JOURNAL OF TOURISM, HOSPITALITY AND ENVIRONMENT MANAGEMENT (JTHEM)

www.jthem.com

DEVELOPMENT OF TOURISM APPS IN IMPROVE THE ECONOMY OF ASNAF BUSINESSES IN PERLIS

Muhammad Nurfiqri Mohd Hajar[1*], Fatimah Noni Muhamad[1], Zati Hanani Ismail[1]

[1] Faculty of Business & Management Sciences, Universiti Islam Antarabangsa Tuanku Syed Sirajuddin (UniSIRAJ), Malaysia
Email: nurfiqri@unisiraj.edu.my, fatimahnoni@unisiraj.edu.my, zatihanani@unisiraj.edu.my

[*] Corresponding Author

Article Info:

Abstract:

The years 2024-2025 are established as the year to visit Perlis as part of the eco-tourism effort by the Perlis state. Therefore, a study on the effectiveness of the proposed establishment of tourism apps towards the development and economic impact of SME Asnaf Perlis has been proposed. The concept of smart Tourism has become crucial after the launch of the National Tourism Policy (NTP) 2020-2030 on the 23rd December 2020, to ensure the continuity of the country's tourism industry and to turn Malaysia into a preferred tourist destination globally. In this policy, the Transformation Strategies are to embrace 'Smart Tourism', a concept that combines information and communication technologies (ICTs) with tourism to improve visitor experience, efficiency of tourism operations, and to support sustainable tourism development (Gretzel et al., 2015). Input regarding Asnaf Perlis's SME businesses will be added to various applications per the study's findings, which will help the targeted community drive their business to success and the effectiveness of these apps regarding their business development.

Keywords:

Tourism, Economic, Asnafpreuner, Technology

Introduction

Perlis, known for its natural beauty and panoramic landscape, has opened up new opportunities to make the state more well-known through the economic sector related to the tourism industry. This is done by helping the asnafpreneur group in Perlis. SunDaily stated that Raja Muda Perlis, Tuanku Syed Faizuddin Putra Jamalullail, has decreed that the people of Perlis are indirectly the ambassadors of Visit Perlis Year 2024-2025 and need to play their respective roles positively. Tourism Malaysia also launched the Perlis Ecotourism Package as an initiative to

introduce the state as one of the ecotourism destinations in Malaysia, thus energising the Visit Perlis Year 2024-2025 campaign. Tourism Malaysia director-general, Datuk Dr Ammar Abd Ghapar, said that the launch of the ecotourism package is also a preparation to promote the Visit Malaysia Year, which sets a target of 26.1 million foreign tourists, with an estimated domestic expenditure of RM97.6 billion.

According to Meerangani et.al (2022), the Industrial Revolution 4.0 has contributed to the rapid development of information and communication technology, positively impacting human life. This development has indirectly contributed to global and national entrepreneurship changes, especially in the digital domain. Digital platforms increase business growth, especially among SMEs (Meerangani et al., 2022). In line with the needs of technological development today, using mobile applications for daily affairs has become a significant matter. The importance of the ever-growing development of the 4.0 industry revolution must be explored together. To prevent the occurrence of setbacks for a locality, the use and application of sophisticated technology is very appropriate.

The tourism sector stands out as one of the factors that drives the economy's growth in any location. Through this study, the relationship between the applications of technology to the tourism sector and the local community's economic development is shown. It is expected to provide impact and convenience in easing the burden of society, especially for the people of Perlis itself. The question of what and to what extent its effectiveness is the measure of this study. A study by Rashid et al. (2019) stated that the impact of Industrial Revolution 4.0 (IR4.0) has transformed the world into a world without borders, i.e., globalisation, which has significantly impacted nearly every operating industry worldwide to remain competitive globally. The setting off of speed, efficiencies, infinity in widespread and the full impact of information and communications technology (ICT) has become fundamental and essential for today's human communication. ICT is widely used regardless of distance or time. The cyber era is also defined as everything belonging to everyone. This is no exception in tourism communication (Rashid et al., 2019).

