Engineering the Value Network of the Customer Interface and Marketing in the Data-Rich Retail Environment

Key Pousttchi and Yvonne Hufenbach

ABSTRACT: In this paper we use a mixed-methods engineering approach to analyze how traditional retailers can use mobile commerce services to enable data-driven marketing and thus compete with the pervasive end-customer ownership of companies controlling the mobile channel. The paper provides the first systematic analysis of the implications of the virtual world market players Apple, Google, Facebook, eBay/PayPal, and Amazon on traditional retailers' business. We use case study research to identify the elements that are required for and suitable to such a strategy. In a second step, we use design science in order to identify and develop the necessary value creation roles, their activities, and the value flows between them. The paper provides two major outcomes: (1) a set of 12 building blocks for generating and applying customer data for traditional retailers adding mobile services and (2) a role-based reference model for the value network of the future retail customer interface and marketing (CIM). The reference model is validated with expert interviews. As an exemplary application of the model, we show two extreme scenarios with strong and weak retailer market positions. As an additional contribution to practice, we present a further introspective analysis of the value network's key new role—that of mobile customer relationship management service provider—and propose a corresponding functional component architecture that fulfills the information technology requirements for the role's complex functionality.

KEY WORDS AND PHRASES: AGFEA, big data, CIM, data-driven marketing, e-tail, IT strategy, mobile CRM service provider, mobile services, retail innovation, strategic impact of digitization, value network.

The influence of information technology (IT) on traditional retailers' business is continually increasing. Current innovation activities include, for instance, in-store technology for efficiency purposes and for better service as well as electronic commerce. Above all, the rise of the Internet has changed the retail business more than any other event in the past 50 years. In some domains, online retailers, having lower operational and capital expenses, have made the market very difficult for traditional market participants. Moreover, mobile technology shows even more potential to change the whole game. In this context, customers using apps to buy over the mobile channel or to compare prices while they are at the retailer's brick-and-mortar store are merely tactical issues.

The strategic threat for traditional retailers is the upcoming pervasive end-customer ownership of companies that control the mobile channel. The major

approaches for such a control originate from a fully controlled end device with a complete walled-garden approach (Apple), from a fully controlled mobile operating system and the control of search queries and their results (Google), and from the control of all social networking and communication of end users (Facebook). In any of these cases, the named origins have been enriched by additional services and data sources, resulting in various additional control points. While these three major players are based in the Internet industry and have no relation to retail yet, there is a second row of two players based in the online shopping world that are attempting to catch up and move in that same direction: eBay/PayPal and Amazon. All five players own cross-functional and context-based customer knowledge from different backgrounds.

For the above-described kinds of players that are characterized by cross-functional and context-based customer knowledge, we use the acronym AGFEA, employing the first letters of Apple, Google, Facebook, eBay, and Amazon. However, in doing so, we do not exclude the appearance of additional players in the coming years. Major characteristics of AGFEA players are

- a remarkable usage time and number of customer interactions per day
- control of and influence over their customers' use of mobile and Internet services
- a large and rich personalized data set about every customer.

Today, these companies already constitute the first reference point for many real-world customers' inquiries. Tomorrow, their increasing control, aggregated personalized customer knowledge, and data-driven marketing abilities will enable them to go further. In a few years' time, traditional retailers may witness these new players act as a filter between their customers and their brick-and-mortar store. Pervasive customer ownership by AGFEAs could bypass and render obsolete many of the traditional retailers' current innovations, especially with regard to their mobile apps and in-store technology. Interesting previews of such a future might be projects like Google Glass or Apple's Passbook. All the AGFEA players show elements of a mobile payment strategy because this is seen as a major source of customer data in order to predict and influence customer behavior [64].

The strategic threat for traditional retailers in the mobile information age, therefore, is represented by a third party that could, for instance, recognize customers' needs in advance, make tailored offers anytime, anywhere by giving advice where (else) to buy, and drive retailers into a competition to pay fees for being shortlisted.

Against this background, we apply a design science approach to analyze how traditional retailers can contend with this type of pervasive customer ownership and utilize a new combination of mobile services and data-driven marketing as a strategic means of competition.

In this paper, we do two things. First, we develop a comprehensive set of 12 building blocks for generating and applying customer data for traditional retailers adding mobile services. Second, we use these building blocks together with an engineering approach to develop a role-based reference model for the value network of the future retail customer interface and marketing (CIM).

Both outcomes contribute not only to theory but also to practice. Our reference model can be used to analyze the value flows for any market and player constellation that operates a full or partial set of mobile services with regard to real-world retail and beyond. Above this level, our reference model can be used for the development and evaluation of new player and business model combinations. We demonstrate and test the applicability of the model with two scenarios for traditional retailers' value creation depending on their ability level in using data-driven marketing via mobile technology. To foster practical applicability of our results, we provide the reference model with exemplary component architecture for the new key role of mobile customer relationship management (CRM) service provider.

The remainder of this paper is organized as follows. First, we provide an overview of the state of the art in research and practice and describe the methodology. Based on that, we derive a set of building blocks for generating and applying customer data for retailers adding mobile services. Accordingly, we use these building blocks to develop a reference model for the value network of the future retail CIM and show the exemplary application of the reference model. We then propose a component architecture for the mobile CRM service provider and address limitations. As a final step, we outline the main findings, draw conclusions, and propose future research.

Background

State of the Art in Research

Relevant literature for our research can be found in four major areas: influence of new technologies on traditional retail, mobile services and apps, data mining and data-driven marketing, and AGFEA players.

The influence of new technologies on traditional retail has been examined by many scholars. Special interest lies in the development from traditional to online retail (e.g., [57]), the impact of online shopping on traditional retail (e.g., [46]), and differences between traditional and online retail (e.g., [21]). Further research focuses on business models and innovations (e.g., [1]), in-store marketing (e.g., [20]), consumer privacy (e.g., [74]), shopping behavior (e.g., [43, 50]), and customer loyalty (e.g., [84]). In the area of multichannel retail and marketing, many scholars have examined strategies (e.g., [85]), specific pricing strategies (e.g., [24]), trends (e.g., [16]), influence factors (e.g., [3]), manufacturer–retailer supply chains (e.g., [12]), effects of multichannel service quality on customer loyalty (e.g., [33, 48]), customer retention (e.g., [78]), and shopper behavior (e.g., [54]).

Mobile services and apps have been analyzed concerning their adoption [25] as well as concerning specific services like location-based services (e.g., [15]), mobile social media (e.g., [44]), mobile gaming (e.g., [37]), and mobile ticketing (e.g., [51]). Mobile payments and mobile marketing have received extensive attention. Research on m-payments has focused mostly on consumer perspective, technical security and trust, and comparisons between mobile and traditional payment services [11], but strategic issues have rarely been addressed (rare examples are [60, 65]). Mobile technologies and services

like mobile payment imply new opportunities for data collection and usage in customer service and marketing, enabling new forms of marketing based on these data [64]. However, research on mobile marketing has concentrated mainly on theory, strategy, consumer behavior, as well as legal and political aspects [79]. Even if there is much literature on mobile services, there are only a few contributions that analyze the usage of mobile technologies and services in retail (e.g., [64, 66, 70]).

A literature overview on data mining and data-driven marketing can be found in Hilage et al. [31] and Silwattananusarn et al. [72]. Shaw et al. [71] identified three major-use cases for data-driven marketing: customer profiling, deviation analyses (identification of anomaly or change in customer behavior), and trend analyses. The data involved were early categorized into five areas [73]: demographic data, contact data, preferences, receptivity, and order history. Even if there is much literature on data mining in retail, there is almost no literature analyzing data collection and usage by mobile services in detail [64].

