

# Payment Instrument Characteristics: A Repertory Grid Analysis

Full Paper

**Jacques Holst**

ITU, Copenhagen  
jaho@itu.dk

**Jonas Hedman**

Copenhagen Business School  
jh.itm@cbs.dk

**Martin Kjeldsen**

ITU, Copenhagen  
kjeldsenmk@gmail.com

**Felix B.Tan**

AUT University, New Zealand  
felix.tan@aut.ac.nz

## ABSTRACT

*Over the last decade, we have witnessed payment innovations that fundamentally have changed the ways we pay. Payment innovations, such as mobile payments and on-line banking, include characteristics or features that are essential to understand if we want to know how and why payers choose among payment innovations. Using the Repertory Grid technique to explore 15 payers' perception of six payment instruments, including coins, banknotes, debit cards, credit cards, mobile payments, and on-line banking, we identify 16 payment characteristics. The characteristics aggregate seventy-six unique features. Many of the characteristics and one of the categories are completely novel and unaccounted for in previous works.*

## Keywords

Payments, Payment characteristics, Repertory Grid

## Introduction

Over the last decades, we have seen payment innovations that fundamentally have changed the ways we pay and how we spend money. For instance, plastic cards, on-line banking, e-money, and SMS payments are some of the innovations that have emerged. Payments or payment instruments are “a tool [...] enabling the transfer of funds from the payer to the payee. There are a variety of different payment instruments, each with its own *characteristics* depending on the type of relationship and transaction between the payer and the payee” (Kokkola 2010, p. 28).

Looking at payment research, we find that payment is not a research discipline in itself or a coherent research topic. The topic appears within several disciplines, including information systems (Mallat 2007), consumer behavior (Hirschman 1979; Penz and Sinkovics 2013; Raghurir 2006), marketing (Raghurir and Corfman 1999), economics (Garcia-Swartz et al. 2006; Penz et al. 2004), sociology (Knights et al. 2007), and banking and finance (Kahn and Roberds 2009). This has ensured a broad coverage of payments, including cost-benefit analysis of cash and payment cards (Garcia-Swartz et al. 2004), choice and spending behavior (Raghurir 2006), payment framework (Carton et al. 2012), and adoption of mobile payments (Mallat 2007; Xin et al. forthcoming). In addition, a few articles synthesize parts of the available literature (e.g. Dahlberg et al. 2008; Raghurir 2006), which contributes greatly to the progress within the individual disciplines. However, payment characteristics are less frequently studied. One notable exception is Hirschman (1982) who did an in-depth study of payment characteristic and identified eleven discrete characteristics. A limitation in Hirschman's (1982) study is contemporary payment innovations, which did not exist in early 1980s. In response to this, Benton et al. (2007) encourage work aimed “to understand payment characteristics and how they are understood by [payers]” (p. 56), since such work are essential in understanding how payers adopt payment instruments and how payers choose to pay. Therefore, the aim of this paper is to explore the following research question:

*What are the characteristics of payment instruments as perceived by payers?*

In this paper, we conduct an exploratory investigation of payment characteristics. We apply the Repertory Grid technique (Kelly 2003; Tan and Hunter 2002), which provides a structured way of interviewing and analyzing the data. We made 15 in-depth interviews with payers in Denmark and identified 16 discrete payment characteristics. Our result contributes to information systems and payment characteristics in the following ways. First, payments are essential to many information systems, including mobile payment, web shops, and internet banking, thus an increased understanding of the underlying payment characteristics embedded in different payment instruments enables designer and developer to design better payment solutions. In relation to payment characteristics, we provide two distinct contributions. First we provide an updated study of payment characteristics that include new payment innovations, such mobile payments and on-line banking. Second, we provide an in-depth definition of the 16 payment characteristics.

We structure the remainder of the paper in the following way: The next section outlines literature on payment characteristics. Then we describe the Repertory Grid methodology. In the fourth section, we present our result. In the fifth section, we discuss the results. Finally, we conclude the paper.

## Payments Research

Payments are central to modern society. They are an integral part of the exchange process of goods and services for money between buyers and sellers. Payments involve many parties, including payers, payment services providers, banks, telecom operators, and payees to mention a few. We will focus on payment characteristics. Humphrey et al. (1996) summarizes the overall results of previous research as “*data underscore our principal observation that the movement toward greater use of electronic payment methods, though gradual, is uniform and unmistakable, both across countries and over time*” (p. 936), but fails to explain why. Schreft (2006) points out that existing research “*is backward looking. It tells us what payment instrument were chosen in the past and so may not be a good indicator of what will be chosen in the future*” (p. 5), and so other forms of studies are needed if the future of payments are to be understood.

