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Taxonomy of payments: a repertory grid analysis

Taxonomy
of payments

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75

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Abstract

Purpose – Recent innovations in payment instruments have fundamentally changed the ways we pay. These innovations, such as mobile/SMS payments and online banking, contain features that are likely to influence how people choose to pay. The purpose of this paper is to understand the factors that impact payers' choice of payment instruments.

Design/methodology/approach – Through in-depth interviews using the repertory grid technique, the authors explored 15 payers' perceptions of six payment instruments, including coins, banknotes, debit cards, credit cards, mobile payments, and online banking. The approach draws heavily on organizational systematics to better understand payers' choice of payment instruments.

Findings – A four-category taxonomy of payments was developed. The authors refer to the taxonomy as the 4Ps: the purchase, the payer, the payment instrument, and the physical technology. The taxonomy comprises 16 payment characteristics consisting 76 payment features that influence payers' instrument choice. One characteristic not known in prior research was identified – that is, "cancellation" – a characteristic more frequently associated with digital payment instruments than with cash or checks.

Research limitations/implications – The findings suggest that payers view payment instruments in a much broader sense, including context, control, or cultural beliefs. Consequently, the authors suggest that researchers try to understand the essence of an innovation before assuming any economic rationalism in human or organizational behavior. The authors also urge researchers to understand the underlying meaning behind constructs of interest; as this study has shown that concepts like context and convenience have many different interpretations.

Practical implications – According to McKinsey (2014) there are over 12,000 startups in the payment arena. For them, the taxonomy can function as a template for the design of payment instruments, as well as understanding the various factors that influence payer choice of payment instruments.

Originality/value – The main contribution of this paper is the 4Ps taxonomy of payments. The taxonomy builds on and extends the work by Hirschman (1982). Since this work, and despite recent trends in payments, there has not been a comprehensive investigation that takes into account more recent innovations in payment instruments.

Keywords Payment instruments, Repertory grid, Taxonomy of payments

Paper type Research paper

Introduction

Payments play an integral role in the purchase of goods and services from vendors. Over the last few decades, innovations and new payment instruments have significantly diversified the ways we can pay (McKinsey 2014). Plastic cards, online banking, e-money, and SMS payments are replacing cash and checks (Humphrey, 2004) and the use of digital payment instruments is on the incline. Payment instruments have attributes and features which influence how people choose to pay (Arvidsson, 2014).

Payments are receiving increased attention from academics and span several disciplines, including information systems (Holmström and Stalder, 2001; Mallat, 2007), consumer research (Hirschman, 1979; Raghubir, 2006; Penz and Sinkovics, 2013), marketing (Raghubir and Corfman, 1999; Lawson and Todd, 2003), management (Priem, 2007), economics



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(Penz *et al.*, 2004; Garcia-Swartz *et al.*, 2006), sociology (Knights *et al.*, 2007), and banking and finance (Kahn and Roberds, 2009; Humphrey, 2010). This has resulted in a broad approach in the study of payments, including what money is (Simmel, 2004), cost-benefit analysis of cash and payment cards (Garcia-Swartz *et al.*, 2004), competition (Hedman and Henningsson, 2015), social implications of internet banking (Linné, 2008), choice and spending behavior (Raghubir, 2006; Runnemark *et al.*, 2015), payment framework (Carton *et al.*, 2012), and adoption of mobile payments (Mallat, 2007; Arvidsson, 2014; Xin *et al.*, 2015).

Despite the above, one aspect of payment research which has been largely ignored is payment characteristics. Since payers choose payment instruments based on their characteristics, it is important to understand payment characteristics (Lawson and Todd, 2003; Arvidsson, 2014). A notable exception is Hirschman's (1982) study which identified 11 discrete characteristics. Over time however, Hirschman's (1982) work, has become less relevant with the rise of contemporary payment innovations. Similarly, Humphrey *et al.* (1996, p. 936) point out that previous research shows the "[...] movement toward greater use of electronic payment methods, though gradual, is uniform and unmistakable, both across countries and over time" but fail to explain why. Schreft (2006, p. 5) makes a similar point: existing research "[...] is backward looking. It tells us what payment instruments were chosen in the past (but that they) may not be a good indicator of what will be chosen in the future." In response, Benton *et al.* (2007, p. 56) encourage work intended "[...] to understand payment characteristics and how they are understood by (payers), since such work is essential in understanding how payers perceive payments. This research provides a good starting point to explain this aspect of payments".

Our approach to a better understanding is to develop a taxonomy see, e.g. Yousafzai and Yani-de-Soriano (2012) and Morrison and Roth (1992). Drawing upon organizational systematics (McKelvey, 1982), we develop a taxonomy of payments that can aid researchers and practitioners in understanding the payer's perspective. Developing our taxonomy begins with an exploratory investigation of payments as understood by payers. The repertory grid (RepGrid) technique (Reger *et al.*, 1994; Tan and Hunter, 2002; Kelly, 2003; Clauß and Döppe, 2014) provides a structured way of collecting and analyzing data, and we used it for 15 in-depth interviews with payers in Denmark. We call the taxonomy the 4Ps, as it is comprised of four categories: purchase, payer, payment instrument, and physical technology. We also identify 16 first-level payment characteristics and 26 second-level payment features. The findings show that payment is a multifaceted concept.

Our work contributes to the understanding of payments in the following ways. First, we provide a taxonomy of payments characteristics with four categories. Second, we provide in-depth definitions of payment characteristics, which provide richness to previous work. Third, we include both traditional payment instruments as well as contemporary payment instruments including mobile device applications and online banking. Previous research has focused solely on either traditional or contemporary payment instruments.

We structure the remainder of the paper in the following way. The next section outlines the literature on payments and payment characteristics. Afterwards, we describe the RepGrid technique. In the fourth section we present the 4Ps. In the fifth section we discuss the results and its implications. Finally, we conclude the paper and summarize the work.

Literature review

Each payment instrument, e.g. cash, payment card, direct debit, is according to the European Central Bank (ECB) "[...] A tool [for] 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). Individual instruments include rules for authorizing,

submitting, processing, and the settlement of payments. Our focal point is on the payer's interpretation of these rules, i.e. the characteristics.

Research acknowledges that payment instruments have certain characteristics, which are preferred by the payer and consequently influence payer behavior (Hirschman, 1982; Benton *et al.*, 2007; Schuh and Stavins, 2010). On this point, some studies investigate payers' preferences of specific payment instruments and identify various characteristics (Hirschman, 1982; Plouffe *et al.*, 2001; Schreft, 2006; Jonker, 2007; Schuh and Stavins, 2010; See-To *et al.*, 2014; Von Kalckreuth *et al.*, 2014). However, to our knowledge there are no taxonomies. The only taxonomies that exist relate to large-value payments (Chakravorti, 2006; Bech *et al.*, 2008). For instance, the ECB classify payments into wholesale payments (between financial institutions) and retail payments (between non-financial institutions).

One of the first and more influential articles on payment characteristics is by Hirschman (1982). The rationale for the paper was that marketing literature had extensively covered factors influencing consumer purchasing behavior, but failed to address the exact means by which the payer completed the purchase (Hirschman, 1982). Hirschman suggested that this lack was based on research assumptions that consumer valuations of products and services were independent of the representation of money, e.g. cash vs credit cards. This standard economic assumption has been challenged (Hirschman, 1979; Prelec and Loewenstein, 1998; Soman, 2001; Raghurib and Srivastava, 2008).

Hirschman (1982) study used focus groups to identify 11 payment characteristics salient to the preference and usage of payment instruments. Such included budgeting, control of spending, documentation, reversibility, transaction record, acceptability, leverage potential, transaction time, security, social desirability/prestige, and transfer time. Table I shows the characteristics and provides a definition for each. Furthermore, Hirschman explored the relative importance of the characteristics of each instrument (including cash, personal checks, bank cards, retail store cards, and travel, and entertainment cards) and of payment context (average day, major shopping trip, out-of-town business trip, and out-of-town pleasure trip).