Research on AGFEA players is quite rare. It has mainly focused on existing business models and strategies; only a few papers have analyzed the impact on the physical world (e.g., [64]). Until now, this topic has been discussed almost exclusively by practitioners (e.g., [38]). Table 1 gives an overview and categorization of the main literature on AGFEA players.

While a large number of relevant contributions in the separate research areas exist, there is only little research linking the areas. As a result, the transformation of the customer interface and marketing with regard to the specifics of the mobile channel and the value network are virtually unexplored.

State of the Art in Practice

Today, most traditional retailers operate online Web sites to provide customers with information and online shops as an additional retail channel. However, current studies also show that most retailers still have no mobile-optimized Web site or mobile apps and that this situation can lead to frustrated and annoyed customers.

Many retailers try to increase customer retention by operating loyalty programs. However, many of these programs are still merely paper based or not really suitable for generating comprehensive customer data. Most traditional retailers merely generate a simple basket of goods data on their own business, instead of gathering cross-sectional and context-based customer knowledge. In theory, if these data are linked to an identified customer, they could already enable the retailer to send out personalized marketing campaigns and perform customer analyses as well as time series analyses in order to increase cross- and up-selling activities in-store. Even if retailers have access to or could develop transactional and specific data, most of them still use mass marketing instead of personalized marketing. If retailers would use data-driven personalized marketing and send their customers only relevant information, response rates could be increased five- to tenfold and sales by 20–30 percent [86].

Table 1. Literature on AGFEA (Apple, Google, Facebook, eBay, and Amazon).

Apple	Google	Facebook	eBay/PayPal	Amazon
Business models (e.g., [40, 80, 81])	Business models (e.g., [8, 80, 81])	Business models (e.g., [40, 80])	Business models (e.g., [49])	Business models (e.g., [35, 80])
Organizational aspects (e.g., [10, 22, 23])	(Mobile) marketing platform (e.g., [67])	Marketing platform (e.g., [29, 68])	Institutional structures (e.g., [26])	Institutional structures (e.g., [26])
Brand strategy (e.g., [23, 76])	Search engine effects on online retailers (e.g., [58])	Ratings and user comments (e.g., [13])	Pricing strategies (e.g., [7])	Pricing strategy (e.g., [181])
Customer loyalty (e.g., [6])	Mobile platforms (e.g., [41])	Users' decision behavior (e.g., [82])	Online payments (e.g., [55])	Retail strategy (e.g., [14])
Influence on retail industry (e.g., [45])			Ratings and user comments (e.g., [28, 30])	(Viral) marketing (e.g., [59])
Mobile devices (e.g., [75])			Consumer behavior (e.g., [5, 9])	Ratings and user comments (e.g., [32])
Mobile platforms (e.g., [41])			Web data analysis (e.g., [69])	

Unlike traditional retailers, AGFEAs specialize in the collection and aggregation of personalized customer knowledge for data-driven marketing. The decisive factor for customer ownership, however, is their presence in the users' lives and thus their pervasiveness in the collection of data, which results from a much higher number of control points and customer interaction points than those of traditional retailers. These companies create unparalleled cross-functional customer knowledge and profiles. This enables them to apply data-driven marketing to a much higher degree than any other type of player—they can send only information or offers that customers really perceive as relevant as well as discover needs and wishes customers have not even thought about.

In contrast, the state of the art in traditional retail business remains Stone Aged. Very few retailers even today use innovative technologies and mobile services. If they use mobile services like couponing or payment at all, most of these are more or less isolated apps and generate a one-dimensional image of the customer. Most retailers are not able to combine mobile services and data-driven marketing and do not realize its strategic impact.

Methodology

Considering the aforementioned problems, the development of building blocks for data-driven marketing and the design of a role-based reference model for the future retail CIM require an exploratory, qualitative-empirical, and design-oriented approach.

To identify a broad range of relevant mobile services and applications that traditional retailers can employ to generate and use customer data, we apply a three-step approach: First, we review the existing academic literature on mobile services and apps. Second, we use multiple case study analysis [83] to identify mobile services currently offered by traditional retailers. Third, after identifying the services, we categorize single services into superordinate groups. At the end of this three-step process, the outcome is a set of building blocks for generating and applying customer data for retailers adding mobile services. This set is finally evaluated and validated by expert interviews.

Using the building blocks, we employ a design-oriented approach to develop a role-based reference model for the value network of the future retail CIM. Design science includes three types of research activities: (1) systematic construction of artifacts, (2) evaluation of artifacts, and (3) reflection on results and theories [77]. Result types are constructs, models, methods, and instances [53]. For our concrete construction of the value network, value flow analysis is particularly suitable. The applied modeling method in this paper is based on the e3-value model, a conceptual method for the description of business models [27]. For our purposes, the method has to be extended by a role concept; therefore, we follow Pousttchi [60]. In that approach, a generic model is developed at the role level where activities are assigned to roles and (only) in the course of a concrete analysis roles are assigned to actors. To assess the value model, we provide an exemplary application exposing it to the current conditions of real markets. Depending on the retailer's ability

level in using data-driven marketing, we derive two different scenarios for their value creation and assignment of roles to players.

As a final step, we give practitioners advice on how the model can be implemented: We propose a general system architecture for the major new role of mobile CRM service provider. Because the most common and standardized modeling approach in the field of object-oriented software engineering is the Unified Modeling Language (UML), we use a UML component diagram to describe the structure and relationship of single components and software systems.

Building Blocks for Data-Driven Marketing and Implementing a Multichannel Strategy

Derivation of the Building Blocks

The first step for derivation of the building blocks for data-driven marketing is to conduct a systematic literature review of multichannel retailing, data-driven marketing, and online and mobile services. The second step is to perform a multiple case study analysis. Therefore, we examined public information available on Web sites and app stores in order to identify mobile B2C services currently offered or planned by 33 multichannel retailers from 10 retail sectors: department stores, grocery, books, electronic and media, clothes and fashion, furniture, do it yourself (DIY), office products, convenience stores, and drugstores. The third step is to categorize the identified mobile services. In this process, 12 categories were identified, which were evaluated by expert interviews. For this purpose, we interviewed four mobile commerce and retail experts from academia and two from industry (managers from a global loyalty and marketing corporation and a consultancy specializing in the retail industry). The experts approved the identified categories and mobile elements and did not reveal any missing categories. Table 2 shows the mobile elements and their classification in the 12 building blocks, together with the analyzed cases and literature.

Description of the Building Blocks

Mobile payments are type of payment transaction processing in which the payer uses mobile communication techniques in conjunction with mobile devices for initiation, authorization, or completion of payment [60]. For retailers mobile payments represent the most relevant opportunity to generate personalized customer data for data-driven marketing, especially if enriched with loyalty and couponing data [64].

Mobile loyalty includes the collection, redemption, and forwarding of loyalty points on mobile devices. For retailers it represents the second-most relevant opportunity to generate customer data for data-driven marketing. Its full potential is unfolded by combining it with mobile payments, recommendations, and ratings.

Table 2. Mobile Elements of Innovative Retail Strategies.