To this point, some studies investigate payers’ preferences for payment instrument (Plouffe et al. 2001; Schreft 2006; Schuh and Stavins 2010; See-To et al. 2014; Von Kalckreuth et al. 2014). However, few studies attempt to explore payment instrument characteristics in-depth. Research acknowledges the fact that payment instruments have certain characteristics, which are preferred by the end user and consequently influence the payer in their behavior (Benton et al. 2007; Hirschman 1982; Schuh and Stavins 2010). Benton et al. (2007) stress this “*A [payer]’s decision to adopt and use a particular payment [instrument] is likely to be based heavily on the fundamental characteristics embodied by that payment [instrument].*” (p. 27)

Hirschman (1982) identified eleven characteristics salient to the preference and usage of payment instruments through several focus group interviews. Jonker (2007) surveyed why consumers pay as they do in the Netherlands. The focus was on payment characteristics of cash, debit and credit card and e-purse. Another stream of research focus on socio-demographics of the payer and show that demographic factors, such as age and income, influence the choice and use of payment instruments (Amromin et al. 2007; Carow and Staten 1999). Historically, there was a strong correlation between income and use of credit cards (Humphrey 2004; See-To et al. 2014). However, recent studies do not provide support for this correlation any longer (Humphrey 2010). Besides demographic factors, contextual factors, such as location, product type, and time, have also been identified (Benton et al. 2007; Bounie and François 2009; Ching and Hayashi 2010; Cohen and Rysman 2013; Klee 2008; Linfeng et al. 2013).

## Repertory Grid

The Repertory Grid (RepGrid) is a structured approach to understand how individuals perceive a phenomenon. It is based on personal construct theory (Kelly 2003) from psychology. The approach has been used within a wide variety of fields, including marketing (Marsden and Littler 2000), strategic management (Reger and Huff 1993), information systems (Napier et al. 2009). Tan and Hunter (2002) provide a comprehensive review of the use of RepGrid.

The procedure of the RepGrid methodology includes the following steps: defining elements (object of investigation), elicitation of constructs (identifying personal construct system), consolidation of constructs

(analysis and synthesis), and reliability test (with independent party). Prior to presenting the procedure we introduce our population.

We interviewed fifteen respondents over a period of roughly two months and ensured a wide demographic background in order to identify as many possible payment instrument characteristics. The sample is a convenience sample based on the authors' personal and professional network. Our sample reflects an average age of 37 (median of 33) with the youngest being 24 and the oldest being 60 years old. We have slightly more males (nine vs six) than females in the study. The respondents work in various professions from cashier clerk in retail to vice president level at a multi-million dollar enterprise. All of our respondents have lived in Denmark for a substantial part of their life. The choice of people in our own network has some limitations, but also some advantages. The clear advantage is access and also willingness to speak. On the other hand the choice could lead to different form of bias. The respondents share the same cultural and societal background, which could limit the number of elicited constructs, but in the case of payments characteristics it is desirable to have the decrease the cultural and societal background as a "constant". As identified (e.g. Danish Payments Council 2014, Borzekowski et al. 2008, Schuh & Stavins 2010) payments are local, we decided to focus on one cultural domain.

### ***Defining Elements***

The elements in the RepGrid technique are the objects to be investigated (Tan and Hunter 2002). The research question determines payment instruments as the objects of the domain, which in turn become the RepGrid's elements that respondents will be introduced to. The selection of elements follows four rules to ensure clarity and consistency relevant for later analysis (Tan and Hunter 2002): 1) an element must discrete (Stewart et al. 1981), 2) the elements should be homogeneous (Easterby-Smith 1980), 3) the elements must not be evaluative, and 4) all the elements must be representative from within the field to be studied (Beail 1985). We choose coins, banknotes, debit cards, credit cards, online banking<sup>1</sup>, and mobile payments as they are commonly used in Denmark (Nationalbanken 2014). Bitcoins or Near Field Communications based payment solutions, such as Apple Pay, are not used in Denmark to any large extent. They would of course make the paper more IS relevant, but the foundation of our current payment system is the payment instruments that we have included.

