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### Special issue: Contemporary research on payments and cards in the global Fintech revolution

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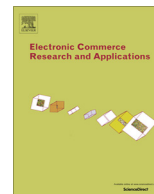
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## Editorial

### Special issue: Contemporary research on payments and cards in the global fintech revolution



In the past several years, there has been a lot of activity in the world of financial technologies involving card and payment services, new business products and processes involving mobile phones and location-based services, and also new money capabilities such as Bitcoin and block chain technology. The genesis of this *Electronic Commerce Research and Applications* Virtual Special Issue (VSI) project grew out of the Editor-in-Chief's recognition that this journal's first Special Issue on mobile payments appeared in 2008, when there was still a lot of hype about mobile phones and how mobile payments might work. Today, the past prognostications about mobile payments and 'the future of money' seem much closer to reality. We nevertheless wonder: How will mobile devices grow to support even greater financial services functionality by the year 2020? Or 2025? And how will payments and money be handled in support of economic exchange in the years to come?

The articles that appear in this ECRA VSI touch upon some of these questions, but in ways that are grounded in present-day financial services operations around the world. The authors share current perspectives on changing patterns in the use of Internet banking, cash, credit, and debit cards in different countries and regions of the world. And they evaluate issues that emphasize incentives, strategic behavior, and the market environment of competition, collaboration, cooperation, entry and expansion, innovation, and regulation. At the center of the authors' thinking throughout the articles in this issue is the idea of payments as existing on a *business technology and market platform*. The idea of a platform is of central importance here. It structures the manner in which payment services are produced, economic exchange is supported, and emerging technologies are transforming the multi-lateral relationships among the main stakeholders in payments. And as a result, the technology platforms that characterize financial services today are not just two-sided – instead they are multi-sided. This creates issues for financial evaluation, operational performance, technology innovation, firm strategy, and market competition.

The first article is the contribution of Tomi Dahlberg, Ji Guo and Jan Ondrus, who present 'A Critical Review of Mobile Payment Research,' based research that has been published since 2007. During this period, as everyone will agree, the market for mobile phone-based financial services and products has really come of

age. But what has been the progress achieved in the academic literature? The authors' prior ECRA article (Dahlberg et al. 2008)<sup>1</sup> examined the initial period of m-payments research, spanning 1999–2006.

The authors report with some disappointment that, even with the passage of so much time, the literature has not made much progress. They aver that the main efforts have occurred with m-payments 'technology,' technology 'adoption,' and m-payments 'ecosystem' research. The other areas (that Dahlberg et al. 2008 earlier noted should be given attention) included some that have had no research activity at all then: for example, m-payments and changes in the social and cultural environment, and traditional payment services versus m-payments. The authors also discussed some other areas that had only been lightly touched upon, such as changes in the legal, regulatory, and standardization environments, competition between m-payment services providers, and considerations of merchant power and the impacts that emerging new electronic payment services would have. Dahlberg, Guo and Ondrus' article contains a wealth of information about the ways that authors around the world have explored m-payments issues, and where they have focused their recent efforts.

But they point out that work needs to be done in selected areas, with more relevant and rigorous articles targeted to higher-quality outlets to create more business and scholarly impact. They further emphasize that academic research that is not informed by deep institutional knowledge of financial services business processes, technology solutions and standards, and other issues involving stakeholders in the technology ecosystem is destined to be of little relevance or value for understanding industry. This includes theory work that is misdirected, empirical studies that fail to study important hypotheses, and modeling and simulation work in which the authors fail to understand what kinds of results will be meaningful in an applied sense.

The next two articles cover issues with respect to consumer behavior, cash and cards, and payment trends in Denmark and Poland. Emma Runnemark, Jonas Hedman and Xiao Xiao conducted research to answer the question "Do Consumers Pay More Using Debit Cards Than Cash?" for the case of Denmark. The authors report on an *incentivized experiment* that they were funded to conduct, on how the payment methods that consumers use influence the amount of spending that they do. This provides an interesting set of observations for Denmark, in terms of what is likely to occur, with mobile payments, Internet payments, and peer-to-peer payments increasingly substituting for payments involving cash.

<sup>1</sup> Dahlberg T, Mallat N, Ondrus J, Zmijewska A (2008) Past, present and future of mobile payments: a literature review. *Electronic Commerce Research and Applications* 7 (2), 165–181.

