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The Adoption and Diffusion of Electronic Wallets: The Case of Monéo

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Abstract

Despite the strong and consistent increase in the use of electronic payment methods worldwide, the diffusion of electronic wallets is still far from widespread. Analysis of the failure of electronic wallet uptake has either focused on technical issues or chosen to analyse a specific scheme (Stalder, 1998). This article proposes a joint approach to analysing key factors affecting the adoption of e-wallets by using the 'Technology

Acceptance Model" (Davis, 1999) which we have expanded to take into account the cost of using e-wallets. We use this model to analyse Monéo, the only French electronic wallet still in operation.

Keywords: **Electronic wallet, TAM, user acceptance, adoption, diffusion, bank**

INTRODUCTION

After the initial craze for electronic wallets at the beginning of the 90s, and their subsequent failure, the 2000s have seen the arrival of a second generation of products such as Proton in Belgium and Monéo in France. However, the development of this second generation has not been smooth either. This highlights the fact that both the general public and retailers are reluctant to adopt e-wallets in two-sided markets where the cards are in direct competition with cash which they are supposed to be replacing.
This article explains the elements affecting the adoption of this electronic payment method using the 'Technology Acceptance Model" (Davis 1999) which offers a conceptual framework for analysing the adoption of new technology from its perceived usefulness and ease of use. We propose extending this model to incorporate the cost of using e-wallets using the 'perceived advantage' variable that is the result of the relation between the perceived usefulness and the cost. Then we will try to explain the adoption of different e-wallets and of Monéo in particular by applying this new variable.

The factors for adopting e-wallets

E-wallets and network externalities

An electronic wallet is an e-money[i] payment instrument. It is a smart card with a microprocessor whose memory is credited with purchasing power stored in a float account that has previously been deposited in a specialized company (bank or e-money issuing company). This float account is debited at each purchase with no involvement from the issuer. The e-wallet offers many advantages: transactions are secure, it is adapted to make micro payments, it is easy to use, universal (there no link with the bank account during the payment process), and it has a wide range of uses. It can be used for point of sale payments and for other applications (social security card, loyalty card, an e-key for building access…), as well as for Internet payments. The e-wallet is similar to the '*Télécarte*' smart card issued by *France Télécom*. Both systems use pre-payment, the difference being that the e-wallet is credited with a purchasing power shown in euros, whilst the *Télécarte* converts the top-up into telephone units. This example and the smart card's wide range of potential uses show that by combining services offered (travel pass plus e-wallet, phone-card plus e-wallet…) the opportunities for penetrating the market increase.

By analysing the many failures (Mondex) and rare successes of e-wallets (EDI and Felica in Japan) we can reach several conclusions.

Firstly, setting up a new payment solution is a long process in which network

externalities play a vital role. These effects are only felt indirectly and over time as merchants decide to offer this payment solution: the more people use e-wallets, the greater the number of merchants inclined to offer this payment solution and, consequently, the more useful e-wallets will become. Consequently, how extensively a payment method is accepted depends closely on the number of users. Eventually, it is the number of possible connections between users of a payment method that makes it useful (Katz and Shapiro, 1994).

Secondly, when network externalities occur, the consumer is not necessarily aware of the network effects they are experiencing. One result may be locked-in inefficient technology. Consumers do not choose a product uniquely on the basis of the intrinsic qualities of specific technology; they are also influenced by the number of people who have chosen one or another of the rival solutions in the past. That is what makes one technology more attractive and increases its chances to dominate in the future. When launching of a method of payment it should be considered as a 'network good' because network effects are responsible for increasing adoption uptake. In much the same way Internet payment systems are affected by the same issues as 'network goods', which explains why the market is dominated by SSL in spite of its precarious security (Sahut 2001). Its ease of use and the fact that it is already integrated into the two main Web browsers including 'Internet Explorer', has given it an installed base of users which other systems such as SET or 3D secure[ii] can not rival, despite the fact that they provide better security. Shapiro and Varian (1999) suggest subsidizing the development phase of the most efficient technology right from the start, so as to generate a large installed base and subsequently increasing prices. Furthermore, research carried out by Chakravarti & Xie (2006) on the impact of a standards war on the adoption of a new technology product by consumers shows the necessity of communicating the relative advantages of e-wallets over the existing standard, in other words cash.

Apart from network externalities, the weak penetration of e-wallets into the European market can be explained by the fact that their promoters are confronted by the problem of a two-sided market made up of merchants and consumers (Verdier, 2006). However, the development of this market depends mainly on consumers adopting this technology, as the merchant will equip himself if there is a sufficient potential user base.

