



Service-Channel Fit Conceptualization and Instrument Development

A Mixed Methods Study in the Context of Electronic Banking

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Abstract Electronically mediated self-service technologies in the banking industry have impacted the way banks service consumers. Despite a large body of research on electronic banking channels, no study has been undertaken to empirically explore the fit between electronic banking channels and banking services. To address this gap, we developed and validated a service-channel fit conceptualization and an associated survey instrument. We applied a mixed methods approach and initially investigated industry experts' perceptions regarding the concept of 'service-channel fit' (SCF). The findings demonstrated that the concept was highly valued by bank managers. Next, we developed an instrument to measure the perceived service-channel fit of electronic

banking channels. The instrument was developed using expert rounds and two pretests involving approximately 300 consumers in New Zealand. Drawing on IS alignment literature, we created a parallel instrument allowing us to calculate SCF across three unique fit dimensions, including service complexity-channel fit, service importance-channel fit, and service routineness-channel fit. To explore the nomological validity of the SCF construct, we linked SCF to customers' intention to use a specific channel for a particular banking task. We tested our model with data from 340 consumers in New Zealand using Internet banking applications for two different banking tasks. The results of our study have theoretical and practical implications for how clients should be serviced through electronically mediated banking channels.

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1 Introduction

Since the early 1970s, the proliferation of self-service technologies within the financial services industry has significantly influenced the way banks service clients. In particular, ATMs, telephone banking, Internet banking, and mobile banking have emerged as efficient means for selling products and servicing customers (Katuri and Lam 2003). For the consumer, these electronic banking channels eliminate the need to visit a branch, and offer convenient access to various banking services. Banks also benefit from self-service technologies as they can reduce costs associated with the traditional branch network.

Prior research suggests that the value of different electronically mediated self-service technologies for particular banking services depends on the specific nature of these services. For instance, complex financial transactions are seen to be difficult to perform on mobile phones due to their hardware limitations such as small screens (Kim et al. 2009; Lu et al. 2010). As a consequence, consumers tend to use mobile banking applications for simple banking services in situations where they need instant access to their accounts and other banking channels are not in reach (e.g., checking their account balance before purchasing goods at a point of sale). By contrast, Internet banking is often used for simple and moderately complicated banking services, such as domestic transactions, international payments, or credit card applications (Deutsche Bank Research 2011; Forrester Research 2007). These varying usage patterns indicate that different self-service technologies have inherent capabilities that align with certain types of banking services, but not with others. This suggests the notion of a “fit” between a given service channel and specific banking services. Furthermore, it seems reasonable to assume that the better the “fit” between banking channel and service, the more likely consumers will use a given channel/service combination.

Despite a substantial body of knowledge on electronic banking services and technology adoption (Beck et al. 2003a, b, 2008; Lamberti and Büger 2009), to date there have been no rigorous studies investigating the fit between electronic banking channels and banking services. Nor has there been sufficient research into how *service-channel fit* (SCF) impacts a consumer’s intention to use a specific electronic banking channel. This gap in research investigating the fit between electronic banking channels and banking services is likely caused by the lack of a validated conceptualization of the notion of SCF. To address this gap, we used a mixed methods research design (Venkatesh et al. 2013) to conceptualize the SCF construct and to develop and validate a survey questionnaire instrument. The research findings should be of interest to both academics and practitioners as they shed light on an important conceptual issue which also has significant practical value for banks and other financial institutions. Specifically, the current study pursues three major goals:

- To assess the relevance of the SCF construct for practitioners.
- To conceptualize the SCF construct and develop scales to effectively measure the perceived fit between banking services and electronic banking channels.
- To empirically validate the scales and examine the nomological validity of the SCF construct.

The next section introduces the theoretical background of our study. Then, we present the findings from qualitative interviews with high level managers working in the

German banking industry which we conducted to evaluate the relevance of our research (study 1). Next, we present the methodological approach and results of a qualitative study (study 2) which we conducted to identify salient dimensions of SCF. We then report the development and validation of a measure for SCF by means of a large-scale quantitative study (study 3). Finally, we discuss implications for existing literature and managerial practice.

