

Why did an Electronic Payment System Fail? A Case Study from the System Provider's Perspective

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Abstract

This paper examines factors which has led to the failure of an electronic payment system (EPS). A case study of a failed Australian EPS was conducted. The findings confirm the influence of EPS adoption factors identified from the literature, which include cooperation with established entities, simplicity, trust, security and mutuality of stakeholder benefits. Furthermore, this study has specifically demonstrated the importance of large partners in the adoption of EPS. These partners are able to provide EPS with access to a large installed base of customers, association with their brand name and marketing resources in order to achieve public awareness. By examining a failed case of EPS from the system provider's perspective, this study presents a revelatory case and, hence, offers contributions to both theory and practice.

1. Introduction

The commercialisation of the Internet and the subsequent evolution of electronic commerce have resulted in a dynamic business environment where transactions are able to take place without face-to-face interaction. As the popularity of electronic commerce continues to increase, numerous payment systems have been created, attempting to make the process of exchanging money over the Internet easier for consumers. Electronic payment systems (EPS) is defined in this study as any payment system that facilitates secure electronic commerce transactions between organisations or individuals. These include systems such as electronic cash, electronic checks, smart cards and micropayment solutions such as PayPal.

EPS provide users with an array of functionalities including person-to-person (P2P) payments and electronic bill presentment and payment (EBPP). These new EPS are also able to facilitate financial transactions over the Internet which are significantly more efficient, faster and less expensive than using credit cards [1]. Yu et al. [2] argue that EPS which help avoid the use of credit cards are important to the development of electronic commerce.

A significant number of EPS have failed within a relatively short period of time. These include companies such as Beenz, CyberCash, Cybercent, Digicash, eCharge, FirstVirtual, Flooz and Micromint [3], [4]. In fact, the use of credit cards still remains the most widely used payment method for electronic commerce transactions despite the criticism from the literature for its lack of efficiency and security as well as high transaction fees [5], [6].

The majority of research into the area of EPS has focused on successful cases such as Hong Kong's Octopus smart card system and PayPal [7], [8]. However, there have been relatively fewer studies into failed EPS [4], [9]. This is most likely due to the difficulty in

gaining access to failure cases. In this study, we explore factors that lead to the failure of EPS. For this purpose, a single in-depth case study of a failed Australian EPS was conducted in 2005.

This study is also differentiated from existing studies of EPS by its approach. Recent studies in this area can be grouped into two general streams. One stream examines adoption of an EPS from the users' perspective or user acceptance [1], [2], [7] and [10]. The other stream of studies proposes new payment schemes from the technological perspective. They develop new payment protocols in order to address some limitations with current solutions [11], [12], [13], [14] and [15]. This study takes a system provider's perspective, through the examination of a business case. This perspective is able to provide coverage of a wider range of issues and factors surrounding EPS including not only user acceptance and technology, but also collaboration and competition within industry and market, and firm-related management issues.

The findings demonstrate that cooperation with established organisations, simplicity, trust, security and mutuality of stakeholder benefits are all of importance to the adoption of EPS. These factors are consistent with the adoption factors found during our literature-based analysis. In particular, this study highlights the significance of establishing partnerships with large organisations in the adoption of EPS because they are able to provide access to a large installed base of customers, association with their brand and marketing resources in order to achieve public awareness.

In the next section, a literature review on factors affecting the adoption of EPS is presented. The research method used for this study is then described. This is followed by a short description of the case. Then findings are presented and discussed. In the conclusion, we highlight contributions made in this paper and make suggestions for further research.

2. Electronic Payment System Adoption

Factors that influence the adoption of EPS are multifaceted. They include cooperation with established entities [16], trust [10], security [17] and simplicity [18]. Recently, the concept of mutuality of stakeholder benefits has also been used to explain the adoption of EPS [19]. These factors are discussed below.

2.1. Cooperation with Existing Entities

The literature related to EPS clearly identifies cooperation with well known, established institutions as a factor which influences adoption of these systems [5], [20], [21], [22] and [23]. Investigating EPS from an economic standpoint, Badderley [16] contends that in order to be successfully adopted, an electronic payment system requires universal acceptability. This acceptability can be achieved through cooperation with institutions such as recognised businesses, governments and banks.