Runnemark, Hedman and Xiao found that the use of a debit card induced their experimental subjects to demonstrate a higher level of *willingness-to-pay* for purchases than when they used cash. The authors report that this is true under a variety of conditions which they controlled for: the amount of cash that the consumer has available when the purchase is made; the type of spending that the person does, such as food and clothes versus entertainment or luxury goods, and their price informedness and consumption habits. The conclusion they drew from their experimental work is that consumer behavior differences are likely to be driven by the different *representations of money* that people may be thinking about, and how they may be differentially sensitive to these forms. This is useful information for practitioners who are interested in obtaining insights on how to best design digitized future payment mechanisms.

Then, Ewelina Sokolowska assesses the state of “Contemporary Innovations in the Payment Card Market in Financial Services: The Case of Poland.” The author believes that we should all be looking toward the Eastern European countries, where more open economies are supporting new innovation and rapid development in the card products market. Her approach in this research is to use various specifications of econometric models in order to assess prior data and then to make forecasts of aggregate payment card-related behavior for consumers in the growing Polish economy.

She focuses on the *intensity of the use of payment card and card-related devices* – and other control variables – as a basis for making informed projections. This research will draw attention of financial services practitioners who are interested in statistical methods for forecasting payments growth, as well as others who have a more specific interest to learn about Poland’s recent development in the payments market. Readers will want to compare the findings of this article with what Runnemark, Hedman and Xiao report on card services substitution for cash, and the extent to which emerging economies can leapfrog over the need to create traditional infrastructures to support banking and payments that have sometimes held back the developed economies.

The following article, by Jonas Hedman and Stefan Henningsson, assesses “The New Normal: Market Cooperation in the Mobile Payments Ecosystem,” and comments on how this is changing the larger payments markets. This is one of two studies that consider what happens when new entrants come into the existing payments services market as the revolution toward fully digital payments continues. Hedman and Henningsson note that new entrants create challenges for the existing firms to defend their positions. The authors approach these issues from the perspective of economic theory, and present a new *mobile payment market cooperation* (MPMC) framework.

Their framework brings together *market cooperation theory* with *business and technology ecosystems theory*, while evaluating competition and collaboration in the payment ecosystem, at three levels of analysis. They argue that firms in the market can employ *build-and-defend strategies* to safeguard their position in the market, or *battering-ram strategies* to enter or improve their competitive positions. Using three case studies, they test whether the strategies improve the firm’s position relative to suppliers and yield near-monopoly power; and allow firms to resist damaging price competition.

Kalina Staykova and Jan Damsgaard have written about “The Race to Dominate Mobile Payments: Entry and Expansion Strategies.” The authors initially describe the payments industry as having been stable for nearly three decades. They also point out that the account acquirers, card issuers, business model, and the dominant design for sharing the *business value of the payments platform* has favored the banks and card services platform operators over the merchants, who have had to bear the high costs

of running it. The authors view this approach as being unworkable in the presence of emerging disruptive payment technologies.

They analyze the drivers of payment services solution success, through evaluation of the entry and expansion strategies of new solution providers in the market. They also offer several new perspectives in their work. They argue that entry of a first-mover m-payments technology innovator will accelerate an early follower’s entry. They also find that a first-mover that is interested in expanding its m-payments capabilities and penetration in the market needs to do so within some bounded amount of time. Otherwise, the first entrant will lose the competitive advantage that it initially gained.

Thereafter, Mark de Reuver, Edgar Verschuur, Fatemah Nikayin, Narciso Cerpa, and Harry Bouwman extend the coverage of mobile payment platform strategy. Their article investigates the subject of “Collective Action for Mobile Payment Platforms: A Case Study on Collaboration Issues between Banks and Telecom Operators.” The authors probe the issues that arise when banks and telecommunication operators have to invest in and develop the technical capabilities of m-payments platforms to authorize and authenticate m-payment consumer payments.

In comparison to the other articles in this VSI, the authors of this research used case study methods to explore the activities associated with *firm collaboration and collective action*. Their case was developed around three large banks and three telecommunication firms in the Netherlands, who sought to develop a trusted service manager. According to a recent white paper (GSMA Mobile Commerce 2013, p. 3),<sup>2</sup> “the role of [a] *trusted service manager* (TSM) [lies] in managing a new range of secure card emulation services for the mobile customer, supporting the use of the mobile phone for contactless transactions of value, such as payment and transit. A TSM mediates between service providers and MNOs.”

The in-depth coverage of the *mobile network operators’* (MNOs) role in this research makes it unique, since only a handful of other researchers have looked at this aspect of the mobile sector in prior work. For their study, the authors use collective action theory, which recognizes that coalitions of investors or collaborators have a hard time to succeed with the *creation of public goods*. Also it is not easy to identify how many participants should be in the coalition, so they will succeed. This perspective, along with the economic theory of platforms, prompted the authors study collaboration and competition between banks and telecommunication operators, in order to figure out how to harmonize the different stakeholders’ strategies, the conflicts among them, what issues need to be handled to support sustainable m-payment innovation coalitions, and also what can lead to platform failure. The authors contribute new knowledge to address these issues.

