Application of The Unified Theory of Acceptance and Use of Technology Method to Analyze Customer Acceptance Level of Electronic Parking Payment Systems

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Abstract

This research aims to find out which variables most influence user acceptance of electronic payment systems. Researchers used a quantitative approach in their research. The students who used motorcycles and electronic payment methods made up the study's population. Sampling strategy that combines purposive sampling with the non-probability sampling technique. There were one hundred responders in the study's entire sample. Researchers used observation, interviews, surveys, and related literature to gather the information they needed for this investigation. The elements that were demonstrated to have an impact on users' acceptance of electronic payment systems were behavioral intention, use behavior, social influence, performance expectancy, effort expectancy, and facilitating conditions, according to the research findings. The variable that most influences user acceptance of electronic payment systems is facilitating conditions for use behavior, which shows that users repeatedly use electronic payment systems because the management has adequate facilities and infrastructure and is commonly used in other public parking lots, such as card readers for tapping in and exit parking, as well as staff who help if there are difficulties and sufficient knowledge in using them.

Keywords: User Reception, Parking, Electronic Payment Systems.

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1. Introduction

The world of modern technology has now developed very rapidly. Many new discoveries and innovations are starting to be developed and have a significant impact on various aspects of life. People in the modern era now need technological assistance to make it easier for them to carry out their daily life activities. One of them is the ease of making payments [1]. Currently, society needs an effective and efficient payment system, and along with technological developments, there is a shift in payment systems from conventional systems to electronic systems. This electronic payment system is starting to be used for every transaction, one of which is parking payments [2]. The electronic payment system is an innovation in payment instruments that originally used cash to become electronic money (e-money), which is more efficient and economical. Non-cash payments are made without using physical money as a means of payment but with electronic (non-physical) money using an inter-bank or intra-bank transfer system via certain software, payment cards, and electronic money [3]. This payment system has several main components that support it, including the money transfer application, network infrastructure, regulations, and procedures that manage the system [4]. Based on data from Bank Indonesia (BI), in 2022, the amount of electronic money circulating in Indonesia was 575.3 million units, which increased by 35% in 2022 to more than 700 million units [5]. This means that many Indonesian people have started to switch to using electronic payment systems in their daily lives [6].

Indonesia is now faced with a phenomenon, namely the demographic bonus, which will reach its peak in 2045. This phenomenon occurs when the number of people entering productive age is greater than the number of other older people [7]. Indonesia's population in 2024 will be 274 million people, with 188 million Indonesians entering the productive age category (15–64 years). Then, in 2025, the population of Indonesia will be 275 million people, with 189 million Indonesians entering the productive age category (15–64 years) [8]. This means that there will be an increase in the number of people of productive age by 1.8 million people [9]. Total vehicle ownership in Indonesia in will increase to 150 million units from the previous year [10]. Generally, motorized vehicle users are in the productive age category [11]. Currently, the number of productive people in Indonesia is quite high, so the
need for parking facilities is increasing to support activities, especially in urban areas [12]. This has resulted in many green open spaces being converted into parking lots, office buildings, and others [13]. Parking is one of the facilities that is needed as a place to store motorized vehicles, but parking management is often a problem. Therefore, a company is needed that can manage parking effectively and efficiently [14].

Many Indonesians own motorized vehicles, including students, where students are in the productive age category. Generally, students often use motorbikes as a means of transportation to support learning or other activities. On campus, students need a parking space to park their vehicles, but problems often occur, namely a lack of space and the absence of a helpful parking manager or system [15]. So a campus needs good parking system management so that academic community activities are not disrupted [16]. Vehicles without good management can cause traffic jams in an area, so vehicle activities do not run smoothly [17]. Congestion conditions in a traffic flow often occur in the morning and evening due to the large number of students who are active at that time [18]. However, there is quite a long queue that occurs during student home time, namely in the afternoon, where every student has finished their activities on campus at the same time and wants to go home through the exit [19]. The large number of students at the same time and the lack of facilities at the campus exit resulted in long queues. The transaction time required for one vehicle is quite long, so effective and efficient parking payment system management is needed. Therefore, the campus is collaborating with a parking management company, in order to create a parking payment system that runs effectively and efficiently [20].

