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SUCCESS DETERMINANTS OF MOBILE PAYMENTS AND SECURITY ISSUES

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Mshvidobadze T. I., Osadze L. T. Success Determinants of Mobile Payments and Security Issues

An important fact related to mobile payments is that adopters have already reached the majority group in more than 47 countries. This paper seeks to identify the main success determinants of firms operating in the segment, looking for relevant characteristics of organizations that are successful in this competitive arena. The research results suggest that companies with organic and flexible structures, open communication qualities, and decentralized decision processes increase their chances of success. Furthermore, the results also show that, given non-impeditive regulations, critical mass and the provision of different services other than the payment choice should be considered by firms operating in the mobile payment segment. Payment systems that allow people to pay using their mobile phones are promised to reduce transaction fees, increase convenience, and enhance payment security. New mobile payment systems also are likely to make it easier for businesses to identify consumers, to collect more information about consumers, and to share more information about consumers' purchases among more businesses. The overall result indicates that organizational resources and management subsystems are relevant to the success of mobile payment enterprises, which usually run as platforms. The paper describes emerging technologies that can benefit mobile payments in terms of usability and security of mobile payments. Despite the convenience, users are wary of potential vulnerabilities, such as data breaches and fraud. As a result, there is an ongoing effort to enhance security measures, including biometric authentication and advanced encryption technologies, to reassure users and safeguard transactions.

Keywords: mobile payments, technology, electronic commerce, transactions, security.

Fig.: 1. **Bibl.:** 19.

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Мшвідобадзе Т. Я., Осадзе Л. Т. Детермінанти успіху мобільних платежів і проблеми безпеки

Важливим фактом, пов'язаним із мобільними платежами, є те, що в понад 47 країнах користувачі вже досягли групи більшості. У цій статті досліджується визначення основних чинників успіху компаній, які працюють у цьому сегменті, з метою виявлення характерних рис організації, що досягають успіху в цій конкурентній сфері. Результати дослідження свідчать, що компанії з органічною та гнучкою структурою, відкритими каналами комунікації та децентралізованими процесами прийняття рішень мають більші шанси на успіх. Крім того, результати показують, що за відсутності обмежувальних регуляцій критична маса користувачів і надання додаткових послуг, окрім функції оплати, мають враховуватися компаніями, які працюють у сегменті мобільних платежів. Системи платежів, що дозволяють людям здійснювати оплату за допомогою мобільних телефонів, обіцяють знизити витрати на транзакції, підвищити зручність і поліпшити безпеку платежів. Нові системи мобільних платежів, імовірно, також спростять ідентифікацію споживачів для бізнесу, сприятимуть збору більшої кількості інформації про споживачів і розширять можливості обміну інформацією про покупки споживачів між різними компаніями. Загалом, результати свідчать, що організаційні ресурси та управлінські підсистеми є важливими для успіху підприємств у сфері мобільних платежів, які зазвичай працюють у форматі платформ. У статті описуються новітні технології, які можуть поліпшити мобільні платежі в аспектах зручності використання та безпеки. Попри зручність, користувачі стурбовані потенційними вразливістю, такими як витік даних і шахрайство. У зв'язку з цим ведеться постійна робота над удосконаленням заходів безпеки, включно з біометричною аутентифікацією та передовими технологіями шифрування, щоб запевнити користувачів у надійності та захистити транзакції.

Ключові слова: мобільні платежі, технології, електронна комерція, транзакції, безпека.

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Mobile payments have become integral to global finance, transforming how consumers and businesses handle transactions. This digital payment method leverages mobile devices, smartphones and tablets, to enable transactions through various applications and platforms.

Mobile payment technology innovations around the globe have different characteristics and attributes, strengthening the argument for the nonexistence of a single theory to explain the phenomenon. This approach can be associated with authors such as Lawrence and Lorsch [1], and Drazin and Van de Vem [2], who suggest that there is no particular way to manage organizations towards innovation without considering the possibility of different market structures or environments. Similarly, Liu, Kaufmann, and Ma's [3] technology ecosystem and path of influence perspective considered as important forces that explain the evolution of mobile payments not only the supply-side drivers for innovation but market-side competition, cooperation, and regulation among stakeholders in financial services.

