Implementation of Knowledge Management in the Electronic Parking System for Public Roadsides

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Abstract. Regulation of public roadside parking with knowledge management can help local governments to increase their productivity, performance, and income so that progress and alignment are created under the Local Government Medium-Term Development Plan. The vision and policy direction taken by the local government aims to increase people's welfare based on religious and cultural values. One implementation of knowledge management is the use of an electronic parking system. E-parking or electronic parking is a condition where parking management is carried out systematically using a parking information system. E-parking systems that can be implemented on the public roadside can also increase efficiency in parking transactions. This research was conducted at several public roadside parking points in Ponorogo, Indonesia. The methods are qualitative which in interviews and research team had discussion with the parking attendants and representatives of the Department of Transportation and the Agency for Revenue, Financial, and Asset Management of Ponorogo regarding implementing the E-parking system. This system consists of electronic records with Android-based applications synchronized on website-based applications and using handheld-pos. The results showed that this system could improve the weaknesses of conventional systems and increase the productivity of parking service managers as a form of service to customers.

1. Introduction

Knowledge management is the process of creating, acquiring, understanding, sharing, and using knowledge, wherever it exists, to enhance organizational learning and performance. With knowledge management, core and organizational competencies can be concentrated and developed [1], covering aspects of the organization's core business processes in improving organizational efficiency [2]. Knowledge management is a new concept in the business world. This concept has grown rapidly, especially since the 2000s. The purpose of applying this concept is to increase and improve the company's operations in seeking competitive advantage. Knowledge management is used to improve communication between top management and employees to maintain work processes, inculcate a knowledge-sharing culture and implement a performance-based reward system.

One of the components in implementing knowledge management is the availability of tools as a means for sharing knowledge. The main problem faced by companies in implementing knowledge management systems is that the utilization of human resources and supporting resources is not optimal yet. Therefore, we need a way to optimize human resources as a
Electronic parking is a way of electronically collecting data and parking payments placed on public roads. This method will later realize the Ponorogo Regency Regional Medium-Term Development Plan (RPJMD) from the Regional Levies Sector (PAD) and the Law on Regional Taxes and Levies (2009), Regional Regulation Number 3 of 2016 on Public Roadsides, and the Law on Fiscal Management (2001) in the Ponorogo Regency Digitizing Parking Management Design Documents for Android and Web Applications. PARKIR Knowledge Management in the Electronic Parking System mitigates the problem related to digitization may arise due to the parking fee collection of public roadsides. These challenges can be overcome by implementing knowledge management with the basis for knowledge management. Managing knowledge means using human resources as the main source in improving human performance and productivity which is a significant component of the conveniences for motorists, especially in urban areas with congested road conditions. New challenges may arise in urban areas with the urgency of parking space necessary to manage the potential and actual receipt of public roadsides. In this study, the research question is knowledge management design documents for Android and Web Applications. The results of the research presented in this paper will certainly arise in urban areas with congested road conditions. In this article, The results of this study are knowledge management design documents for Android and Web Applications. The research results can be utilized in the implementation of knowledge management for Android and Web Applications. The rules that are made according to Law Number 2 of 2017 on Changes in the Fiscal System due to Law Number 28 of 2009 on Regional Taxes and Levies can be carried out evenly and does not burden the Local Own-Source Revenue (PAD) revenue for the benefit of an individual or entity as a permit holder to park outside parking types. Then, later the electronic parking can cooperate with banks providing electronic money, like wallets, debit, or credit cards. Then, later the electronic parking can cooperate with banks providing electronic money, like wallets, debit, or credit cards. These challenges can be overcome by implementing knowledge management design documents for Android and Web Applications.
2.2 Information System and Digitalization of Parking Levies Management on Public Roadsides (PARKIR-GO)

2.3 Knowledge Management
Knowledge management has a close relationship with technology. Information and communication technology has become an essential catalyst in developing and implementing knowledge management practices. Technology allows the creation of databases to store knowledge in a structured and organized form. Knowledge management systems such as knowledge database systems, document management systems, or content management systems help collect, store, and manage knowledge efficiently. Technology enables more effective collaboration and knowledge sharing among geographically separated individuals and groups. Collaboration tools such as document-sharing platforms, web-based knowledge management systems, intranets, or communication tools such as forums or instant messaging facilitate communication and knowledge exchange. Technology also plays an important role in searching for and accessing knowledge. The built-in search engine, content indexing, and advanced search features enable individuals to find relevant knowledge quickly and efficiently. Technology can also provide access to knowledge anywhere and anytime via mobile or cloud-based devices. Data analytics and processing technologies can be used to analyze and extract knowledge hidden in large amounts of existing data. Using techniques such as text analysis, data mining, or artificial intelligence, organizations can identify new patterns, trends, and insights useful for decision-making and innovation. Technology also plays a role in supporting organizational learning and training. Learning management systems or online learning platforms allow access to courses, learning modules, and educational resources. Technology also facilitates continuous learning through webinars, video tutorials, or collaborative knowledge-sharing platforms.