2 Theoretical Background

2.1 Literature on the Adoption of Electronic Banking Channels

This study examines electronic banking channels which we define as combinations of IS artifacts that provide access to one or more banking service domains. Individual adoption and acceptance of these electronic banking channels, such as mobile, Internet, phone and ATM banking, have been researched extensively and several authors have applied (or extended) theoretical frameworks including diffusion of innovation theory (DOI) (Rogers 2010), theory of reasoned action (TRA) (Fishbein and Ajzen 1975), technology acceptance model (TAM) (Davis 1989), as well as the theory of planned behavior (TPB) (Ajzen 1991). For example, Tan and Thompson (2000) developed a research model investigating the factors impacting the adoption of electronic banking services in Singapore. Their findings confirmed that consumers’ attitudes and perceived behavioral control factors, rather than subjective norms, have a significant impact on consumers’ intentions to use electronic banking services (Tan and Thompson 2000). Several other studies investigated the acceptance of electronic banking services by using modifications of TAM (Cheng et al. 2006; Lai and Li 2005). Suh and Han (2003), for instance, incorporated a trust construct into TAM to explain customer acceptance of electronic banking applications. The findings indicated that in the context of electronic banking, trust has a stronger direct effect on a customer’s attitude than perceived ease of use (Suh and Han 2003).

The underlying theoretical frameworks used in the majority of e-banking adoption studies (e.g., TRA/TAM or TPB) have been often conceptualized as parsimonious research models. Given the parsimony of these underlying theoretical frameworks, much of the existing research on electronic banking channels does not aim to specifically explain how or why consumers choose different technology channels (Venkatesh 2006). In particular, “individual technology-adoption research has not considered service characteristics or channel characteristics beyond what may be specified in models like TAM and UTAUT and can be augmented by a focus on service design and constructs,

such as service characteristics, to determine how and why consumers choose a particular service channel” (Venkatesh 2006, p. 509).

2.2 Product and Service Distribution via Electronic Channels

Service operations literature suggests that the characteristics of products and services need to match (or fit) electronic channels (Beck et al. 2005; Krammer et al. 2011; Pahlke et al. 2011; Pousttchi and Hufenbach 2011; Weiß and Leimeister 2012). Thus, it is essential to account for the unique characteristics of products and services as well as a channel’s propensity to support these characteristics (Black et al. 2002; Froehle 2006; Froehle and Roth 2004, 2007; Sampson and Froehle 2006; Schmenner 1986, 2004). For instance, several studies confirm that product complexity influences the perceived suitability of a given product for a particular electronic channel (Sampson and Froehle 2006; Schmenner 1986, 2004). Highly complex products (or services) are seen as more appropriate to be distributed via traditional brick-and-mortar stores because customers appreciate the interactive face-to-face communication with sales personnel in these settings (Aksin et al. 2007).

A number of studies have examined the distinctive characteristics of various banking services, and how these characteristics impact the suitability of a particular electronic banking channel. For example, Sayar and Wolfe (2007) defined domestic transfers, standing orders, and account inquiries as simple and standardized banking services. By contrast, credit products (e.g., mortgages, personal loans, and credit cards) as well as investment products (e.g., buying property, stock securities, and bonds) were characterized as complex transactions (Sayar and Wolfe 2007). Other authors examined the ways in which the perceived importance of financial products influences consumers’ propensity to purchase financial products online (Barczak et al. 1997; Black et al. 2002; Lee 2002; Morrison and Roberts 1998).

Although these studies have considered the unique characteristics of banking services, we were unable to identify studies that incorporated unique channel and product characteristics into theoretical models in order to predict outcomes such as electronic banking channel adoption. This research aims to help address this gap by adapting fit theory to the context of electronic banking channels and banking services to conceptualize a SCF construct.

2.3 Task-Technology Fit and Fit Measurement

The theoretical grounding for this study comes from prior research on task-technology fit (TTF) (Goodhue and

Thompson 1995). TTF is defined as the extent to which the capabilities of a particular technology match, or fit, the needs of a particular task (Dishaw and Strong 1999). TTF theory argues that individuals using information systems exhibiting high TTF will perform better than users carrying out similar tasks using technologies with a low TTF. Since its introduction, the TTF model has been applied in a diverse range of IS contexts, such as group support systems or software development tools (Dishaw and Strong 1999; Goodhue 1998; Staples and Seddon 2004; Zigurs et al. 1999). However, most researchers have studied the TTF of specific technologies in mandatory and organizational use settings. In this study, we intend to adapt TTF theory to examine the use of delivery *channels* as opposed to individual technologies. Our context is the voluntary use of electronic banking channels at the individual level.