The Technology Acceptance Model and a proposal of extension

The question of why people decide to accept or reject a specific technology remains an important issue. Literature on information systems has offered numerous models to explain how the technology is adopted within organizations. The standard reference model is the 'Technology Acceptance Model' (TAM) by Davis (1989).

This model is an adaptation of the theory of reasoned action proposed by Fishbein and Ajzen (1975) to explain and predict the behaviour of people in a specific situation. (Figure 1 depicts a simplified version of the model). The TAM postulates that two particular beliefs - perceived usefulness and perceived ease of use - are of primary relevance to ICT acceptance behaviour.

Numerous works have validated this model in different contexts by using quantitative research methodology: email (Desq 1991), computer aided software engineering (Chau 1996), e-library (Hong et al., 2001). They have helped prove a statistical relation

between the variables thought to be determining and measures representing user behaviour. A fundamental limitation of this model is that it explains statistically (a snapshot at a given moment) a dynamic phenomenon (which is developing over time). The in-depth understanding of an eventual relation between factors and behaviour is still beyond the reach of this type of model.

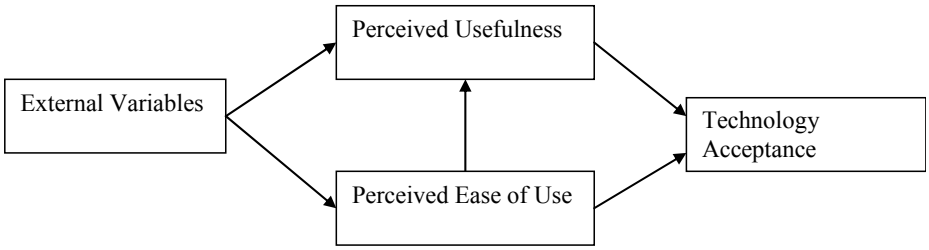

Figure 1: simplified version of the Technology Acceptance Model

(Adapted from Davis et al. 1989)

Perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her performance".

Perceived ease of use is defined as "the degree to which a person believes that using a particular system would be effortless".

One of the goals of the TAM (Davis, 1989) is to serve as a starting point for examining the impact that external variables can have on behavioural intention. So, a lot of researchers have proposed to expand the TAM in order to explain perceived usefulness by a wide range of external influences: computer attitude (Chau, 2001); relevance (Hong et al., 2001; Shih, 2004); perceived enjoyment (Yi & Hwang, 2003), perceived risk (Chan et al., 2004), efficiency gain (Hu et al., 2005), etc.

These extensions assume that the decision to purchase is made by the company or organisation. The user is thus uniquely confronted by the choice of whether or not to use this technology. Yet, when one is considering adopting an e-wallet, the perceived usefulness (expectation of result) must also take into consideration the cost of this payment instrument, which will determine its relative perceived advantage. We therefore end up with an expanded TAM that can be used to understand consumer acceptance of a technology and not only by users within an organisation.

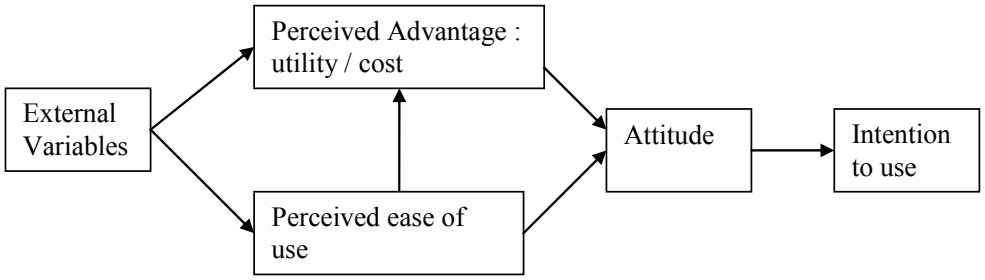

Figure 2: expanded TAM

EVALUATION OF E-WALLETS ADOPTION

Model for assessing e-wallets

Within the enlarged TAM, two dimensions should be taken into consideration when assessing the perceived relative advantage of e-wallets: the perceived usefulness and the cost. The consumer may be prepared to pay a certain amount (either a set price and/or per transaction) to use this method of electronic payment if the perceived usefulness is superior to that of cash for which there is no direct cost.