Another more recent study from the central bank in the Netherlands (Jonker, 2007) identified four overarching payment system characteristics: safety (absence of perceived physical danger and financial risk in using the instrument), speed (time needed to perform a transaction), costs that the consumer carries for the possession and actual use of a payment

Characteristic	Definition
Budgeting	The payment instrument supports budgeting and planning of expenditures
Control spending	The payment instrument keeps spending under control
Documentation	The payment instrument provides a consolidated record of purchasing
Reversibility	The extent to which a payment instrument provides the ability to reverse a transaction made at the point of purchase
Transaction record	The payment instrument provides a physical record of each transaction made at the point of purchase
Acceptability	The payment instrument is acceptable in a wide variety of retail outlets
Leverage potential	The payment instrument allows one to "borrow" money, that is, to spend money not currently on hand
Transaction time	The speed with which a purchase transaction is conducted using a given payment instrument
Security	The security associated with a payment instrument if it is lost or stolen
Social desirability/prestige	The social desirability or prestige possessed by a particular payment instrument
Transfer time (credit)	The period of time before the funds "spent" with the payment instruments are actually transferred from the buyer's account to that of the seller

Table I.
Summary of
Hirschman's
(1982) payment
characteristics
with definition

instrument, and ease of use (effort needed by the consumer to pay with a particular instrument). The study also surveyed why consumers pay at point-of-sale locations (bar, restaurant, gas station, parking, public transportation, retail, supermarket, vending machine), and focused on cash, debit and credit cards, and the e-purse.

Another stream of research focuses on payer demographics and shows correlations between factors including age, income, and the choice of instruments (Carow and Staten, 1999; Humphrey *et al.*, 2000; Lawson and Todd, 2003; Amromin *et al.*, 2007; Humphrey, 2010). Historically, there have been strong correlations, for instance between income and use of credit cards (Humphrey, 2004; See-To *et al.*, 2014). However, recent studies do not support such correlations (Humphrey, 2010). Contextual factors affecting instrument choice, such as location, product type, and time have also been identified (Benton *et al.*, 2007; Klee, 2008; Bounie and François, 2009; Ching and Hayashi, 2010; Cohen and Rysman, 2013; Linfeng *et al.*, 2013).

Existing research provides a sufficient launch point, but crucial limitations are present, including the focus on demographic factors and secondary data, on questionnaires with little room for payer explorations, and on limited number of payment instruments. Hirschman's work also possesses noteworthy limitations. Most important is the time passed since the study was carried out. The use of payment instruments has changed dramatically since her study. For instance, checks are obsolete, the debit card has emerged as a key payment instrument and internet banking and mobile payments are widely used. Another limitation is the use of focus group to identify the 11 payment characteristics, which can result in observer dependency. Rushkoff (2005) argues that focus groups are problematic in that participants often aim to please rather than offer their own perspectives. With these limitations in mind, we will demonstrate in the next section that adopting a qualitative approach using the RepGrid technique and our empirical context addresses these limitations.

RepGrid

The RepGrid is a structured approach to understanding how individuals perceive a phenomenon. It is a qualitative open-ended interview method that allows the most relevant payment features and characteristics to emerge from the payers themselves. Further, a qualitative line of enquiry will allow us not only to identify attributes that relate to contemporary payment innovations but also to elicit clearer definitions of these characteristics.

Although the RepGrid is based on personal construct theory (Kelly, 2003) in psychology, it has been used in many fields, including marketing (Marsden and Littler, 2000; Lemke *et al.*, 2011), strategic management (Reger and Huff, 1993), and information systems (Hunter, 1997; Napier, Keil and Tan, 2009). Tan and Hunter (2002) provide a comprehensive review of the use of RepGrid.

The use of the RepGrid is suitable for this study for several reasons. First, a personal construct can be understood as the underlying mechanism of a personality that enables an individual to interpret a situation. To understand how individuals interpret a payment instrument's features, one must understand the individual's personal construct. The RepGrid's purpose is to record an individual's point of view concerning an object or phenomenon as well as the individual's contrasting viewpoint. Any personal opinion of a phenomenon – e.g. cash is useful – is likely to have a slightly different meaning for each individual expressing it, because there are varying experiences of “cash” or “useful.” If an explanation of the opposite “cash is useful” was given by an individual, this might allow us to better understand what “useful cash” means to her/him – e.g. that cash is accepted everywhere – thus yielding insights about the individual's construct system. In turn, this may start a discussion regarding whether cash is in fact accepted everywhere or not. The RepGrid therefore allows for maximum response. Second, participant responses are

expressed in their own words and yet, researchers can delve further into the responses to elicit richer information. This allows for a more thorough understanding of participants' perceptions. Lastly, the rich data collected enables a thorough examination of the underlying meaning behind each of the identified payment features and characteristics, allowing for clearer definitions to be derived; and identification of any new characteristics not evident in prior research into payment systems.

The RepGrid technique comprises the following steps: defining elements (object of investigation), eliciting constructs (identifying personal construct system), consolidating constructs (analysis and synthesis), and testing reliability (with independent parties).

Defining elements

The elements in the RepGrid technique are the objects to be investigated (Tan and Hunter, 2002). The focus of our research is payment instruments. These form the RepGrid's elements, to which participants will be introduced. To ensure clarity and consistency for later analysis (Tan and Hunter, 2002), the selection of elements follows four rules: an element must be discrete (Stewart *et al.*, 1981), the elements should be homogeneous (Easterby-Smith, 1980), the elements must not be evaluative, and all the elements must be drawn from the field to be studied (Beail, 1985). There are six payment instruments included in this study: coins, banknotes, debit cards, credit cards, online bank payments, and MobilePay. They are all discrete, homogenous, none-evaluative, and are well-known and commonly used in Denmark (Nationalbanken, 2014), the empirical context.

Elicitation of constructs

Elicitation of constructs in a RepGrid interview is concerned with understanding the participant's perception, or personal construct system of payment instruments. The literature refers to several techniques for identifying personal construct systems. According to Fransella *et al.* (2004), constructs may be elicited by using one, two, or three elements at a time. We use the classic approach (Tan and Hunter, 2002) of "minimum context card form" and use three out of the six elements during each elicitation iteration.

Study participants. We interviewed 15 participants over a period of roughly two months and ensured a wide demographic background in order to identify as many possible payment instrument features. Table II provides an overview of the participants.

The sample is a convenience sample based on the authors' personal and professional network. Teddlie and Yu (2007) define it as "drawing samples that are both easily accessible and willing to participate in study" (p. 79), which ensures that the sample reflects a broad, diversified, and saturated sample of the Danish population. This was done to achieve a higher validity in the results.

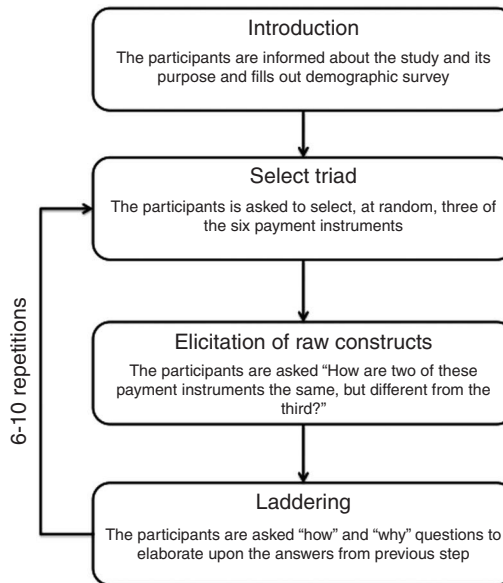
Our sample reflects an average age of 37 (median of 33) with the youngest being 24 and the oldest being 60. We have slightly more males than females (nine vs six). The participants have a range of employment, from retail cashier to vice-president in a multi-million-dollar enterprise, and were familiar with all the payment instruments. All participants have lived in Denmark for a substantial part of their life.

Interview procedure. Before the interview, all of the participants were e-mailed a description of the project and the interview. The procedure of the RepGrid interview follows a specific structure to ensure high quality and quantity of constructs. It was conducted by two of the authors and the interviews were held in the participants' native language. The recommendations of Tan and Hunter (2002) were used as the overall guide for structuring the interviews. See Figure 1 for an overview of the interview procedure. It is worthwhile to note that participants were not asked to numerically rate the elements along each elicited constructs.