Problem Statement

TravelWeeklyAsia (October 2022) states, "However, Perlis faces significant challenges in ramping up tourism. Infrastructure constraints such as the lack of air connectivity and limited accommodation options deter more travellers from visiting the state". Visitors can drive or take the Electric Train Service (ETS), which connects Kuala Lumpur to Padang Besar for under six hours. For air travel, the Sultan Abdul Halim Airport in Alor Star, Kedah, serves as the main gateway, though this still requires travellers to hire a car or make other land arrangements for the one-hour journey to Perlis. Second, the absence of a large hotel may deter group tours or conferences from choosing Perlis as their preferred destination. The two- and three-star Seri Malaysia Perlis and Putra Regency Hotel have just under 300 rooms combined. Other lodging options are small operators running motels and homestays.

Small and medium-sized enterprises with inadequate digital tools struggle with the demands of storing and managing massive amounts of data effectively. Unlike their digitally empowered counterparts, the latter is essential for well-informed decisions and tailored customer interactions. In essence, the lack of digital tools prevents SMEs from adopting modern business practices and reduces their capacity to flourish in a world that is becoming more digital. In the following sections, the study examines how to overcome these obstacles to implement digital

transformation successfully. SMEs must attract and retain employees with the technical know-how necessary to guide their digital transformation. The lack of such experts hinders the adoption of transformative technologies, leading to lost chances for innovation and efficiency gains. The very expense of finding and compensating digital talent increases the complexity of this issue, frequently forcing SMEs to put off or postpone technological advancement.

Literature Review

The Use of Apps in Business Performance

In the era of Industry 4.0, advanced technologies such as digitalisation, big data, blockchain, Artificial Intelligence (AI), and the Internet of Things (IoT) are seen as essential tools for promoting sustainability within the circular economy. These technologies—including robotics, machine learning, and user-friendly human interfaces—are helping to make circular practices more efficient and effective. By integrating innovation into business models, Industry 4.0 is driving the transformation needed for circular economy initiatives to thrive (Alkaraan et al., 2023; Laskurain-Iturbe et al., 2021).

According to Salesforce (2018), buyers view mobile applications (apps) as a more valuable tool for decision-making. In a survey of 489 buyers, nearly one-quarter indicated engagements with suppliers via mobile apps to learn about goods or services and the continued usage of apps during the post-purchase period (Marketo, 2017). The shift in the usage of mobile apps is consistent with the rise of more tech-savvy and younger buyers (Swani, 2021). Mobile apps could assist the SMEs through various aspects; increasing business penetration, higher sales, enhanced cooperation with customers and suppliers, improved image of the company, speedy operation, and better productivity of workers (Rahayu & John, 2016; Talwar et al., 2020; Talwar et al., 2020; Talwar et al., 2020). It is commonly accepted that smartphone application use in SMEs will significantly contribute to business growth. In the context of a mobile app, pragmatic factors such as reliability, customizability, accessibility, gratification, and ease of use have been highlighted as the central factors in delivering a positive customer experience (Magrizos, Apospori, Carrigan, & Jones, 2020).

A mobile app can represent SME products through emotional development and social learning, focusing on the products' subjective and specialised features. As such, mobile apps significantly influence consumers' buying decisions about SMEs' products and services. Mobile apps are end-user software applications developed for a mobile operating system that expand the handset's functionality by allowing users to perform specific activities, such as searching for information and social interaction. Tectonic trends in digitalisation through mobile applications and consumer interaction via diverse social media networks have created convincing channels for SMEs to deliver an efficient business model due to improved and simpler user/customer data collection and enhanced productivity in customer support, virtual collaboration, and electronic payment. A good mobile-app-driven business method focuses on a more creative and competitive strategic business ideology that can support and direct SME businesses in an innovative, profitable, and sustainable manner (Gomeseria, 2019). The rise of Industry 4.0 has made digital technologies a key foundation for businesses striving to stay competitive (Govindan, 2023; Govindan & Arampatzis, 2023). Embracing digitalisation is no longer optional—it's now a top priority for improving both efficiency and productivity. To successfully expand and speed up the adoption of the circular economy on a global scale, businesses must adopt innovative and integrated models that fully leverage digital tools such

as the Internet of Things (IoT), mobile applications, artificial intelligence, cloud computing, and machine learning.