Building blocks	Mobile elements	Multichannel retailer	Literature
Mobile payments	QR code payments	Carrefour, Edeka	E.g., [11, 60, 64]
	NFC payments	Bloomingdale's, Macy's, OfficeMax, Edeka, Metro	
	Barcode payments	Walmart, Edeka, OBI	
	In-app payments	Bloomingdale's, Tesco, Macy's, Office Depot	
	Gift card	Target	
Mobile loyalty	Own club card	Bloomingdale's, Target, Tesco, Carrefour, Best Buy, OBI, OfficeMax	E.g., [48, 52, 84]
	Branded credit card with loyalty card function	Bloomingdale's, Carrefour	
	Third-party loyalty card	Edeka, Metro, dm	
Mobile couponing	Discount	Bloomingdale's, Target, Tesco, Macy's, Carrefour, Walmart, dm, Edeka, Gap, H&M, OBI, Office Depot, 7-Eleven, Walgreens,	E.g., [2, 17]
	Add-on/bundling	Target, Tesco, Carrefour, Macy's, 7-Eleven, Walgreens	
	Gift	Barnes & Noble, H&M	
Mobile entertainment	Raffle/contest	Bloomingdale's	E.g., [2, 61, 74]
	Augmented reality	Macy's, IKEA, Harveys	
	Game	Bloomingdale's, Target, Carrefour, Metro, Edeka, Thalia, Best Buy, Gap	
	Music	Target, Carrefour, Media Markt Saturn	
	Recipe	Tesco, Edeka, Metro	
	Wallpaper	Bloomingdale's, Target	
	Greeting card	Metro, Macy's, Burberry	
	Photo	Tesco, Metro, Macy's, Walmart, Harveys, OBI, CVS	
	Magazine	John Lewis, Tesco	
	Video	John Lewis, Bloomingdale's, Target, Macy's, Metro, Barnes & Noble, Best Buy, H&M, B&Q	
	Leisure	Edeka	
	E-book reader	Thalia, Barnes & Noble	

Category	Feature	Retailers	Reference
Mobile social media	Blog/Forum	Carrefour	E.g., [32, 44, 47, 56]
	Feedback/contact	John Lewis, Bloomingdale's, Carrefour, Walmart, Metro, Best Buy, Star Furniture	
	Send-to-a-friend option	Bloomingdale's, Target, Walmart, Edeka, Thalia, Media Markt Saturn, Best Buy, Gap, H&M, Harveys, 7-Eleven	
	Share on social networks	Bloomingdale's, Target, Tesco, Carrefour, Walmart, Edeka, Thalia, Barnes & Noble, Media Markt Saturn, Best Buy, Conrad, H&M, M&S, Harveys, Star Furniture	
Mobile ratings	Review	John Lewis, Macy's, Target, Metro, Thalia, Barnes & Noble, B&Q, Office Depot	E.g., [28, 30, 32]
	Rating	John Lewis, Target, Edeka, Metro, Thalia, Barnes & Noble, B&Q	
Mobile lists	Wish list	Macy's, Best Buy	
	Shopping list	Bloomingdale's, Target, Tesco, Macy's, Carrefour, Walmart, Edeka, Walmart, Metro, IKEA, Office Depot, CVS	
	Gift list	Bloomingdale's, Target, Macy's	
	Favorite list	Bloomingdale's, Tesco, Walmart, Conrad	
Personalized marketing	Weekly ad/newsletter	Bloomingdale's, Target, Metro, Walmart, Edeka, Media Markt Saturn, Conrad, IKEA, B&Q, OBI, OfficeMax, CVS, dm	E.g., [4, 36, 39, 71, 73]
	Daily deal/recommendation	Target, Tesco, Carrefour, Macy's, Walmart, Metro, Best Buy, H&M, Office Depot, 7-Eleven, dm	
	Information	Macy's, Target, Carrefour, Walmart, Edeka, Thalia, Barnes & Noble, H&M, M&S, IKEA, OBI, CVS	
	Event	Bloomingdale's, Carrefour, Macy's, Walmart, M&S, IKEA, 7-Eleven, Star Furniture	
	Order tracking/information	Walmart, Best Buy, H&M	
	Customized service	Target, Tesco, Walmart, CVS, Star Furniture	
	Alert	John Lewis, Target, OBI	
	Product reservation	B&Q, Hornbach	

Table 2. Continued

Building blocks	Mobile elements	Multichannel retailer	Literature
Location-based services	Store locator/map	John Lewis, Bloomingdale's, Target, Tesco, Macy's, Carrefour, dm, OBI, Walmart, Edeka, Metro, Barnes & Noble, Harveys, CVS, Media Markt Saturn, Best Buy, Conrad, Gap, H&M, M&S, IKEA, B&Q, OfficeMax, Office Depot, 7-Eleven, OXXO, Star Furniture	E.g., [15, 19]
	In-store navigation	Macy's	
	Marketing	Walmart, Mac's	
	Information	M&S	
	Car finder	Carrefour	
	Check in	Star Furniture	
Mobile product information	Product details	Bloomingdale's, John Lewis, Macy's, Carrefour, Edeka, Metro, Thalia, Barnes & Noble, Conrad, Gap, IKEA, Hornbach, Star Furniture	E.g., [34, 42]
	Price	Target, Macy's, Walmart, Barnes & Noble, Office Depot, CVS	
	Customer review	Bloomingdale's, Macy's, Barnes & Noble, CVS	
	Promotion	Bloomingdale's, Macy's, Edeka, Thalia	
	In-store availability	Target, Walmart, IKEA, Gap	
Mobile ticketing	Public transport	–	E.g., [51]
	Parking	–	
	Event	–	
Mobile virtual network operator	International calling card	Tesco	E.g., [62]
	Branded SIM card	John Lewis, Tesco, Edeka, Conrad, Carrefour, Metro, IKEA	

Mobile couponing describes the process of sending, receiving, forwarding, and redeeming a digital coupon by mobile devices. Mobile coupons realize monetary value in the form of a discount, add-on, or other value. They can stimulate impulse buying and generate additional sales and recommendations.

Mobile entertainment includes mobile services for amusement and raffles. The ability to kill time is the most important driver for consumers' use of mobile services [61]. For retailers this building block has two major implications: (1) it is recommended that aesthetic design be paid attention to and, (2) where appropriate, means of "gamification" in all types of mobile applications be included in order to comply with consumer expectations; it makes sense to provide (data-generating) applications that help consumers kill time and retain them as customers.

Mobile social media include the discussion and recommendation of purchased products as well as the forwarding of loyalty points, coupons, or mobile marketing campaigns via mobile viral marketing. Mobile viral marketing is a form of distribution or communication that is transmitted by customers via mobile devices to other potential customers, typically encouraging them to further transmit the content [56].

Mobile ratings are subjective evaluations of objects (e.g., products, services, and mobile marketing campaigns) by customers via mobile devices. A rating might be a simple overall grade or a complex field report with pictures and text. Based on those ratings, retailers can interact with customers, analyze service quality, and improve services and products.

Mobile lists consist of different list types like wish, gift, product, or shopping lists that can be created, approved, and forwarded by customers via mobile devices. Retailers can send recommendations for cross-selling and upselling, offer discounts, or even make a promotional gift based on the listed items (and so can other customers).

Personalized marketing is a type of customer-specific communication based on purchase and interaction history, other customer data such as preferences, recommendations, or ratings, and technical data from the network, device, operation system, browser, or other applications. Personalized information is perceived as valuable by customers and even has the potential for forwarding, which again generates additional information about forwarding and receiving customers (e.g., identifying multipliers and opinion leaders).

Location-based services are services that require and use the geographic position of one or multiple users. In combination with marketing, retailers can send mobile coupons or personalized information. Location-based marketing increases purchase probability [19] as well as positive attitudes toward advertisement [4].

Mobile product information is a mobile service providing customers with information on products (e.g., ingredients, potential allergy triggers, price, quality labels, manufacturer, or details about the manufacturing process). Retailers can combine product information systems with advertisements for related or additional products and learn more about customers' shopping motives.

