

Figure 10. URBANIK storage stock

To cite this document:
Wirati, Triantya Wahyu., Assyifa, Allya Sofiana., Afif, Mochamad Fakhriy. (2024). Optimizing the Digitalization of Storage and Sales of Urban Farming Products as an Effort for Food Security and Improving the Local Economy. *Journal of Digital Business and Innovation Management*, Vol. 3 No.1, pp. 53-61.

Figure 10 shows the URBANIK inventory management page that helps store owners track their inventory directly and in real-time. They can quickly determine the number of goods available, stock status, and the movement of goods in and out of the warehouse. With accurate and immediately available information, store owners can optimize inventory management. They can avoid excessive overstocking or understocking that can lead to lost sales. Accurate information about product availability enables better customer service. Online stores can provide customers with more precise delivery time estimates and avoid unpleasant customer experiences due to unavailable items.

Conclusion

The URBANIK website was designed to address the problems of limited storage space, non-ideal air temperature and humidity conditions during the planting process, and people who do not have time to buy vegetables and fruit at the market. The website presents new innovations in the world of agriculture in an effort to promote food security, so it is hoped that it can help its users meet their food needs.

From a design perspective, this research has limited features (only inventory management, e-commerce, and sales recap features). Therefore, it is hoped that future research will develop a prototype urban farming-based website system that includes features such as plant management, inventory, marketing of agricultural products, integration with meteorological or environmental systems, and real-time monitoring of crop conditions.

Urban farming website designers can review the use of technologies such as IoT (Internet of Things), big data, spatial analysis, and artificial intelligence (AI) in the context of urban farming and evaluate how these technologies can improve the efficiency, productivity, and sustainability of urban farming, thereby resulting in a deeper understanding of how information technology can support and improve urban farming practices sustainably and efficiently.

REFERENCES

Anggraini, S., Sinaga, E., Loso, S., Heirina, A., & Vajri, I. Y. (2024). Z-FARM WISDOM: Menyatukan Tradisi dan Inovasi Pertanian Ramah Lingkungan untuk Generasi Z. *Insight Mediatama*.

BPS. (2023). "Jumlah Rumah Tangga Usaha Pertanian (RTUP) di Provinsi Jawa Barat naik 6,25 persen". *BPS*. Diakses 1 Januari 2024 dari <https://jabar.bps.go.id/pressrelease/2023/12/04/1096/jumlah-rumah-tangga-usaha-pertanian--rtup--di-provinsi-jawa-barat-naik-6-25-persen-.html>

Cambra Baseca, C., Sendra, S., Lloret, J., & Tomas, J. (2019). A smart decision system for digital farming. *Agronomy*, *9*(5), 216.

Firdayani Nasution, Desri Amanda, Aulia Habibi Saputri, Rizki Hambali,

and Suhairi Suhairi. (2023). Implementasi Digital Marketing Pada Analisis STP (Segmenting, Targeting, Positioning). *Jurnal Minfo Polgan* 12(2): 2369–78. doi:10.33395/jmp.v12i2.13274.

Gunawan, Akhmad. (2023). Hubungan Persediaan Dengan Penjualan Pada Laporan Keuangan Koperasi Bukit Muria Jaya Tahun 2021-2022. *Jurnal PBM : Pengembangan Bisnis dan Manajemen* 23XXIII(43): 95–109.

Hidayah, Wahidatul Eny, and Linda Dwi Rohmadiani Rohmadiani. (2023). Analisis Faktor Yang Berpengaruh Terhadap Kawasan Peri Urban Kecamatan Wringinanom. *COMPACT: Spatial Development Journal* 2(1): 31–40. doi:10.35718/compact.v2i1.846.

Hu, Y., Cai, X., & DuPont, B. (2015). Design of a web-based application of the coupled multi-agent system model and environmental model for watershed management analysis using Hadoop. *Environmental Modelling & Software*, *70*, 149-162.

Kaloxylos, A., Groumas, A., Sarris, V., Katsikas, L., Magdalinos, P., Antoniou, E., & Terol, C. M. (2014). A cloud-based Farm Management System: Architecture and implementation. *Computers and electronics in agriculture*, *100*, 168-179.

Kistyanto, A., Hermanto, F. Y., Amirusholihin, A., & Nnamdi, A. O. (2024). Pendampingan Masyarakat Desa Ponokawan dalam Upaya Membangun Desa Eduwisata berbasis Urban Farming dengan konsep Pemberdayaan. *CARADDE: Jurnal Pengabdian Kepada Masyarakat*, *6*(3), 481-489.