It is important to note that researchers have applied various approaches to measure fit constructs in various research contexts. In a seminal article on fit measurement, Venkatraman (1989) outlined six different approaches for assessing fit between two or more variables including fit as moderation, fit as mediation, fit as matching, fit as gestalts, fit as profile deviation, and fit as covariation. Although not specifically discussed by Venkatraman (1989), researchers also commonly use response scales (ranging from negative to positive numbers) that ask respondents to mentally calculate fit components themselves. Reviewing the literature on task-technology fit theory, it becomes apparent that researchers have primarily used fit as moderation (Dishaw and Strong 1999; Goodhue 1995) and fit as covariation (D’Ambra and Wilson 2004; Goodhue and Thompson 1995; Staples and Seddon 2004), or directly assessed fit via multiple reflective items (Ferratt and Vlahos 1998; Klopington and McKinney 2004). Interestingly, none of the identified studies on TTF used a parallel instrument to determine fit despite the fact that this is a well-accepted procedure in strategic alignment literature (Chan et al. 1997; Parker and Van Witteloostuijn 2010; Prescott 1986). Parallel instruments help researchers to collect data for two given variables separately. Then, having obtained individuals’ responses for both concepts, researchers can compute a fit score based on the values individuals provided for the items. For example, Chan et al. (1997) studied the effect of information systems (IS) alignment on business performance and IS effectiveness. To measure IS alignment, i.e., the alignment (or fit) between business strategic orientation and IS strategic orientation, respondents were surveyed using a parallel instrument, i.e., respondent were asked to rate different dimensions of business strategic orientation and the IS support for these dimensions (1997). For instance, one item to assess business strategic orientation was “*We are almost always searching for new business opportunities.*” The parallel item for IS strategic

Table 1 Participants interviewed for the relevance check

Bank	Participant	Participants' job description	
A	1	Product manager developing and outsourcing electronic banking channels	
	B	2	A member of the management board who acts as the CIO of Bank B
		3	Managing director overseeing the IT infrastructure for private clients
		4	Director of IT architecture for the private business division
		5	Senior product manager in the e-services division for corporate clients
C	6	Board member and CEO of Bank C	
	7	Board member of Bank C who is responsible for customer services	
	8	Divisional head for customer services of Bank C	
	9	Product manager for Bank C focusing on mobile banking applications	

orientation was “*The systems used in the business unit assist in the identification of new business opportunities*” (Chan et al. 1997, p. 131). To calculate IS alignment, i.e., the fit between business strategic orientation and IS support, Chan et al. (1997) suggest that a matching approach or a moderating approach can be applied. A matching approach uses the absolute value of the difference between parallel items, e.g., the difference between items measuring business strategic orientation and IS support for a particular strategic orientation. The intuitive interpretation of a matching approach is that a higher difference between the scores indicates misalignment. By contrast, a moderation approach uses the product of the parallel items to assess fit. The intuitive interpretation of a moderation approach is a synergistic relationship between the two components of fit, e.g., business strategic orientation and IS support for a particular strategy are complementary in that the existence of one increases the positive effect on outcomes of the other (see Venkatraman 1989). Chan et al. (1997) compared both approaches and found a moderation approach to be more adequate. That is, the authors used the product of parallel items as an indicator for IS alignment. All product scores were averaged to obtain an overall score for IS alignment. Given that parallel survey instruments help researchers to obtain a rich and detailed view on why individuals perceive fit between two independent variables (Jiang et al. 2002; Tesch et al. 2003), we rely on a parallel survey instrument to measure SCF in this study and follow the approach described by Chan et al. (1997).

3 Study 1: Relevance Check Conducted with German Banks

To the best of our knowledge, no study has rigorously investigated the fit between banking services and electronic banking channels. Because we were interested in understanding the relevance of this construct for practitioners,

we first conducted an exploratory study investigating practitioners' perceptions toward the proposed SCF concept (Rosemann and Vessey 2008). Overall, nine high level managers from three German banks were interviewed with regard to the relevance of the SCF concept for their bank operations and planning. Table 1 describes the participants of our relevance check.

Bank A and B are traditional banks and Bank C solely focuses on “non-face-to-face” channels such as mail, facsimile, email as well as its ATM, telephone, Internet, and mobile banking applications. During the interviews, the SCF model was introduced and then discussed with each manager. Most discussions lasted between 50 and 60 min and were recorded and transcribed afterwards.