The Use of Apps in Promoting the Tourism Sector

According to Mickaeil (2011), among the business apps, travel applications are the seventh most popular category of most downloaded apps, and 60% of travellers use mobile apps while travelling. Liu et al. (2019) have listed six indicators of mass media use that influence the selection of tour destinations: the destination of the tour visit, transportation, accommodation, food, and tourism activities such as shopping and leisure activities. Numerous studies have identified the impact of using mobile applications in a tour. However, no other studies have highlighted the weaknesses of mobile applications in a tour session. The Voon et.al (2017) study examined whether mobile applications in tourism are a device that becomes a necessity in the tourism sector. This has been proven by the passage of time that mobile development is rapidly expanding, and mobile phones have become necessary for tourists.

The study by Kennedy and Gretzel (2012) concludes that using mobile applications as a whole involves developing a taxonomy of mobile apps in tourism from two perspectives. First, the taxonomy of services-related applications has identified seven categories: navigation, social, mobile marketing, security/emergency, transactional, entertainment, and information. Second, the taxonomy based on the level of interactivity with mobile applications in tourism is about personal preferences, location, and security, through the web, content addition, aesthetic changes, and those applications that remain the same for everyone. With the availability of mobile applications, all accommodation arrangements, e-banking services, destination location navigation, and transportation, including flight tickets and entry tickets to any tourist or recreational destinations, can be made online. Transportation bookings within the travel destinations can also be booked via mobile applications, destination information is accessible, and food can be booked online without visiting the restaurants.

Some of Malaysia's most trending mobile apps examples are Grab Car, MyTaxi, GrabFood, FoodPanda, Google Maps, and Waze. Tourism applications are important for the enhancement of the tourism industry. Smartphone applications' perceived ease of use and usefulness positively impact consumers (Alghizzawi, Ghani, et al., 2018). Tourism applications that can be accessed through smartphones are the new way of marketing for the hotel industry and tourism agencies like Wego, Booking, and TripAdvisor (Morosan & DeFranco, 2016).

Digital Advancement in Supporting SME's (Asnafpreneur)

By shifting to digital platforms and embracing modern technologies, many entrepreneurs are successfully transforming traditional business models into more dynamic, profitable ones that better align with current market needs (Tasnim et al., 2023). Technology and digital media, especially for marketing and operations, allow entrepreneurs to reach wider audiences, boost sales, and lower operational costs more effectively. Digital tools support key functions like spreading information, promoting products, and handling payments—making them indispensable in modern entrepreneurship. Platforms like Facebook, Instagram, TikTok, and YouTube are now powerful tools for business growth, while online marketplaces such as Shopee and Lazada continue to attract a growing customer base. Additionally, services like Foodpanda, Lalamove, and GrabFood have become important players in the digital business ecosystem. Notably, small and medium enterprises (SMEs) in rural areas have seen up to a

30% increase in sales annually when they engage in initiatives like the Rural Entrepreneur Digitization Program (Program Pendigitalan Usahawan Desa, PPUD) (Tasnim et al., 2023).

Digital online platforms, such as Amazon, deliver several e-commerce variants, including business-to-business (B2B), business-to-consumer (B2C), and even consumer-to-consumer (C2C) (P´olvora et al., 2020b). Hundreds of SMEs, startups, and partners use Amazon Web Services to launch and scale their companies. Such technological pioneers generate tremendous economic benefits, and with their inventions, they delight consumers. Jeff Bezos left his job at D. E. Shaw and founded Amazon in 1994 (Bezos & States, 2019). Amazon's website was released in July 1995, following a year of software development by a team of 10 staff. From the outset, Bezos's corporation concentrated on making e-commerce attractive, safe, and convenient for first-time internet shoppers. The enterprise was not competitive until 2001 and faced some financial challenges after becoming profitable. However, by the third quarter of 2016, it was the fourth most successful listed corporation in the United States. Amazon formally entered the Indian market on June 5, 2013, though its presence in the country was limited to serving as a pure marketplace, connecting domestic merchants with commercial customers. Amazon promotes SMEs as a fundamental component of its business and as extensions of its customer-centric culture. Omar et al. (2019) stated that digital technology is a platform capable of increasing the marketability of a product and innovation up to the global level.