The previous parking payment system still used conventional methods, which made transactions slow and inefficient, so Green Parking started implementing an electronic payment system to reduce this. The cards that can be used for electronic payment systems are those from BRI (Brizzi), BCA (Flazz), and Mandiri (E-Money) banks [21]. Based on an interview with the Director of Green Parking Operations, there are still problems with the implementation of the electronic payment system, namely the ineffectiveness of the socialization carried out so that the information received by students is incomplete and the lack of facilities that support this electronic payment system [22]. Students as users experience difficulties in using it because, when they want to make a payment, they have to register a card first so they can use the system at the same rate [23]. Then there are no facilities for purchasing cards and refilling balances, which creates problems when parking payment transactions take longer. So there is an indication that there is a lack of student acceptance of switching to using this system [24]. So further research is needed regarding user acceptance of electronic payment systems for parking on campus to overcome this problem. This aims to find out whether the payment system has been implemented well and can be accepted by users [25].

A paradigm for examining assessments of the degree of acceptance in a system is called the Unified Theory of Acceptance and Use of Technology (UTAUT). Information technology user behavior is explained by UTAUT. Theory of Planned Behavior (TPB), Combined TAM and TPB (C-TAM-TPB), Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT), Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM) and Motivational Model (MM), Theory of Planned Behavior (TPB), and Social Cognitive Theory (SCT) are the eight models that have been successfully developed previously and combined into this one [26]. UTAUT is a well-known theory that is frequently used while performing user acceptance study on IT. User acceptability plays a significant role in how well a technology is implemented. The hope that arises from a group of users to optimize the use of information technology (IT) packaged to facilitate their job can be understood as user acceptance. A major issue for the parameters of a new technology's successful use is user acceptance [27]. Even when the new technology will benefit the user personally, there are situations when users choose not to use the information system that has been made available to them [28]. As a result, a key element in assessing the success or failure of an executed technological project is user acceptance [29].

An information system can be defined as a system in an organization that combines the needs for carrying out daily transactions, assisting operational processes, and supporting managerial and strategic activities in the organization by providing output that can be related to certain external parties in the form of necessary reports [30]. Apart from supporting decision-making, coordination, and supervision, information systems can help managers analyze problems and visually depict complex problems. The information provided by an information system explains one of the main systems that can be seen from what has happened in the past, what is happening, and what may happen in the future. The use of IS can provide many benefits, both for organizations and companies and for individual users [31]. The benefit of using IS for companies is that it can increase the company's competitive advantage. Companies can obtain relevant, accurate, timely, and complete information needed by the company based on the company's internal and external environment. Meanwhile, for individual users, the use of SI can provide benefits, namely maximizing work productivity, output quality, and work effectiveness [32]. In addition, companies implement information systems (IS) in the long term for several reasons, such as to reduce costs, increase production without large increases in costs, and improve the quality of services or products. User acceptance of the new IS is a major factor in the success of information system users. If users do not want to accept the new SI, of course, this will not provide full benefits to the company. On the other hand, if there is greater acceptance from
users, there will be more desire from them to make changes to their practice and to use it more optimally when starting to use a new IS [33]. Parking is a condition where a vehicle is not moved, which is not temporary. In other words, parking is any vehicle that is not moving in a certain position in a certain place, whether there are traffic signs or not. The value of the money is entered into the value of money in electronic money media, which is stated in Rupiah units, and is used to carry out payment transactions by directly reducing the value of money in the electronic money medium [33]. Electronic money is an electronic means of payment that is obtained by first depositing a certain amount to the issuer, either directly, through the issuing agents, or by debiting an account at a bank. Electronic money is defined as money that is linked to a computer network and the Internet and is kept on a chip, also referred to as RFID (Radio Frequency Identification) [34]. Attaching the card, which is a type of electronic money, to an EDC (Electronic Data Capture) device is how transactions using electronic money are made. The card that replaces your cash has the previously mentioned RFID chip inserted in it. It is linked to the Internet and a computer network for digital media storage through the use of EFT (Electronic Funds Transfer) [34].