After this, we present “Towards a Web Payment Framework: State-of-the-Art and Challenges,” written by Antonio Ruiz-Martinez. He thoughtfully notes that, with the Internet, consumer access to products and services online, as well as digital content has grown dramatically, transforming how business-to-consumer commerce is done. He further notes that the new business models require payment via the Internet. Unfortunately though, the payments platform for e-business has lagged other aspects of e-commerce in its development. He proposes a layered web payment framework that encompasses standard kinds of payment information, as well as five other layers that use it. They include: web applications that support Internet payments for online purchases; web-based APIs to connect the applications to the functionality required for payments; digital wallets that permit consumers to digitally interact with the web applications in

<sup>2</sup> GSMA Mobile Commerce (2013). The role of the trusted service manager in mobile commerce. London, UK, December.

support of payments; the various kinds of payment instruments that can be used support the economic exchange of value (credit cards, debit cards, and other forms of digital money; and finally the negotiation mechanisms that provide the capability to confirm the exchange of value for goods and services that are purchased.

An example is the *non-repudiation mechanism* layer, which serves to ensure that there is appropriate digital evidence so that the origin, recipient, message submission and delivery of a payment cannot be *repudiated*, or denied in the presence of evidence that cannot be refuted. Another is the *transport* layer, which ensures there is a protocol in place to indicate that some transactions require payments to be made, for example, via HTTP on the Internet, or via NFC for mobile payments. Related to this is the *secure transport layer*, which ensures that payments can be made via the transport layer in ways that are intended to have a high degree of security. To date, the typical solutions involve digital encryption of data, but there are not standards for the encryption of data that flows through the transport layer. The author points out the extent of the complexity of payment platform with this multi-layered framework perspective, and the importance of establishing standards for interoperability, despite the continuing emergence of new technologies.

The next paper that is included in this special issue is on “A Secure M-Commerce System Based on Credit Card Transactions.” It was contributed by Fang-Yie Liu, Yi-Li Huang, and Sheng-Mao Wang. Among the research papers that we have included in the issue, this is the most technical one, since it emphasizes digital cryptography algorithms to make the use of credit cards safer for online shopping. The authors proposed a *secure mobile commerce system* that coordinates the cash flows associated with online buying and selling, in association with the related credit entities, to protect information that is shared. The innovation of this work is the idea of implementing a *data connection core* to link the card-issuing bank with consumers who are making purchases. The data connection core makes it possible for the linkage to be made prior to the time when consumers initiate wireless communication. The authors argue that this will boost security.

To evaluate the quality of their proposed solution, the authors conducted computational simulations to represent the device the consumer uses, the merchant that is making a sale, and the card-issuing bank. They evaluate how this will work for stakeholders that each use different computing devices with various CPU, RAM and operating systems platforms capabilities. They assess the simulation outcomes for the computation of internal keys and communications keys for key of different bit lengths (512, 768 and 1024 bits), and to compute the values of the operators and functions in the proposed secure mobile commerce system. They further demonstrate the computation times for the generation of messages handled by the system that are encrypted and decrypted, once again involving different bit lengths for the content of the data used to carry a message. Beyond this performance evaluation, the authors use the cybersecurity theorem-and-proof method to justify their conclusions about the security of the digitally-reengineered process with the secure mobile commerce system they proposed. They also compared their approach with two other approaches: secure socket layer (SSL) and secure electronic transactions (SET).

The penultimate article in this issue is about “The Internet Banking Diffusion: An International Analysis,” by Samer Takieddine. The author focused on the development and estimation of a *country-level path analysis model* that represents direct and indirect relationships for economic and technological factors in the economics with Internet banking diffusion at the national level. The countries included in the data analysis are: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy,

Latvia, Lithuania, Luxembourg, Malta, Macedonia, Netherland, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Turkey, and United Kingdom. Takieddine uses *multiple group analysis* in the context of *structural equation modeling* to identify differences in the validity of the different models applied to different groups of countries, as well as a cluster analysis using Hofstede’s cultural dimensions to identify *country-level cultural groups*. The estimation methods used primarily involve PLS. The author offered evidence for the combined effects of Internet security and Internet access in promoting Internet banking diffusion. The author also found that, for the cultural group of countries with high power distance, masculinity, uncertainty avoidance, and low individualism, there have been lower diffusion rates for Internet banking.