Research Methodology

Research Design
The study "Development of a Tourism Application to Support the Economy of Asnaf Businesses in Perlis" employed a qualitative approach to explore users' detailed experiences, views, and recommendations regarding using a mobile application focused on tourism. Given the study's objective—to explore how digital interventions can support the economic activities of marginalised groups like the asnaf—, qualitative methodologies are appropriate because they capture depth and meaning in human experiences. The research framework directing the study is constructivist, viewing knowledge as socially created and understood by individuals. This model is ideal for examining human behaviour as it allows researchers to investigate the personal meanings that participants connect to their experiences with the treatment. A qualitative approach is most suitable for this research, as it allows for in-depth exploration of participants' subjective experiences and feedback, which are crucial in understanding how digital applications are perceived and utilized in a tourism context (Creswell & Poth, 2018).

Sampling Method
The sampling technique employed is purposive sampling, which is appropriate for qualitative studies where participants are deliberately selected based on their relevance to the research topic (Patton, 2015). This intentional sampling approach is utilised to guarantee that the participants possessed pertinent knowledge in tourism and technology, making the data richer with contextually relevant knowledge. Respondents participated in the study, comprising three tourists from each of the three key districts in Perlis (Arau, Padang Besar & Kangar).

Data Collection Method

The study employed a semi-structured interview approach that combined structure and flexibility. This allowed the researcher to provide guidance on appropriate subjects while allowing participants to elaborate on aspects they perceived to be important. The interview guide consisted of four main sections: experience using the application, opinions about its usability, satisfaction and areas of improvement, and perceived effects on tourist behaviour and attitudes. These segments are designed to give an overall picture of the application's usage, perception, and impact among users and the local tourism environment. The interviews were carried out with nine participants who were particularly chosen from three major Perlis tourism areas—Kangar, Arau, and Padang Besar.

Data Analysis

To analyse the data, the researcher used thematic analysis, a widely accepted method in qualitative research for identifying, exploring, and reporting patterns in data. Thematic analysis was carried out using Atlas.ti version 24, a computer software specifically designed for handling complex qualitative datasets. Data analysis began with verbatim transcription of interview audio recordings, followed by coding—labelling specific data segments with labels that capture their content. These codes were then sorted and categorised into broader themes: Application Usage, Benefits, Feedback, Suggested Improvements, and Effects of Usage. To allow for visual organisation and interpretation, each theme was coded with a colour code (e.g., green for application experience, red for behavioural impact), allowing the researcher to map responses across themes and respondent groups effectively.

Trustworthiness of Study

The study employed various validity methods to increase the credibility and trustworthiness of findings. Data triangulation was performed by procuring information across three geographically different regions within Perlis, thus providing a broad perspective. Two, member checking was employed wherein participants were invited to confirm whether conclusions from their responses reflected accuracy, minimising researcher bias. In addition, a record of coding strategies, theme development, and interpretive choices was kept to guarantee confirmability and dependability. In general, employing a high-quality and ethically sound qualitative method allowed the researchers to develop deep, knowledge-rich insights into the usability, effectiveness, and impact of an application designed to support asnaf entrepreneurs. The study demonstrated technological potential regarding local economic development and revealed how high-quality qualitative methods can uncover the concealed realities of local stakeholders' experiences with digital transformation initiatives.

Findings and Data Analysis

This report follows the qualitative research methodology procedures to analyse feedback from respondents who participated in a study on developing a tourism application to support the economic activities of *asnaf* businesses in Perlis. Data was analysed using thematic and content analysis. The interview questions are divided into four main sections:

- **Section A:** Experience Using the Application
- **Section B:** Perceptions of the Application's Functionality
- **Section C:** Satisfaction and Suggestions for Improvement
- **Section D:** Effects on Tourist Behaviour and Perception

In total, **nine respondents** were involved in this study. This sample size is sufficient based on three popular tourist areas in Perlis: **Kangar, Arau, and Padang Besar**. The distribution of feedback for each section of the interview questions is shown in Table 1.

Table 1: The Distribution of Feedback

Interview question section	Number of feedbacks
Section A: Experience Using the Application	12 responses
Section B: Perceptions of the Application's Functionality	12 responses
Section C: Satisfaction and Suggestions for Improvement	11 responses
Section D: Effects on Tourist Behaviour and Perception	8 responses

Data was analysed using **Atlas.ti version 24** software.

