Digital Transformation of Payment Systems Using Field Service Management

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Abstract—Like many other industries, the payment industry has been affected by digital transformation. The importance of digital transformation in the payment industry is very crucial. Because the payment industry is considered a leading industry in digital and emerging technologies, and the digitalization of other industries such as retail, health, and telecommunication, it also depends on the growth rate of digitalized payment systems. One of the technological innovations in service management is Field Service Management (FSM). Despite the widespread use of FSM in various industries such as petrochemical, health, maintenance, etc., this technology can also be recruited in the payment industry, transforming the payment industry into a more agile and efficient one. Accordingly, the present study pays close attention to the application of FSM in the payment industry. Given the importance of merchants' bargaining power in the payment industry, this study aims to use FSM in the digital transformation initiative with a targeted focus on providing real-time services to merchants. The research method consists of three parts. Firstly, conducting the review of past research, applications of FSM in the payment industry are considered. In the next step, merchants' benefits such as emotional, functional, economic, and social benefits in using FSM are identified using in-depth interviews and content analysis methods. The related business model in helping the payment industry transforming into a more agile and efficient industry is considered in the following step. The results revealed the 10 main pillars required to realize the digital transformation of payment systems using FSM.

Keywords—Digital transformation, field service management, merchant support systems, payment industry.

I. INTRODUCTION

INFORMATION technology has grown exponentially and has had a significant impact on organizations and their internal processes. This change in business structure has also impacted societies, and societies have shifted from industrial economies to network (knowledge) economies. This change has meant that organizations' performance is no longer measured solely based on the economy of scale, and the supply of products and services is changed wholly for mass customization and according to the needs of each customer. Information technology helps organizations to use these technologies as enabler tools to achieve organizational goals, which increases the efficiency of organizational processes and, on the other hand, empowers the firm in various areas of business [1].

Information technology has also facilitated the flow of information, reducing the cost of customer access to global markets and increasing their choices. In addition to the industrial economy, which is based on addressing customers' needs and creating new needs for them, this new environment requires a novel approach that focuses on what and how to create value [2]. Creating value without a sustainable business model is complicated and associated with a high probability of failure. Business models fulfill a significant role in transforming organizational resources into economic value. This economic value can be in the form of reduced costs or increased customer-perceived quality in the industry in which the organization operates [3]. That is why the business model's significance has increased over the recent years so that without a business model, technology alone seems to be of little value [4]. The value is created when technology is commercialized through a useful business model [5]. So, in the future, the competition will be concerned with business models, not with products or technologies [6].

The service industries are among the industries that are most affected by changes in the business model. One of the aspects that require innovation in service design and delivery is the aspects that deal with repetitive tasks. By automating repetitive tasks, technicians will improve their performance and service quality by focusing on complex issues. One of the value creation models in this category of service organizations is the value shop model, in which the value of the business model arises from solving customer problems and at the client location [7], [8]. A value shop schedules activities and applies resources in a fashion that is dimensioned and appropriate to the client's problem.

To maximize efficiencies, improve revenues, and enhance customer satisfaction in the service industry, the concept of FSM has been evolved. In FSM, service rendered by sending technicians to client premises/locations to install, service, repair, upgrade some equipment regarding client needs. According to the above definitions, value configuration in FSM can be considered based on the value shop configuration [9].

The payment industry, like other industries, is related to both the supplier-side and the customer-side. Much of the research on digital transformation in the payment industry has been related to evolution by providing customer-side services [10]-[13]. However, it is essential to pay attention to the supply-side as much as the customer-side. In the payment industry, suppliers are the merchants [14]. Merchants are owners of physical devices, such as point of sale terminal (POS terminal), or digital vendors, use internet payment gateways (IPGs), providing payment services to their

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customers. It is the responsibility of the payment service provider (PSP) or PSP contractors to provide services to merchants. If the PSP fails to provide timely support, maintenance services for POS terminals, or IPGs (whether corrective or preventive services), it will promptly face intense pressure from the merchants switching to other PSPs. That is why the digital transformation in the payment industry requires as much attention to the merchant needs. For this reason, this research has considered the use of FSM software for the use of PSPs, intending to solve the problems of merchants in merchants' locations according to the value creation approach of value shop. The goal is to provide support through the FSM software to support all activities related to the provision of field services at every step of the process. Using the features of this software, staff management (recruitment and selection, etc.), as well as task management and empowerment, will be simplified. As a result, the company's overall profit has reached its final level through effective planning and timely scheduling, which in turn leads to increased customer satisfaction. The FSM software has the end-to-end platform feature, which eliminates all the needs of the service provider and the client from an unanswered port and does not require the installation of any other software to provide or receive services.