Kus Indrani Listyoningrum, Danise Yunaini Fenida, and Nurhasan Hamidi. (2023). Inovasi Berkelanjutan Dalam Bisnis: Manfaatkan Flowchart Untuk Mengoptimalkan Nilai Limbah Perusahaan." *Jurnal Informasi Pengabdian Masyarakat* 1(4): 100–112. doi:10.47861/jipm-nalanda.v1i4.552.

Murti, Fitria Ari, and Hesti Nur'aini. (2023). Pengaruh Teknik Penyimpanan Terhadap Mutu Pakcoy (Brassica Rapa L) Serta Konsentrasi Pakcoy Terhadap Sifat Fisik Dan Sensoris Jus Panas (Pakcoy Nanas). *Jurnal Multidisiplin Dehasen (MUDE)* 2(2): 277–86. doi:10.37676/mude.v2i2.3821.

Rizaty, Monavia Ayu. (2021). "Sebanyak 56,7% Penduduk Indonesia Tinggal di Perkotaan", *Katadata*, diakses 1 Januari 2024 dari < https://databoks.katadata.co.id/datapublish/2021/08/18/sebanyak-

567-penduduk-indonesia-tinggal-di-perkotaan-pada-2020>

Rukmana, Siti Nuurlaily, and Sari Cahyaningtias. (2021). Pola Sebaran Proses Urbanisasi Di Kecamatan Taman, Kabupaten Sidoarjo. *Jurnal Kawistara* 11(1): 17. doi:10.22146/kawistara.63539.

Sahputra, Marwian Aditya, Meriska Defriani, and Teguh Iman Hermanto. (2023). Rancang Bangun Aplikasi Pelayanan E-Trayek Berbasis Mobile Menggunakan Metode Extreme Programming. *Jurnal Teknik Informatika* 2(1): 34–44. doi:10.56211/sudo.v2i1.229.

Saad, M. H. M., Hamdan, N. M., & Sarker, M. R. (2021). State of the art of urban smart vertical farming automation system: Advanced topologies, issues and recommendations. *Electronics*, *10*(12), 1422.

Sari, Diana, Rini Suwartika Kusumadiarti, and Erix Gunawan. (2023). Perancangan Sistem Informasi Index Penyakit Pasien Rawat Inap Menggunakan Microsoft Visual Studio 2010 Di RSUD H. Bob Bazar, SKM. *Jurnal Ilmiah Hospitality* 12(1): 279–90. http://stp-mataram.e-journal.id/JHI.

Septya, Fanny, Rosnita Rosnita, Roza Yulida, and Yulia Andriani. (2022). *Urban Farming* Sebagai Upaya Ketahanan Pangan Keluarga Di Kelurahan Labuh Baru Timur Kota Pekanbaru." *RESWARA: Jurnal Pengabdian Kepada Masyarakat* 3(1): 105–14. doi:10.46576/rjpkm.v3i1.1552.

Setyowati, L., & Apriliyanto, R. D. (2024). Peningkatan Umkm Lokal Berbasis Digitalisasi Dan Publikasi Eco Green Di Perumahan Pln Surabaya (Kel. Petemon, Kecamatan Sawahan, Kota Surabaya). *Multidisiplin Pengabdian Kepada Masyarakat*, *3*(01), 6-17.

Surls, R., Feenstra, G., Golden, S., Galt, R., Hardesty, S., Napawan, C., & Wilen, C. (2015). Gearing up to support urban farming in California: Preliminary results of a needs assessment. *Renewable Agriculture and Food Systems*, *30*(1), 33-42.

Terribile, F., Agrillo, A., Bonfante, A., Buscemi, G., Colandrea, M., D'Antonio, A., & Basile, A. (2015). A Web-based spatial decision supporting system for land management and soil conservation. *Solid Earth*, *6*(3), 903-928.

Waluyo, Mohammad Rachman, Nurfajriah, Fajar Rahayu I Mariati, and Qisthi Al Hazmi Rohman. (2021). Pemanfaatan Hidroponik Sebagai Sarana Pemanfaatan Lahan Terbatas Bagi Karang Taruna Desa Limo. *Ikraith-Abdimas* 4(1): 61–64.