Atlas.ti version 24 is utilised to efficiently organise, code, and analyse qualitative interview data. It enabled the researcher to categorise substantial segments of the interview texts using specific codes, organise those codes into themes, and map connections between concepts. The software made it easier to manage large volumes of text, identify response patterns, and ensure a structured and transparent analysis process. Using Atlas.ti, the researcher could efficiently turn raw feedback into meaningful insights about how the tourism application supports *asnaf* businesses in Perlis.

The data was coded based on interview feedback collected by the researcher. Then, the data was analysed according to the codes and themes developed. Themes from each interview response were assigned the same colour codes to ease interpretation.
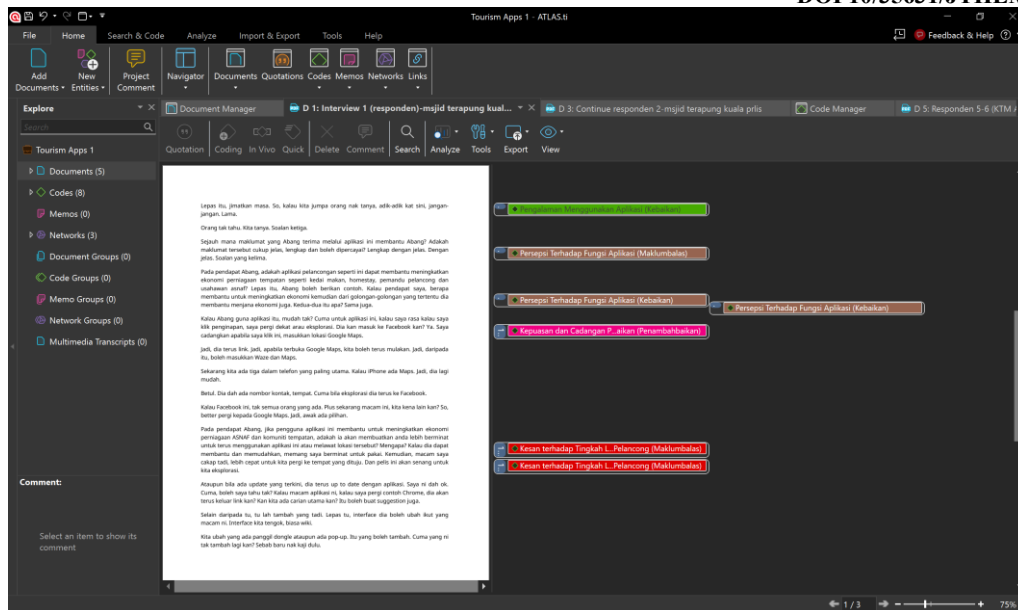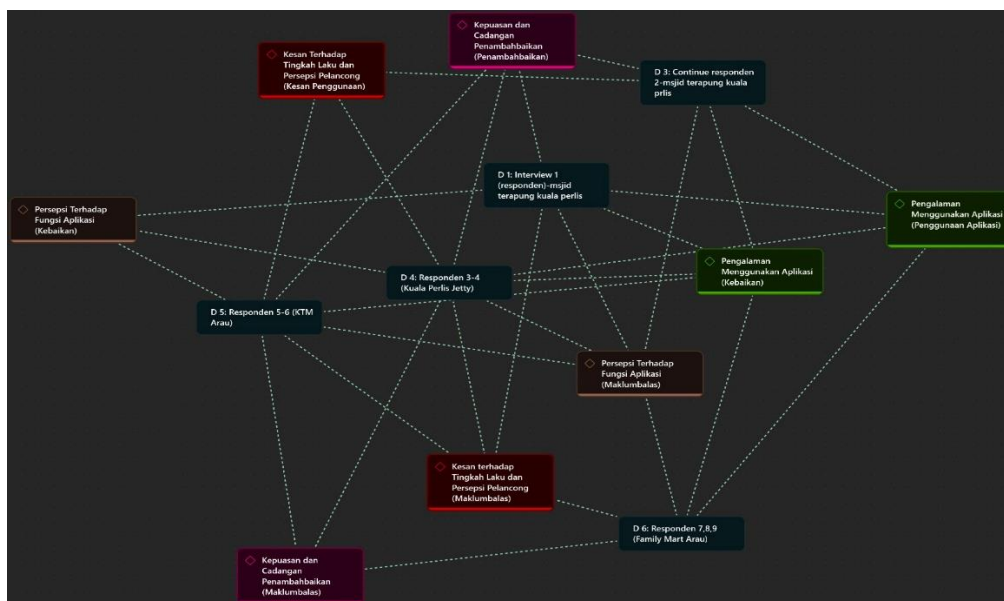
Figure 1: The Development of Codes and Themes