Mobile payments have grown vigorously in the past ten years. In 2017, above 16% of the population in 42 nations were using cell phones and other mobile devices to pay school fees and service bills, make domestic transfers, and receive wages [4]. This percentage is a milestone in Rogers' diffusion model [5], suggesting that mobile payments have reached early majority adopters, going beyond its infancy with early adopters.

Amongst the nations that are frontrunners on the use of cell phones or other mobile devices as a payment instrument, Kenya, China, and Brazil stand out, together with the Nordic countries where smartphone ownership is close to 100% [6]. The success of Kenya in mobile payments comes from M-Pesa, a service created by the telecommunication company Vodafone and launched in 2007 by its associate Safaricom. In 2017, M-Pesa had already consolidated itself with annual transactions equivalent to 50% of the country's GDP, being used by more than three-fourths of the Kenyan population [7].

Technological advancements and changing consumer behaviors have driven the widespread adoption of mobile payments. In 2023, the global mobile payment market was valued at US\$67.5 bn and is projected to reach US\$587.52 bn by 2030, reflecting a compound annual growth rate (CAGR) of 36.2%. The rise in mobile payment usage has been propelled by the widespread availability of NFC-enabled smartphones and robust internet connectivity, which have made these services accessible to a broader audience.

Despite the evolution of the literature related to payment innovations, only a small part of it has fo-

cused on the use of mobile payments in retail transactions from an organizational point of view. The most common strand investigates individual behavior and attitudes towards a specific aspect of mobile devices, using Davis's [8] Technology Acceptance Model (TAM) or latter advancement approaches.

Generally, the results suggest that social influence is a determinant of the intention to use or recommend mobile payment systems, along with the perceived relative advantage of the cell phone and its ease of use.

Accordingly, this paper seeks to identify and discuss on determinants of innovative firms in the mobile payments segment. Based on a literature review, the prominent cases of Alipay, M-Pesa, and Nubank, and the opinions of specialists, this study selected and analysed the major forces contributing to the expansion of mobile payment initiatives, suggesting a strategic focus to managers and practitioners.

Payment systems that allow people to pay using their mobile phones are promised to reduce transaction fees, increase convenience, and enhance payment security. New mobile payment systems also are likely to make it easier for businesses to identify consumers, to collect more information about consumers, and to share more information about consumers' purchases among more businesses.

Mobile payment technologies could bring many benefits to consumers and merchants. Mobile payment systems could act as a digital wallet, storing coupons and loyalty information. These systems may even be able to "find" and offer coupons to the consumer (Fig. 1).

Because of the growing storage and computing capacity of mobile phones, they could also become repositories for our purchases. Mobile payment technologies could help customers keep purchase records, and could address the problem of lost receipts and rejected returns. There is also the potential for better payment security. In most credit card transactions, consumers use the same number over and over again to effectuate charges, without a Personal Identification Number (PIN). Neither consumers nor companies can possibly ensure that the array of individuals who handle credit card numbers keep them securely. Mobile payment technologies could leverage information about the consumer, location information, security features on the device, and one-time account identifiers to more effectively verify buyers' identifies, thereby achieving more secure transactions. Properly implemented, such advances could reduce the harm created by stolen credit card numbers and make it more difficult to engage in in-person credit card fraud. In a best-case-scenario adoption, mobile payment systems will reduce the overall cost of transactions [9].