Mobile ticketing is the assignment and verification of the right to claim a specific service at a specific time or for a certain period at a certain place
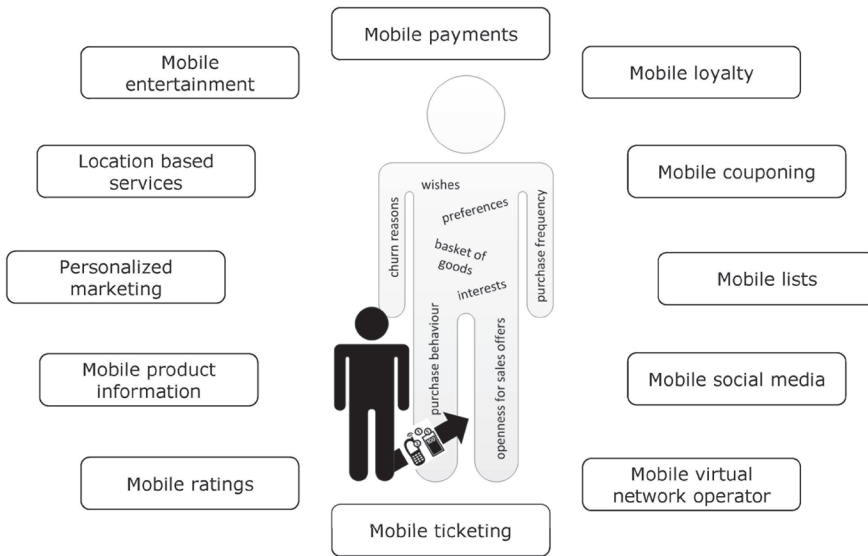
Figure 1. Building Blocks for Generating and Applying Customer Data for Retailers Adding Mobile Services

using the right-holder's mobile device. Often the purchase and payment is directly integrated in the ticketing process. The process comprises sending, receiving, and forwarding mobile tickets, which can also include coupons or banners. Retailers may use mobile ticketing for a variety of purposes, for example, sending customers a free mobile parking or public transport ticket when checking out at the store.

Mobile virtual network operators (MVNO) are companies selling mobile communication services (voice or data) under their brand without possessing their own mobile network license [62]. However, virtually all of these operations are nonstrategic and treat mobile services like any other store-brand product. Despite this fact, the strategic potential of owning the customer's access to the mobile network is very high. Depending on the MVNO type, these operators can have direct billing and customer relationships and thus command a large customer base (including mobile phone numbers and partial control of the device) for a variety of retailers' mobile services.

The 12 building blocks are summarized in Figure 1.

Development of a Value Network for the Future Retail CIM

Next, we develop a value network for realization of the identified building blocks. The value network and some of its roles are based on the mobile payment reference model (MPRM) 2.0, which provides a mobile-payment-centered view [64]. For handling the complexity of traditional retail, the model has to be extended with corresponding roles, and the level of detail has to be increased.

Therefore, we decompose roles and actors. Roles are typical combinations of value activities that can be assigned to one (possibly changing) actor. The combination of these roles and value flows forms the value network of the future retail CIM. Finally, we discuss application of the value network and propose a system architecture for the key role of mobile CRM service provider.

Roles and Activities

Next, we focus on the most important roles to implement and operate the building blocks that enable data collection, analysis, and/or usage. Following Pousttchi and Hufenbach [63, 64] and Pousttchi et al. [65], we include six essential roles: mobile marketing service provider, mobile payment service provider, mobile ticketing service provider, trusted service manager, mobile CRM service provider, and data warehouse operator. The network is not a closed system and can be extended by additional roles, which, however, add complexity.

Most of the building blocks (e.g., mobile entertainment, mobile loyalty, and mobile couponing) are related to marketing activities. Thus, they require a role that designs and implements mobile marketing campaigns. This functionality is combined in the role of mobile marketing service provider (MM SP). The mobile marketing service provider supplies advertisers with infrastructure, knowledge, and a customer database for mobile marketing campaigns. It is responsible for planning, operating, and evaluating campaigns.

The building block mobile payments requires a role that provides mobile payment procedures. All elements of this functionality are combined in the role of mobile payment service provider (MP SP) under the terms discussed in Pousttchi and Hufenbach [64].

The building block mobile ticketing requires a role that offers procedures for ticketing using mobile devices and mobile communication technologies. For the mobile ticketing service provider (MT SP)—as well as for the mobile payment service provider and the mobile marketing service provider—these devices and technologies include not only standard mobile radio but especially low-distance communication such as NFC (near field communication) and BLE (Bluetooth low energy, e.g., all types of "beacons"). The mobile ticketing service provider also handles ticket bookings and validations.

To support secure payment and ticketing transactions, a role that distributes and manages applications and keys on a universal integrated circuit card (UICC; in 2G networks referred to as a SIM [subscriber identity module] card) in protected memory areas of mobile devices or other storage media is required. This functionality is combined in the role of the trusted service manager (TSM). At the runtime of a service, the trusted service manager authenticates the transaction partners and guarantees end-to-end security.

The management of the mobile customer relationship requires a role that derives and provides any kind of customer intelligence from the collected data for customer insights, for the preparation of mobile marketing campaigns, and for other means of customer acquisition and retention. This functionality is combined in the role of mobile CRM service provider (MCRM SP), which

provides retailers and other business customers the technical and process expertise to manage the mobile customer relationship. Furthermore, it is responsible for customer analyses on the basis of original and derivative data, market research, and strategic recommendations. Because in practice the required hardware and software for the technical operation and maintenance of the customer data platform, including physical operation of data privacy protection, are typical outsourcing targets, the set of roles is completed with the merely technical role of data warehouse operator.

The coherence of the described roles is established by the value network, which is described next.

Value Network

The systematic construction of a value network starts with a complete set of actors or roles and analyzes their core functions with regard to incoming and outgoing value, linking them to the respective provider or receiver of that value. To ensure the universal applicability of a reference model, every relevant conceivable value exchange should be taken into account (even if set to zero when the model is applied for analysis). Although for reasons of space we have to restrict our description, the resulting model in Figure 2 shows all of the value exchanges between roles.

The mobile marketing service provider is responsible for campaign management. For sending advertising messages to existing or potential new customers, the mobile marketing service provider receives transaction-based fees from the retailer. Using response data from customers, the mobile marketing service provider can also evaluate each campaign commissioned by a retailer.

The mobile payment service provider is responsible for payment handling between the retailer and its customers and receives a basic fee for the participation as well as a transaction fee from the retailer. The mobile payment service provider handles the clearing and settlement of payments between the customers' and the retailer's or the mobile ticketing service provider's bank. In addition, with each payment transaction the mobile payment service provider generates data for evidence-based marketing. In many scenarios participation in the mobile payment procedure might be free of charge in order to persuade the customer to accept mobile marketing and reveal personal data.

The mobile ticketing service provider is responsible for the complete interaction between the issuer of a ticket and its holder and thus receives a basic fee and/or a transaction fee. In addition, with each ticketing transaction a customer performs via its mobile device, the mobile ticketing service provider generates data for evidence-based marketing. For providing advertising space on mobile tickets, the mobile ticketing service provider may additionally receive transaction fees from the mobile marketing service provider.

The trusted service manager controls customer authentication and end-to-end transaction security and earns pertinent fees from the mobile payment service provider and the mobile ticketing service provider.