Figure 2: The Network of Themes

- **Green** – Experience Using the Application
- **Brown** – Perceptions of the Application's Functionality
- **Pink** – Satisfaction and Suggestions for Improvement
- **Red** – Effects on Tourist Behaviour and Perception

The findings of the interviews revealed **five (5) primary themes**: Application Usage, Benefits, Feedback, Improvements and Effects of Usage. The details of data analysis coding are shown in Table 2.

Table 2: Data Analysis of the Findings

Themes	Subthemes
Section A: Experience Using the Application (2 Themes)	
Application Usage	a) ”Saya akan guna Google Maps dengan, untuk penginapan, Agoda.” b) ”Selalunya guna aplikasi Google, Google map, mencari hotel tu guna Google booking.” c) ”Selalunya kalau datang Perlis ni kalau nak senang, tengok TikTok lah.” d) ”Saya guna aplikasi seperti Agoda untuk check booking hotel di mana murah, di mana lebih mahal semua.” e) ”Trip.com ke Agoda. Kalau saya, bila ada aplikasi ini, kita jadi macam, kita punya persiapan kita tu tak kalut.”
Benefits	a) “Jimatkan masa.” b) ”Lagi senang lah kalau nak cari maklumat dan semua tu pakai Google dan semua tu.” c) “Saya rasa aplikasi ini adalah aplikasi yang dipercayai.” d) ”Menurut saya, ini lebih mudah.” e) “Tersuai dengan perkembangan teknologi.” f) ”Mudah lah, lagi mudah untuk pakai internet kan.” g) ”Macam bila kita ada aplikasi ni, kita macam, kita tak menyusahkan orang lain.”
Section B: Perceptions of the Application's Functionality (2 Themes)	
Feedback	a) “Lengkap dengan jelas.” b) “Tapi still ada some information tu yang orang kata apa, reliable lah.” c) “Still ada information dia boleh percaya.” d) ”Saya percaya maklumat ni cukup jelas, lengkap dan boleh dipercayai.” e) “Tak berapa lengkap bagi saya.” f) ”Bagi saya, memudahkan lah. Memudahkan lah. Lagi cepat lah kan.” g) “Sangat mudah because nowadays orang dah tak kenal jalan tau.” h) “Dia bagi kita alternative route yang memang helps us untuk accommodate dengan kita punya plan, travel plan.”
Benefits	a) “Membantu untuk meningkatkan ekonomi.” b) “Membantu menjana ekonomi juga.” c) “Yes, mestinya boleh membantu meningkatkan ekonomi semua tu.” d) ”Dapat membantu meningkatkan ekonomi perniagaan.”
Section C: Satisfaction and Suggestions for Improvement (2 Themes)	

Feedback	a)	*"Saya paling suka the fact kat dia provide gambar-gambar tempat tu."*
	b)	*"Jika orang terdekat kita tidak tahu tentang Perlis. Sekurang-kurangnya ada aplikasi ini yang boleh membantu kita. Kita ada aplikasi yang boleh tahu tentang Perlis."*
	c)	*"Dah bagi contoh-contoh dari segi tempat makan."*
	d)	*"Dekat aplikasi ni, dia dah spesifik kan."*
	e)	*"Benda ni bagi maklumat yang jelas lah kat kita."*
Improvements	a)	*"Saya cadangkan apabila saya klik ini, masukkan lokasi Google Maps."*
	b)	*"Kalau boleh tempat makan terus letak map ke. Ataupun letak view ke."*
	c)	*"Letak review terbaik tinggi ke."*
	d)	*"Boleh cuba tambahkan video lagi."*
	e)	*"Cadangan saya ialah maybe boleh letakkan review juga sekali."*
	f)	*"Kalau boleh, kita tekan tempat makan tu. Kalau dia bagi direction terus, tak apa."*

Section D: Effects on Tourist Behaviour and Perception (2 Themes)

