

# From *meiwaku* to *tokushita*!

## Lessons for digital money design from Japan

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### ABSTRACT

Based on ethnographically-inspired research in Japan, we report on people's experiences using digital money payment systems that use Sony's FeliCa near-field communication smartcard technology. As an example of ubiquitous computing in the here and now, the adoption of digital money is found to be messy and contingent, shot through with cultural and social factors that do not hinder this adoption but rather constitute its specific character. Adoption is strongly tied to Japanese conceptions of the aesthetic and moral virtue of smooth flow and avoidance of commotion, as well as the excitement at winning something for nothing. Implications for design of mobile payment systems stress the need to produce open-ended platforms that can serve as the vehicle for multiple meanings and experiences without foreclosing such possibilities in the name of efficiency.

### Author Keywords

Digital money, e-cash, e-wallets, mobile payment, ethnography, Japan, ubiquitous computing.

### ACM Classification Keywords

K4.4. Computers and society: Electronic commerce.

### INTRODUCTION

Cash is increasingly seen as a species threatened, if not endangered, by the purported efficiency and convenience of digital technologies [3, 8]. Credential cards (credit, charge, or debit) are used to authorize the transfer of money from account to merchant and have proven widely popular, displacing cash payments particularly for larger purchases. And seeking to displace cash from even small purchases, stored-value cards which transfer "e-cash" from the card itself directly (or ostensibly directly) to the merchant have established footholds in places like college campuses, Starbucks, and gift card issuing retail chains.

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Near-field communication (NFC) and security technologies enable incorporation of both kinds of cards into mobile devices, allowing one to pay with a wave or touch of one's e-wallet. These begin to open a new space for HCI research and design around the experience, use, and aesthetics of digital money.

Japan is often held up as a digital money success story, a place where the cashless future is arriving first. Next to Hong Kong, Japan has seen the widest adoption of stored-value digital payment for everyday transactions. Many factors, including regulatory, technical, and infrastructural, may underlie this success. For this paper, we present findings from a short ethnographically-inspired study to focus attention on the interaction- and culture-based factors promoting, and inhibiting, digital money's relative success in Japan, and their broader implications for HCI design.

Rather than attempt to evacuate the social and cultural habits and attachments that "irrationally" hinder the universal adoption and applicability of advanced payment technologies, our research suggests that, on the contrary, social and cultural factors not only matter, but may make or break an m-payment or e-cash system. Furthermore, it is often people's ability to activate, modify, dream with, or even love the technology that makes it successful.

### PRIOR WORK

Sociologists and anthropologists of money have drawn attention to the social inflection and earmarking of cash [7, 11]: hardly an anonymizing or homogenizing medium, money in this view works best when it works toward people's varied ends, which may have more to do with relationships, politics, or faith than low transaction costs, efficiency, or rationality.

Research in ubiquitous computing has begun to take seriously the social nature of future payment systems. For example, Kindberg et al. [4] found participants in theatrical simulations of different digital payment mechanisms as much or more attuned to social implications and norms ("do other patrons know I've paid?") than to rational assessments of technical security and trust.

Various market-research studies have looked at factors influencing m-commerce adoption, including its relative

success in Japan than elsewhere [9]: better mobile UI design, more favorable regulations, more desirable and competitive services. Some view Japan as a special case driven by cultural idiosyncrasies, a nation of early adopter *otaku* (“geeks”) from which little can be generalized.

Our approach is not one of comparative market research or business analysis, but one inspired by the ethnographer’s goal of taking a culture in its own terms, challenging preconceptions, and seeking first-hand understanding of what it looks and feels like from within. It is aligned with that of Bell and Dourish [1] and Mainwaring et al. [5, 6] who assert that pervasive technology is already a (socially constructed) fact of life in many contexts already, and that tech-centered visions like “ubiquitous computing” or the “cashless society” can be usefully de-familiarized through immersion in these incomplete, messy, i.e., real places.

### STUDYING FELICA E-MONEY

In Summer 2007 we conducted research in greater Tokyo and the island prefecture of Okinawa on the use of FeliCa-based e-money. We used a combination of arranged and impromptu interviews, observation, and, when possible, participation (e.g., we “charged” smartcards with 3000 JPY [25 USD] to give as participant gifts). In addition to e-money end-users, we spoke with retailers who had adopted e-money POS equipment, people marketing the e-money system, and people researching e-money.