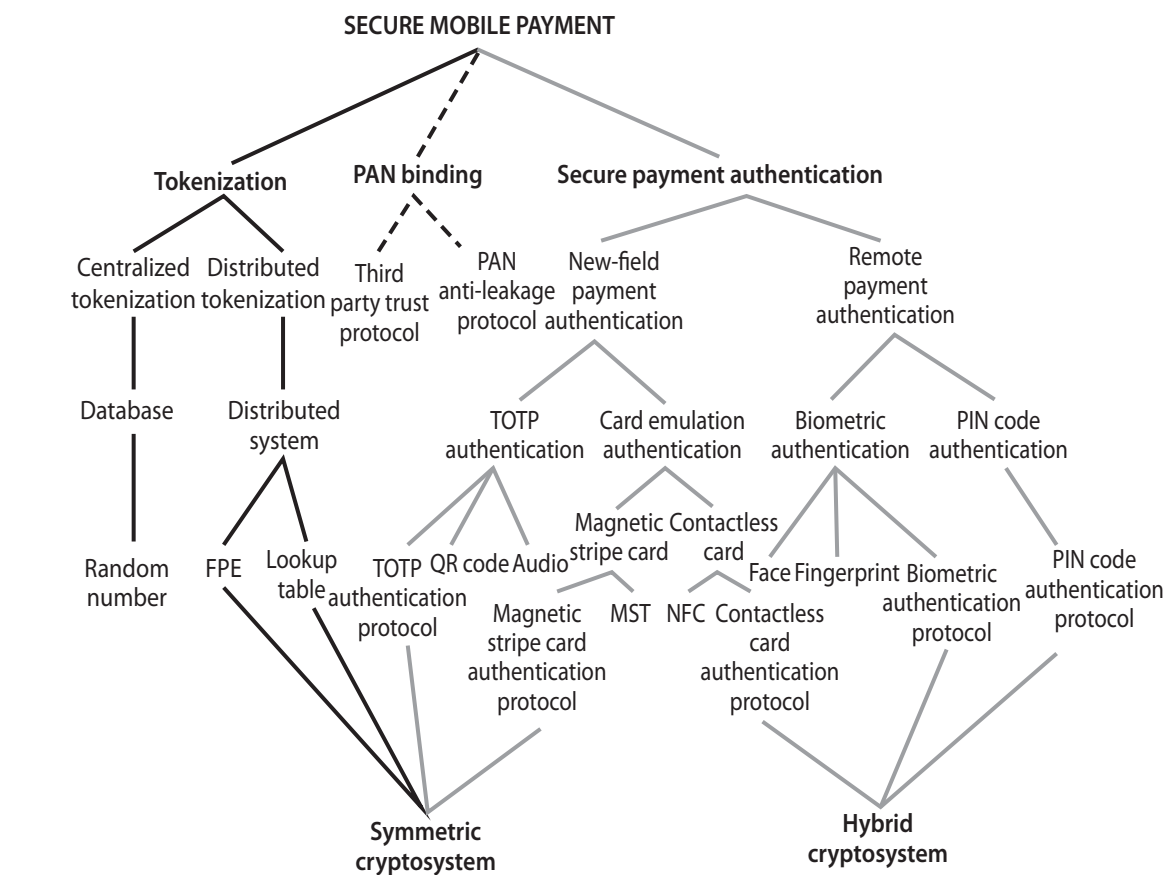


Fig. 1. Mobile payment security technology framework

Source: State of the Art: Secure Mobile Payment.

According to Karnouskos [10], “any payment where a mobile device is used in order to initiate, activate, and/or confirm this payment can be considered a mobile payment”. This concept comprises payment services offered online or offline, representing a digital financial transaction. An important feature of this concept is that mobile payments can be performed both to settle transactions in electronic commerce, mobile commerce, and physical stores, as long as they are carried out with mobile devices.

Koenig-Lewis, Marquet, Palmer, and Zhao [11] gave a similar interpretation to the concept of mobile payment, excluding from its scope mobile banking and other mobile services such as mobile ordering and mobile delivery.

Mobile payment growth is limited within geographic domains, being dependent on the sociodemographic characteristics of the population, infrastructure, and regulation direction given by authorities.

Based on Diffusion of Innovation (DOI) Theory, Wang [12] explored the effects of customer-perceived utilitarian and hedonic value on the use of mobile payment, finding that complexity – which has been de-

defined as the degree an innovation is seen as difficult to realize or operate – had a negative influence on mobile payment continuance intention.