Oh et al. [19] assert that a precondition for success in the EPS market is the involvement of a partner who is able to provide a critical mass of users. Rogers [24] defines critical mass as the point where "enough individuals have adopted an interactive innovation to cause the perceived cost-benefit of adopting the innovation to shift from negative to positive for the individuals in the system" (p.250). Therefore, once this critical mass is provided by the partner, both the benefits of the system and consequently system use will increase. This can be seen in the case of the successful PayPal system. Rosen [23] argues that the main contributor to the widespread acceptability of PayPal was its cooperation with large entities with an installed base of users, especially online auction site eBay. This is also consistent

with the principle of network externalities which stipulates that the value of unit product/service increases as the number of sold products/services, or the number of consumers, increases [25], [26]. Network externality has positive feedback mechanism in itself which makes the strong stronger.

2.2. Trust

The literature identifies that a high level of user confidence or trust in an EPS is an important factor contributing to their successful adoption [8], [22], [27], [28] and [29]. In investigating Hong Kong's successful Octopus payment system, Chau and Poon [10] identified trust in the system and its provider as a primary contributor to its success. Liao and Wong [7] also examined the Octopus system, surveying users and identifying factors which influence the use of the smartcard. The authors also found that users are willing to use the Octopus system because they perceive it to be trustworthy. These two investigations of the Octopus system are pertinent as they identify elements which lead to the successful adoption of an EPS. These findings are supported by a user survey conducted by Abrazhevich [1] who found that users would refrain from using a system which they feel is not trustworthy. Kniberg [4] associates the credibility of an EPS with adoption, arguing that a credible, recognised and trusted system will be more likely to be adopted by both users and merchants.

2.3. Security

In the context of EPS security refers to the capacity of a system to reduce fraud and protect the user from the theft of their funds and personal information [6]. Security has been a longstanding issue for wary customers, which can be traced back to the origins of electronic commerce [30], [31]. The literature widely recognises the security concerns of users and the effect it has on the adoption of electronic payment systems [8], [17] and [20]. Taking a technological view of security, Rose et al. [32] contend that inadequacies associated with security are the primary impediment to the acceptance of electronic commerce. Rose et al. [32] strongly recommend that organisations engaged in electronic transactions employ security measures such as encryption and firewalls. In the aforementioned study of the Octopus system, Liao and Wong [7] concluded that the employment of security mechanisms by the payment provider had a positive effect on customers' willingness to use the system.

2.4. Simplicity

A survey undertaken by Weiler [18] found that simplicity was one of the most pertinent aspects influencing EPS adoption. A number of payment schemes have focussed on factors such as security and user anonymity, employing technologies and processes which are difficult for the user to understand [4]. As a result, these systems have failed to achieve widespread usage. In a study of a failed smart card implementation trial in New York, Truman et al. [9] found that the complexity of using the smart card technology (in particular, the process of replenishing the cards) adversely affected the acceptance of the technology. On the other hand, Schwartz [8] found that the simplicity of the PayPal payment process was a significant contributor to its success. Yu et al. [2] clearly asserts that an EPS should be simple and easy to use. Ease of use has long been cited as a contributing factor affecting the adoption of information systems [33], [34]. Davis [33] defines ease of use as "the degree to which a person believes that using a particular system would be free of effort" (p.320). A

number of studies have applied the construct of ease of use to the context of EPS. For example, Liao and Wong [7] found that perceived ease of use had a positive effect on customers' willingness to use the Octopus smartcard system. Kniberg [4] states that the ease of registering with an EPS provider is also a factor which affects the adoption of an EPS.

2.5. Mutuality of Stakeholder Benefits

The concept of stakeholder mutuality has also been applied to the adoption of EPS [19]. The authors contend that mutuality of benefits and costs among stakeholders is a necessary condition for the diffusion of an EPS. In the context of EPS, main stakeholders include consumers and merchants looking to use the system. Mutuality of stakeholder benefits stipulates that the benefits for each individual stakeholder must exceed the cost these stakeholders incur when they choose to adopt a system. When adopting an EPS, consumers incur certain costs including transaction fees, the time taken to sign up and occasionally, subscription costs. For merchants who wish to use an electronic payment system as a means for collecting money from customers (for example, through their company web page), an EPS must be integrated with organisational processes and this may also incur certain investments. Applying mutuality of stakeholder benefits to the adoption of EPS would imply that a consumer would be more likely to adopt an EPS if the aforementioned costs were outweighed by the benefits of the payment system, namely, convenience, cost advantages, rewards etc. Similarly, merchants would be attracted to adopt an EPS if their integration costs were compensated by benefits such as increased revenue, lower fees, less paperwork, etc. The concept of mutuality of stakeholder benefits assumes stakeholder independence and rationality. In the case of EPS, stakeholders are able to act independently of each other due to the absence of regulation by an overarching governance structure [19].