FeliCa is a passive NFC chip developed by Sony for use in smartcards and modified by FeliCa Networks, a joint venture of Sony and NTT DoCoMo, for incorporation into handsets. Sony has shipped over 160 mil. since its debut in 1996, and FeliCa Networks an additional 40 mil. since its inception in 2004. Whether in a stand-alone smartcard or integrated into an *osaifu keitai* (“wallet mobile phone”), each FeliCa device can support up to eight different applications, such as stores of e-value or identity credentials, and realize eight parallel secure transactions within 100 ms. of coming within range (a few cm.) of a FeliCa reader. A number of separate e-money systems are built upon FeliCa, the most prominent brands in our data are listed in Table 1.

FeliCa-based cash has its origins in the mundane, but daunting, institutional practicalities of moving millions of commuters efficiently through fare-collection gates in megacity transit systems. Suica, a play on the onomatopoeia *sui-sui* (“flowing quick and smooth”), was developed by JR East, a major railway serving the Tokyo area, as a more efficient evolution of its magnetic-striped paper tickets. All of our participants in greater Tokyo had used a Suica card, or the roughly equivalent PASMO card; these are taken-for-granted aspects of commuters’ daily lives. During 2007 the use of Suica has expanded to stores and vending machine payments in and around stations.

Brand	Use	Accepted in
Suica, PASMO	Transit & E-cash	Tokyo rail, subway, bus lines; nearby shops and vending machines; some taxis.
Edy	E-cash only	National convenience store chains; some department stores, restaurants, karaoke clubs; vending machines, taxis.
iD DCMX	Credit charges	(Similar to Edy.)

Table 1. Selected FeliCa-based payment systems in Japan.

Most of our interviewees carried cash, at least one form of transit card (Suica or PASMO), and at least one credit card. Added to this were store cards for collecting points, and airline cards for collecting miles; these were how “stand alone” e-cash like Edy found their way into the wallet, embedded within point cards (in Edy’s case, ANA [All Nippon Airlines] cards).

During our interviews we asked participants to empty their wallets and talk about when and how they used the different payment systems. As they described what they would buy with cash versus a credit card or how they differentiated between e-cash and cash, two strong and surprising themes emerged: *meiwaku* and *tokushita*.

### AVOIDING MEIWAKU

Avoiding commotion in Japan is a far more broad and deep concern than just an institutional imperative for efficiency. At the personal, cultural level, avoiding *meiwaku* (annoyance, disorder, causing a commotion) is understood as both a practical and aesthetic/moral imperative, one of the first things children are taught.[2] One does not jaywalk; one does not talk on the phone on the train; one certainly does not pay with a credit card, certainly not for a small transaction, if it can be avoided. “I feel as though I’m causing trouble for store clerks when I pay by credit card,” one participant confessed; another added “Making people wait is un-cool. People behind you in queue and clerk might think, ‘time wasting jerk!’.” In fact, one ought to avoid credit cards in the first place, as they expose one to a risk of indebtedness, an explosion of shameful *meiwaku*. (This is one factor behind that statistic that less than 1/10<sup>th</sup> of consumer spending in Japan is by credit card, compared to nearly 1/4<sup>th</sup> in the U.S. [10])

In many ways, from the consumer perspective, the pre-paid touch-and-go cash card should be a pro-social, face-saving elixir. Not only need nothing be signed, there is no fumbling for change, no interrupting the flow. No incurring of debt. Payment is automatically and precisely settled down to the last yen, the possible messiness of human error avoided. Indeed, e-money is most often used when most other people use it. In the subway station everyone moves with their Suica or PASMO. In the university convenience

store the students glide through the check out to the warble of the Edy reader. To do otherwise is to risk *meiwaku*.

### Digital money hides the work behind it

Alas, the relationship between *meiwaku* and digital money cuts both ways: reducing but also causing. We heard stories of spectacular breakdowns involving transit cards (and against a backdrop of pervasive *sui sui* normalcy, even minor breakdowns stand out as spectacles). The most common cause had to do with loading cash onto the card: forgetting to do it, finding oneself without access to an appropriate terminal, not being able to see in advance that it was necessary. Unlike failed e-commerce transactions, these m-payment failures were public: red lights flashed, warning alarms sounded, queues backed up, heads turned.

Keeping e-money running smoothly required work from people who use it. Regular cash does not magically turn into e-cash; to convert it, one has to find a re-charging machine or a sales clerk with a POS terminal, and both are specific to the brand of e-cash involved. E-cash cannot be spent anywhere, like cash: one has to find a brand-specific POS reader. Nor can one type of e-cash be converted into another: it must be spent or linger in a rarely used e-cash account. (Conversion of e-cash back into cash is prohibited by law.) Each type of e-cash requires its own work.