No.	Age	Gender	Income ^a	Education	Profession	Marital status	No. of children	Duration
1	26	Male	100-200	Undergraduate	Student and part-time job	Married	1	1:54
2	24	Male	0-100	High school	Freelancer	Relationship	0	1:33
3	33	Female	400-500	Post-graduate degree	PhD student	Relationship	1	1:21
4	41	Female	500+	Post-graduate degree	Technology sales	Divorced	1	0:47
5	26	Male	100-200	High school	Retailing	Single	0	0:59
6	27	Female	400-500	Academy profession program	Sales coordinator	Single	0	1:27
7	55	Male	500+	Vocational education	Regional manager	Married	3	1:15
8	32	Male	500+	Post-graduate degree	Senior advisor	Relationship	2	0:50
9	47	Male	300-400	High school	Consultant and Bitcoin trader	Married	0	1:08
10	38	Male	500+	Post-grad. degree	Business angel	Divorced	2	0:43
11	48	Male	500+	Undergraduate	Administrative director	Married	1	0:52
12	30	Female	300-400	Undergraduate	Social worker	Single	0	0:43
13	59	Male	500+	Vocational education	Craftsman	Married	0	0:43
14	60	Female	100-200	Undergraduate	Nursery assistant	Divorced	4	1:11
15	29	Female	300-400	2X undergraduate	Art director	Relationship	0	1:21

Note: ^aIncome in thousands DKK

Table II.
Demographics of the participants



Source: Based on Tan and Hunter (2002)

Figure 1.
Interview procedure

This is due to the focus of the study’s research was on qualitative responses rather than on the numerical ratings. As such, the interview protocol is a slight variation to the traditional RepGrid format. Such an approach however is not new – there have been instances where numerical ratings have not been collected. For example, in a study of the situational factors that managers of information system projects consider when planning new

software projects (Moynihan, 1996), elements were not rated as they were not influential in achieving the study's objective.

Step 1: select triad. The participants were presented with six pieces of colored index cards, i.e. the elements. The front of each card showed the name of one payment instrument, along with a few clearly labeled examples of widely used consumer brands which provide that payment instrument. The card also described the typical size and form of each payment instrument, thus ensuring the participants were familiar with the payment instrument. After the interviewer turned the index cards upside-down and mixed them, the participant was asked to pick three of the index cards, at random. This prevented the participant from knowingly selecting a specific card.

Step 2: elicitation of raw constructs. After the participant had selected three index cards, s/he was asked: in the context of paying, how are two of these payment instruments the same, but different from the third? The participant began to express his or her construct system concerning the characteristic that differentiated the selected payment instruments. The participant was then asked to provide a short label to describe the emergent pole (how two are the same).

Step 3: laddering. As the participant provided insights into their personal construct system, the interviewer applied the laddering technique (Reynolds and Gutman, 1988; Tan and Hunter, 2002) by asking "how" and "why" questions to encourage the participant to provide more information in areas where certain ambiguities may still exist. The laddering technique "provokes" the participants to pose contrasting statements to the emergent pole. The following transcript illustrates the laddering technique: Participant No. 2 has provided the emergent pole for coins and banknotes. He explained how carrying abundant cash provides a feeling of being rich. However, he declares that the feeling was not present in regards to MobilePay. The interviewer asks for an elaboration of the contrasting pole, and he explains:

Participant no 2: In a way, you end up in the same category with coins and banknotes, because you all of a sudden become aware of how much you can spend [...]. I don't know entirely how [MobilePay] is connected in that regard.

Interviewer: How and why is it different?

Participant: Well, is [MobilePay] tied into one's bank account to see if there is enough money?

When the interviewer was convinced that clarity had been achieved, the index cards were then returned to the pile, flipped and mixed. The participant was then again asked to select three index cards at random, and was asked the same question about this second set of three cards. This eliciting process was repeated, allowing the participant to explain his or her construct system (i.e. back to Steps 1-3). On average, participants completed six-10 such "construct elicitation rounds" or iterations. Table III shows extracts from four out of the eight iterations done from the first interview, with the elements, emergent pole, quotes, and contrast pole. In total, the interviews generated 246 raw constructs.

Consolidation of constructs

We applied Jankowicz (2004) bootstrapping technique, in the analysis of the raw constructs. This involved color-coding and numbering of each raw construct based on the participant. An example can be found in picture one in Table IV. All the raw constructs were printed out onto 246 physically index cards, see picture two in Table IV. They included the elements, emergent pole, quotes, and contrast pole. Following this, we began to compare the raw constructs with each other. As illustrated in picture 3 in Table IV the physical index cards were arranged on a table, following the bootstrapping technique (Jankowicz, 2004),

No.	Element ^a	Emergent pole	Quotes	Element ^a	Contrast pole	Quotes
1.01	C, BN	Constraints	You can only buy for the amount (of money) you have (now)	DC	Opportunities	
1.08	OB	Administration	Backstage, the only place where money comes into my life. Payments for overheads, transparent so you can see what you pay for	C/CC	Direct payment	
1.10	CC	Personal security	Value added services (insurance by purchasing)	OB/MP	No personal security	
1.11	MP	Flexible	When I have to pay to someone who is not next to me [...] the ability to transfer the "cross country", without additional hardware		Inflexible	
1.12	[X]	[X] ^b	Transparency, on production of the receipt, create opportunities and therefore flexibility		[X]	Seller cannot see the receipt of money immediately

Notes: ^aC, coins; BN, banknotes; DC, debit cards; CC, credit cards; OB, online bank payments; MP, MobilePay; ^bin cases where no headline was provided for emergent and contrasting pool by the participant, then a [X] has been put in its place

Table III.
Interview illustration

which made it easy to move the different raw constructs around. They were grouped and paired as if the same underlying idea was shared. The process was iterative, i.e. existing groupings were continuously reevaluated as new constructs were applied to the groupings for the purpose of ensuring that they still contained the same underlying idea collectively. Finally, after several iterations, 76 groupings emerged, which we label as second-level payment features.

Construct saturation. The overall aim is to obtain as many unique constructs as possible. Interviewing people with as many varied backgrounds as possible will increase the likelihood of a higher concentration of payment instrument attribute. Tan and Hunter (2002) suggest that 15-25 participants would "generate sufficient [data] to reveal the extent of the characteristics" (p. 42).

Napier *et al.* (2009) calculated whether construct saturation has been reached by checking whether new constructs were elicited in the last interview. If not, they conclude that most constructs about payment instrument features have been found. We applied this strategy to check for saturation. We used our definition of a unique construct to indicate when a new construct was elicited. To illustrate the number of new constructs per interview, the numbers were graphically represented in a plot-diagram, supplemented by a polynomial trend line demonstrating the trend of new constructs from the first to the 15th interview. As illustrated in Figure 2, the trend shows a gradual decrease, from ten new constructs in the first interview, to zero new constructs in the 15th interview, reaching construct saturation after 15 interviews.

Reliability test. A check of the internal plausibility of instrument features was conducted with independent third parties to ensure reliability, stability, and accuracy (Jankowicz, 2004). Initially, we verified the clarity of payment features by asking eight university students to read the definitions individually and explain the meanings. The definitions were adjusted in cases where a student did not understand. After this, we engaged a chief executive officer (CEO) from a finance company in a seven-hour dialogue to verify the meanings. After three iterations, we had reached 94.7 percent agreement on the interpretations and grouping of the 76 unique features into 16 instrument characteristics.