3. Research Method

For the purpose of this study, we conducted a case study of a failed EPS. As EPS are influenced by multiple factors such as individual consumers, internal management, merchants and alliance partners as seen in the literature review, case study is appropriate because it allows researchers to deal with multiple factors in a comprehensive manner [35]. The case study is also appropriate because we aim to answer 'why' and 'how' questions [36], that is, why and how the EPS under study failed to attract a sizable user base.

Data were collected using semi-structured interviews and document analysis. In selecting participants within the organisation, the roles and organisational level of staff members were considered with the objective of attaining all appropriate perspectives of the organisation. The interview process involved three participants, each from a different area of the organisation. These participants included the heads of the Operations department and the Research and Development team as well as the Product Manager. Table 1 summarises the participants and their roles within the organisation. Three interviews were conducted with the Product Manager while the Operations Manager and the Research and Development Manager were interviewed once at the company's headquarters. Interviews were recorded with a tape recorder and were then transcribed for analysis. To corroborate data collected during the interviews and to enhance the findings, relevant organisational documentation was also requested and analysed. Correspondence via email was maintained with participants and the transcripts were reviewed by each of them.

Participant	Roles	No. of interviews
Operations Manager	The Operations Manager ensured the system remained reliable and also oversaw the customer service team.	1
Research and Development (R&D) Manager	The R&D Manager was responsible for requirements gathering and running the company's software engineering projects	1
Product Manager/Board Member	The Product Manager was a member of the board and was responsible for defining the organisation's direction and acted as the Managing Director whenever required.	3

Table 1: Overview of case study participants

Transcribed interview data and organisational documentation were analysed using a process similar to the data analysis approach outlined by Miles and Huberman (1984). The initial stage of data analysis involved the identification of key themes ('open coding'). Eight themes were initially found with interview and documents, yielding five themes previously identified from the literature and three unique themes.

4. Case Description: OzPay

The company under study, OzPay (pseudonym), was created by a software development firm which specialised in electronic commerce solutions. OzPay was a part of a Government sponsored information technology development initiative which also involved research organisations and local universities. This program provided both funding and support to technology organisations, offering a myriad of management services including advisory panels, market research and avenues of locating additional funding. The development of OzPay began in 1999 with the system being released to the public via the company's web page in 2002. The system operated publicly from 2002 through to 2005 and cost approximately AU\$2 million (US\$1.5 million).

OzPay was a browser based system and did not require users to install any additional software. Customers were simply required to open an OzPay account then deposit money into it from an existing Australian bank account. Like the majority of online payment systems, registering for an account was done through online forms. OzPay users could choose to sign up for either an unauthenticated account or a merchant account. Unauthenticated accounts did not require users to provide information regarding their identity. However, these accounts had a daily transfer limit of \$1000. Merchant accounts were designed for users and organisations who wished to sell goods online. OzPay instituted a 100 point identity check for merchants in accordance with the *Financial Transaction Reports Act 1988*. The 100 point identity check required merchants to provide documentation of their identity such as a driver's licence and passport. Both these types of accounts were free and there were no subscription fees.

OzPay began initially as a system for the collection of payments. The idea of a single, integrated account based system was based on the premise that credit card payments over the Internet were inefficient. The system enabled users to transfer money to others with an OzPay account within a secure environment. Customers could also pay bills and purchase goods from organisations listed in OzPay's business directory. Finally, towards the end of the project, customers with an OzPay account could purchase prepaid mobile phone credit from their phones. OzPay provided organisations with an electronic commerce solution which

enabled them to invoice and accept payments from their customers online, avoiding the use of credit cards. OzPay was aimed at reducing manual transaction processing through the maintenance of records, initially catering especially to Small-to-Medium Enterprises (SMEs).

5. Findings

Eight reasons for the failure of OzPay were identified from the case analysis, which are summarised below. The first five factors are consistent with the literature analysis discussed above; the latter three are more concerned with the specifics of the system under study.