According to [15], it is crucial to use a holistic approach to develop a business model. Accordingly, we can look at the development of a business model from various perspectives. Therefore, it can be argued that the presentation of a holistic framework for designing a business model that can benefit from the lens of different stakeholders. Considering different stakeholders' views in designing a business model leads to a desirable business model. Therefore, in order to ensure the desirability of the idea, it is necessary to consider the multiple stakeholders.

II. RESEARCH METHOD

Ensuring the desirability of the idea from stakeholders requires a correct definition of the concept of value. For this reason, the in-depth interview (IDI) method has been recruited to define the value correctly. This is how the interview sessions were conducted. Initially, the interview protocol was sent to the experts. Then, as the appointed time approached, the time and place of the interview were announced again. At the beginning of the interview, the interviewees talked about FSM and its benefits for the payment industry. The interviews were then recorded with the experts' consent, and after gathering the information of each expert, the audio files were converted to text and sent to them for approval. Conducting subsequent interviews was subject to the coding of the first interview. After implementing the first interview's audio text, the open coding of the first interview was employed using ATLAS.ti 8 software. The following steps are conducted to define the correct codes.

1. At first, the interviews were carefully reviewed by researchers and two experts in the payment industry.
2. After reviewing the interviews, the open coding of the interviews was done. The interviews' open coding was based on the consensus reached among the researchers and two members of the payment industry to define the codes.
3. The consensus was reached through the following steps: During the initial (open) coding, three fundamental questions were considered: (1) What is the primary concern of the participant (interviewee) in rendering/ receiving payment services? (2) How does FSM address this concern? Moreover, (3) how to address this concern using information systems? These three questions give the analyst valuable insight into the collection of qualitative data. The results of the interviews are shown separately for the stakeholders in Table I.

TABLE I
VALUES OBTAINED FOR EACH OF THE STAKEHOLDER GROUP

Stakeholder group	Value obtained
PSP	Define and design multiple maintenance/support models as a periodic and emergency case, instantaneous monitoring of service and support process, define different levels for accessing the software, receive various reports by creating executive insights by smart managerial dashboards, extract service and merchants knowledge using big data analytics, reducing service delivery costs especially overhead costs, streamlined POS installation and maintenance processes.
Merchants	Real-time and reliable maintenance/support services for their payment infrastructure.
Technicians (payment infrastructure supporter)	Real-time information about the level of performance, instantaneous management of assigned activities, daily settlement, the ability to work part-time, managing personal financial issues using a digital wallet, optimized routing, remote payment devices diagnostics, and locating vehicles.
Supply and deployment unit of PSP	Instantaneous monitoring of vehicles, goods, and materials allocated to technicians, inventory management, checking the history of maintenance, repair, and operations (RMO) goods, checking the history of raw materials, continuous monitoring of MRO's clearance and delivery goods.
The project management unit of the PSP	Project scheduling and time management, automatic assignment of technicians to areas by optimizing routing, effective workforce Planning and Scheduling, managing project logs, and data.
Administrative Affairs and Human Resources of PSP	Finished cost management, technicians wage, and salary management, technicians payroll management, human resource management including recruitment of required human resources, immediate and intelligent withdrawal of technicians, management of technicians contracts, management of technicians violations, evaluation of current technicians performance, motivation and punishment of technicians, real-time performance management of technicians.
Merchant support and care department of PSP	Managing communication with service requesting organizations and reviewing complaints and reviewing them by regulations, following up on complaints immediately and intelligently, notifying instantaneous notifications in the form of online notifications to technicians, the possibility of instantaneous monitoring of technicians' performance.