Overall, the discussions indicated that the participants perceived the SCF idea as a valuable concept for banks. They agreed that banks do not have well-established instruments to judge which banking services fit each banking channel best. For instance, participant six argued: “For us as a direct bank, a [measure of] SCF for electronic banking services would be very interesting. Currently we are re-considering the product mix for our banking channels. Having a SCF tool would be very helpful here.” The interviews also revealed that currently all three banks still use “trial and error” when introducing electronic banking applications. For example, participant 7 stated: “Our team spent EUR 300,000 for designing a mobile banking application. Only 27 customers registered for this service, and five of those never used the service. In addition, out of the 22 users, 14 were banking staff. As a result, we terminated the service.” This participant added that a SCF instrument could potentially prevent such misinvestments. In summary, all managers confirmed that an SCF instrument would be beneficial for banks. It was also interesting to note that all of the interviewees welcomed the inclusion of a relevance check in this study, and they indicated that they appreciated being involved in academic research.

4 Study 2: Conceptualization of the Service-Channel Fit Construct

Drawing from TTF research, SCF is defined as the user's perception of the correspondence between a banking service and the suitability of a particular electronic banking channel to support a given banking service. Banking services include the various kinds of financial and non-financial transactions a consumer may wish to conduct with his or her bank. These financial and non-financial transactions can be assumed to have different characteristics that may or may not be supported by certain electronic banking channels. Given the paucity of research on the fit between banking services and electronic banking channels, our first goal was to identify the characteristics of banking services that are supported by electronic banking channels in varying ways. In other words, we sought to understand the "service characteristics or channel characteristics [...] to determine how and why consumers choose a particular service channel" (Venkatesh 2006, p. 509). More specifically, our goal was to conceptualize SCF as a formative second-order construct that is formed by the fit between electronic banking channels and various service characteristics. We conducted a qualitative study to identify the first-order constructs that form SCF in the context of electronic banking.

4.1 Participants and Setting

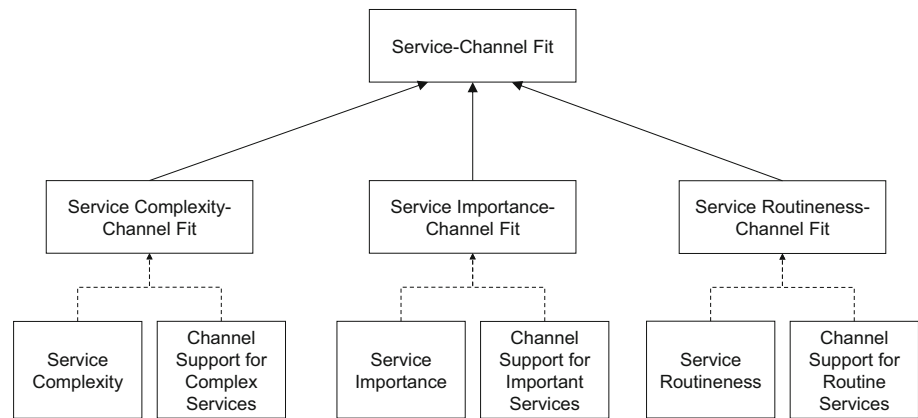
We were interested in collecting and analyzing rich data in order to inform the SCF conceptualization and the development of a survey instrument. Therefore, five exploratory focus groups consisting of consumers in New Zealand (each including five to seven electronic banking users) were carried out. Purposive sampling methods were employed in selecting participants for this study (Calder 1977). In particular, the focus groups were selected so as to achieve a wide variety of individual characteristics across the different user groups. We contacted research participants via email, telephone, or face-to-face conversations. A prerequisite for participation within the focus groups was that each participant had used at least one electronic banking channel (ATMs, telephone, Internet, or mobile banking) for their banking needs and that they were familiar with the most common functionalities of that specific self-service technology. Also, all participants were involved in the purchasing of financial products in their own household. The participants ranged between 24 and 61 years of age, and included 11 men and 15 women. Educational levels ranged from high school education to PhDs (see Table A1 in Appendix A for more details). Data

collection was carried out through semi-structured focus group discussions featuring open-ended questions. The questions asked the research participants to describe:

- The banking activities they perform on each electronic banking channel.
- The perceived characteristics of banking services and how banking services differ from each other.
- The perceived suitability of each electronic banking channel for various banking services.