5.1. Lack of Cooperation with Well-established Entities

An electronic payment system (EPS) will not be able to survive without forming an alliance with a well-known partner with an installed base of customers. This may include organisations such as banks, Internet stores, and portals. OzPay attempted to engage a substantial number of organisations including search engines, airlines and a number of financial institutions. The organisation devoted the last six months of the project purely to locating a partner. OzPay's Product Manager remarked:

“Clearly we would never be able to do it on our own. That became apparent pretty early on. We had to have large customers or a large number of people using it and the best way of doing that is through a large partner. Without a large partner to bring customers and to bring this extra effort involved in moving people to it, it would never happen”.

Besides striving for a critical mass of users, OzPay also sought to align with a large partner for secondary reasons. These include the provision of funding, association with trusted brands and awareness. Although the OzPay system received government funding, the costs of development and operations gradually increased over time. In relation to trust, the Operations Manager stated:

“One of the things we identified as enhancing trust was association with trusted brand names and to that end we attempted to engage some larger companies”.

OzPay also viewed the role of a partnering organisation as providing public exposure and marketing to the company and the OzPay system. Thus, it is identified that partners can play various roles including the provision of a customer base, funding, association with trusted brand names and public exposure.

5.2. Lack of Security

Security and trust are still concerns for customers when adopting an EPS, and they are closely related to each other. If an EPS does not adequately provide a secure service and establish itself as trustworthy, consumers will treat the system with suspicion which will hinder its ability to achieve widespread acceptability. OzPay faced a number of relatively unique security barriers. Firstly, because OzPay accounts were linked to bank accounts, there needed to be additional security as bank accounts in particular are sensitive to users. Furthermore, users were concerned when mobile phone transactions were involved. Users felt that others would have unauthorised access to their money if they were in possession of the account holder's phone. In order to address these issues, OzPay employed familiar standards such as VeriSign's encryption approach but had no security advantages over other electronic payment systems.

However, an internal report on OzPay's security showed that users perceived the OzPay system as equally vulnerable to fraud as other electronic payment systems. This

implies that some degree of differentiation is needed in relation to security in order to distinguish one EPS from another. Successful cases such as PayPal have employed security mechanisms that can be differentiated from other payment systems. For example, Schwartz [8] attributes the rapid adoption of PayPal to its financial surveillance software that monitors transactions. Furthermore, OzPay did not adequately promote the system's security features. Therefore, in addition to having the appropriate security procedures in place, there is also a need to actively promote these mechanisms in order to assure users that their transactions and personal data are secure.

5.3. Lack of Trust

The findings also suggest that trust is more important than security. Even though OzPay instituted many of the standard security protocols, it was operated by a company which was unfamiliar to many customers. This is consistent with the findings of Kniberg [4] who argued that "users and merchants are more likely to use an insecure payment system from a trusted company than a secure payment system from an untrusted company" (p.60). Thus, the issues of security and trust were found to be very important in the success of EPS adoption. Without adequate security features and a system that users trust, it would be extremely difficult for an EPS to achieve widespread usage.

5.4. Complexity

Complexity, as a mirror image of simplicity in the literature review, is a significant factor affecting the adoption of EPS. The complexity of the OzPay system was a major barrier to its acceptance. OzPay's R&D Manager identified that the system was "very, very complicated". While the system was "feature rich", offering a substantial number of services such as P2P payments, EBPP, invoicing and automatic payments, OzPay "never had a simple offering" and "people didn't even get the original concept and it sort of can get lost when you've got all this other stuff built in".

A focus group study of the OzPay system found that its large range of features diluted its product definition. The Operations Manager argued that one of the major reasons PayPal had succeeded was its ability to present their service in a simple manner. In contrast, OzPay struggled with how to present their system such that it looked simple to people. This problem was exacerbated by the registration process, which was described by staff as "pretty bad", "complicated" and "long". OzPay's R&D Manager recalls:

"It was never consciously decided on a registration strategy. It was just 'what should we get out of them?' and then a page with a lot of stuff on it and it wasn't really obvious why you needed all that stuff necessarily and it was never really revisited. I think it could've been better, I think it could've explained why we needed particular information because we were trying to be user centred".

Another complexity SME merchants faced in adopting the OzPay system was the difficulty of coupling OzPay's invoicing and accounting capabilities with their existing systems. OzPay's Operations Manager expressed his concern below:

"The system just made everything a bit more complicated because [SMEs] had one more set of accounts to reconcile to their bank account and all that sort of thing and one extra thing to keep track of".