Effects of Usage	a)	*"So maksudnya akan membantu-bantu juga orang-orang asnaf tu. Menjadi pendapatan lah."*
	b)	*"Ya, dia membantu saya untuk buat decision dalam saya punya pelancongan sebabnya kalau saya tahu tempat ni macam tak best, saya tak nak nak pergi kan macam bazir masa kan."*
	c)	*"Quite mudah jugalah. At least tak payah try nasib."*
Feedback	a)	*"Kalau dia dapat membantu dan memudahkan, memang saya berminat untuk pakai."*
	b)	*"Dan Perlis ini akan senang untuk kita eksplorasi."*
	c)	*"Bagi saya memang perkara tu akan buat saya lebih ingin menggunakan aplikasi ni sebab saya percaya peniaga-peniaga tempatan semua mereka wajar disokong oleh bukan hanya orang tempatan tapi juga orang luar yang ingin melancong tempat-tempat tersebut."*
	d)	*"Sebab at least saya tahu dengan kita gunanya aplikasi ni. Kita akan dapat bantu juga."*
	e)	*"Pada saya, semestinya lah dia macam bila ada benda-benda gini. Sebab dekat sini dia dah ada list dah."*

Conclusions

From the visualisation of the network, several significant conclusions are derived regarding user comments on the tourism application aimed at assisting *asnaf* companies in Perlis. The map reflects a close connection between respondent groups and central theme zones, the implication being that the answers gathered were complete, diverse, and covered one concern

regarding application performance. The five generic themes found and confirmed by recurring correlations among respondents are application use, perceived functionality, satisfaction, improvement suggestions, and influence on tourist behaviour and perception. Each of the above topics is further divided into subtopics like impact, feedback, and benefits, and it is understood that end-user feedback provides detailed analysis of worth perceived and scope for improvement in addition to overall use.

Besides that, the occurrence of feedback on perceived economic benefits and tourist impact on conduct decides the app's effectiveness in increasing consciousness among people towards local businesses and directing tourist decisions. Notably, locations such as Arau evidenced strong thematic correspondence with feedback and impact themes, which are indicative of possible regional variations in the perception and expectation of users. This geographic response pattern suggests that while the core aspects of the app are enjoyed throughout all regions, region-specific behaviour and preference need to be considered for future development and personalisation.

When all else is controlled, the results show that the app is adequate and helpful in developing local tourism and *asnaf* entrepreneurship. Nevertheless, there is a need for improvement based on customer feedback. The graphic demonstrates that the proposed themes are well-supported and that the presented data captures the diversity of users' experiences by affirming thematic saturation. These findings form a sound foundation for the future technological advancements of the application as well as its application towards local economic empowerment.

Acknowlededgment

References

Alghizzawi, M., Ghani, M. A., & Som, A. P. M. (2018). The role of digital marketing in consumer behavior: A survey. *International Journal of Information Technology and Language Studies*, 2(1), 24–31. Available at: https://www.academia.edu/38907230/The_role_of_digital_marketing_in_consumer_behavior_A_survey

Alkaraan, F., Albitar, K., & Hussainey, K. (2023). Digital transformation and sustainability: The role of Industry 4.0 technologies in the circular economy. *Journal of Business Research*, 156, 113521. https://doi.org/10.1016/j.jbusres.2022.113521

Bernama. (2023, December 5). Healthcare capacity in Perlis needs to be improved - Raja Muda. Bernama. https://www.bernama.com/en/news.php?id=2251345

Bernama. (2023, December 7). Tourism Malaysia launches Perlis eco-tourism package. Bernama. https://www.bernama.com/en/news.php?id=2252064v

Chin, J. L. (2011). Women and Leadership: Transforming Visions and Current Contexts. *Forum on Public Policy: A Journal of the Oxford Round Table*, (2), 1–12.

Creswell, J. W., & Poth, C. N. (2018). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches* (4th ed.). Sage Publications.