Higher level of alliance among companies is a necessary condition for the success of initiatives in the mobile payment arena. An open management approach indicates the degree of cooperation between different organizations in the industry as an important element [13]. The theme seems more fascinating when applied to the actors involved in the mobile payment industry, which forms a large and varied ecosystem. Kaufmann, Liu, and Ma [14], for example, endorsed the market-side competition driver for innovation in mobile payments, emphasizing that cooperation among stakeholders in financial services is an important force that explains the evolution of mobile payments.

Associated with the degree of cooperation among stakeholders in a specific market is the degree of competition, which is frequently cited in studies about innovation. Confronting the conventional wisdom that competitive markets are more innovative, Aghion, Bloom, Blundell, Griffith, and Howitt [15] advocated for an inverted U-shaped curve representing the relationship between innovative activity and the degree of competition. Focussed on instantaneous

payment instruments, Hartmann, Hernandez, Plooi, and Vandeweyer [16] stated that this relationship is unclear. Accordingly, the exploratory nature of this study can lead to other perceptions about the theme.

Along with being a new product or service, mobile payment instruments are often considered business model innovations, mainly because of their network nature and the complexity of a platform operation [17].

The future of mobile payments is poised to be shaped by advancements in technology, shifts in consumer behavior, regulatory changes and the ongoing evolution of the global financial ecosystem. Several emerging trends promise to redefine the landscape of mobile payments, driving greater convenience, security and integration across various aspects of daily life.

Research from Worldpay revealed that by 2027, digital wallets are expected to comprise half of all e-commerce spend in the UK.

The total number of digital wallet users will exceed 5.2 billion globally by 2026. Businesses are discovering the capabilities of digital cards and wallets to enable loyalty and reward functions in real-time alongside payments. AI will enhance these capabilities, creating potential for brands to build Predictive Credit Cards' that tailor credit limits and rewards based on consumer behavior.

According to new research from Lloyds Bank and FreedomPay, 80% of companies said they use payments data to learn more about their customers and tailor their services and products to them.

Loyalty program linked to digital wallets provide companies with data that can be used to create unique offers that match the customer's shopping habits, developing customer loyalty.

As mobile payments and digital wallets continue to transform how we pay, collecting consumer data will continue to become easier, helping companies to personalize their customer experiences.

Companies need to invest in the latest payment technologies to ensure that customers are offered their preferred method of payment in a frictionless manner. The Lloyds Bank and FreedomPay research found that 57% of UK Retail, Food & Beverage, and Hospitality companies recognize that a poor payment experience could push customers towards competitors.

Security remains a critical concern in the mobile payment space. Despite the convenience, users are wary of potential vulnerabilities, such as data breaches and fraud. As a result, there is an ongoing effort to enhance security measures, including biometric authentication and advanced encryption technologies, to reassure users and safeguard transactions.

Mobile devices are increasingly targeted by malware, which can steal sensitive information like credit card numbers and passwords. Malware can be distributed through malicious links, email attachments or even apps from untrusted sources.

Banking malware targets Android users due to its open-source operating system. Businesses are also encouraged to implement mobile device management (MDM) solutions to detect and remove malicious applications.

Phishing remains a prevalent threat, where fraudsters trick users into divulging personal information through fake emails or text messages. Using public Wi-Fi for mobile payments can also expose users to risks, as these networks are often unsecured.

Hackers can intercept data transmitted over public Wi-Fi, including payment information. It is recommended to use a virtual private network (VPN) to encrypt data when using public Wi-Fi, or avoid making payments over these networks altogether.

Data breaches can occur when cybercriminals exploit vulnerabilities in mobile payment systems to access sensitive information. Tokenization and encryption are crucial technologies that protect mobile payment data by replacing sensitive information with secure tokens and encrypting data during transmission. Despite these measures, breaches still pose a significant risk.

Lost or stolen devices can lead to unauthorized access to mobile wallets and payment apps. Implementing two-factor authentication (2FA) and biometric security features like fingerprint or facial recognition can improve security.

Additionally, users should ensure their devices are up-to-date with the latest security patches to prevent exploitation of known vulnerabilities.

Identity validation methods like one-time passcodes or two-factor authentication can also be integrated to ensure the correct customer completes the transaction.