The relative obscurity of OzPay meant that ease of use was not an issue affecting the adoption of this particular system as people did not get a chance to interact with the system and make the adoption decision based on this criterion. Thus, the findings of

this case indicate that simplicity does have a positive effect on the adoption of EPS and that if the user finds a system to be complex they are unlikely to adopt it.

5.5. Lack of Mutuality of Benefits

The case illustrates that a lack of mutuality of stakeholder benefits has a negative effect on the adoption of EPS. OzPay's facilities offered a sizable number of benefits to users but these were outweighed by the costs incurred when adopting the system. P2P payments had a speed advantage over banking systems as transactions were all processed on the OzPay system. However, the Operations Manager noted that this only meant that the recipient got the money sooner and that there was no advantage for the sender. The OzPay system offered cost advantages, especially for SMEs who often suffered from the high costs associated with credit card payments.

OzPay was set up as an online deposit account. As such, customers had to go through a registration process then transfer money from their existing bank account to their newly created OzPay account. A barrier to the adoption of OzPay identified by staff was the fact that OzPay required customers to open an additional deposit account. OzPay's R&D Manager recalled:

"People already had the perception they already have too many accounts...so they just wouldn't change for the sake of a few, you know, a few dollars here and there because it was effort to change into another system. One of the weaknesses there was trying to get people to have new accounts above and beyond their already, you know, 3 or 4 bank accounts. You're going to need a lot to get them to change".

The R&D Manager also asserted that the complexity of the system meant that there were costs and time required of consumers to understand the system and figure out how it would be beneficial to them. Furthermore, if an organisation wanted to adopt OzPay in order to assist in collecting money and accounting, there were also costs associated with integrating the system with existing information systems. The Product Manager expressed his concern in this respect:

"The areas where [OzPay] could save money weren't enough to justify the costs for an organisation to move towards it" and

"the amount of money we saved on transactions was not enough to justify...the effort involved in getting people to use it".

Thus, this case has also shown that mutuality of stakeholder benefits is relevant to the adoption of EPS and that it has a positive influence on the adoption of these systems.

5.6. Inadequate Marketing Initiatives

The marketing initiatives undertaken by OzPay were insufficient in exposing their system to the public. The Operations Manager noted that this problem was caused by a lack of funding, as expressed below:

"we just didn't have the resources to pump into publicity and marketing or anything like that".

Another problem identified by the R&D Manager was the lack of customer engagement:

"the biggest cost (for customers) was trying to figure out how [the OzPay system] will help them because we didn't help them figure that out very well".

OzPay looked to large companies in order to penetrate public consciousness. However, when they did manage to become a payment provider for a large utility, they did not effectively advertise their offering and, hence, users overlooked the OzPay

payment option and continued to pay their utility bills using credit cards. Therefore, the inability of initiatives to capture public attention is another factor leading to the failure of this EPS.

5.7. Lack of Clear Direction

Stakeholders within OzPay could not agree on a single direction. Each of the participants interviewed had varying opinions as to what the direction of OzPay should have been. Possible directions included customised payment systems for SMEs, a ubiquitous wallet-like system, a rewards based approach and a simple online banking account. This problem stemmed from a differing degree of understanding of the system within the company that ended up leading to board in-fighting and ultimately the end of OzPay operations. The issue of unclear direction can be seen in a number of failed EPS that offer a substantial number of features but fail to present a clear and consistent offering [4]. This issue is also related to the complexity of the OzPay system.

5.8. Addressing Insignificant Customer Problems

An additional factor leading to the failure identified by participants was that the OzPay system did not address significant problems of customers. The Operations Manager asserts:

“Instead of finding out what the customers wanted and then building that and selling it to them we built...some cool technology first...We had some ideas about...online payments and in particular small online payments, you know, down to a few cents and we thought “wow wouldn’t it be great if you could do this” and so we thought up all this cool stuff and then we built it but along the way we didn’t really stop to ask ourselves who wanted it and as it turns out nobody was really asking for it”.