Pictures

1

Luksé	Element	Emergent pose [12]	Definition	Element	Rapport	Definition
11.01	ms da	[X]	[Betalingstransumentet] bliver nødt til at være nogle penge du har. De her to kræver, at du har [betalingstransumentet]. Det er selvfølgelig forskellige. Kræver ikke en mobilbetaling. = Det bare den i løbet af at kunne bruge den = vedr. forberedelse på den måde at her skal der være penge på kreditkortet og det skal lige komme for at du kan bruge den. = Du skal er ikke altid jeg lige har det med. Så hvis jeg bare skal gå en tur, så tager jeg ikke det med mig. Hvis I tiden hvis vi skulle ud og spille 5-6 kolleger, så skulle vi alle sammen stå og alle regningen ud. Det tog lang tid og de 5 min var svært.	ms	[X]	[Betalingstransumentet] behøver ikke være penge man har, fordi det kan være ulovligt kredit.
11.02	ms da	Kræver forberedelse		ms	Kræver ikke forberedelse	Men den her kræver, at du har en mobilnet. = Man har 16 sekler med og så ville det være smart hvis man kunne betale med MobilePay (vedr. forberedelse) her kan du betale nemmere. Jeg har altid mit W med (jagok hvis jeg bare skal lige gå en tur).
11.03	ms da	[X]	Hvis I tiden hvis vi skulle ud og spille 5-6 kolleger, så skulle vi alle sammen stå og alle regningen ud. Det tog lang tid og de 5 min var svært.	ms	[X]	Her er der en som betaler og så overfører vi andre. Det er 3 gange nemmere.
11.04	ms kr	[X]	Her kan du betale på kredit. I hvertfald protokollat, så det kommer en på hvor mange penge du har. Du kan bruge dem flere steder.	kr	[X]	Pengesedler kan man også bruge alle steder, men det kræver at man har dem med. Kræver at det er penge du har.
11.05	ms	[X]	Jeg ved ikke om jeg kan bruge betalingstransumentet i udførelse.	pe	[X]	Jeg ved at jeg kan bruge betalingstransumentet i udførelse.
11.06	kr	[X]	Jeg ved at jeg kan bruge det i udførelse.	pe	[X]	Man ikke bruge danske pengesedler i udførelse fordi man skal veksle først.
11.07	ms kr	[X]	Her er det ikke noget problem om jeg skal betale i den ene valuta eller i den anden. = Det gør det nemmere. Man ved ikke om butikken tager mod [betalingstransumentet]. Så har man et [betalingstransumentet] man kan ikke bruge der og det er uterimeligt, fordi man kan ikke bruge [betalingstransumentet] der hvor man gerne vil.	pe	[X]	[Man skal bruge lokal valuta] = det er derbeholdt og gennemslags. Hvis man har den rigtige valuta kan man altid betale.

2



3

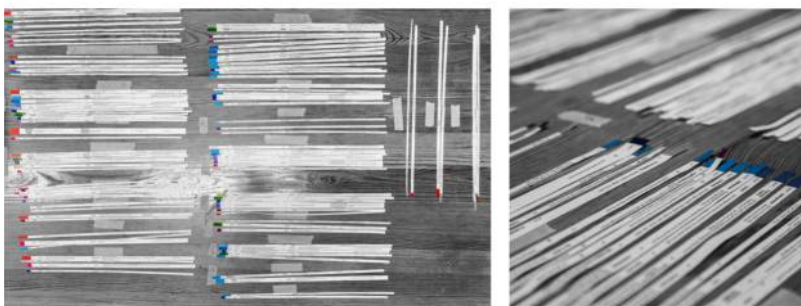


Table IV.
Illustrations of
bootstrapping

Subsequently, we evaluated the payment categories for external plausibility, i.e. to what extent the payment categories represent new knowledge about payments, cf. Hirschman (1982). We identified five new payment characteristics, verified the previously identified instrument characteristics, and most importantly, added content and definitions to the instrument characteristics. These steps yielded insights that were pertinent for the development of the taxonomy.

Taxonomy development

The taxonomy is grounded in McKelvey's (1982) work on organizational systematics. His idea is that "three things may be known about any entity – its essence, its definition, and its name." To illustrate, consider the possibility that two different instrument features can be related to the payment process (i.e. essence) and used to complete a payment (i.e. definition), but have different names and therefore are completely distinct. Accordingly, we define our taxonomy of payment system characteristics as "the development of

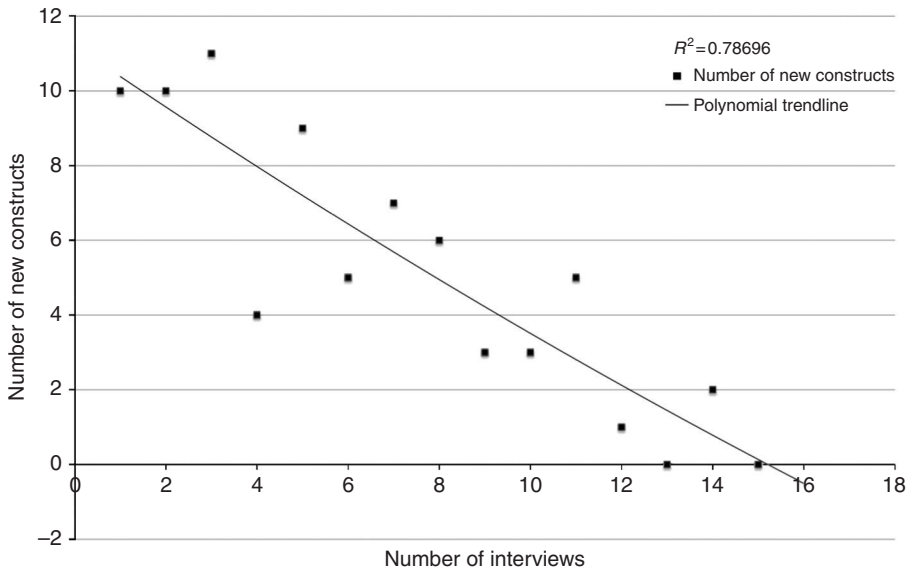


Figure 2.
Construct saturation

theories and methods for classifying payment system characteristics by several criteria, including the causes of the stability or change over time, and the external mechanism by which they evolve.”

In developing the taxonomy, we worked iteratively between payment system features and payment system characteristics, and clustered the characteristics (with respective features) into four categories. To ensure internal validity, we asked the CEO who participated in the reliability check to validate the categories (based on her extensive experience in the banking sector in particular payment instruments). We also reviewed the literature (Hirschman, 1982; Benton *et al.*, 2007; Jonker, 2007; Schuh and Stavins, 2010) to ensure external validity.

Payment characteristics taxonomy

In total, 246 raw constructs were identified through the interviews. The raw constructs revealed the participants’ personal construct regarding payments. The bootstrapping process reduced the constructs to 76 payment features (second level), which were clustered into 16 payment characteristics (first level). Through the iterative process of observation and analysis described above, we identified four categories in our taxonomy of payment characteristics. We refer to this taxonomy as the 4Ps: the purchase, the payer, the payment instrument, and the physical technology. Table V shows the taxonomy with its four categories, 16 first-level characteristics, 76 second-level features, and participant number. In the remainder, we describe the 4Ps with their respective categories and characteristics.

Purchase

The first category relates to the process of paying. The customer does not only have to choose goods and services, but also choose between payment instruments in commercial and private exchange situations. A number of factors influence this, including context, time, amount, and cancellation.

Context is the most important factor (based on frequency of mention by the participants), and addresses what is being bought (e.g. a car, an online subscription to a newspaper, or a