To complete the model, a central role in the construction of the value network is assigned to the mobile CRM service provider, which not only handles all
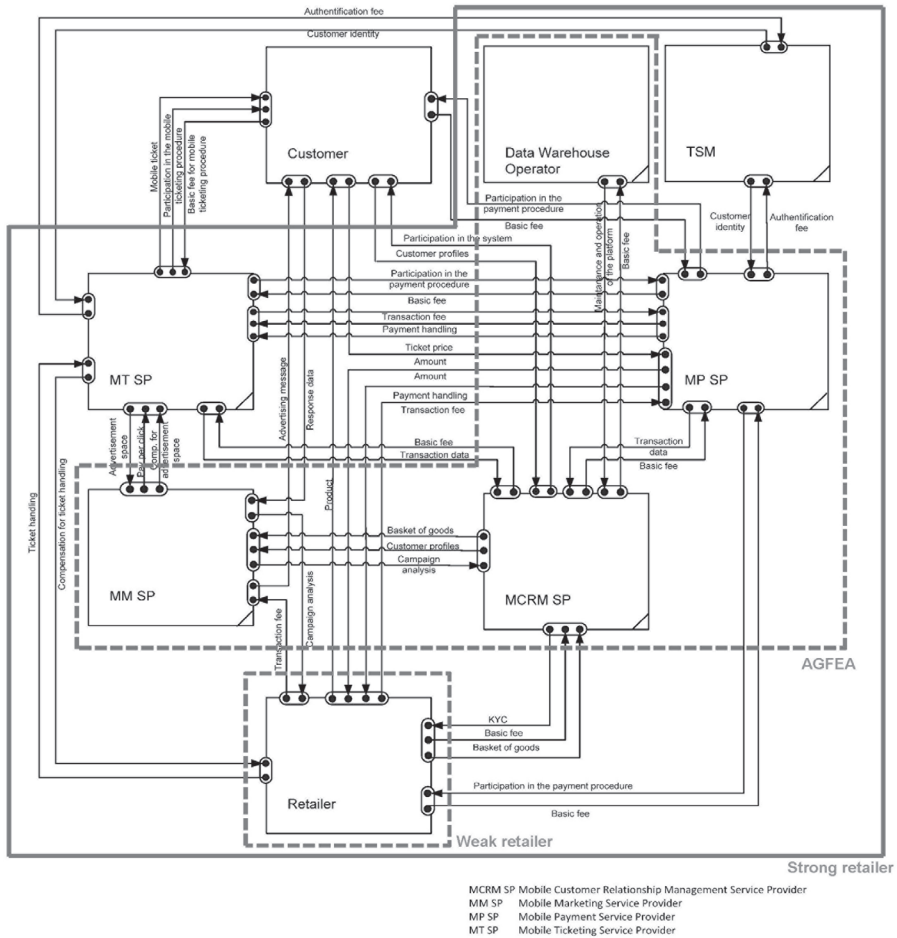
Figure 2. Value Network of the Future Retail CIM

detailed, aggregated, and derived customer data but also manages the relationship between virtually all roles. For participation in the system, the customer registers for the mobile marketing and mobile payment system with his or her personal data and agrees to opt in. The retailer transmits a basket of goods data from each transaction to the mobile CRM service provider. The mobile marketing service provider and the mobile payment service provider also forward their customer data (e.g., campaign response results) to the mobile CRM service provider to enrich customer intelligence and improve analysis quality. In return they receive basic fees. The mobile CRM service provider aggregates and analyzes data from all of the various sources in order to provide descriptive and inferential statistics for customer support, (micro-)segmentation, and strategic recommendations to help retailers improve marketing as well as location and product decisions; in return it receives transaction-independent revenues in form of a basic fee (flat fee). As a second major function, the mobile

CRM service provider supplies the necessary data for evidence-based marketing to the mobile marketing service provider. The data warehouse operator physically hosts the data and operates the necessary data warehouses for the mobile CRM service provider, receiving a pertinent fixed fee.

The value network for the future retail CIM as a reference model represents not only a description but also a construction kit: Application of the model might (1) include different assignments of roles to players as well as (2) the analysis of alliances (i.e., operation for different players at the same time), which would allow traditional players to compete with AGFEAs and (3) an easy extension with additional roles (e.g., media or agencies). This could also create a number of new interorganizational business models and might lead to new direct and indirect sources of revenue for traditional retailers.

Application of the Reference Model

The above-described value model shows its core functionality but does not describe the allocation of roles to players. In general, all roles could be fulfilled by one single player or by different players, depending on market conditions as well as intracorporate factors. The model allows derivation of both extreme and trend scenarios, as well as comparison of actual and target states. To fulfill the aim of the paper, we have to determine under which conditions an instantiation of the value network enables traditional retailers to compete with AGFEAs and to use data-driven marketing as a strategic means of competition. Thus, we combine evaluation and exemplary application of the model by assigning players to roles and presenting two extreme scenarios: strong retailer and weak retailer (see Figure 2). Beyond that, the value network is especially suited for a multitude of intermediate steps and scenarios for retailers.

Scenario 1: Strong Retailer

The presented building blocks generally would enable traditional retailers on a strategic level to identify potential customers, provide better service at the brick-and-mortar store, and entice the customers into the store. However, the crucial issue for competitiveness of traditional retailers vis-à-vis AGFEAs is not the general existence of the roles. If the retailer can integrate most of the roles, especially the mobile marketing and mobile payment roles, either on the retailer's own or via vertical alliances, the strong retailer scenario occurs (actors shown in Figure 2 with solid broad lines). In this scenario, especially if also combined with horizontal alliances, the retailer is able to control the pervasive end-customer ownership and constitute the first reference point for customer inquiries. The emphasis of the strong retailer is placed on developing new business areas and revenue sources. As a general characteristic of the strong retailer, intelligent role combinations could create a number of interorganizational business models for the retailer, leading to new direct and indirect revenue streams.

Scenario 2: Weak Retailer

Retailers with a weak market position and customer relationship often do not have the ability to fulfill additional roles or even to combine different roles. If such a retailer or his alliance cannot build up a high number of customer interactions per day and is dependent on mobile services offered by an AGFEA, the weak retailer scenario occurs (actors shown in Figure 2 with dashed broad lines). In this case, the retailer loses the central end-customer ownership to the AGFEA, which might perform virtually all of these roles. Generally, the mobile marketing oriented roles are extremely attractive to AGFEA's. In order to operate these roles, they would be ready to perform or at least control the mobile payment oriented roles. Google Wallet, Amazon Simple Pay, and Apple iBeacon are clear examples of the realization of the threat described in the introduction.

Therefore, it can be concluded that ownership of the roles of mobile marketing service provider, mobile CRM service provider, mobile payment service provider, and mobile ticketing service provider will determine whether AGFEAs will be able to extend their market power from the virtual world to the real (i.e., in-store) world or whether traditional retailers will be successful in achieving the very opposite.

Component Architecture

To make clear how implementation of our model might look, we complement our strategic research with a proposition regarding the main functionality and system components for the central role in the value network, that of the mobile CRM service provider.

To build customer knowledge and to manage the mobile customer relationship, three main components are essential: the central database system, a user mobile app that represents the user's main access to the system, and a CIM Web app that controls the retailer's access to the system. To operate alliances, any component has to be multitenant.

Customer acquisition and retention require two major components, strategy and analytics and tactics and campaigns. The first component accesses the database system and operates individual analyses and recommendations for CIM actions. The second component uses the data for conception, implementation, and analyses of mobile marketing campaigns. Thus, recommendations can be integrated in personalized campaigns, campaigns can be customized to CIM-specific goals, and campaign response rates can be measured.

We propose the component-based mobile CRM service provider system with a UML component diagram shown in Figure 3.