### ***Elicitation of Constructs***

The elicitation of constructs in a RepGrid interview is concerned with understanding the respondent's perception, or personal construct system, of each of the six payment instruments. The literature refers to several methods for identifying personal construct systems. We use the classic approach (Tan and Hunter 2002) of "Minimum Context Card Form" and show three elements.

The procedure of the RepGrid interview follows a specific structure ensuring a high quality and quantity of constructs. Tan and Hunter (2002) recommendations are used as the overall guide on how to structure the interview. Before the interview, all of the respondents were emailed a contract that included a description of the project and the interview. During the interview, the respondents were presented with six pieces of similar colored index cards. On the front of each card one of the payment instruments along with a few examples of commonly used brands within the type of payment instrument were clearly labeled. Each of the six payment instruments' typical size and form were described ensuring the respondent understood and were familiar with the payment instrument. The respondent was asked to pick, at random, *three of the index cards* after mixing and turning the index cards upside-down, preventing the respondent from knowingly selecting a specific card.

Once the respondent selected three index cards, the respondent was asked: *In regards to a characteristic in a payment instrument, how are two of these payment instruments the same, but different from the third?* The respondent began to express his or her construct system concerning the selected payment instruments. As the respondent proceeded to provide insights into the respondent's construct system, the interviewer applied the laddering technique asking 'how' and 'why' questions to encourage the respondent to provide more information in areas where certain ambiguity might still exist. Once the interviewer considered that enough clarity was achieved the index cards were then returned to the pile, flipped and mixed. The respondent, randomly, selects three index cards again and continues all over with the process

---

<sup>1</sup> Note that we do explore online banking as a mean to make payments, in particular to pay invoices.

of explaining his or her construct system. Each round is called a construct elicitation round, or iteration. The respondents completed, on average, eight iterations.

The overall aim is to obtain as many unique constructs as possible, and thus by interviewing as many people with as varied background as possible will increase the likelihood of a higher concentration of payment instrument characteristics. Tan and Hunter (2002) suggest that 15-25 respondents would “generate sufficient [data] to reveal the extent of the characteristics” (p. 42). In our study, we reached construct saturation after 15 interviews.

### **Consolidation of constructs**

The fifteen interviews resulted in 246 raw constructs, all of which are processed through Jankowicz (2004) bootstrapping technique - a technique ensures that the model is consolidated and void of replications. The raw constructs were paired with those that have the same perspective on a theme. 76 constructs were identified using the above-mentioned technique. Then each of the 76 constructs was grouped according to theme. In total 16 themes emerged which forms the foundation of our payment characteristics.

## **Results**

In this section, we present our findings. In table 1 we present 16 payment characteristics with an elaborated definition as well. Recall that underlying the 16 payment characteristics there are 76 individual “features”. The characteristics are listed based on the number of individual features, e.g. Context is based on 15 features. The number is in brackets.

<b>Characteristics</b>	<b>Definition in short</b>
Context (15)	Context relates to the location of the payment, the type of product being purchased, the payee, and the role of the payer (if you are buying for yourself or others)
Control (13)	Control addresses the degree the payment instrument empowers the payer to control its own fortune. This could involve the information or feedback provided by the payment instrument regarding spending's.
Convenience (7)	This characteristic relates to barriers and how easy it is to over come these when paying. For instance, it could be the navigation on a payment app or website.
Social doctrines (6)	Society and culture “dictates” how we should pay and perceive money and it should be used.
Risk (4)	Various forms of aspects tied to a feeling of risk taking for the payer.
Expenditure (4)	Expenditure relates to the costs of payment instrument and paying. For instance, some payment cards have an annual fee.
Sensory perception (4)	Sensory perception addresses the experience of the payment instrument by our five senses.
Time (4)	Time, both in speed, frequency and time period, is an aspect that encourages various forms of behavior.
Equipment (3)	Payment instrument relies on additional equipment to function, e.g. card terminals.
Spending (3)	Aspects that influence the level or rate by which money is being spent.
Credit (3)	This characteristic relates to whether the your paying with borrowed money.
Trust (3)	Trust in the payment systems – will the transaction be completed.
Access (2)	The payment instrument's ability to provide access to funds.
Amount (2)	The amount being paid.