The focus group discussions lasted between 60 and 90 min each and were recorded and transcribed afterwards. To analyze the data, we applied a two-staged coding procedure borrowed from grounded theory studies (Strauss and Corbin 1998). The first stage involved open coding. Open coding is the process of breaking down, examining, comparing, conceptualizing, and categorizing data (Strauss and Corbin 1998). Afterwards, using axial coding, the transcripts were investigated for similarities or differences and then grouped into clusters of conceptual units. The major goal of axial coding is to reassemble data that was disassembled during the open coding process. Following this coding procedure, initially the first author who also conducted the focus groups coded all transcripts. Then, the second author reviewed a subset of the transcripts and associated coding patterns, resulting in an inter-coder reliability of 82 %. In case of disagreement between the two coders, an independent IS scholar who was unfamiliar with the study was asked to facilitate a discussion in order to reach a coding consensus. The discussion showed that in almost all cases the reasons for disagreement were misunderstandings of the participants' statements. The generated axial codes were then used as a base for construct development. It is important to note that our goal in study 1 was not to conclusively assess the SCF among particular services and electronic banking channels, but to identify the salient dimensions of the SCF construct, i.e., characteristics of banking services that are supported by different banking services to varying extents. Specifically, we used the axial codes and compared them with extant literature on service operations management in order to identify dimensions of SCF as perceived by electronic banking users. Three such SCF dimensions emerged from the focus group discussions: 1. service complexity-channel fit, 2. service importance-channel fit, and 3. service routineness-channel fit. Figure 1 shows the conceptualization of SCF as a formative second-order construct. The outcome of our analysis is discussed below, along with related insights from extant literature and definitions of the three identified dimensions of SCF.

Fig. 1 Conceptualization of service-channel fit as a formative second-order construct



4.2 Service Complexity-Channel Fit

The focus group discussions demonstrated that the complexity of banking products and services together with consumers' perceptions of how well electronic banking channels support complex services is an important dimension of SCF. For example, the discussions indicated that complex banking services would be difficult to perform on telephone banking applications as these technologies would not visualize account information effectively. For instance, one participant argued: "Telephone banking is much less developed than Internet banking. I'd say it is much more archaic and I used telephone banking back in the days when I was a student and pretty much used it to check if I had money. I only had one account and never used it to transfer money between accounts. So the only time I used telephone banking was to check if I could go out that night or not. I could never do on telephone banking what I do on the Internet banking—telephone banking is just not suited for more complicated banking services." Similarly, another participant was discussing the suitability of ATMs for more or less complex transactions: "ATM is obviously good for getting cash out when it's in the right place. Nowadays ATM machines give me also the opportunity to deposit money and I have used that in certain parts. I think simple transactions work best on ATMs. For example, I would not like to spend much time on typing in information into an ATM machine."

It is well documented that service complexity is an influential factor in consumers' use of electronically mediated service channels. Prior studies have often drawn on media richness theory to study the suitability of different media for tasks with varying complexity. For example, building on media richness theory, Dennis and Kinney (1998) investigated communication patterns within teams. Task complexity was found to influence the task-media fit of specific communication media within

organizations. Highly complex and difficult tasks required richer media to support effective communication whereas simplistic tasks could also be performed on less rich media such as email. Prior literature also studied the impact of task complexity on individuals' intentions to use a given information system (see Kamis et al. 2008 for a discussion). For example, Nadkarni and Gupta (2007) developed and tested a research model of perceived website complexity. The results show that perceived complexity negatively influences individuals' willingness to use websites (Nadkarni and Gupta 2007). Studies focusing on electronic banking adoption (Mäenpää et al. 2008; Sayar and Wolfe 2007) and service operations have discovered similar findings and indicated that complexity negatively influences the perceived suitability of electronically mediated channels (Barczak et al. 1997; Black et al. 2002; Lee 2002; Morrison and Roberts 1998). We also found several studies that established the relationship between complexity, communication processes, and technology fit (Shirani et al. 1999; Te'eni 2001; Zigurs et al. 1999). These studies found that the more complex tasks are, the more challenging it is to establish fit between the task and the technology, e.g., decision support systems (Zigurs et al. 1999). For these reasons, we identified service complexity-channel fit as one dimension of the SCF construct. Following Wood (1986), we define service complexity as *the perceived difficulty individuals experience while performing a given banking service*. We define service complexity-channel fit as *the extent to which service complexity fits with the support of a given electronic banking channel for complex services*.