Categories	First level (characteristics)	Second level (features)	Respondent number	
Purchase	Context (15)	u7: online store dependent	7, 10, 11	
		u8: currency dependent	11, 13	
		u9: store dependent	3, 5, 13	
		u23: bill splitting	11, 12, 15	
		u24: ownership	2, 10, 14, 15	
		u26: where am I buying	2, 3, 5, 10	
		u28: who am I buying for	7, 13	
		u32: where is it used	3	
		u38: individual's preferences in private transactions	7, 10, 12	
		u46: what am I buying	5, 12, 14	
		u48: ecosystem dependent	7, 9, 11	
		u49: remote payments location	1, 8	
		u59: country dependent	6, 11	
		u61: mobility	8, 10, 13	
		u67: individual's preferences	3, 11, 15	
	Time (4)	u3: the speed/delay of a completed payment	1, 5, 9, 13	
		u16: playing the system	1, 12	
		u29: frequency of expenses	3, 9, 10, 12, 13	
		u58: behavioral pattern	5	
	Amount (2)	u41: payment time with large \$\$	1	
		u52: small vs large \$\$	9, 10, 12	
	Personal	Cancellation (1)	u65: cancellation	14
		Control (13)	u6: awareness	7, 15
u14: identity			12	
u18: exhaustion of capital			3, 13	
u19: fee transparency			2, 4, 7, 11, 15	
u21: administrative tool			5, 8, 15	
u34: degree of overview			1, 14	
u37: input/output			6, 11, 14, 15	
u42: consequence: control			11, 12	
u45: availability of receipts			2, 4, 8, 10, 14	
u50: feedback			7, 15	
u60: detect transactions			5, 6, 14	
u71: degree of overview			5, 6, 11	
Cultural beliefs (6)		u73: consequence: insights of economy	5, 6, 11	
		u1: metaphor for social standing	10, 12, 14	
		u17: ethical	3	
		u35: educative effect	8, 10	
		u36: probability of illegal/legal activities	1, 9, 10	
		u54: metaphor for symbolic value	14, 15	
Risk (4)		u62: environmental considerations	4	
		u11: loss of access	10, 13	
		u43: loss of value (consequence of losing PI)	2, 10, 12, 14	
		u47: awareness of value	2, 10, 12	
Payment instrument	Convenience (7)	u76: theft	10, 15	
		u10: accessibility to fortune	1, 2, 7, 13	
		u12 unification	3, 15	
		u22: ease of learning	8, 11	
		u30: the speed of a payment instrument	4, 7, 14	
		u39: pro-activity	4, 11	
		u40: number of steps to complete task	5, 6, 12, 13, 14	
u64: ease of use	3, 4, 5, 13			

*(continued)***Table V.**
Taxonomy of
payment
characteristics

Table V.

Categories	First level (characteristics)	Second level (features)	Respondent number	
Physical technology	Expenditure (4)	u13: usage costs u31: coverage of assets u56: cost of losing payment instrument u63: establishment expenses	1, 7, 9, 12, 15 3, 10 8, 10 8	
	Spending (3)	u55: spending limitation: comfort u66: spending finances u70: emotional aspects	5, 10, 15 5, 6, 11, 14, 15 5, 12	
	Credit (3)	u33: management of credit u44: are funds available u74: credit vs debit	6, 15 9 2, 4, 10, 11, 15	
	Trust (3)	u4: tie to provider u15: providing sensitive information to receiver u25: trust in provider	11, 15 5 9, 12	
	Access (2)	u53: finance availability u57: payment precision	7, 8, 11, 13 2, 19, 11, 15	
	Loyalty (2)	u5: insurance 27: added benefits	1, 10 2	
	Sensory perception (4)	u20: matter u51: volume u69: weight u72: audial	6, 8, 9, 10, 11, 12, 15 3, 7 1, 11, 13 11	
	Equipment (3)	u2: IT infrastructure dependent u68: requires extra hardware u75: internet access	8, 11 3, 7 4, 12	
	4	16	76	

small object at a flea market), where the purchase is taking place (e.g. between friends, or at a particular type of store) and the identity of the purchaser (e.g. goods bought on behalf of an employer, or as a favor for someone else). A few examples by Participant 5:

It [cash] is money, but they cannot be used for online purchases. However, you can pay with them in all stores.

But in another context (restaurant) MobilPay enables you people to easily split the bill. In the past, if we went out for dinner 5-6 colleagues together, we had to split the bill up. It took a long time and five minutes was wasted.

I only use my credit card for pleasures (clothing, travel, cinema, restaurant visits) and anything but the necessary (food, bill, rent).

Context also addresses the transferability of payment information between payers, and the preferences of payers and payees in peer-to-peer transactions. Finally, payment instruments have different levels of flexibility when it comes to currency considerations and when a payer has to do an exchange of currency. Some payment instruments limit the payer to using a fixed currency in one country or region. Others are flexible, enabling the payer to use the same currency in any region. These considerations are all relevant to the payer's situational context when completing a purchase.

Another factor relates to different aspects of time, for instance, the time taken to receive a payment. Lags between banking systems enables payers to overspend without being charged, because individual amounts spent are not recorded as withdrawn till later. Specific payment instruments are used for specific types of payments depending on their frequency. One type of instrument may be used for frequent purchases, while other types of

instruments might be used for less frequent purchases. We also observed that the instrument used primarily near the beginning of a month might differ to that used near the end of the month:

I allow myself to be overdrawn on my Mastercard [...] It's just that I can spread the bill a little further out. It just makes economic terms that I am not so much in the minus one month (Participant 1).

The factor of amount is concerned with the distinction between small and large payments. Size helps define which instrument the payer uses. For large payments, special considerations are made for the time taken to complete a transfer:

You can use them [payment cards] for relatively large amounts and no limits (Participant 10).

The final purchase characteristic is cancellation and concerns the ease of canceling a payment instrument after the payer has registered with the provider to use the payment instrument. Like many other web services, contemporary payment instruments now require registration as a member, and so the ability to cancel such a membership is relevant.

Personal

The second category relates to the personal traits or personal preferences of the payer. Three factors are critical: control, cultural beliefs, and risk.

Control is concerned with empowering the payer with decisions and information about his own finances, spending, and payment instrument. This especially relates to the payer knowing the current balance of money spent, as it allows the payer to control his or her personal finances:

It goes wrong very often as you often spend more money than you have in the account [...]. And because you can withdraw money you do not have and you can pay with something even if you have not. The temptation is too large (Participant 11).

I access my online banking two times a day, because I do my shopping as I do. So I have to constantly keep myself updated what I have in my account (Participant 15).

I bought an apartment, so I must be in control of my finances, a budget, and to have online banking where you can transfer to its budget account and constantly keeping an eye on whether I have enough money means everything to me (Participant 7).

Payers distinguish between payment instruments that generate income, and payment instruments that consume that income. Control is tied directly to consumption, and is concerned with how payers can manage their personal finances. Different payment instruments have various levels of feedback (i.e. how easy is it to see how much cash is left in the wallet, or on the payment card, while in the purchase situation) resulting in different insights into one's financial standing at that moment. This information difference also creates some ambiguity for the payer, who may not only want to know how much is left, but also want to know if any money is left. This distinction further influences the payer's level of spending, as control is related to the ability to manage one's finances. Payers want to be able to see expenses, have access to receipts, and know what usage fees a payment instrument will charge.

Cultural beliefs are concerned with the "soft values" associated with payment instruments. These values are derived from the payer's social context and background, and are relevant to the choice of payment instrument. Two examples of specific cultural beliefs are environmental considerations related to the production of cash, and a payment instrument's ability to educate children about finances. Other examples are the personal metaphors assigned to payment instruments. Instruments can reflect a person's social

standing in society (e.g. coins belong to the poor or the young, while the exclusive platinum payment cards and high-value banknotes belong to the rich), but can also have a symbolic value depending on the situation (e.g. the 20-dollar bill given as a birthday gift by a grandmother is more distinctive than the 20-dollar bill pulled from an ATM). Cash can also have an historical value, such as newly designed notes or coins). Payment instruments can also be associated with particular types of purchase that cause certain emotions (e.g. cash is quickly associated with activities of differing legality, because of its anonymity and difficulty in tracing):

It is nice to have coins because then you put them in the children's piggy bank. Then they will have a relationship with money (Participant 10).

Banknotes have a criminal atmosphere about them. It is immoral for example, if rolled to sniff coke, if curled up and used to pay a hooker, if used for black money to pay a hit man. It is the untraceable (Participant 10).

Risk is concerned with feelings of danger for the payer. Risk originates in situations where the payer becomes aware of the exact value of the instrument carried. For some payment instruments the value increases with quantity (e.g. the more banknotes you carry, the more value is available, whereas that might not be necessarily the case for debit cards). A payer carrying a lot of money becomes aware of the potential risks, such as losing the payment instrument (e.g. due to theft, or simply by dropping it), or the access it gives to one's finances.

Payment instrument

This category relates to features of the payment technology, such as convenience, expenditure, spending, credit, trust, access, and loyalty.