Suica/PASMO have the advantage here, as their e-cash affiliates grew outwards from transit lines themselves, and are generally well-supported within. But stand-alone e-cash systems like Edy have networks based on participating retail chains, and it can still require a special effort to find the appropriate store in which to spend your ecash.. And unlike Suica/PASMO, use of an Edy card was often seen to involve an apparently pointless exercise of converting real cash into e-cash solely to take the place of real cash at the POS, rather than to gain passage through fare gates where fiddling with tickets was a clear invitation to *meiwaku*.

### Problematic solutions: mobile phones and credit cards

The *osaiifu keitai* is a potential solution to management of e-money, as it not only can be used in an almost eyes-free touch-and-go manner, but also affords inspection of loaded e-cash systems through their respective menu-based UIs. Despite this functionality being now standard in most Japanese handsets, only the most tech savvy participants were aware of its ability to make e-cash visible and even those said they seldom used the feature. More typical was a perception of this technology inviting more, not less, *meiwaku*: “When I see someone in front of me use an *osaiifu keitai* instead of a train pass, I mentally tell them, ‘You’d better have that charged!’” one non-user confided.

Despite the cultural stigma of credit cards, linking a credit card to one’s prepaid e-cash device, preauthorized to top-up when the balance fell below a threshold, was a popular practical management solution – among those with access. Such linking is private and invisible, so only the user (and perhaps their parent) need know of the debt-related

commotion-risk incurred. Nevertheless, within the logic of Japanese society, this brings a likely cost to the FeliCa or Osaifu Keitai brand. It is hard (though perhaps not impossible in the contradictory mess of real-world ubicomp) to maintain an image of pre-paid purity and “cash replacement” should everyone acknowledge that behind the scenes the new e-money is just credit cards in disguise.

A little commotion can sometimes be a good thing. For those who very carefully manage their money and worry about indebtedness, the ease of an e-money transaction is a disadvantage. According to one woman in Tokyo, “I don’t like paying with e-money because I don’t feel like I’m actually ‘using money’. If we were to start using e-money exclusively, I would lose my sense of money.” For others there are times when using a credit card slows down the transaction and imbues it with a feeling of ritual as well as conferring status to the cardholder; “Using credit cards at a hotel or an expensive restaurants is a status symbol, so I do it to demonstrate that I am ‘worthy’.”

### ACHIEVING TOKUSHITA!

The Japanese disdain for *meiwaku*, and the complex management involved in avoiding it, was what most clearly emerged from our conversations as central to the benefit (and cost) of Felica-based e-money. Not far behind, however, was a love of *tokushita* (obtaining [*shi ta*] a gain, benefit, profit, or advantage [*toku*]). In helping us analyze the delight and even compulsion many of our participants expressed in using loyalty and reward points, our interpreter introduced us to this term, explaining that “*tokushita!*” was the sort of thing a *Pachinko* winner would exclaim. Accumulating points for a loyalty-reward is not gambling *per se*, but it does involve getting “something for nothing” through a kind of playful, almost “cheating”, perhaps addictive activity. Both the push of *meiwaku* and the pull of *tokushita* are critical to understanding the success and cultural meaning of e-cash in Japan.

*Tokushita* involves a practical gain wrapped in an aesthetic pleasure. Even without their widespread ties to point schemes and loyalty programs, the experience of a successful touch-and-go FeliCa payment is carefully designed to be an attractively multisensory micro-performance: the activated reader begins to glow or flash colorfully, the tension resolved by the touch (or near-touch) of the NFC card, which, like magic, triggers a light and sound display (the details of which vary by brand, e.g., Edy looking and sounding somewhat different than Suica or iD). This attention to detail, to beautiful wrapping and packaging, will come as no surprise to anyone familiar with Japan. But the interaction design publicly apparent in every FeliCa transaction does again illustrate a cultural commitment, or perhaps preoccupation, with turning mundane transactions into gifts, of giving more than is strictly required.

*Tokushita* is most fully realized, however, through the institution of the loyalty point, a kind of e-money or para-

currency in its own right, independent from (but now strongly leveraged by) e-cash systems. In the case of Edy, ANA mileage is the primary associated para-currency. Use of the ANA Edy card (the most common form of Edy card) to make a payment earns the cardholder 1 mile for every 200 JPY (2 USD) transaction. The miles can later be converted back to Edy cash but only as lump sums: 10,000 JPY (83 USD) for 10,000 miles.