Electronic payment providers must firstly identify consumer needs. In this case, OzPay identified that SMEs were suffering from the high costs of online credit card transactions. Around mid 2004, however, OzPay acknowledged that they needed to provide credit cards payments through their system. According to research conducted by OzPay, the need to provide credit card interaction arose because of liability issues. Some payments for specific goods are sometimes best done with credit cards and because some people do not want (or are not permitted to have) an OzPay account and wish to continue to pay online with credit cards. This implies a demand for online credit card transactions despite problems identified from the literature such as its high costs and lack of security [6]. This is further illustrated in the fact that even successful payment systems such as PayPal accept credit cards for merchants.

One of the initial aims of the OzPay system was to solve the “micropayments problem”. Micropayments involve customers paying a small fee (say, less than A\$10) for each item of content they download [3]. The fees associated with credit cards make these small payments infeasible. However, OzPay employees found that users were not responsive to their micropayments solution as noted by the Operations Manager:

“the idea (for OzPay) came out of the so-called micropayments problem but it turns out that that’s not really a problem at all because all the people we approached about micropayments weren’t that interested in it”.

This is consistent with a recent study undertaken by Abrazhevich [37] who found that users did not understand the concept of micropayments and hence did not consider it to be important.

6. Discussion

Employing a single case study on a failed EPS, this study has identified a number of factors that are critical to a successful adoption of an EPS. These factors and their influence on each other are summarised in Figure 1.

No single factor explains the successful adoption of an EPS. However, the case study implies that cooperation with existing entities appears to be the most significant factor. This is due to the fact that through cooperation with well known institutions electronic payments providers are able to simultaneously address a number of issues associated with the adoption of EPS. Firstly, a large partner is able to provide an EPS with marketing clout and exposure to the public. A small company like OzPay was only able to reach local businesses through its limited marketing campaigns. A well known institution would be able to provide resources for marketing and hence create *public awareness*. Gaining the trust of consumers is challenging without a partner who is able to provide an EPS with association with trusted and credible brand names. Thus, establishing an alliance with a large partner is crucial in gaining what Kniberg [4] calls *credibility* in the eyes of users. Most importantly, the large partner can provide a critical mass of users. If this critical mass of users is achieved through the partnership, the benefits of the system as well as usage of the system will increase [24], [25]. For example, if a popular online store adopted a particular electronic payment system, the imperative to use that system for customers of that store would increase.

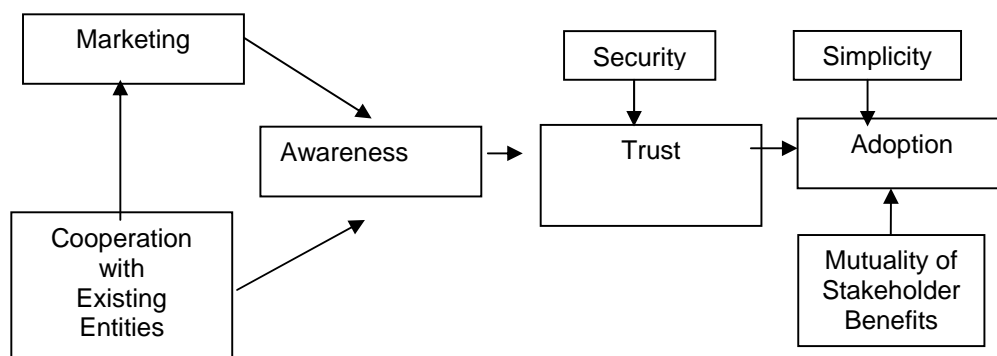


Figure 1: Factors affecting the adoption of electronic payment systems

However, partnering with an established organisation does not necessarily ensure sustained usage of the system. An EPS is assessed on factors such as simplicity, security and mutuality of stakeholder benefits when customers know about the system and interact with it in some manner. An EPS needs to be presented in a clear and simple manner. If a consumer is unable to understand the underlying concept behind an EPS, the chance of them adopting such a system is low. In addition, electronic payment providers need to assure users that their system is secure. The findings of this study show that when the security of an EPS fails to adequately address user concerns, consumers will not adopt it. The data shows that a degree of differentiation is required in relation to security and that the security mechanisms employed must be promoted to customers. Trust plays a role in this process as users tend to perceive credible and established organisations as trustworthy. Finally, mutuality of stakeholder benefits, where the benefits associated with adopting an EPS for consumers and merchants exceed the costs incurred when adopting the system, will also increase the likelihood of adoption.