Convenience factor concerns the effort required to make a payment. It is the ease experienced when using the instrument. This is related not only to the ease of accessing one's full finances, but also to the ease of learning new payment instruments. For digital payment instruments, the speed of navigating the user interface affects the experience. Payers are also concerned with the number of steps required to complete a payment, or to check their accounts, etc. Convenient payment instruments require fewer steps. Instruments that require the payer to make a conscious effort are less convenient. Finally, payers consider whether the physical payment instrument fits into something they are already carrying (e.g. the cell phone is already the bus ticket, calendar, and messenger device), and allows them to avoid carrying another object:

It is easy to access the funds you own (Participant 2).

Expenditure is concerned with various costs that the payer incurs for operating the instrument. Four areas are seen as relevant. The first is the cost of setting up a payment instrument (e.g. a payment provider might impose a one-time charge for membership). The second relates to the cost of using a payment instrument (e.g. most payment cards charge annual subscription costs). The third addresses the cost of losing a payment instrument (e.g. a lost payment card will in most cases be replaced free of charge or for a minor fee, while losing cash will cost the exact amount of cash lost). Finally, whether the cost of loss or theft of the payment instrument is covered by insurance (cash is not insured, so if saved in the mattress is not likely to be recovered if stolen):

You can soon not find a post office where you can pay a bill. I cannot afford to because it costs 55 to 70 kroner to pay by giro (Participant 13).

Spending is concerned with factors that influence the rate of spending. Assuming money is available; the payer's feelings dictate very closely the rate of spending. Those feelings can

be related to an ability to purchase without waiting, to a sense of purchasing power, or in making impulse purchases, or to the possibility of obtaining a discount. Finally, a payer's spending rate is influenced by whether a payment instrument is exhausted quickly (e.g. cash) while payment instruments like payment cards encourage the continuation of purchasing.

Credit is concerned with whether a payment is completed using debit or credit, and the facets that are tied specifically to credit. Apart from whether debit or credit is used, payers are concerned with the validity of credit payments. Using credit causes a concern regarding the ability to manage one's credit rating. Many participants claim that credit is "the root of all evil," and want to avoid using it.

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

Access is concerned with two aspects. First, and most obvious, is the matter of whether money is available. If the payer has no money, then no payment instrument will be useful. A second aspect is the payment instrument's ability to pay the exact amount the payer is being charged, and this is important for techniques of bargaining (e.g. "I know the price is 500, but I only have 400 in cash").

Loyalty is concerned with obtaining fringe benefits when using specific payment instruments. These benefits often are given as membership rewards. Both banking institutions and payment card companies may offer low prices for purchases such as concert tickets, and special insurance for products bought using their particular payment instrument.

Physical technology

Finally, the fourth category deals with the technology in the hand of the payer and includes sensory perception and equipment.

Sensory perception 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 raises concerns of how intangible money is made to manifest, as well as the durability and hygiene of physical payment instruments. Instruments also vary by weight and volume, and these factors influence choice. Finally, the sound a payment instrument makes is also observed to make a difference (e.g. "Lukas refused to bring coins when going running as they make too much noise").

Payment instruments may depend on additional equipment for full functionality. Most contemporary payment instruments rely on three things: an underlying technical infrastructure to process the payment; a device hosting the payment instrument's software in the form of a computer or mobile device; and an established connection to the internet with a sufficient speed level.

Discussion

Payments remain part of our everyday life even though cash is no longer king. Today, the ways we pay are changing. One reason is technology innovation, like global payment infrastructure that facilitates payment cards, internet banking, and mobile payments. Payment instrument innovations permit new features that payers perceive differently. The characteristics are important to understand, and as Benton *et al.* (2007) summarized:

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]. In this regard, the [payer]'s payment choice is essentially no different from other choices [payers] make to use (buy, or

consume) any other type of good or service. However, unlike the case of consumption of goods and services, very little attention has been paid thus far to the study of payment [instrument] characteristics and the role that they play in [payers] choices of payment [instruments] (p. 27).

In response to this and other calls, we investigated the payer's personal construct system of payments and find that payments are a multifaceted phenomenon entailing many characteristics and features. Building on work by McKelvey(1982) on organizational systematics, we develop the 4P taxonomy, which is to our knowledge one of the first taxonomies on payments. The taxonomy shows that payer's perception of payments can be understood through the four categories: purchase, payer, payment instruments, and physical technology. This is our main contribution to the payment literature and the payment characteristics identified therein. The categories extend previous research in several ways, for example, Jonker (2007) who proposed safety, speed, costs, and ease of use as key categories. The differences include first that the 4Ps taxonomy with its categories, characteristics and features (Table V) is broader and provides a richer picture of payment characteristics than existing frameworks. We would argue that is an outcome of the RepGrip technique and the broad spectrum of included payment instruments. Second, the 4Ps taxonomy provides relationships between categories and characteristics, which complements Hirschman's work. For instance, that context, time, amount, and cancellation are related to purchase. Third, besides broadening the view of payment characteristics, the taxonomy clarifies existing vagueness. For instance, Bounie and François (2009), Ching and Hayashi (2010), Xu and Riedl (2011) refer to the tri-aspect model of Humphrey *et al.* (1996), which includes transaction characteristics, payment characteristics, and consumer characteristics, but does not provide definitions how these categories should be interpreted. Humphrey *et al.* (1996) do in fact declare that, "[...] our model is not rich enough to capture all of the factors influencing changes in use of all payment instruments" (p. 929). The 4Ps taxonomy with its underlying payment system characteristics provides a better means to understand payments.

In Table VI, we complement the taxonomy with definitions of the 16 payment characteristics. The characteristics are different that Hirschman's (1982). For instance, she has "transaction time" and "transfer time," whereas we only have time. One should remember that in the early 1980s personal payments were manually processed, whereas today it based on a global interconnected infrastructure. Furthermore, and a consequence of time, we have identified characteristics that are related to the underlying mediated technology, i.e. sensory perception and equipment. Context should be emphasized as one major difference in our study compared to Hirschman. The definitions provide insights into how the payment characteristics could be interpreted. For instance, Borzekowski *et al.* (2008) who worked toward understanding why consumers use debit and credit cards uncovered several reasons, the most important being convenience. They concluded, however, by asking, "[...] what does 'convenience' mean specifically?" (p. 170). Table VI provides a definition of convenience and Table V shows seven underlying payment features, which might provide an answer to their question. This could also be used in, for instance, future research, such as Borzekowski *et al.* (2008) to develop surveys. Furthermore, we found that cancellation has not been identified in previous research. We believe this is becoming increasingly important as our use of digital services in daily life increases. We need to manage and sometimes cancel them. trust is mentioned by Benton *et al.* (2007) when they talk of the characteristic of privacy. Here, we find that they lack two perspectives, which are concerned with the provider of the payment instrument. The first omission is the way the providing company handles the payments, and the second is whether the payer trusts this provider. Trust will become more important in future when more digital payment instruments will be available from non-core financial institutions, such as Apple and Google (Chae and Hedman, 2015). The definition of sensory perception considers how payers

Characteristics	Definition
Context (15)	Location of the payment, the type of product being purchased, the payee, and the role of the payer (buying for self or others)
Control (13)	Degree to which the payment instrument empowers the payer to control own finances. This could include information or feedback provided by the payment instrument on spending
Convenience (7)	Ease of use, or usability, or overcoming barriers to payment. Could include navigation on a payment app or website
Cultural beliefs (6)	Society and culture strongly suggest how we should pay, perceive money, and how money should be used
Risk (4)	Aspects that create a feeling of risk for the payer
Expenditure (4)	Cost of using the payment instrument, and paying that cost. For instance, some payment cards have an annual fee
Sensory perception (4)	Experience of the payment instrument by our five senses
Time (4)	How various aspects of time affect payment behavior. Examples include speed and frequency of payment, and clustering (like the time of day, end of the week, or end of the month)
Equipment (3)	All equipment needed by the payment instrument to function, e.g. card terminals
Spending (3)	Aspects that influence the level or rate at which money is spent
Credit (3)	Payments made with borrowed money
Trust (3)	Trust in the payment system. Examples: will the transaction be completed, will the user's privacy be secure
Access (2)	The payment instrument's ability to provide access to funds
Amount (2)	The amount of payment
Loyalty (2)	Aspects related to specific benefits offered by cards to users
Cancellation (1)	Permanent disconnection from usage of the payment instrument

Note: The number in brackets shows how many of the respondents mentioned an underlying payment feature for each payment system characteristic

Table VI.
Definition of payment characteristics

perceive the actual payment instrument as an object. The category might also have growing importance when the payment instrument is no longer cash, payment card or other standardized shape. It is clear that digital payment instruments can be installed on many different devices. MobilePay is 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 at which society will adopt other objects as payment instruments, so the very instrument will be less likely to have the same characteristics as in the past. To this end, the physical technology category might include further perspectives, since digital payment instruments are now being facilitated by tokens of various forms.