Loyalty (2)	Aspects that tie directly to obtaining benefits due to loyalty cards.
Cancellation (1)	Cancellation is relevant to the subject of cancelling, or disconnecting ones tie to the payment instrument.

**TABLE 1. Summary of Payment Characteristics****Context**

The first characteristic is concerned with the overall aspects related to the payer's purchase situation. These situational contexts are broad but cover the typical questions of; what is being bought (i.e. a car, an online subscription to a newspaper, or a small object at a flea market), where is the purchase taking place (between friends? to a store? if the latter, which type of store? A small or large, or perhaps even an international store or online one? Across a distance or to the person next to you?), who is the receiver of the purchased good (e.g., buying goods in behalf of work? or doing an errand for someone else?). A payer must also consider a receiver's preference (e.g. in such situations when giving gifts, or sharing a bill). These considerations are all relevant to the payer's situational context when completely a purchase.

**Control**

Control is concerned with empowering the payer to have control and overview over his own fortune, spending, and payment instrument. This especially relates to giving the payer information about how much money is spent at any given time, allowing the payer to control his or her own economy. Payers distinguish between payment instruments that generate income, and payment instruments that consume that income. Control is tied directly to the consuming aspect, and is concerned with how payers can manage their fortune through the use of different payment instruments. The different payment instruments have various levels of feedback (i.e. it is easier to see how much cash is left in the wallet, than to see how much money is left on the payment card whilst being in the purchase situation) resulting in varying insights into one's economic standing in that given moment, and generally. This variation of insight also creates some ambiguity, not only when wanting to know how much is left, but also when wanting to know if any money is left. A distinction that further influences the payer's level of spending. Control is related to the ability of managing one's economics, and so payers want to be able to detect expenses, have access to receipts, and know whether a payment instrument has fees associated with its use.

**Convenience**

The third is concerned with how many barriers, or how much of an effort a payer must make when completing a payment. It is the level of ease, which the payer experiences when using the payment instrument. This is especially related to the ease of accessing one's full fortune, but also the ease of learning to use new payment instruments. For the digital payment instruments, the speed of navigating the payment instrument's user interface influences the payer's user experience. Payers are also concerned with the required number of steps, which must be taken in order to complete a payment, or check one's account etc. The fewer steps required, the more convenient the payment instruments. Finally, payers consider whether the payment instrument fits into something they are already bringing (e.g. the cell phone is already the bus ticket, calendar, and messenger device), and so avoiding having to remember to bring the payment instrument.

**Social doctrine**

This characteristic is concerned with 'soft values' associated with payment instruments. These values are not the monetary kind, but rather the social kind, which is given by and to our fellow men. They are principles taught by society and culture and thus of relevant to the payer in their choice of payment instrument. Such matters as the environmental considerations related to the production of cash, or payment instruments ability to educate children about economics, are two examples of special social values. Payment instruments can represent a person's social standing in society (e.g. coins belong to the poor or young, while the exclusive platinum payment cards and highest valued banknotes belong to the rich), but can also have a symbolic value depending on the situation (e.g. the twenty dollar bill given as a birthday gift from a grandmother is more special than the twenty dollar bill just pulled from an ATM).

Payment instruments can also have special types of purchases associated with them causing various forms of emotions (e.g. is cash quickly associated with various forms of legal activities because of its anonymity and difficulty of tracing them). Not all cash is only used for illegal payments, but society's social doctrine open up for the possibility. (Note the waste majority of cash in Denmark, i.e. 500 DKK banknote, is not circulated in the payment system – it is used something else)

### ***Risk***

Risk is concerned with factors that relate to a feeling of risk-taking for the payer. The feeling of risk originates from situations where the payer becomes aware of the worth of the value carried. With some payment instruments the value rises as the quantity of the payment instrument is increased (e.g. the more banknotes you carry, the more value is available, whereas, with debit cards that might not be necessarily the case). When a payer carries a lot of money, he or she becomes aware of the potential risk of losing the payment instrument (e.g. due to theft or simply by forgetting or dropping it), and the access it gives to one's fortune, or in case the payment instrument has a monetary value, also losing the entire value of the payment instrument.