Using radio waves, radio frequency identification technology, or RFID, is an object identification technique. The identifying procedure is carried out using an RFID transponder (RFID tag) and an RFID reader [35]. An object or things to be identified are given RFID tags. No two RFID tags have the same ID number since each one has a unique identifying number (ID number). RFID is a component of automatic identification (Auto-ID) technology, which is currently increasingly popular across a number of industries, including manufacturing, services, and purchasing. When compared to traditional barcodes, RFID (radio frequency identification) technology has the advantage of using wireless data transmission instead of optics [36]. It can also perform many-to-many communications, meaning that multiple readers can read a single tag or a single reader can read multiple tags. So this system promises prospects for various needs, especially in industrial circles, such as library management, pharmaceutical inventory management, supply chain management, smart cards, and many more.

2. Research Methods

Researchers used a quantitative approach in their research. The quantitative approach that researchers use has two stages, namely data collection and analysis. The first method is data collection, carried out through surveys and distributing questionnaires indirectly. With the aid of Google Forms tools for filling it out, the questionnaire was distributed indirectly through social media, specifically via WhatsApp, Line, Instagram, and other platforms. The second approach is data analysis, which entails applying a number of statistical procedures determined by the model in use. With the aid of SmartPLS version 4 tools, the researcher conducted outer model analysis, inner model analysis, and hypothesis testing after receiving the data from the questionnaire results. Based on the previously utilized hypotheses, the researcher then came to findings and provided recommendations. The students who used motorcycles and electronic payment methods made up the study's population. Sampling strategy that combines purposive sampling with the non-probability sampling technique. This sampling method is thought to accurately represent a population and is based on considerations of the best suitable sample. The total sample in the study was 100 respondents. In this study, researchers obtained the necessary sources of information using related literature, observation, interviews, and surveys. Researchers conducted a survey using a research instrument, namely a questionnaire that had four Likert scales. The questionnaire was created using Google Form as a place to fill in and accommodate answers. In this research, the UTAUT model is used.

3. Results and Discussion

Based on the overall results of the demographic analysis carried out in this research, it was found that the respondents were dominated by women (60%), and the remaining people (40%) were men. This means that female students dominate using electronic payment systems when making parking payments. There were respondents with experience of 1 to 5 years (70%), respondents with experience of 1 year or less (20%), and respondents with experience of 6 to 10 years. (5%) and the rest were respondents (5%) who had experience of > 10 years. This means that students who have experience using electronic payment systems for 1–5 years dominate when making parking payments. Judging from the results of the measurement model analysis of the model used in this research, it can be said that the results have met the requirements at each stage of the test, so it can be It was concluded that the model in this research had good characteristics and was suitable to proceed to the next stage, namely testing the structural model (inner model).

After doing a structural analysis of the model, the t-test results show that the first hypothesis (H1) is true. This is because the t-test relationship between the variables has a value greater than 1.96, which is 4.6, and an effect size value of 0.29, which means the influence is in the middle category. Accordingly, behavioral intention (BI) is moderately influenced by performance expectancy (PE), and as PE rises, BI will also rise, increasing the adoption and usage of electronic payment systems. It may be concluded that there is a significant association between behavioral intention (BI) and performance expectancy (PE) when the path coefficient value is greater than 0.1, namely 0.4. The study's findings indicate that interest in utilizing electronic payment methods is influenced by
performance expectations. This is due to students' perceptions that using an electronic payment system will assist them in a number of ways, including boosting productivity and decreasing mistakes made when parking and making payments when exiting the lot. They therefore want to let other students know that the electronic payment system is functioning properly and use it once more. The hypothesis's outcomes are consistent with earlier studies' findings that behavioral intention (BI) is positively impacted by performance expectancy (PE).