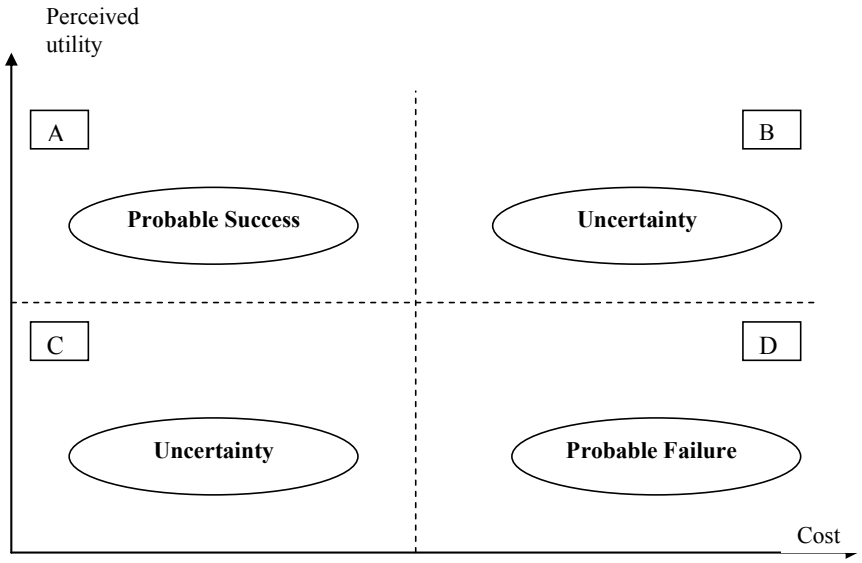

Figure 3: Model for assessing e-wallets

If these two dimensions for assessing methods of payment for consumers are presented graphically, we end up with four situations.

Squares B and D represent situations in which the cost of use is high. If the perceived usefulness is low, failure is highly probable. On the other hand, if the perceived usefulness is high, the situation is indeterminate. In this case it is recommended to reduce the costs whilst increasing (or at least conserving) the level of usefulness for the consumers.

Squares A and C represent situations in which the cost of use is low. If the perceived usefulness is also low, the situation will be undermined as the consumers will choose between this method of payment and cash. On the other hand, if the perceived usefulness is high, this method of payment is likely to be chosen over cash.

Currently in Europe, most e-wallets stand a high risk of being rejected (fig no. 3 square D). Indeed, the level of usefulness perceived by the consumer is often very low because these e-wallets only allow them to carry out payment operations and consumers do not want to bear the cost of use as there exists a substitute which is almost perfect and free: cash.

E-wallet promoters should implement a policy aimed at increasing the usefulness perceived by the consumer and/or reducing the costs they incur. Several studies show that consumers see e-wallets as a substitute for notes and coins (Bourne et al. 1999). The usefulness of an e-wallet depends therefore in its faculty to fulfil the traditional functions of cash more efficiently and possibly to fulfil others. For example, it has been clearly identified that there is an advantage for consumers to own an e-wallet in situations where a micro payment has to be made and where it may be difficult to find the exact amount of money needed for the payment. One of the conclusions drawn from the analysis of the relative failure of Mondex's introduction trial in New York (Van Hove, 2001) highlighted the necessity of offering e-wallets where they would be most useful, for example for automatic payments (vending machines, launderettes…).

The e-wallet can also be useful to the consumer if it makes the payment process in itself simpler or faster. This is one of the justifications for adding on complementary services to e-wallets. When taking public transport, the user will usually have to queue to buy a ticket, pay, go through a ticket control system, and finally hold on to the ticket for inspection. With the e-wallet, all these steps can be covered in one single action. The user presents his e-wallet at the control point activating the payment and registering it (this provides proof of being in possession of a valid ticket and the payment registering also updates the e-wallet's accounting system). The process is therefore both simplified and speeded up by using an e-wallet.

The e-wallet will be considered useful when available in situations where the consumer recognizes its advantage over cash; if it fulfils certain functions better than cash, or if it is combined with complementary services which the consumer considers to be useful in themselves.

However, although it is necessary for the consumers to recognize the usefulness of an e-wallet, this is not enough to guarantee its success, particularly if there are costs linked to its use (fig no. 3 box C).

The e-wallet's cost burden is a crucial factor. As long as the advantages that the e-wallet offers to one of the parties do not compensate for the share of the cost incurred, the e-wallet has little chance of being widely adopted. The questioning of e-wallet users (Bourne et al. 1999) revealed that when faced with a free alternative, consumers prefer to use that solution if it is easily accessible.
Finally, the use of a payment method is based on confidence and its universality, two qualities which themselves depend on our social experience. If we continue to use coins and notes extensively to pay for purchases, it is because in our experience they are universally accepted. In order for a consumer to consider the e-wallet as a credible payment method, it must guarantee a certain universality of use. But, as we have already seen, when its usefulness becomes low, if the cost for using an e-wallet is too high, the consumer will prefer to use cash. Consequently, for its most common use, point of sale payments, the consumer often perceives the e-wallet's utility as limited. He is therefore unwilling to pay to use it. The consumer will not consider e-wallets as universal, as in most cases its cost makes it useless. Moreover, as e-wallets are generally billed by fixed charge payments rather than by transaction, giving the consumer the impression that he is paying for all the payments he makes, even though the e-wallet is only useful for a tiny fraction of all these payments. However, the adoption of a discriminating pricing system that would bill only for certain uses is not a workable solution today. It would call for technical measures and a structure of costs close to those of credit cards.