Implications

The 4P taxonomy and its characteristics have both research and practical implications. The result shows that payments is a multifaceted phenomenon related to the use of payment instruments is influenced by personal characteristics, which is dependent on different purchasing environments, mediated by technology. Clearly, technology only supports or mediates the payments, but when reviewing recent research on, in particular, mobile payments, it is viewed as technology adoption (Vrechopoulos and Atherinos, 2009; Dan and Jing, 2011; Arvidsson, 2014; Mohammadi, 2015) decision or diffusion of innovation (Lee *et al.*, 2005; Mallat, 2007; Mallat and Tuunainen, 2008). For instance, the paper by Arvidsson (2014) aims to “understand consumers’ attitudes on start using mobile payment services,” but the study bases the investigation on the assumption that the use of payment service is a technology adoption decision. However, it should be noted that the conclusion was that technology adoption and innovation of diffusion must be complemented

by theories on learning, network economies and value-creation if use of payment instruments are to be fully understood. Thus given the results from this study, we conclude that theoretical frameworks underlying research on payment instruments needs to be challenged and discussed.

There are also several practical implications of the study. It will be of particular value to payment providers and payment designers. The taxonomy provides an in-depth understanding of payers' perception of payment characteristics, which will assist in the design or re-design of current and future payment instruments. We do not claim or suggest that every payment instrument must "satisfy" all payment features. Instead our recommendation is that the designers most consider the purchase, payer, payment instruments, and physical technology broadly. For instance, the perception of payment instruments is very "context" dependent, meaning that the idea of one payment solution is not feasible. Instead designers' must take the use context in consideration and explore the context in-depth.

Limitations and future research

Before concluding the paper, we address some of the limitations of the present study and outline some paths for future research. Payment characteristics are important for payers, but how important are the individual characteristics when paying remains unsolved. This is one limitation of the taxonomy. 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, online, or on-street) and the type of goods or service. Another aspect, which relate to is potential changes in payer's perception of trust and privacy with the on-going digitalization of payments and in particular mobile payments.

Regarding method, the RepGrid technique has a number of limitations. It provides in-depth knowledge about how the participants perceive payments, but lacks ability to generalize beyond theory. We have tried to compensate for this by having as diverse a group of participants as possible. However, we have not been able to include participants with limited legal capacity, e.g. people below the age of 18 or people under power of attorney. Thus, for future research, we encourage researchers to include outliers or unusual participants, such as the very rich or very poor, and people with physical disabilities, and also to explore payments within an unstable economy, e.g. Greece, or cash dependent countries, such as Germany.

Another limitation, but also a consequence of the purpose of the study, is the payer perspective and the choice of individuals as payers. Equally interesting is how payees perceive payment characteristics. Payees could include merchants, retail chains, payment service providers, banks, and also governments, since it is likely that each group perceives payments very differently. Another path for future research is from a payee and in particular from merchants' perspective. When looking to the future where more digital payment instruments will be 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 toward a cashless society, so the very payment 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 explored payments and investigated the underlying characteristics of coins, banknotes, debit cards, credit cards, mobile payments, and online banking. We used the RepGrid technique to guide our data collection and analysis (Tan and Hunter, 2002; Kelly, 2003; Jankowicz, 2004) and interviewed 15 payers in-depth to elicit raw constructs. In the analysis, we used the bootstrapping technique to consolidate the data (Jankowicz, 2004). In this process, we identified 76 payment features and 16 payment characteristics. We clustered the payment characteristics into four categories to create taxonomy of payments. It shows that payment is a broad and multifaceted concept that relates to the purchase, the payer, the payment instrument and psychical technology. Therefore, we label the taxonomy as the 4Ps taxonomy. The taxonomy and the identified characteristics build upon previously identified and labeled characteristics, but we add content to the characteristics, and organized these into categories. The result is one step toward a better understanding of payments in general and of specific payment characteristics. The taxonomy builds on and extends the work by Hirschman (1982). Thus it is a response to calls for research on payment characteristics (Benton *et al.*, 2007; Schuh and Stavins, 2010).

References

- Amromin, E., Jankowski, C. and Porter, R. (2007), "Transforming payment choices by doubling fees on the Illinois Tollway", *Economic Perspectives*, No. QII, pp. 22-47.
- Arvidsson, N. (2014), "Consumer attitudes on mobile payment services – results from a proof of concept test", *International Journal of Bank Marketing*, Vol. 32 No. 2, pp. 150-170.
- Beail, N. (1985), *An Introduction to Repertory Grid Technique*, Brookline Books, Cambridge, MA.
- Bech, M.L., Preisig, C. and Soramaki, K. (2008), "Global trends in large-value payments", *Economic Policy Review*, Vol. 14 No. 2, pp. 59-81.
- 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", FRB of Boston Public Policy discussion paper, Boston, MA.
- 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*, Vol. 40 No. 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", Economics and Social Sciences Working Paper No. ESS-06-05, Telecom Paris, Paris.
- Carow, K.A. and Staten, M.E. (1999), "Debit, credit, or cash: survey evidence on gasoline purchases", *Journal of Economics and Business*, Vol. 51 No. 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*, Vol. 15 No. 1, pp. 14-25.
- Chae, J.S.U. and Hedman, J. (2015), "Business models for NFC-based mobile payments", *Journal of Business Models*, Vol. 3 No. 1, pp. 29-48.
- Chakravorti, S. (2006), "The evolving payments landscape and its implications for monetary policy", in Schmitz, S.W. and Wood, G. (Eds), *Institutional Change in the Payments System and Monetary Policy*, Routledge, Milton Park, pp. 81-92.
- Ching, A.T. and Hayashi, F. (2010), "Payment card rewards programs and consumer payment choice", *Journal of Banking & Finance*, Vol. 34 No. 8, pp. 1773-1787.
- Clauß, T. and Döppe, S. (2014), "Why do urban travellers select different travel modes: a repertory grid analysis", *Academy of Management Proceedings*, Academy of Management, Philadelphia, PA, August 1-5.