### ***Expenditure***

Expenditure is concerned with various forms of costs as the payer is aware of and is responsible for paying. Four areas are seen as relevant. The first is the cost of establishing the owner of a payment instrument (e.g. establishing a membership at a payment provider might have a one time charge). The second relates to the cost of using a payment instrument (e.g. most payment cards have yearly subscription costs assigned to them). The third addresses the cost of losing a payment instrument (e.g. a payment card will in most cases be reissued free of charge or for a minor fee, while losing cash will cost the exact amount of cash lost). Finally, whether the payment instrument is covered by an insurance covering the cost of losing the payment instrument (cash is for instance not insured, so cash saved in the mattress will be covered purely by the owner if stolen).

### ***Sensory Perception***

This characteristic is concerned with how payers perceive the payment instrument, especially the physical aspects. The payer experiences quite differently the material used for various payment instruments. This brings up concerns of how intangible money is made manifest, as well as the durability and hygiene of tangible payment instruments. The tangible payment instruments also vary not only in weight, but also in volume. Two separate aspects influencing choice. Finally, the sound a payment instrument makes is observed to make a difference as well (e.g. Lukas refused to bring coins when going running as they made too much of a noise).

### ***Time***

Time is concerned with various forms of time. For instance, is the time it takes for a recipient to receive a payment a relevant factor. Being able to take advantage of lagged banking systems enables payers to overspend without being charged because money is not recorded as withdrawn till a later point. Specific payment instruments are used for specific type of payments depending on their level of frequency. One type of payment instrument is used for frequent purchases, while less frequent purchases rely on other types of payment instruments. It is also observed that the primary used payment instrument in the beginning of a month might differ towards the end of the month.

### ***Equipment***

Payment instruments can depend on additional equipment to fully function. Most modern payment instruments rely on three things: (i) an underlying technical infrastructure processes the payment, (ii) a device hosting the payment instrument's software in the form of a computer or mobile device, or (iii) an established connection to the internet with a sufficient speed level.

## **Spending**

Spending is concerned with factors that influence the level of spending. Assuming money is available, the payer's emotional feelings dictate very closely the rate of spending. Those feelings can be related to having the ability to purchase and avoiding waiting time, providing a sense of purchasing power, or give in to impulse purchases, or possibilities for obtain a discount. Finally, payer's spending level is influenced by whether they use a payment instrument which is exhausted quickly (e.g. cash) while payment instruments like payment cards encourage the continuation of purchasing.

## **Credit**

Credit is concerned with whether a payment is completed using debit or credit, and the differences tied specifically to use of credit. Apart the distinction of whether debit or credit is being used. Payers are concerned with the validity of credit payments. Secondly, the use of credit causes a concern for the ability to managing and staying alert of one's economic standing. Many respondents claim that credit is the root of all-evil, wanting to stay clear of its use.

## **Trust**

Trust is the foundation to any payment and is primarily concerned with ensuring that the payment credentials are handed over to the actual receiver of a payment. However, trust towards the system processing a transaction is also necessary, as well as having trust to the institution providing and responsible for the payment instrument.

## **Access**

Access is concerned with two aspects. First, and most obvious, is the matter of whether capital is even available to be spent. If the payer has no money, then no payment instrument will do him or her good. Secondly, a concern is relevant to the payment instrument's ability to pay the exact amount the payer is being charged with. A technique frequently used in bargaining (e.g. *'I know the price is 500, but I only have 400 in cash'*).

## **Amount**

Amount is concerned with the distinction made between small and large payments. A matter that help defines which payment instrument the payer ends up using. In regards to large payment, special considerations are made relating to the time it takes to complete a transfer.

## **Loyalty**

Loyalty is concerned with obtaining side-benefits when using specific payment instruments. These benefits often are given as a membership rewards. It can be both bank institutions and payment card providers who provide offers such as concert tickets, or special insurances for products bought using their payment instrument.

## **Cancellation**

The final characteristic is cancellation and is concerned with the ability of cancelling a payment instrument once the payer has obtained the payment instrument. Similar to many others Internet services, modern payment instruments are becoming products one must sign up for, and so a concern of how to cancel such a membership is relevant.