The Moneo case

In France, the Monéo e-wallet was launched in 1999. It is either included as a chip in a bank card or comes as a stand-alone card. In fact, even though it is present in most bank cards, Monéo is seldom activated by the cardholders.

In order to evaluate an e-wallet, the first step is to study how it can accomplish traditional functions of cash:

- the e-wallet can facilitate conserving and transporting value by avoiding carrying around heavy or bulky notes and coins,
- it facilitates payments by cutting out the need to count and recognize coins, thus speeding up payment,
- it is supposed to increase the security of value, by limiting the risks in the case of loss or theft, and guarantees anonymity of payments.

These functions are fulfilled to a greater or lesser degree by Monéo. In the domain of security, Monéo offers little more guarantees than a bank note because in order to reduce investment costs, its designers fitted it with a chip which is much less secure (and much less expensive) than those used on a bank card. In the event of a fraudulent reloading (which according to the UFC – Federal Union of Consumers in France – is not difficult at all[iii]), the customer risks losing up to 100 euros which corresponds to the maximum amount that can be loaded on the card plus a deductible which could be as high as 275 euros to which you must also add another deductible of 275 euros if the reloading by bank card, making a total of 650 euros. Moreover, Monéo is not an anonymous payment instrument as the issuer can track the user's consumer habits. These limitations of Monéo can induce a low perceived utility by users.

On the other hand, we show in the first part, the importance of the cost pay by users in the adoption of an e-wallet. Monéo is still an expensive option for both parties in the transaction. Retailers must carry the cost of installing a payment terminal as well as the transaction costs when they use the system. The banks offer them two rates: a fixed monthly charge of around 5 euros or a commission which may vary between 0.3% and 0.9% on each transaction. The card carriers pay an annual charge of between 7 and 12 euros even though this service is free in most other European countries (Spain, Holland, Austria, Norway, and Switzerland). Moreover, the business strategy chosen by some e-wallet issuers which means that retailers and card users have to carry the cost of the system is difficult to justify from an economic point of view as, contrary to cash which brings them no benefits, the money in the e-wallets' float account (prepayment system) can be invested and generate interest revenue. The revue generated would allow them, much as providers of free Internet services such as Google, to consider an alternative business strategy.

In total, the cost and low perceived usefulness explain the rejection by the consumer of this e-wallet. According to official figures[iv] from BMS (*Billettique Monétique Services*, the Monéo promoter), only 1 million Monéo e-wallets had been activated by the end of 2005 even though more than 51.2 million bank cards were in circulation. Moreover, the system was generating around 78 million payments annually across a network of 100,000 affiliated retailers - around the same number of transactions as carried out using bank cards in a single day (bank cards are used for 6.27 billion transactions totalling 325.4 billion euros[v]). These figures highlight the difficulty the e-wallet is having taking off despite extensive trials and advertising campaigns. Around 300 million euros have been invested directly and indirectly to launch the scheme.

That is why Monéo has redefined its strategy since 2004 concentrating on specific and captive markets such as municipal services or student services; more specifically for payment in pay and display machines and university restaurants respectively. In the latter, students had little choice in adopting the Monéo as some university restaurants didn't accept other payment methods. Student protests were held to denounce these practices and ended with 8 Monéo reloading terminals being destroyed in Tours[vi]. One can legitimately wonder if Monéo's change in strategy doesn't reflect an acknowledgement of powerlessness in its ability to become a universal method of payment.

CONCLUSION

The key factors of success of this payment method are security, anonymity of transactions, the cost of transactions, as well as the plurality of functions (payment, travel card, e-key for building access, etc.). These key factors, already known to banks from their experience with bank cards, have often been neglected and explain why many e-wallets have encountered problems developing. In particular, the implementation of multiple functions will be necessary to reduce the cost for users but the problem will be to find agreements on revenue sharing between different actors in the value chain. It is therefore necessary to wait several years before seeing e-wallets really emerge as a credible alternative to cash payments for point of sale purchases, and still more time before they can compete with micro payment solutions on the Internet.

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