Limitations

For developing the building blocks, we concentrated mostly on existing case studies as well as on the literature on mobile services. In the future, further building blocks, depending on new technologies and business models as well
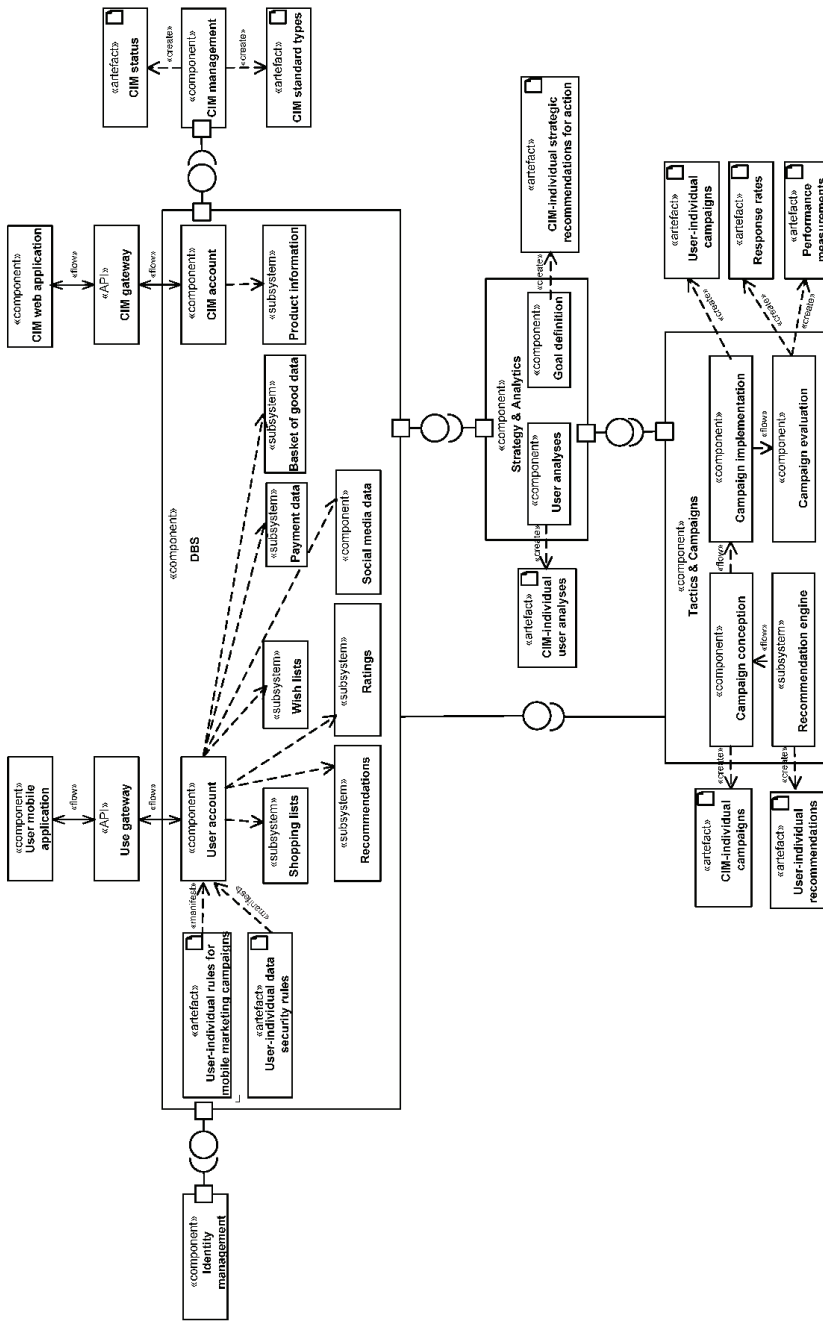
Figure 3. Exemplary Component Architecture for the Mobile Customer Relationship Service Provider

as new AGFEA players from completely different areas, might enter the market and influence the value network. It is also imaginable that in a maturing market, single roles will be split. In case of the mobile payment service provider, for instance, the two activities of clearing and settlement could become two separate roles. Furthermore, as to implementation, our paper stops at a theoretical level and implementation barriers are not examined.

Conclusion

Online and mobile technologies have changed consumers' lives as well as their shopping behavior. AGFEAs constitute the first reference point for many consumers. AGFEAs are characterized by increased control over the end-customer relationship, aggregated personalized customer knowledge, and data-driven marketing abilities. This represents a strategic threat for retailers in their core business.

Against this background, we applied a design science approach to analyze how traditional retailers could compete with this type of pervasive customer ownership and use a combination of mobile services and data-driven marketing as a strategic means of competition.

The paper has two results. As a contribution to practice, we develop a value network and exemplified implementation with an architecture proposition for the mobile CRM service provider. The value network can be used for analysis as well as for the development of new opportunities. Thus, the presented reference models can be used for the value proposition model and the value configuration model (in the sense of [65]). Furthermore, they can be used as tools for strategic analysis and systematic comparison of retailers/markets and the design of new business and partnering models. As a contribution to research, we provide a systematic analysis of AGFEAs' implications for a real-world industry. Furthermore, the approach presented is suitable for development and configuration of future business models.

Future research might concentrate on generic configuration of value networks and the relevant ontologies as well as on application of the methodology to other industries (e.g., banking) and AGFEA influences on the public sector.

REFERENCES

1. Aubrey, C., and Judge, D. Re-imagine retail: Why store innovation is key to a brand's growth in the "new normal," digitally-connected and transparent world. *Journal of Brand Strategy, 1,* 1 (2012), 31–39.
2. Bauer, H.; Reichardt, T.; Barnes, S.; and Neumann, M. Driving consumer acceptance of mobile marketing: A theoretical framework and empirical study. *Journal of Electronic Commerce Research, 6,* 3 (2005), 181–192.
3. Bell, D.; Choi, J.; and Lodish, L. What matters most in Internet retailing. *MIT Sloan Management Review, 54,* 1 (fall 2012), 27–33.
4. Beneke, J.; Cumming, G.; Stevens, A.; and Versfeld, M. Influences on attitude toward mobile text message advertisements: An investigation of

South African youth. *International Journal of Mobile Marketing, 5,* 1 (2010), 77–97.

5. Black, G. Consumer demographics and geographics: Determinants of retail success for online auctions. *Journal of Targeting, Measurement & Analysis for Marketing, 15,* 2 (2007), 93–102.

6. Brown, S. Turning customers into lustomers: The Duveen proposition. *Journal of Customer Behaviour, 6,* 2 (2007), 143–153.

7. Chen, J.-M.; Cheng, H.-L.; and Lin, I.-C. On channel coordination under price-dependent revenue-sharing: Can eBay's fee structure coordinate the channel? *Journal of the Operational Research Society, 62,* 11 (2011), 1992–2001.

8. Chen, R.; Kraemer, K.; and Sharma, P. Google: The world's first information utility? *Business and Information Systems Engineering, 1,* 1 (2009), 53–61.

9. Clark, J., and Ward, S. Consumer behaviour in online auctions: An examination of partitioned prices on eBay. *Journal of Marketing Theory and Practice, 16,* 1 (2008), 57–66.

10. Coget, J.-F. The Apple Store effect: Does organizational identification trickle down to customers? *Academy of Management Perspectives, 25,* 1 (2011), 94–95.

11. Dahlberg, T.; Mallat, N.; Ondrus, J.; and Zmijewska, A. Past, present and future of mobile payments research: A literature review. *Electronic Commerce Research and Applications, 7,* 2 (summer 2008), 165–181.

12. Dan, B.; Xu, G.; and Liu, C. Pricing policies in a dual-channel supply chain with retail services. *International Journal of Production Economics, 139,* 1 (2012), 12–20.

13. Dekay, S. How large companies react to negative Facebook comments. *Corporate Communications: An International Journal, 17,* 3 (2012), 289–299.