3. Research Methods

This study used a descriptive qualitative method, a qualitative descriptive research that analyzes the development of knowledge management for electronic parking planning. Process and meaning (subject perspective) are highlighted in this study. The theoretical basis is used as a guide so that the research focus is in accordance with the facts in the field. In addition, the theoretical basis is also useful for providing an overview of the research setting and as material for research results discussion. In this approach, the researchers created a complex picture, examined words and detailed reports of respondents' views, and conducted studies in natural situations. The research steps carried out were:

- Interview: The author interviewed parties related to the research, including the head of the transportation agency, head of Revenue, Financial, and Asset Management Agency (BPPKAD), coordinator of parking attendants, and the public, who utilize electronic and conventional parking systems on public roadsides. There are 2 service officials and 23 parking attendants.

- Observation: The author conducted observations in a participatory and unstructured manner in the area of public roads.

- Literature Review: The author collected data and documents related to research that support discussions from various sources: journals, websites, books, and others.

4. Results and Discussion
Knowledge management assists in collecting, storing, and sharing knowledge related to the use of parking technology, I think. With well-managed knowledge, organizations can efficiently utilize parking technologies to optimize parking space usage and reduce parking space search time. Knowledge of workflow, software use, and parking management methods, can help design efficient parking systems and reduce congestion in parking areas.
4.1. System Needs Analysis

The system required is a system that can record vehicle transactions entering and leaving the public roadside parking area; the system developed is an integrated web and android based application making it easier to manage. The system can make daily, weekly, and monthly transaction recaps. The system can use cash and electronic money as valid proof of payment. The system must be strong, reliable, real-time, and fast.

4.2. Equipment Needs Analysis

To design e-parking, a system support device is needed, namely a handheld pos, which is used to print parking receipts by parking attendants. Printed evidence containing information on parking time, QR code, rates, and information on public roadside parking fees. In addition, CCTV is needed to periodically monitor the work carried out by parking attendants at predetermined parking points and a personal computer with a minimum specification of 4GB RAM and Windows 10 or Mac OS used by the admin.

4.3. System Specifications

The system developed can be in the form of web and Android applications so that it is easy to carry out maintenance. All software modules must have a User ID with privileges based on the management level in the transportation agency and BPPK AD. All transaction data can be synchronized automatically according to the transaction time. The system can store data on the number of incoming and outgoing vehicles based on handheld pos readings. The system can operate even in a power failure and other technical disturbances. Overall the system needed is a reliable, integrated system, can operate 24 hours, is efficient in the use of resources, can easily troubleshoot if there is a problem, and eliminates dependence on humans as operators.
4.4. Public Roadside Electronic Parking System Flow

To support the smooth running of the system, a system flow is needed to implement the electronic parking system. The general roadside electronic parking system flow can be seen in Figure 1.

Figure 1. Public Roadside Electronic Parking Flow (Parkir-Go)

The Parkir-Go System involves several actors in the flow of the public roadside electronic parking system: users (parking users), jukir (parking attendants), jukir coordinators (deposit recipients), and admins (web and android administrators of electronic parking systems). Each actor has his/her roles, rights, and obligations. Parking users have the right to receive proof of payment and complaint reports and are obliged to pay for parking in accordance with regional regulations. The next actor is the parking attendant. Parking attendants are from the community applying to the transportation agency. Parking attendants have the right to receive parking reports transparently and report on deposit fees transparently to get fair profit sharing.

Then, it is obligatory to record parking and deposit fees to the coordinator in accordance with the assignment letter from the transportation service. Another actor is the Parkir-Go coordinator. The transportation agency can appoint civil and non-civil service coordinators with a work agreement. The coordinator can receive deposit reports from parking attendants according to the agreed time and see progress in real-time with the Parkir-Go application. In addition, the coordinator must record and recalculate deposits to be coordinated with the admin and transportation services. The last actor is the admin. Admins are civil servants from the transportation agency or regional revenue agency. The admin can get parking reports, parking points, levy reports, and progress reports of parking attendants from the coordinator. Then, the admin must set the parking point and the levy rate recorded on the handheld POS held by the parking attendant.

In addition to the public roadside electronic parking flow, the payment flow for the public roadside electronic parking system can be seen in Figure 2.
4.4.1 Cash Payment Scheme

- **Pay cash without electronic proof**
  - Parking User
  - Parking Attendant Inputs the Type of Vehicle
  - Non Cash Payment?
  - Parking User shows the Parkir-Go Card and tap to Parking Attendant
  - Parking Attendant selects the type of vehicle
  - Parking Attendant selects the cash payment option
  - Parking Attendant accepts money from the user
  - Parking Attendant selects finish
  - Parking Attendant shows the transaction code to the user
  - User shows the Parkir-Go Card and continues the transaction via the Parkir-Go handheld POS
  - User receives an electronic proof notification
  - Parking is complete.

- **Pay cash with electronic proof**
  - Parking User
  - Parking Attendant Inputs the Type of Vehicle
  - Cash Payment?
  - Parking Attendant print out the receipt
  - Parking User get the Payment Proof
  - Parking User get the Payment Proof
  - PARKING ATTENDANT

4.4.2 Non-Cash Payment Scheme
Pay cashless

Pay non-cash (parking attendant uses the Parkir-Go application)

Optional: Pay non-cash with no cell phone parking attendant (parking attendant uses QR CODE necklace accessories)
5. Conclusion

By gathering and analyzing existing datasets, we can identify innovation opportunities and challenges. This impact assists organizations in identifying specific technology needs, selecting appropriate solutions, and optimizing operational costs. It also facilitates knowledge sharing and collaboration among individuals and teams, enabling faster implementation and problem-solving.

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