## **Discussion**

The analysis of how payers perceive the characteristic of six payment instruments reveals 16 discrete characteristics; see Table 1 for a summary. The result shows that the concept of payment instruments is a broad multifaceted concept that involves many dimensions and sub dimensions. The identified characteristics complement previous research (Amromin et al. 2007; Benton et al. 2007; Borzekowski et al. 2008; Bounie and François 2009; Hirschman 1982; Humphrey 2010; Plouffe et al. 2001; Schreft 2006;

Schuh and Stavins 2010; See-To et al. 2014) in several ways. There is a high variation in how many characteristics and which the different articles have identified. Our key findings are the following: None of the reviewed articles has identified the same set of characteristics as this study, but Context and Control are recurrent characteristics in most previous research. However, Context and Control do not have the same interpretation in all studies. For instance, Hirschman (1982) defines control as “The payment system helps to keep spending under control”, whereas we define control as empowering the payer by providing feedback. Furthermore, we found Cancellation of payment as a new characteristic. Trust, Sensory perception, Equipment, Spending, Credit, Access, Loyalty, and Amount are rarely addressed in previous research. In the remainder of the section, we will discuss some of the findings more in detail

The payment characteristics contribute to the understanding of payment characteristics in two ways. First, by identifying new payment characteristics, e.g. cancellation. Second, the definitions clarify the vagueness in existing definitions. For instance, (Bounie and François 2009); Ching and Hayashi (2010; (Xu and Riedl 2011) refer to three overall characteristics that determine payment choice: Transaction characteristics, payment instrument characteristics and consumer characteristics. However, none of them provides any definition that clarifies the interpretations of the three characteristics. Furthermore, they refer to the work of Humphrey et al. (1996) when presenting the three-aspect model. Humphrey has no reference to any such model, and do in fact declare that “*our model is not rich enough to capture all of the factors influencing changes in use of all payment instrument*” (p. 929).

One of our key findings suggests that Context is an important characteristic in understanding payment behavior – it influences the choice of payment instrument. In previous studies, context is most often predefined location, such as store or restaurant. We find that Context should be treated with more care and not confined only to location, but also include what is being purchased, what is the purpose of the purchase, and who the payee is. One explanation for this finding is that the view of payments and money differs among, for instance, countries. Compare, for instance Denmark, our research context, and Germany. In Denmark payers use debit cards extensively, but in Germany they still use cash. Cash use is also much more common in the USA and in part due to the extensive tipping system, which do not exist for instance in Denmark.

Context is a recurrent factor in the adoption and design of information systems. Our result confirms this, but also stresses the importance of this factor. For instance, adoption research should pay more attention to the context (when and where) people adopt technology. This has also implications for the design of end user devices (software and hardware) that need to be flexible to the context or there will be a need for context specific devices.

### **Future Research**

Payment characteristics are important for payers, but how important are the individual characteristics when paying remains unsolved. We suggest therefore that future studies investigate the importance of payment characteristics in different payment Contexts, such as the location of the payment (in-store, on-line, or on-street), the type of product (physical vs service), and the payee. Another path for future research is from a payee and in particular from merchants’ perspective. How do payers perceive Trust and Privacy with the on going digitalization of payments (from payment cards to online banking, and mobile payments) is another issue that needs further investigation. For instance we find that previous research, e.g. Bento et al. (2007) do not address two perspectives, which are related to the provider of the payment instrument. First, is the way of how the payment instrument provider handles the payments. Second, whether the payer trusts the provider as a company. When looking to the future where more digital payment instruments will be a lot more available, a payer will have to consider whether they trust the providers. *Sensory perception* considers how payers perceive the actual payment instrument as an object. The category might also start to have a greater importance in a future where the payment instrument is no longer cash, payment cards or another standardized shape. It is clear that digital payment instruments can be installed on many different devices. Mobile payments are available for iOS, Android and Windows, which is a broad spectrum of smartphones and tablets. With the introduction of the Apple Watch and Apple Pay, Apple increased the pace by which society will head towards using other objects as payment instruments, so the very instrument will be less likely to have the same unified characteristics as in the past. To this end, the *Equipment* category might include further perspectives since digital solutions are beginning to be accompanied by tokens of various forms.



## Conclusion

In this paper, we explore how payers perceive the characteristics of coins, banknotes, debit cards, credit cards, mobile payments, and online banking. We interview 15 payers, from a convenience sample to ensure broad diversified social economic background. We follow the Repertory Grid approach to guide our data collection and analysis (Jankowicz 2004; Kelly 2003; Tan and Hunter 2002) and identified 76 unique features that we clustered into 16 discrete characteristics. The paper answers calls for such research, see e.g. Benton et al. (2007), and provide an updated study of payment characteristics based on six common payment instruments. In addition, to the characteristics, we also provide an elaborated definition of each payment characteristic. The result builds and extends upon existing research (Benton et al. 2007; Hirschman 1982; Schuh and Stavins 2010) and uncovers the salient characteristics of payment instruments.