14. Devi, B. Amazon's foray into e-grocery market: Successful venture. *ICFAI Journal of Consumer Behavior, 3,* 3 (2008), 59–70.

15. Dhar, S., and Varshney, U. Challenges and business models for mobile location-based services and advertising. *Communications of the ACM, 54,* 5 (2011), 121–128.

16. Dholakia, R.; Zhao, M.; and Dholakia, N. Multichannel retailing: A case study of early experiences. *Journal of Interactive Marketing, 19,* 2 (spring 2005), 63–74.

17. Dickinger, A., and Kleijnen, M. Coupons going wireless: Determinants of consumer intentions to redeem mobile coupons. *Journal of Interactive Marketing, 22,* 3 (summer 2008), 23–39.

18. Di Russo, D.; Mudambi, S.; and Schuff, D. Determinants of prices in an online marketplace. *Journal of Product & Brand Management, 20,* 5 (2011), 420–428.

19. Drossos, D.; Giaglis, G.; Lekakos, G.; Kokkinaki, F.; and Stavraki, M. Determinants of effective SMS advertising: An experimental study. *Journal of Interactive Advertising, 7,* 2 (2007), 16–27.

20. Dulsrud, A., and Jacobsen, E. In-store marketing as a mode of discipline. *Journal of Consumer Policy, 32,* 3 (2009), 203–218.

21. Fahy, C. Internet versus traditional retailing: An address model approach. *Journal of Economics and Business, 58,* 3 (2006), 240–255.

22. Finkle, T., and Mallin, M. Steve Jobs and Apple, Inc. *Journal of the International Academy for Case Studies, 16,* 7 (2010), 49–57.

23. Fitzsimons, G.; Chartrand, T.; and Fitzsimons, G. Automatic effects of brand exposure on motivated behavior: How Apple makes you "think different." *Journal of Consumer Research, 35,* 1 (2008), 21–35.

24. Frischmann, T.; Hinz, O.; and Skiera, B. Retailers' use of shipping cost strategies: Free shipping or partitioned prices? *International Journal of Electronic Commerce 16,* 3 (spring 2012), 65–87.

25. Ge, W.; Zhao, X.Y.; and Ma, Y. Literature review on consumer adoption behavior of mobile commerce services. In *Proceedings of the 2011 International Conference on e-Business and e-Government.* Washington, DC: IEEE Press, 2011, pp. 1–5.

26. Gefen, D., and Pavlou, P. The boundaries of trust and risk: The quadratic moderating role of institutional structures. *Information Systems Research, 23,* 3, part 2 (2012), 940–959.

27. Gordijn, J.; Akkermans, J.; and van Vliet, J. What's in an electronic business model? In R. Dieng and O. Corby (eds.), *Proceedings of the 12th International Conference on Knowledge Engineering and Knowledge Management.* Berlin: Springer, 2000, pp. 257–273.

28. Gregg, D., and Scott, J. A typology of complaints about eBay sellers. *Communications of the ACM, 51,* 4 (2008), 69–74.

29. Harris, L., and Dennis, C. Engaging customers on Facebook: Challenges for e-retailers. *Journal of Consumer Behaviour, 10,* 6 (2011), 338–346.

30. Hayne, S.; Wang, H.; and Mendonca, S. eBay as the "Terminator": Determining user suspension from feedback ratings. *Journal of Organizational Computing & Electronic Commerce, 22,* 2 (2012), 160–183.

31. Hilage, T., and Kulkarni, R. Review of literature on data mining. *International Journal of Research and Reviews in Applied Sciences, 10,* 1 (2012), 107–114.

32. Hu, N.; Tian, G.; Liu, L.; Liang, B.; and Gao, Y. Do links matter? An investigation of the impact of consumer feedback, recommendation networks and price bundling on sales. *IEEE Transactions on Engineering Management, 59,* 2 (2012), 189–200.

33. Huang, C.-Y. Excess loyalty in online retailing. *International Journal of Electronic Commerce, 16,* 2 (winter 2011–12), 115–133.

34. Hufenbach, Y., and Pousttchi, K.: Mobile product information systems—State of the art and conceptual model. In *Proceedings of the 13th International Conference on Electronic Business.* Singapore: ICEB, 2013, pp. 22–30.

35. Isckia, T. Amazon's evolving ecosystem: A cyber-bookstore and application service provider. *Canadian Journal of Administrative Sciences, 26,* 4 (2009), 332–343.

36. Jackson, T. Personalisation and CRM. *Database Marketing & Customer Strategy Management, 15,* 1 (2007), 24–36.

37. Jason, O.; Soh, J.; and Tan, B. Mobile gaming. *Communications of the ACM, 51,* 3 (2008), 35–39.

38. Javelin Strategy & Research. Who will lead in mobile purchasing? Apple, Google, Facebook, Amazon, PayPal . . . or your bank? *Mobile Banking Week,* March 8, 2012 (available at www.mbweek.com/2012/03/08/1540/).

39. Jenkinson, A. Evolutionary implications for touchpoint planning as a result of neuroscience: A practical fusion of database marketing and advertising. *Journal of Database Marketing & Customer Strategy Management, 14,* 3 (2007), 164–185.

40. Keen, P., and Williams, R. Value architectures for digital business: Beyond the business model. *MIS Quarterly 37,* 2 (2013), 643–647.

41. Kenney, M., and Pon, B. Structuring the smartphone industry: Is the mobile Internet OS platform the key? *Journal of Industry, Competition and Trade, 11,* 3 (2011), 239–261.

42. Kim, J., and Lee, H.-H. Consumer product search and purchase behaviour using various retail channels: The role of perceived retail usefulness. *International Journal of Consumer Studies, 32,* 6 (2008), 619–627.

43. Kim, J., and Park, J. A consumer shopping channel extension model: Attitude shift toward the online store. *Journal of Fashion Marketing & Management, 9,* 1 (2005), 106–121.

44. Kleijnen, M.; Lievens, A.; de Ruyter, K.; and Wetzels, M. Knowledge creation through mobile social networks and its impact on intentions to use innovative mobile services. *Journal of Service Research, 12,* 1 (2009), 15–35.

45. Kunter, M. Coordination via cost and revenue sharing in manufacturer–retailer channels. *European Journal of Operational Research, 216,* 2 (2012), 477–486.

46. Lee, H.; Lee, S.; Kim, H.; and Lee, R. Is the Internet making retail transactions more efficient? Comparison of online and offline CD retail markets. *Electronic Commerce Research & Applications, 2,* 3 (autumn 2003), 266–277.

47. Liang, T.-P.; Ho, Y.-T.; Li, Y.-W.; and Turban, E. What drives social commerce: The role of social support and relationship quality. *International Journal of Electronic Commerce, 16,* 2 (winter 2011–12), 69–90.

48. Lin, H.-H. The effect of multi-channel service quality on mobile customer loyalty in an online-and-mobile retail context. *Service Industries Journal, 32,* 11 (2012), 1865–1882.

49. Lumpkin, G., and Dess, G. E-business strategies and Internet business models: How the Internet adds value. *Organizational Dynamics, 33,* 2 (2004), 161–173.

50. Malaga, R. Consumer costs in electronic commerce: An empirical examination of electronic versus traditional markets. *Journal of Organizational Computing & Electronic Commerce, 11,* 1 (2001), 47–58.

51. Mallat, N.; Rossi, M.; Tuunainen, V.; and Öörni, A. The impact of use context on mobile services acceptance: The case of mobile ticketing. *Information & Management, 46,* 3 (2009), 190–195.

52. Mann, A., and Prein, J. Mobile loyalty programs: Relevance for relationship management and consumer acceptance. In K. Pousttchi and D. Wiedemann (eds.), *Handbook of Research on Mobile Marketing Management.* Augsburg: IGI Global, 2010, pp. 362–380.