Two major areas of Edy usage in Japan are Tokyo and Okinawa. Tokyo as a center of business and street life is unsurprising in this regard, but at first the island of Okinawa, “the Hawaii of Japan”, seems an unusual place to find widespread e-cash adoption. However collecting miles is attractive for both tourist and resident. Okinawa is a three hour flight from Tokyo. For residents, using an ANA Edy card in convenience stores, department stores, gas stations, and taxis around the island is a way of inching their way closer to their dream of leaving the island. For tourists it’s a way of achieving their dream of returning. We were told one story of a customer who had used an Edy card to buy a diamond ring during a “double mileage points” promotion at an Okinawan department store. This was an extremely laborious transaction as the cost was high 420,000 JPY (3,800 USD) and Edy has a 50,000 JPY (417 USD) limit. The store moved the charging station for the customer as they had to charge their card 9 times in order to complete the purchase. The *meiwaku* of these transactions must have been high, but so was the *tokushita*, as they generated nearly 5000 ANA miles.

Most people’s experience of *tokushita* was rather less dramatic. For those of our interviewees who had their Suica or PASMO transit card linked to a credit card there was pleasure in collecting mileage or other points simply as a reward for their daily commute, or the magazine they bought enroute. The miles were not necessarily used for travel, but rather converted back to e-cash to be spent on lunch. Points were also described as a way of justifying a frivolous purchase. So buying a new pair of shoes was recognized as unnecessary, “but at least I got points”.

In many ways the benefits of points are illusory; if you are really trying to earn enough points to earn flights simply through your grocery shopping then it will be an extremely long time before you get your ticket, even if you start spending more than you should purely to earn points. Rather, you would probably be better off just “going to the discount travel agent”. But maybe the point of *tokushita* is the illusion and the dream?

#### IMPLICATIONS

Mobile payment systems need to produce open-ended platforms that can serve as the vehicle for multiple meanings and experiences without foreclosing such possibilities in the name of efficiency. It is often people’s ability to activate, modify, dream with or even love the technology that makes it successful. By considering the role

that *meiwaku* and *tokushita* play in the life of e-cash in Japan, we suggest that e-cash systems should:

- 1) Result in a net decrease in commotion, before, during, and after point of sale.
- 2) Be designed for public use and take into account the environment of the transaction. (A noisy convenience store is not an intimate restaurant.)
- 3) Support management of their money without either introducing new burdens nor decreasing friction to a point of invisible spending.
- 4) Subtly engage multiple senses, both for practical and aesthetic issues.
- 5) Leave room for dreams, irrationality, for *tokushita*! Money is not just about exactness and frugality; it’s also about fun. If e-money brightens your day then it might also fit into your life.

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#### REFERENCES

1. Bell, G., Dourish, P. Yesterday’s tomorrows: Notes on ubiquitous computing’s dominant vision. *Personal and Ubiquitous Computing* 11, 2 (2006), 133-143.
2. Dillon, T. My sense of *meiwaku*. *Japan Times*, 17 February 2007.
3. *The Economist*. The future of money: A cash call. 15 February 2007. [http://www.economist.com/printedition/displayStory.cfm?story\\_id=8697424](http://www.economist.com/printedition/displayStory.cfm?story_id=8697424)
4. Kindberg, T., Sellen, A., Geelhoed, E. Security and trust in mobile interactions: A study of users’ perceptions and reasoning. *Proc. Ubicomp 2004*, 196-213.
5. Mainwaring, S.D., Chang, M.F., Anderson, K. Infrastructures and their discontents: Implications for ubicomp. *Proc. Ubicomp 2004*, 418-432.
6. Mainwaring, S.D., Anderson, K., Chang, M.F. Living for the global city: Mobile kits, urban interfaces, and ubicomp. *Proc. Ubicomp 2005*, 269-286.
7. Maurer, B. The anthropology of money. *Annual Review of Anthropology* 35 (2006), 15-36.
8. OECD. *The Future of Money*. Organization for Economic Cooperation and Development Secretariat, Paris, France, 2002.
9. Weber, A. The convergence of mobile data phones, consumer electronics, and wallets: Lessons from Japan. *Telematics and Informatics* 24, 3 (2007), 180-191.
10. Williams, M. NTT DoCoMo to offer credit-card payments by handset. *InfoWorld*, 8 November 2005, [http://www.infoworld.com/article/05/11/08/HNhandsetpayments\\_1.html](http://www.infoworld.com/article/05/11/08/HNhandsetpayments_1.html)
11. Zelizer, V. *The Social Meaning of Money*. Princeton University Press, Princeton, NJ, USA, 1997.