TABLE II
THREE ELEMENTS OF VALUE CONFIGURATION

Main stakeholder	Value proposition	Value creation and distribution	Value capture
PSP/PSP departments	The proposed system is a smart FSM system in place of the merchant. The most crucial value provided is reducing waste in the provision of installation services and support for payment infrastructure at the merchant location. Reducing overhead costs using optimized scheduling and routing. Managing performance of payment infrastructure technicians in a real-time manner through performance.	Partners' collaboration and critical activities that reduce service costs are classified as follows. Partners: GPS navigation software providers that support optimized routing, banks to provide services for cash-in and cash-out from technicians' wallets, MNOs for providing broadband infrastructure. Key Activities: Provide ongoing training to technicians through the software, 24/7 support service level with optimized scheduling.	Reduce costs and increase revenue by reducing waste of time to reach the merchants' location, reducing the failure rate of payment infrastructure due to improved support cycles/periods, faster installation of equipment, better marketing based on data collected from locations/merchants and technicians, increasing the revenues from the service delivery commission.
Technicians	The transformation from unmotivated forces to motivating forces. The monthly wage of the technicians is fixed in the current situation, but in the optimal case, the monthly wage is changing based on technicians' performance. This approach provides the technician with the opportunity to take advantage of the benefits of "self-help". This business approach allows technicians to perform services at any time and in any place according to the geographical area of their choice.	Partners' collaboration and critical activities that reduce service costs are classified as follows. Partners: GPS navigation software providers that support optimized routing, banks to provide services for cash-in and cash-out from technicians' wallets, MNOs for providing broadband infrastructure. Key Activities: Provide ongoing training to technicians through the software, 24/7 support service level with optimized scheduling.	In this system, technicians use several income methods. They receive payments for their performance, and they will be rewarded if they can participate in marketing services or perform their services, whether installation or repair, with higher quality. Also, providing the right of choice to the support to serve in the desired geographical area.
Merchants	In this system, merchants are more confident in providing electronic payment services. If the carrier needs repairs or support, the nearest support will come to him as soon as possible. Due to the high level of communication between the merchant and the technicians, the merchant can obtain the necessary information from the latest payment innovations and use it in his business if necessary.	Partners' collaboration and key activities that reduce service costs are classified as follows. Partners: GPS navigation software providers that support optimized routing, banks to provide services for cash-in and cash-out from technicians' wallets, MNOs for providing broadband infrastructure. Key Activities: Provide ongoing training to technicians through the software, 24/7 support service level with optimized scheduling.	In this system, merchants can create a leveraging effect on their business by providing reliable payment services to customers. This leverage effect both increases the number of customers and reduces lost sales costs due to the availability of the following.

TABLE III
PROPOSED BUSINESS MODEL

KEY PARTNERS	KEY ACTIVITIES	VALUE PROPOSITION	CUSTOMER RELATIONSHIPS	CUSTOMER SEGMENTS
MNOs Banks GPS navigation software providers	Cloud network management Developing a merchant support system Maintenance of payment devices Continuous training of technicians **RESOURCES** Network of technicians Technical knowledge about payment infrastructure Connected devices	Ability to provide smart support services at any time and in any place Reduce the cost of merchant support services Increase the level of service quality Smart routing to minimize distance costs Ability to define a variety of merchant support schemes Managing performance of payment infrastructure technicians in a real-time manner	Merchant support system Instant notifications Multiple online media to solve customer problems **CHANNELS** Website Customers Portal Applications Social Networks	PSPs Merchants Technicians
COST STRUCTURE			**REVENUE STREAMS**	
Costs include system development, technical infrastructure, physical locations, and support costs, including advertising, marketing, human resources, and business management.			Commission fees (Contract with PSP)	

III. BUSINESS MODEL

The use of IDI discussions declares the stakeholders' point of view about transforming the payment industry using a supply-side approach. When the stakeholders' benefits are declared, they can be used to define each of the three components of the value proposition and configuration part of the business model. These include the value propositions, value creation and distribution, and the capture of value by each stakeholder group [2]. The value proposition makes researchers examine the definition of products and services, provide measurable ecological and social value in concert with economic value, and turn it into a straightforward economic concept from the perspective of each mindset [16]. In addition to the value proposition, the way of thinking about value creation is also crucial. Value creation is at the core of any business model; businesses tend to capture value by pursuing novel business opportunities, new markets, and new revenue stream models built on the employment of business opportunities [17]. Moreover, the value proposition statement can help value how to earn revenues from providing goods, services, or information to users and customers. Therefore, the value proposition statement should be described to encompass three main elements of business models: value proposition, value creation, and value capture. These three elements are described in Table II. The proposed business model is shown

in Table III using the business model canvas [18].