Gomeseria, J. (2019). Good mobile app-based eCommerce application. *International Journal of Scientific and Research Publications,* 9(4), 1–5.

https://doi.org/10.29322/IJSRP.9.04.2019.p8813

Govindan, K. (2023). Digitalization in the circular economy: An overview of current research and future directions. *Resources, Conservation and Recycling*, 188, 106678. https://doi.org/10.1016/j.resconrec.2022.106678

Govindan, K., & Arampatzis, G. (2023). Achieving circular economy through digitalization and Industry 4.0: A systematic literature review. *Sustainable Production and Consumption*, 35, 65–82. https://doi.org/10.1016/j.spc.2022.11.014

Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2015). Smart tourism: Foundations and developments. *Electronic Markets*, 25(3), 179–188. https://doi.org/10.1007/s12525-015-0196-8

Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2015). Smart tourism: Foundations and developments. *Electronic Markets*, 25(3), 179–188. https://doi.org/10.1007/s12525-015-0196-8

Kennedy, E. D., & Gretzel, U. (2012). A taxonomy of mobile applications in tourism. *E-Review of Tourism Research*, 10(2), 47–50. Available at: https://www.researchgate.net/publication/272566673_A_Taxonomy_of_Mobile_Applications_in_Tourism

Laskurain-Iturbe, I., Heras-Saizarbitoria, I., & González, A. (2021). Industry 4.0 technologies and circular economy: Exploring the role of digitalization in the transition towards a more sustainable production model. *Journal of Cleaner Production*, 321, 128944. https://doi.org/10.1016/j.jclepro.2021.128944

Magrizos, S., Apospori, E., Carrigan, M., & Jones, R. (2020). The impact of affective and cognitive app experiences on loyalty towards retailers. *Journal of Retailing and Consumer Services*, 54, 102031. https://doi.org/10.1016/j.jretconser.2019.102031

Marketo. (2017, January 17). Marketo survey finds the future of marketing is engagement. PR Newswire. https://www.prnewswire.com/news-releases/marketo-survey-finds-the-future-of-marketing-is-engagement-300399398.html

Ministry of Tourism, Arts and Culture Malaysia. (2020). National Tourism Policy 2020–2030: Executive Summary. Retrieved from https://www.tourism.gov.my/files/uploads/Executive_Summary.pdf

Morosan, C., & DeFranco, A. (2016). It is time to revisit UTAUT2 to examine consumers' intentions to use NFC mobile hotel payments. *International Journal of Hospitality Management*, 53, 17–29. https://doi.org/10.1016/j.ijhm.2015.11.003

Omar, M. K., Azizan, N. A., & Ismail, M. D. (2019). Digital platform potential for asnaf zakat entrepreneurs: A systematic literature review. *International Journal of Academic Research in Business and Social Sciences*, 9(12), 1–15. https://doi.org/10.6007/IJARBSS/v9-i12/6704

Patton, M. Q. (2015). Qualitative research & evaluation methods: Integrating theory and practice (4th ed.). SAGE Publications.

Rahayu, R., & Day, J. (2016). E-commerce adoption by SMEs in developing countries: Evidence from Indonesia. *Eurasian Business Review,* 6(1), 25–41. https://doi.org/10.1007/s40821-016-0044-6

Shahzad, A., Zakaria, M. S. A., Kotzab, H., Makki, M. A. M., Hussain, A., & Fischer, J. (2023). Adoption of fourth industrial revolution 4.0 among Malaysian small and medium enterprises (SMEs). *Humanities and Social Sciences Communications*, 10(1), Article 76. https://doi.org/10.1057/s41599-023-02076-0

Solis, B. (2018, July 11). Mobile is eating the customer journey. Forbes. https://www.forbes.com/sites/briansolis/2018/07/11/mobile-is-eating-the-customer-

journey/

Suriantie, S., & Nor Aishah, H. (2017). The use of social media in enhancing the performance of micro and small enterprises. *International Journal of Academic Research in Business and Social Sciences*, 7(12), 1–10. https://doi.org/10.6007/IJARBSS/v7-i12/3600

Talwar, S., Dhir, A., Kaur, P., & Mäntymäki, M. (2021). Mobile apps for SME business sustainability during COVID-19 and onwards. *Journal of Business Research*, 136, 481–492. https://doi.org/10.1016/j.jbusres.2021.07.045

Tasnim, M., Kamarudin, L. M., Sa'ari, J. R., & Mahamod, M. I. (2023). Digital entrepreneurship transformation in rural areas: A study on Program Pendigitalan Usahawan Desa (PPUD). *Journal of Entrepreneurship and Business*, 11(1), 34–48. https://doi.org/10.24191/jeb.v11i1.21543