The final paper in the special issue is by Jun Liu, Robert J. Kauffman and Dan Ma, entitled “Competition, Cooperation and Regulation: Understanding the Evolution of the Mobile Payments Ecosystem.” The scientific contribution of this article is to extend a theory-based explanatory model of technology components, services, and infrastructures as a foundation for understanding technological innovation and payments ecosystem transformation over time. The authors emphasize how competition and cooperation among industry firms support different forms of mobile payment-related innovations; and how regulatory forces either accelerate or delay it. The authors’ results show patterns of innovation that characterize the growth and development of tech innovation in the presence of competition, cooperation, and regulation, for m-payments specifically, and e-commerce more generally.

The reviews for this article were crowd-sourced, so the authors received more than the two or three reviews that are typically used for the developing authors’ submissions. ECRA’s departing Co-Editor, J. Christopher Westland (who was recently appointed as Editor in Chief of Springer’s *Electronic Commerce Research*), acted as the handling editor for the article’s review process. As an expert in the area of global innovation management, he offered a unique perspective that encouraged the authors to portray the timeline of technology development and business process innovation as beginning with the early credit cards, so that purchase transactions could be decoupled from the use of cash.

As we close our discussion, it’s important to point out to readers that ECRA specifically and Elsevier generally is moving to *article-based publication* (ABP). There are several authors whose research is not represented here, since their submissions are currently under development. They will be associated with this *virtual special issue* (VSI), when they reach the publication stage. Any new submissions that authors believe can be tightly tied to the themes of this VSI are welcome to submit their work even after the publication of the present papers. If they come to completion in a reasonable amount of time, and are viewed as being appropriate for later VSI publication, the Editor in Chief of the journal will do his best to develop them rapidly for publication. The main idea of the ABP approach is to achieve very rapid publication, without diminishing the beneficial effects of great efforts put toward the development and reviewing of submitted manuscripts. Speed and quality are both good, but quality is necessary for speed to make sense.

In addition, the first instance of the application of the ABP approach for Regular Research papers will occur with the ECRA (14, 6) (November–December 2015) issue. No effort will be made to associate individual Regular Research papers with others that have some thematic similarity. The reality in today’s world of academic publishing is that the author’s greatest interest is that their article will appear soon once it is accepted, and be assigned volume, issue and page numbers, so it can be cited in its final published form. ECRA, like many other journals, assigns *direct object identifier* (DOI) numbers. But many authors indicate that their

universities and institutes do not recognize DOI assignment as the criterion action that shows publication has occurred for an article. The assignment of pages numbers in an issue is a different matter, even though many journals have been moving away from the simultaneous release of physical paper-based journal. In ECRA's case, Elsevier puts out an archival annual volume, in the year following the bimonthly publication of six electronic issues.

In closing, we would like to share a few notes of thanks.

A special issue is never brought to completion without the full-on effort and key contributions of important participants in the project. The Guest Editors are thankful for input from ECRA's Publisher, Suzanne Abbott, who was helpful in sharing some thoughts at one point about how to be innovative in bringing together a highly capable group of authors who have interesting research to share. She also coached the Editor in Chief on the transition to the ABP and VSI approaches at ECRA. Her guidance has been invaluable.

We also benefited from the efforts of Jun Liu, who was visiting Carnegie Mellon University during the special issue's development. He served as a Special Issue Editorial Assistant, who coordinated some of the work on the various submissions, and gave high-quality reviews. We specifically asked him to help out with the development of "article highlights" and "graphical abstracts so there was consistency across authors for content and quality.

We wish to recognize Kavitha Balu, ECRA's Journal Manager in Chennai, India, who was helpful in the ways that a special issue's development demands to support the authors, reviewers and Guest Editors. We also benefited from the insight and speed of reaction of the anonymous peer reviewers who guided the devel-

opment of the articles in this issue. Hilda Xu in Beijing, China always helps from the Elsevier side with ECRA's special issue work, to ensure that the Guest Editors' work is coordinated effectively with Elsevier's business process for publication.

During the process of its development, one of the authors of an article that is published is this VSI – Emma Runnemark, a Ph.D. student at the Copenhagen School of Business – suffered an untimely demise. We dedicate this special issue to Emma, who committed her time and energy to her research. It is always a challenge to discover the inner workings of e-commerce and business problems that involve knowledge about strategy, organizations, and consumers, and the complex world of customer, institutional relationships. And it is interesting to see how various issues can be interpreted through the lenses of appropriate behavioral, social and economic theories. We all will surely miss seeing what her future contributions in the fintech area will be like.

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