## Acknowledgement

This work was carried out with the support of the Copenhagen Finance IT Region ([www.cfir.dk](http://www.cfir.dk)), and was funded by the Danish Enterprise and Construction Authority, under Grant #ERDFH-09-0026.

## References

- Amromin, E., Jankowski, C., and Porter, R. 2007. "Transforming Payment Choices by Doubling Fees on the Illinois Tollway," *Economic Perspectives:Q II*, pp. 22-47.
- Beail, N. 1985. *An Introduction to Repertory Grid Technique*. Brookline Books, Cambridge, MA.
- Benton, M., Blair, K., Crowe, M. D., and Schuh, S. D. 2007. "The Boston Fed Study of Consumer Behavior and Payment Choice: A Survey of Federal Reserve System Employees."
- Borzekowski, R., Elizabeth, K. K., and Shaista, A. 2008. "Consumers' Use of Debit Cards: Patterns, Preferences, and Price Response," *Journal of Money, Credit and Banking* (40:1), pp. 149-172.
- Bounie, D., and François, A. 2009. "Cash, Check or Bank Card? The Effects of Transaction Characteristics on the Use of Payment Instruments."
- Carow, K. A., and Staten, M. E. 1999. "Debit, Credit, or Cash: Survey Evidence on Gasoline Purchases," *Journal of Economics and Business* (51:5), pp. 409-421.
- Carton, F., Hedman, J., Damsgaard, J., Tan, K.-T., and McCarthy, J. 2012. "Framework for Mobile Payments Integration," *Electronic Journal of Information Systems Evaluation* (15:1), pp. 14-25.
- Ching, A. T., and Hayashi, F. 2010. "Payment Card Rewards Programs and Consumer Payment Choice," *Journal of Banking & Finance* (34:8), pp. 1773-1787.
- Cohen, M., and Rysman, M. 2013. "Payment Choice with Consumer Panel Data," Working Papers, Federal Reserve Bank of Boston.
- Dahlberg, T., Mallat, N., Ondrus, J., and Zmijewska, A. 2008. "Past, Present and Future of Mobile Payments Research: A Literature Review," *Electronic Commerce Research and Applications* (7:2), pp. 165-181.
- Easterby-Smith, M. 1980. "The Design, Analysis and Interpretation of Repertory Grids," *International Journal of Man-Machine Studies* (13:1), pp. 3-24.
- Garcia-Swartz, D., Hahn, R., and Layne-Farrar, A. 2006. "The Move toward a Cashless Society: A Closer Look at Payment Instrument Economics," *Review of Network Economics* (5:2), pp. 175-197.
- Garcia-Swartz, D. D., Hahn, R. W., and Layne-Farrar, A. 2004. *The Economics of a Cashless Society: An Analysis of the Costs and Benefits of Payment Instruments*. AEI-Brookings Joint Center for Regulatory Studies.
- Hirschman, E. C. 1979. "Differences in Consumer Purchase Behavior by Credit Card Payment System," *Journal of Consumer Research* (6:1), pp. 58-66.
- Hirschman, E. C. 1982. "Consumer Payment Systems: The Relationship of Attribute Structure to Preference and Usage," *Journal of Business* (55:4), pp. 531-545.
- Humphrey, D. B. 2004. "Replacement of Cash by Cards in Us Consumer Payments," *Journal of Economics and Business* (56:3), pp. 211-225.
- Humphrey, D. B. 2010. "Retail Payments: New Contributions, Empirical Results, and Unanswered Questions," *Journal of Banking & Finance* (34:8), pp. 1729-1737.