After the model's structural analysis, the t-test results show that the second hypothesis (H2) is true. This is because the t-test relationship between the variables has a value greater than 1.96, at 3.9, and an effect size value of 0.2, which means the influence is in the middle category. Accordingly, effort expectancy (EE) has a medium impact on behavioral intention (BI), meaning that an increase in EE will result in an increase in BI and an increase in the adoption and usage of electronic payment systems. It is possible to conclude that effort expectancy (EE) and behavioral intention (BI) have a substantial relationship when the path coefficient value is greater than 0.1, namely 0.3. The study's findings indicate that interest in utilizing electronic payment methods is influenced by corporate expectations. Students' desire to use the electronic payment system again and tell other students that it is functioning well stems from their perception that it can help simplify and reduce their efforts during the parking process, both in terms of tapping in and for payment transactions when leaving the parking lot. The hypothesis's outcomes are consistent with earlier studies' findings that effort expectancy (EE) positively affects behavioral intention (BI).

After doing a structural analysis of the model, the t-test results show that the third hypothesis (H3) is true. This is because the t-test relationship between the variables has a value greater than 1.96, which is 2.7, and an effect size value of 0.1, which means the influence is small. Accordingly, behavioral intention (BI) is somewhat influenced by social influence (SI), and as SI rises, BI will also rise, increasing acceptance and usage of the electronic payment system. It is possible to conclude that social influence (SI) and behavioral intention (BI) have a strong relationship because the path coefficient value over 0.1, or 0.25, indicates this. The study's findings indicate that interest in using it is influenced by social influence. This is due to the fact that students feel more inclined to use the electronic payment system again and tell other students about how well the system worked when they receive encouraging and positive feedback from those close to them. The hypothesis's outcomes are consistent with earlier studies' findings that behavioral intention (BI) is positively impacted by social influence (SI).

After the model's structural analysis, the t-test results show that the fourth hypothesis (H4) is true. This is because the t-test shows a relationship between the variables with a value greater than 1.96, or 9.1, and an effect size value of 0.858, which means the influence is large. Accordingly, use behavior (UB) is greatly influenced by facilitating conditions (FC), and if FC rises, UB will also rise, increasing the adoption and usage of electronic payment systems in parking lots. It may be concluded that there is a strong association between facilitating conditions (FC) and use behavior (UB) when the path coefficient value is greater than 0.1, specifically 0.66. The study's findings indicate that usage behavior is influenced by enabling factors. The reason for this is that the infrastructure and facilities encourage students to use the electronic payment system. They also believe that the system is frequently used for purposes other than parking and that using it to pay for parking is not difficult. As a result, students are happy to use the system frequently and for other purposes. The hypothesis's outcomes are consistent with earlier studies' findings that facilitating conditions (FC) positively impact use behavior (UB).

After the model's structural analysis, the t-test results show that the fourth hypothesis (H4) is true. This is because the t-test relationship between the variables has a value greater than 1.96, which is 3.4, and an effect size value of 0.09, which means it has a small effect. Accordingly, use behavior (UB) is somewhat influenced by behavioral intention (BI), and if BI rises, UB will also rise, increasing the acceptance and usage of electronic payment systems in parking lots. It is possible to conclude that behavioral intention (BI) and use behavior (UB) have a substantial association since the path coefficient value above 0.1. The study's findings demonstrate how usage behavior when utilizing the electronic payment system is influenced by interest in using. This is a result of the system's high level of service quality. In order to make students feel satisfied when using the system frequently and for other purposes, other students express positive things about the electronic payment system and express a desire to use it during the parking process, both for tapping in and for transaction payment when leaving the parking lot. The hypothesis's outcomes are consistent with earlier studies' findings that behavioral intention (BI) positively affects use behavior (UB).

4. Conclusion

It is possible to draw the following conclusions from the study's findings: It has been demonstrated that performance expectancy, effort expectancy, social influence, facilitating conditions, behavioral intention, and usage behavior are factors that affect users' adoption of electronic payment systems. The variable that most influences user acceptance of electronic payment systems in parking is facilitating conditions for use behavior, which shows that users repeatedly use electronic payment systems because the management has adequate facilities and infrastructure and is commonly used in other public parking lots, such as card readers for tapping entering and exiting the parking lot as well as staff who help if there are difficulties and sufficient knowledge in using it. Parties
planning to conduct additional research on related topics can take into account a number of suggestions based on the findings of the existing research. Researchers are further advised to pay attention to determining the population and sample to be studied so that they are appropriate to the research topic, then review the facilitating conditions and behavioral intention variable indicators, which need to be adjusted in selecting the questions to field conditions.

References