7. Conclusion

This study has used a single case study to demonstrate the major factors affecting the adoption of electronic payment systems. Factors identified in the literature have been found to influence the adoption of OzPay. Well known institutions are able to aid in EPS adoption through the provision of a large installed base of customers. This study has also found that these institutions play other crucial roles in EPS adoption. Large partners are able to provide EPS with association with trusted brand names and marketing clout. These result in the system gaining credibility and public awareness. Once this has been achieved the system is assessed by users on factors such as simplicity, security and mutuality of stakeholder benefits.

The study also found additional – managerial - factors such as inadequate marketing initiatives and a lack of a cohesive direction contributed to the demise of OzPay. Furthermore, the findings also indicate that the system did not address significant user problems. The system was established in order to make transactions, especially micropayments, more efficient. However, it was found that consumers did not seem to consider the issue of micropayments as significant as initially expected.

This study has made three major contributions among others. First, by examining a failed case of an EPS, it offers a balanced view of factors affecting the life of EPS in the area dominated by success stories. Second, by taking the system provider's perspective, the paper highlights a wide range of relevant issues from management to collaboration in markets compared to existing studies focusing on individual consumers' perspective or technological aspects. Finally, although the influence of factors in the EPS adoption model depicted in Figure 1 still need to be tested, this study offers a more concrete framework for future studies on the adoption of EPS than what is currently available in the literature.

Apart from enriching the existing literature on EPS adoption, the findings of this study will be valuable for practitioners as they address some critical issues that need to be considered in developing an EPS. Since the importance of engaging a well known partner has been established as an imperative for electronic payment providers, strategies need to be identified to help these providers effectively negotiate with these organisations.

For future research, besides testing the factors affecting EPS adoption and their influence on each other as proposed in this study, further research can also focus on elaborating mutuality of stakeholder benefits in relation to the adoption of EPS. Specifically, the role of incentives and rewards in order to encourage the adoption of EPS need to be examined to enrich the findings of this study. Finally, in light of the success of the iTunes music store and the emergence of micropayments via mobile phones, the issue of micropayments needs to be revisited.

8. References

- [1] Abrazhevich, D. (2001) Electronic Payment Systems: Issues of User Acceptance, In Stanford-Smith, B. and Chiozza, E. (Eds.), *E-work and E-Commerce* (pg 354-360). IOS Press.
- [2] Yu, H.C., Hsi, K.H. and Kuo, P. J. (2002) 'Electronic payment systems: an analysis and comparison of types', *Technology in Society*, 24, pg 331-347.
- [3] Hurwicz, M. (2001) 'The Return of Micropayments', *Web Techniques*, 12, 2001.
- [4] Kniberg, H. (2002) 'What Makes a Micropayment Solution Succeed', Masters Thesis, Institution for Applied Information Technology, Stockholm, Sweden.
- [5] Simpson, B. (2004) 'What's Next for Electronic Payments?', *Collections & Credit Risk*, 9(3), pg 22-26.
- [6] Shon, T.H. and Swatman, P.M.C. (1998) 'Identifying Effectiveness Criteria for Internet Payment Systems', *Internet Research: Electronic Networking Applications and Policy*, 8(3), pg 202-218.