- Humphrey, D. B., Pulley, L. B., and Vesala, J. M. 1996. "Cash, Paper, and Electronic Payments: A Cross-Country Analysis," *Journal of Money, Credit and Banking*, pp. 914-939.
- Jankowicz, D. 2004. *The Easy Guide to Repertory Grids*. John Wiley & Sons.
- Jonker, N. 2007. "Payment Instruments as Perceived by Consumers - Results from a Household Survey," *Economist-Netherlands* (155:3), pp. 271-303.
- Kahn, C. M., and Roberds, W. 2009. "Why Pay? An Introduction to Payments Economics," *Journal of Financial Intermediation* (18:1), pp. 1-23.
- Kelly, G. A. 2003. *The Psychology of Personal Constructs. Volume One. A Theory of Personality*.
- Klee, E. 2008. "How People Pay: Evidence from Grocery Store Data," *Journal of Monetary Economics* (55:3), pp. 526-541.
- Knights, D., Noble, F., Vurdubakis, T., and Willmott, H. 2007. "Electronic Cash and the Virtual Marketplace: Reflections on a Revolution Postponed," *Organization* (14:6), pp. 747-768.
- Kokkola, T. (ed.) 2010. *The Payment System*. Frankfurt am Main: European Central Bank.
- Linfeng, H., Wuke, Z., and Qing, X. 2013. "The Determinants of Online Payment Method Choice: Insight from an Eye-Tracking Study," in: *WHICEB 2013 Proceedings. Wuhan International Conference on e-Business*
- Mallat, N. 2007. "Exploring Consumer Adoption of Mobile Payments: A Qualitative Study," *The Journal of Strategic Information Systems* (16:4), pp. 413-432.
- Marsden, D., and Littler, D. 2000. "Exploring Consumer Product Construct Systems with the Repertory Grid Technique," *Qualitative Market Research: An International Journal* (3:3), pp. 127-144.
- Napier, N. P., Keil, M., and Tan, F. B. 2009. "It Project Managers' Construction of Successful Project Management Practice: A Repertory Grid Investigation," *Information Systems Journal* (19:3), pp. 255-282.
- Nationalbanken. 2014. "Report on New Payment Solutions," Copenhagen.
- Penz, E., Meier-Pesti, K., and Kirchler, E. 2004. "'It's Practical, but No More Controllable': Social Representations of the Electronic Purse in Austria," *Journal of Economic Psychology* (25:6), pp. 771-787.
- Penz, E., and Sinkovics, R. R. 2013. "Triangulating Consumers' Perceptions of Payment Systems by Using Social Representations Theory: A Multi-Method Approach," *Journal of Consumer Behaviour* (12:4), pp. 293-306.
- Plouffe, C. R., Vandenbosch, M., and Hulland, J. 2001. "Intermediating Technologies and Multi-Group Adoption: A Comparison of Consumer and Merchant Adoption Intentions toward a New Electronic Payment System," *Journal of Product Innovation Management* (18:2), pp. 65-81.
- Raghubir, P. 2006. "An Information Processing Review of the Subjective Value of Money and Prices," *Journal of Business Research* (59:10), pp. 1053-1062.
- Raghubir, P., and Corfman, K. 1999. "When Do Price Promotions Affect Pretrial Brand Evaluations?," *Journal of Marketing Research*, pp. 211-222.
- Reger, R. K., and Huff, A. S. 1993. "Strategic Groups: A Cognitive Perspective," *Strategic Management Journal* (14:2), pp. 103-123.
- Schreft, S. L. 2006. *How and Why Do Consumers Choose Their Payment Methods?* DIANE Publishing.
- Schuh, S., and Stavins, J. 2010. "Why Are (Some) Consumers (Finally) Writing Fewer Checks? The Role of Payment Characteristics," *Journal of Banking & Finance* (34:8), pp. 1745-1758.
- See-To, E. W., Papagiannidis, S., and Westland, J. C. 2014. "The Moderating Role of Income on Consumers' Preferences and Usage for Online and Offline Payment Methods," *Electronic Commerce Research*, pp. 1-25.
- Stewart, V., Stewart, A., and Fonda, N. 1981. *Business Applications of Repertory Grid*. McGraw-Hill London.
- Tan, F. B., and Hunter, M. G. 2002. "The Repertory Grid Technique: A Method for the Study of Cognition in Information Systems," *MIS Quarterly*, pp. 39-57.
- Von Kalkreuth, U., Schmidt, T., and Stix, H. 2014. "Choosing and Using Payment Instruments: Evidence from German Microdata," *Empirical Economics* (46:3), pp. 1019-1055.
- Xin, H., Techatassanasoontorn, A. A., and Tan, F. B. forthcoming. "Antecedents of Consumer Trust in Mobile Payment Adoption," *Journal of Computer Information System*.
- Xu, Q., and Riedl, R. 2011. "Understanding Online Payment Method Choice: An Eye-Tracking Study," in: *ICIS 2011 Proceedings*. p. Paper 18.