- Cohen, M. and Rysman, M. (2013), "Payment choice with consumer panel data", working papers, Federal Reserve Bank of Boston.
- Dan, L. and Jing, Z. (2011), "TAM-based study on factors influencing the adoption of mobile payment", *China Communications*, Vol. 8 No. 3, pp. 198-204.
- Easterby-Smith, M. (1980), "The design, analysis and interpretation of repertory grids", *International Journal of Man-Machine Studies*, Vol. 13 No. 1, pp. 3-24.
- Fransella, F., Bell, R. and Bannister, D. (2004), *A Manual for Repertory Grid Technique*, John Wiley & Sons, Chichester.
- 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*, Vol. 5 No. 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, Frankfurt.
- Hedman, J. and Henningsson, S. (2015), "The new normal: market cooperation in the mobile payments ecosystem", *Electronic Commerce Research and Applications*, Vol. 14 No. 5, pp. 305-318.
- Hirschman, E.C. (1979), "Differences in consumer purchase behavior by credit card payment system", *Journal of Consumer Research*, Vol. 6 No. 1, pp. 58-66.
- Hirschman, E.C. (1982), "Consumer payment systems: the relationship of attribute structure to preference and usage", *Journal of Business*, Vol. 55 No. 4, pp. 531-545.
- Holmström, J. and Stalder, F. (2001), "Drifting technologies and multi-purpose networks: the case of the Swedish cashcard", *Information and Organization*, Vol. 11 No. 3, pp. 187-206.
- Humphrey, D.B. (2004), "Replacement of cash by cards in US consumer payments", *Journal of Economics and Business*, Vol. 56 No. 3, pp. 211-225.
- Humphrey, D.B. (2010), "Retail payments: new contributions, empirical results, and unanswered questions", *Journal of Banking & Finance*, Vol. 34 No. 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*, Vol. 28 No. 4, pp. 914-939.
- Humphrey, D.B., Pulley, L.B. and Vesala, J.M. (2000), "The check's in the mail: why the United States lags in the adoption of cost-saving electronic payments", *Journal of Financial Services Research*, Vol. 17 No. 1, pp. 17-39.
- Hunter, M.G. (1997), "The use of RepGrids to gather interview data about information systems analysts", *Information Systems Journal*, Vol. 7 No. 1, pp. 67-81.
- Jankowicz, D. (2004), *The Easy Guide to Repertory Grids*, John Wiley & Sons, Chichester.
- Jonker, N. (2007), "Payment instruments as perceived by consumers – results from a household survey", *Economist-Netherlands*, Vol. 155 No. 3, pp. 271-303.
- Kahn, C.M. and Roberds, W. (2009), "Why pay? An introduction to payments economics", *Journal of Financial Intermediation*, Vol. 18 No. 1, pp. 1-23.
- Kelly, G.A. (2003), *The Psychology of Personal Constructs. Volume One. A Theory of Personality*, Routledge, Milton Park.
- Klee, E. (2008), "How people pay: evidence from grocery store data", *Journal of Monetary Economics*, Vol. 55 No. 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*, Vol. 14 No. 6, pp. 747-768.
- Kokkola, T. (Ed.) (2010), *The Payment System*, European Central Bank, Frankfurt am Main.
- Lawson, R. and Todd, S. (2003), "Consumer preferences for payment methods: a segmentation analysis", *International Journal of Bank Marketing*, Vol. 21 No. 2, pp. 72-79.
- Lee, E.-J., Kwon, K.-N. and Schumann, D.W. (2005), "Segmenting the non-adopter category in the diffusion of internet banking", *International Journal of Bank Marketing*, Vol. 23 No. 5, pp. 414-437.

- Lenke, F., Clark, M. and Wilson, H. (2011), "Customer experience quality: an exploration in business and consumer contexts using repertory grid technique", *Journal of the Academy of Marketing Science*, Vol. 39 No. 6, pp. 846-869.
- Linfeng, H., Wuke, Z. and Qing, X. (2013), "The determinants of online payment method choice: insight from an eye-tracking study", *Proceedings of Wuhan International Conference on e-Business (WHICEB)*, Wuhan, May 26-28, 2017.
- Linné, T. (2008), "Digitala Pengar. Nya villkor i det sociala livet", Lund University, Lund.
- McKelvey, B. (1982), *Organizational Systematics – Taxonomy, Evolution, Classification*, University of California Press, Boston, MA.
- McKinsey (2014), *The Road Back: McKinsey Global Banking Annual Review 2014*, McKinsey & Company, Boston, MA.
- Mallat, N. (2007), "Exploring consumer adoption of mobile payments: a qualitative study", *The Journal of Strategic Information Systems*, Vol. 16 No. 4, pp. 413-432.
- Mallat, N. and Tuunainen, V.K. (2008), "Exploring merchant adoption of mobile payment systems: an empirical study", *e-Service Journal*, Vol. 6 No. 2, pp. 24-57.
- Marsden, D. and Littler, D. (2000), "Exploring consumer product construct systems with the repertory grid technique", *Qualitative Market Research: An International Journal*, Vol. 3 No. 3, pp. 127-144.
- Mohammadi, H. (2015), "A study of mobile banking usage in Iran", *International Journal of Bank Marketing*, Vol. 33 No. 6, pp. 733-759.
- Morrison, A.J. and Roth, K. (1992), "A taxonomy of business-level strategies in global industries", *Strategic Management Journal*, Vol. 13 No. 6, pp. 399-417.
- Moynihan, T. (1996), "An inventory of personal constructs for information systems project risk researchers", *Journal of Information Technology*, Vol. 11 No. 4, pp. 359-371.
- 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*, Vol. 19 No. 3, pp. 255-282.
- Nationalbanken (2014), "Report on new payment solutions", Nationalbanken, Copenhagen.
- 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*, Vol. 12 No. 4, pp. 293-306.
- 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*, Vol. 25 No. 6, pp. 771-787.
- 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*, Vol. 18 No. 2, pp. 65-81.
- Prelec, D. and Loewenstein, G. (1998), "The red and the black: mental accounting of savings and debt", *Marketing Science*, Vol. 17 No. 1, pp. 4-28.
- Priem, R.L. (2007), "A consumer perspective on value creation", *Academy of Management Review*, Vol. 32 No. 1, pp. 219-235.
- Raghubir, P. (2006), "An information processing review of the subjective value of money and prices", *Journal of Business Research*, Vol. 59 No. 10, pp. 1053-1062.
- Raghubir, P. and Srivastava, J. (2008), "Monopoly money: the effect of payment coupling and form on spending behavior", *Journal of Experimental Psychology: Applied*, Vol. 14 No. 3, pp. 213-225.
- Raghubir, P. and Corfman, K. (1999), "When do price promotions affect pretrial brand evaluations?", *Journal of Marketing Research*, Vol. 36 No. 2, pp. 211-222.
- Reger, R.K. and Huff, A.S. (1993), "Strategic groups: a cognitive perspective", *Strategic Management Journal*, Vol. 14 No. 2, pp. 103-123.

- Reger, R.K., Gustafson, L.T., Demarie, S.M. and Mullane, J.V. (1994), "Reframing the organization: why implementing total quality is easier said than done", *Academy of Management Review*, Vol. 19 No. 3, pp. 565-584.
- Reynolds, T.J. and Gutman, J. (1988), "Laddering theory, method, analysis, and interpretation", *Journal of Advertising Research*, Vol. 28 No. 1, pp. 11-31.
- Runnemark, E., Hedman, J. and Xiao, X. (2015), "Do consumers pay more using debit cards than cash?", *Electronic Commerce Research and Applications*, Vol. 14 No. 5, pp. 285-291.
- Rushkoff, D. (2005), *Get Back in the Box: Innovation from the Inside Out*, HarperCollins, New York, NY.
- Schreft, S.L. (2006), *How and Why Do Consumers Choose their Payment Methods?* Diane Publishing, Kansas City, MO.
- Schuh, S. and Stavins, J. (2010), "Why are (some) consumers (finally) writing fewer checks? The role of payment characteristics", *Journal of Banking & Finance*, Vol. 34 No. 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*, Vol. 14 No. 2, pp. 1-25.
- Simmel, G. (2004), *The Philosophy of Money*, Psychology Press, London.
- Soman, D. (2001), "Effects of payment mechanism on spending behavior: the role of rehearsal and immediacy of payments", *Journal of Consumer Research*, Vol. 27 No. 4, pp. 460-474.
- 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*, Vol. 26 No. 1, pp. 39-57.
- Teddle, C. and Yu, F. (2007), "Mixed methods sampling a typology with examples", *Journal of Mixed Methods Research*, Vol. 1 No. 1, pp. 77-100.
- Von Kalckreuth, U., Schmidt, T. and Stix, H. (2014), "Choosing and using payment instruments: evidence from German microdata", *Empirical Economics*, Vol. 46 No. 3, pp. 1019-1055.
- Vrechopoulos, A. and Atherinos, E. (2009), "Web banking layout effects on consumer behavioural intentions", *International Journal of Bank Marketing*, Vol. 27 No. 7, pp. 524-546.
- Xin, H., Techatassanasoontorn, A.A. and Tan, F.B. (2015), "Antecedents of consumer trust in mobile payment adoption", *Journal of Computer Information System*, Vol. 55 No. 4, pp. 1-10.
- Xu, Q. and Riedl, R. (2011), "Understanding online payment method choice: an eye-tracking study", *ICIS Proceedings: Paper No. 18, Shanghai, December 4-7*.
- Yousafzai, S. and Yani-de-Soriano, M. (2012), "Understanding customer-specific factors underpinning internet banking adoption", *International Journal of Bank Marketing*, Vol. 30 No. 1, pp. 60-81.

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