IV. DISCUSSION

After defining the business model, it is necessary to take appropriate measures to implement it. In this article, 10 service components (SC) are considered for the successful implementation of the business model. These 10 SC customize FSM software to meet the needs of the payment industry. Such personalization transforms the supply-side aspect of the payment industry using digital technologies. These 10 SC are shown in Fig. 1.

According to Fig. 1, component 1 is responsible for managing services. Services include three main categories of merchant marketing, installation, and maintenance services in the payment industry. This service can be started by requesting from the PSP or requesting from the merchant. Component 2 is responsible for instantly calling geographic location data along with optimal routing. Location information includes merchant location information and backup. SC 3 manages PSP projects. Projects can be a combination of one or more services (merchant marketing, installation, and maintenance services) defined in the system. SC 4 is the technician's desk management. In addition to viewing the defined and performed services, the technician at the desk can observe the number of points received, and the merchants' satisfaction with their services. Features such as workflow forms, communication with other technicians, and continuous training are other features defined in the technician's desk. SC 5 is a merchant desk that can monitor the status of its requests, check the information of the assigned technician(s), and in the future, be able to define information related to its business such as promotions and campaigns for its customers. SC 6 is a PSP desk that, in addition to defining multiple schemes and projects, can monitor the status of services provided by technicians to merchants. Smart and instantaneous reports and dashboards can provide a good understanding of the state of human resources and PSP infrastructure. SC 7 is financial management. In this service, the technician can use the digital wallet embedded in the software to have personal financial management. The digital wallet allows the technician to cash out daily, use customer club services, and respond to some services such as choosing between various insurance policies. Using advanced technologies in a digital wallet such as Blockchain makes it possible to offer various wallet services for technicians.

SC 8 deals with gamified work evaluation. In this component, the technician's performance is evaluated using gamification mechanisms in the forms of points, scores, badges, leaderboards, etc. Also, the solutions for improving technicians' performance and the models for receiving bonuses and premiums are connected to this gamified system. SC 9 deals with inventory management. This component enables PSP Instantaneous monitoring of vehicles, goods, and materials allocated to technicians, inventory management, checking the history of maintenance, repair, and operations (RMO) goods, checking the history of raw materials, continuous monitoring of clearance and delivery of MRO

goods. SC 10 service also handles workflow management. There are all the steps required to perform maintenance/ support/installation/marketing services in the form of specific workflows that relate to the technician or merchant or the PSP desk. Necessary training files, including video and audio files, are included, and there is the possibility of 24/7 communication in quick troubleshooting related to any of the workflow steps.
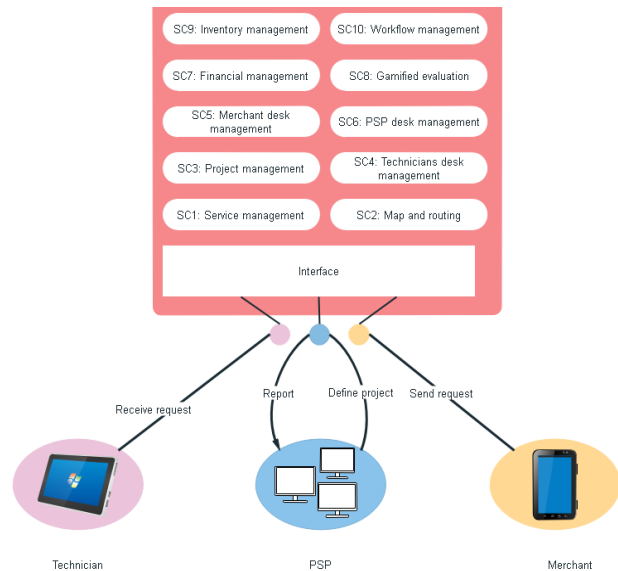

Fig. 1 Proposed service components

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