53. March, S., and Storey, K. Design science in the information systems discipline: An introduction to the special issue on design science research. *MIS Quarterly, 32,* 4 (2008), 725–730.

54. McGoldrick, P., and Collins, N. Multichannel retailing: Profiling the multichannel shopper. *International Review of Retail, Distribution & Consumer Research, 17,* 2 (2007), 139–158.

55. Nosrati, M.; Karimi, R; Makekian, K.; and Hariri, M. PayPal as the most loved payment system among merchants and buyers in online transactions. *World Applied Programming, 3,* 9 (2013), 396–400.

56. Palka, W.; Pousttchi, K.; and Wiedemann, D. Mobile word-of-mouth—A grounded theory of mobile viral marketing. *Journal of Information Technology, 24* (2009), 172–185.

57. Panteva, N., and Stampfli, D. From bricks to clicks. *RMA Journal, 94,* 7 (2012), 52–56.

58. Papatla, P., and Liu, F. Google or BizRate? How search engines and comparison sites affect unplanned choices of online retailers. *Journal of Business Research, 62,* 11 (2009), 1039–1045.

59. Park, J.; Gu, B.; and Lee, H. The relationship between retailer-hosted and third-party hosted WOM sources and their influence on retailer sales. *Electronic Commerce Research & Applications, 11,* 3 (2012), 253–261.

60. Pousttchi, K. A modeling approach and reference models for the analysis of mobile payment use cases. *Electronic Commerce Research and Applications, 7,* 2 (summer 2008), 182–201.

61. Pousttchi, K., and Goeke, L. Determinants of customer acceptance for mobile data services: An empirical analysis with formative constructs. *International Journal of Electronic Business, 9,* 1/2 (2011), 26–43.

62. Pousttchi, K., and Hufenbach, Y. Analyzing and categorization of the business model of virtual operators. In X. Hu, E. Scornavacca, and Q. Hu (eds.), *Proceedings of the 8th International Conference on Mobile Business.* Washington, DC: IEEE Press, 2009, pp. 87–92.

63. Pousttchi, K., and Hufenbach, Y. Value creation in the mobile market. *Business & Information Systems Engineering, 53,* 5 (2011), 299–311.

64. Pousttchi, K., and Hufenbach, Y. Enabling evidence-based retail marketing with the use of payment data—The mobile payment reference model 2.0. *International Journal of Business Intelligence and Data Mining, 8,* 1 (2013), 19–44.

65. Pousttchi, K.; Schießler, M.; and Wiedemann, D. Proposing a comprehensive framework for analysis and engineering of mobile payment business models. *Journal of Information Systems and e-Business Management, 7,* 3 (2009), 363–393.

66. Rudolph, T., and Emrich, O. Situation-related tasks for mobile services in retailing. *International Review of Retail, Distribution & Consumer Research, 19,* 5 (2009), 483–503.

67. Rutz, O., and Trusov, M. Zooming in on paid search ads—A consumer-level model calibrated on aggregated data. *Marketing Science, 30,* 5 (2011), 789–800.

68. Schultz, D.; Block, M.; and Labrecque, L. Consumer retailer preference and Facebook: Friends or foes*? International Journal of Integrated Marketing Communications, 4,* 1 (spring 2012), 7–18.

69. Sen, A.; Dacin, P.; and Pattichis, C. Current trends in Web data analysis. *Communications of the ACM, 49,* 11 (2006), 85–91.

70. Shankar, V.; Venkatesh, A.; Hofacker, C.; and Naik, P. Mobile marketing in the retailing environment: Current insights and future research avenues. *Journal of Interactive Marketing, 24,* 2 (2010), 111–120.

71. Shaw, M.; Subramaniama, C.; Tana, W.; and Welge, M. Knowledge management and data mining for marketing. *Journal of Decision Support Systems, 31,* 1 (2001), 127–137.

72. Silwattananusarn, T., and Tuamsuk, K. Data mining and its applications for knowledge management: A literature review from 2007 to 2012. *International Journal of Data Mining & Knowledge Management Process, 2,* 5 (2012), 13–24.

73. Stephenson, B. Critical marketing strategies for the 1990s—Databased marketing and multichannel marketing. *Journal of Direct Marketing, 3,* 3 (1989), 34–41.

74. Strueker, J.; Accorsi, R.; and Mueller, G. On providing one-to-one marketing with customers' privacy in stationary retail. In *Proceedings of the 10th IEEE Conference on E-Commerce Technology and the Fifth IEEE Conference on Enterprise Computing, E-Commerce and E-Services.* Washington, DC: IEEE Press, 2008, pp. 44–49.

75. Tariq, M.; Ishrat, R.; and Khan, H. A case study of Apple's success with iconic iPod and iPhone. *Interdisciplinary Journal of Contemporary Research in Business, 3,* 1 (2011), 158–168.

76. Uncles, M. Broadening the scope of brand management. *Journal of Brand Management, 17,* 6 (2010), 395–398.

77. Vaishnavi, V., and Kuechler, B. A framework for theory development in design science research: Multiple perspectives. *Journal of the Association for Information Systems, 13,* 6 (2012), 395–423.

78. van Baal, S., and Dach, C. Free riding and customer retention across retailers' channels. *Journal of Interactive Marketing, 19,* 2 (2005), 75–85.

79. Varnali, K., and Toker, A. Mobile marketing research: The-state-of-the-art. *International Journal of Information Management, 30,* 2 (2010), 144–151.

80. Walton, N. "Four-closure": How Amazon, Apple, Facebook & Google are driving business model innovation. In *Proceedings of the International Conference on Innovation Management and Technology Research.* Washington, DC: IEEE Press, 2012, pp. 97–101.

81. Walton, N., and Oestreicher, K. Google & Apple's gale of creative destruction. *China-USA Business Review, 11* (2012), 1478–1491.

82. Yang, T. The decision behaviour of Facebook users. *Journal of Computer Information Systems, 52,* 3 (2012), 50–59.

83. Yin, R. *Case Study Research: Design and Methods.* Thousand Oaks, CA: Sage, 2009.

84. Yun, Z.-S.; Pysarchik, D.; and Srivastava Dabas, C. The determinants of retail loyalty of Indian consumers. *Journal of Food Products Marketing, 18,* 4 (2012), 268–286.

85. Zhang, J.; Farris, P.; Irvin, J.; Kushwaha, T.; Steenburgh, T.; and Weitz, B. Crafting integrated multichannel retailing strategies. *Journal of Interactive Marketing, 24,* 2 (2010), 168–180.

86. Zmuda, N. Direct disconnect: Retailers neglect valuable data trove. *Advertising Age, 80,* 31 (2009), 1–45.

KEY POUSTTCHI (key.pousttchi@wi-mobile.de) is an associate professor of information systems and mobile business at the Business School, University of Augsburg. He heads the wi-mobile Research Group there. His research activities center on mobile payments and financial services, data-driven marketing, mobile-integrated business processes, and the strategic impact of digitization on traditional industries. His work has been published in, among other journals, *Journal of Information Technology, Business & Information Systems Engineering, International Journal of Electronic Business,* and *Information Systems & e-Business Management.*

YVONNE HUFENBACH (yvonne.hufenbach@wi-mobile.de), a lawyer, is a Ph.D. student in the wi-mobile Research Group as well as a project leader for mobile marketing and telecommunication markets. Her research focuses on mobile marketing, mobile financial services, legal aspects, and mobile product information systems. Her work has been published in *Business & Information Systems Engineering* and *International Journal of Business Intelligence and Data Mining.*