To more fully understand the new privacy issues in mobile payments, it is necessary to look at the information flows of standard credit card transactions. In a typical credit card transaction, all parties to the transaction get an incomplete view of the sale. The merchant collects information about what the consumer bought (Stock Keeping Unit (SKU) information, known as "Level 3" data) and the name of the consumer. In most cases, this Level 3 data is not transferred to any other participant in the transaction. Despite knowing what the consumer actually bought, merchants are practically limited in using that information, because they often cannot uniquely identify their customers. Names are not unique, and thus mer-

chants cannot use credit card swipes alone to create a reliable consumer database, with individuals tied to their Level 3 purchase histories. This is one reason why many merchants use loyalty cards. Loyalty cards allow the merchant to uniquely identify the consumer even where she uses different methods of payment [18]. The payment network (including, for instance, Visa, MasterCard, and American Express) receives very little information from the transaction. The payment network itself may only receive the account number, the amount of the charge, and the merchant's identity.

The banks involved (the merchant's and consumer's banks), typically only receive similar information to the payment networks: the total amount of the purchase, where the purchase was made, and the consumer's unique identity (in case of the consumer's bank). Airline and hotel reservations are a common exception to this limited information transfer. In many cases, reservation information is transferred back to the consumer's bank and appears on her bill.

New mobile payment systems may disrupt these arrangements by enabling merchants to collect personally-identifiable contact information from consumers, and by transferring Level 3 data to payment networks. With these capabilities, all of the service providers in the payments ecosystem – merchants, payment networks, and the banks involved in the transactions – could develop much more comprehensive and detailed dossiers about consumer purchase behavior than they typically have today. The capabilities of new payment systems will, for example, make it easier for merchants to build customer databases without resorting to loyalty cards. This possible shift has profound consequences for consumer privacy and the relationship consumers have with payment providers and merchants.

The need for loyalty cards will be eliminated, but so too could the ability of individuals to avoid profiling. Many consumers have long been uncomfortable with information collection surrounding their purchases. Such information collection could cause embarrassment, lead consumers to avoid buying certain items, or possibly contribute to systems that institute widespread service and price discrimination.

Beyond merchants, the payment network itself could also receive more information. Some of the companies most likely to be successful in mobile payments have designed their systems to collect Level 3 data about consumers' purchases (for example, PayPal, Google Checkout, and Facebook Credits appear to work this way) [19].

Under existing privacy rules, these entities could share this information with third parties – for example, advertisers – without the affirmative consent of the consumer. They could also use it for their own

marketing, research, or other purposes. For instance, social network services with payment systems could add transaction histories to their already rich databases of behavioral information. Thus, a move to mobile payments could carry with it a move to a profoundly different relationship between customers and payment system service providers than has existed in the past. Further, there is no guarantee that this shift would be apparent to consumers using mobile payments systems to complete sales transactions.

CONCLUSIONS

We have discussed the factors that are important determinants of firms in the mobile payments space. We describe notable cases and opinions of experts in the payment market, including mobile payment initiatives.

Digital wallets not only make for quick, contactless payments but also provide businesses with a route to ethically collect customer data to personalize their customers' payment experiences.

The total number of digital wallet users will exceed 5.2 billion globally by 2026. Businesses are discovering the capabilities of digital cards and wallets to enable loyalty and reward functions in real-time alongside payments. AI will enhance these capabilities, creating potential for brands to build 'Predictive Credit Cards' that tailor credit limits and rewards based on consumer behavior.

Mobile payments are the application of mobile commerce. A mobile payment also acts as an important financial application and is attracting wide attention from researchers, developers, bankers, merchandisers and clients. However, it has not yet become a mainstream approach for making payments. Non-secured mobile payments are simply not acceptable.

Finally, the study suggests the necessity of mobile payment firms to focus on strength their organic characteristics and flexible structures, applying an open and participative management and avoiding excessive centralization of decisions. In this regard, large companies trying to enter the mobile payment segment should take a spin-off as a serious option to refrain from single control which diminishes the chance to propose disruptive innovations.

These systems provide security at transaction, network level and application level. The Payment Systems developed should provide the security at each and every level to improve the customer satisfaction as well as value chain of an organization. ■

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