- [7] Liao, Z. and Wong, W.K. (2004) 'The Sustainability of a Smartcard for Micro e-Payments', Australian Conference of Information Systems 2004, Tasmania, Australia.
- [8] Schwartz, E.I. (2001) 'Digital cash payoff', *Technology Review*, 104(10), pg 62-68.
- [9] Truman G. E., Sandoe, K. and Rifkin, T. (2003) 'An empirical study of smart card technology', *Information and Management*, 40(6), pg 591-606.
- [10] Chau, P. and Poon, S. (2003) 'Octopus: An E-Cash Payment System Success Story', *Communications of the ACM*, 46(9), pg 129-133.
- [11] Camenisch, J., Piveteau, J., and Stadler M. (1996) 'An efficient fair payment system', Proceedings of the 3rd ACM Conference on Computer and Communications Security, New Delhi, India.
- [12] Dai, X. and Grundy, J. (2006) 'NetPay: An off-line, decentralized micro-payment system for thin-client applications', Accepted for *Electronic Commerce Research and Applications*.
- [13] Herzberg, A. (2003) 'Payments and banking with mobile personal devices', *Communications of the ACM*, 46(5), pg 53-58.
- [14] Juang, W.S. (2006) 'D-cash: A flexible pre-paid e-cash scheme for date-attachment', Accepted for *Electronic Commerce Research and Applications*.
- [15] Peha, J.M. and Khamitov, I. M. (2004) 'PayCash: a secure and efficient internet payment system', *Electronic Commerce Research and Applications*, 3(4), pg 381-388.
- [16] Baddeley, M. (2004) 'Using E-Cash in the New Economy: An Electronic Analysis of Micropayment Systems', *Journal of Electronic Commerce Research*, 5(4), pg 239-253.
- [17] Ba, S., Whinston, A.B. and Zhang, H. (1999) 'Building Trust in the Electronic Market Through an Electronic Incentive Mechanism', Proceedings of the 20th International Conference on Information Systems, North Carolina, United States.
- [18] Weiler, R.M. (1995) Money, Transactions and Trade on the Internet. MBA Thesis, Imperial College, London, England.
- [19] Oh, S., Kurnia, S., Johnston, R.B., Lee H. and Lim, B. (2006) 'A Stakeholder Perspective on Successful Electronic Payment Systems Diffusion', Hawaii International Conference on Systems Sciences (HICSS-39), Hawaii.
- [20] Mann, R.J. (2003) 'Regulating Internet Payment Intermediaries', Proceedings of the 5th International Conference on Electronic Commerce 2003, Pennsylvania, United States.
- [21] McAndrews, J.J. (1997) 'Network Issues and Payment Systems', Federal Reserve Bank of Philadelphia Business Review, November/December, pg 15-25.
- [22] Panurach, P. (1996) 'Money in Electronic Commerce: Digital Cash, Electronic Fund Transfer and Ecash', *Communications of the ACM*, 39(6), pg 45-50.
- [23] Rosen, C. (2001) 'The e-buck stops here', *InformationWeek*, 840, pg 55-58.
- [24] Rogers, E.M. (1991) The "Critical Mass" in the Diffusion of Interactive Technologies in Organizations. In Kraemer, K.L. (Ed.), *The Information Systems Research Challenge: Survey Research Methods* (Vol. 3, pg 245-263). Boston, Massachusetts: Harvard Business School.
- [25] Shapiro, C. and Varian, R. (1999) *Information Rules*, Harvard Business School Press.
- [26] Hanseth, O. (1999), The Economies of Standards, In: Ciborra, C.U and Associates *From Control to Drift: The Dynamics of Corporate Information Infrastructures*, OUP, Oxford
- [27] Dekleva, S. (2000) 'Electronic Commerce: A Half Empty Glass?', *Communications of the Association for Information Systems*, 3(18).
- [28] Lanford, P. and Hubscher, R. (2004) 'Trustworthiness in E-commerce', Proceedings of the 42nd Annual Association for Computing Machinery Southeast Regional Conference, Alabama, United States.
- [29] Yeung, J.H.Y., Shim, J.P. and Lai, A.Y.K. (2003) 'Current Progress of E-Commerce Adoption: Small and Medium Enterprises in Hong Kong', *Communications of the ACM*, 46(9), pg 226-232.
- [30] Ford, W and Baum, M.S. (1997) *Secure Electronic Commerce: Building the Infrastructure for Digital Signatures and Encryption*, Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1997.
- [31] Garfinkel, S. and Spafford, G. (1997) *Web Security and Commerce*, Cambridge, Massachusetts: O'Reilly & Associates, Inc., 1997.
- [32] Rose, G., Khoo, H. and Straub, D.W. (1999) 'Current Technological Impediments to Business-To-Consumer Electronic Commerce', *Communications of the Association for Information Systems*, 1(16).
- [33] Davis, F.D. (1998) 'Perceived Usefulness, Perceived Ease of Use and User Acceptance of Information Technology', *MIS Quarterly*, 13(3), pg 319-340
- [34] Karahanna, E. and Straub, D.W. (1999) 'The Psychological Origins of Perceived Usefulness and Ease of Use', *Information and Management*, 39(4), pg 283-295.
- [35] Lee, A.S. (1989) 'A Scientific Methodology for MIS Case Studies', *MIS Quarterly*, 13, pg 33-50.
- [36] Yin, R.K. (1994) *Case Study Research: Design and Methods*. 2nd edn. Sage Publications, Thousand Oaks.
- [37] Abrazhevich, D. (2002) 'Diary on Internet Payment Systems', Proceedings of the British Conference on Human Computer Interaction, London, England.