4.3 Service Importance-Channel Fit

Many focus group participants suggested that they view certain types of banking transactions as being more important than others and that electronic banking channels

support important and less important services to varying extents. For instance, some participants argued that they perceive high value transactions (e.g., worth several hundred dollars) as more important than others: “When I expect a large payment I check my online account several times a day. I often trade goods on Ebay and sometimes I sell pretty expensive stuff... so to make sure that I don’t send off the goods before I got the money, I check my account several times a day. If it is there and I can just fire the goods off once the funds are cleared. On the other hand, if I sell less expensive goods I am usually less concerned about the financial transaction. Internet banking is particularly good for these kind of transactions because I can check my account instantly while working on other things.” Others mentioned that certain banking services would be very important to them as they would significantly impact on their personal life. Several respondents explained this by using financial loans or mortgages to illustrate why they view these services as salient: “I use mostly Internet for my personal banking. Even for very important things like insurance products and superannuation products. I put quite a lot of money into these products as they are necessary to have. Internet is a good medium for those products as you can sit at home and read about them before buying them.”

Our literature review also suggested that perceived service importance is an influential aspect of how well users believe that an electronic banking channel supports a given banking service (Sayar and Wolfe 2007). For example, Katuri and Lam (2003, 2007) characterized transactions according to their degree of importance of transaction amount, degree of importance of transaction type, and degree of importance of transaction cost (Katuri and Lam 2003, 2007). The authors argued that consumers select or reject Internet banking applications depending on the perceived importance of the transaction (Katuri and Lam 2007). Also, transactions such as mortgages or financial loans impact significantly and over a longer time-span on a consumer’s personal life, hence are perceived as being of high importance, whereas account inquiries are often seen as low-importance services (Sayar and Wolfe 2007). Service operations literature also found that consumers view certain transactions as being more salient than others – which influences organizational channel management (Campbell and Frei 2010; Reinsch and Beswick 1990). For these reasons, we identified service importance as one dimension of the SCF construct. Following Reinsch and Beswick (1990), we define service importance as *the level of perceived salience of specific banking transactions*. We define service importance-channel fit as *the extent to which service importance fits with the support of a given electronic banking channel for important services*.

4.4 Service Routineness-Channel Fit

The focus groups suggested that consumers develop a routineness if they perform specific banking services on a regular basis. After they have repeated a banking service several times via an electronic banking channel, they would perform these services rather automatically because of learning effects. The notion of service routineness was a recurring concept within the focus group discussions. One participant argued: “*I think regularity, routine, and how often you have to perform each banking service is very important when using electronic banking channels. Once you have learned how to use them and if you do them routinely ... the process becomes habitual. For example, I know exactly which buttons to press when using ATMs or telephone banking. That’s because I use them quite often. The procedure stays the same and I know exactly what to do.*” Another participant agreed and contributed: “*I agree. I recall the steps I have to do all the time when I access Internet banking for my banking transactions ... you know where the links are and you remember which information is needed in order to transfer money. It’s kind of a routine for me.*”

Service routineness is a characteristic that has been frequently used in IS and service operations literature to study consumer perceptions of electronic channels (Venkatesh 2006). Many authors have argued that the level of routineness with which individuals perform services influences their perceptions of the services (Goodhue 1995, 1997, 1998; Goodhue and Thompson 1995; Karimi et al. 2004; Saeed and Abdinnour 2011; Suh 1999; Venkatesh et al. 2011; Wang et al. 2006; Zigurs et al. 1999, p. 226). Research on task-medium fit and task-technology fit has established that task routineness impacts the fit between a given medium (or technology) and the tasks performed by individuals. For example, Goodhue and Thompson (1995) argued that task routineness positively influences the perceived task-technology fit of information systems. The authors suggested that “the strongest effect of task characteristics on TTF was from non-routine tasks.” They found that individuals engaged in more non-routine tasks “rated their information systems lower on data quality, data compatibility, data locatability, training/ease of use, and difficulty of getting authorization to access data ” (Goodhue and Thompson 1995, p. 226). As part of a study conducted to research the effect of media richness of technologies in organizations, Suh (1999) suggested that routine activities are more appropriate for lean communication channels. Once the task became routine for the user, individuals would not require as rich a medium, because they would feel familiar with the task. In contrast, non-routine activities would require richer communication media (Suh 1999). For these reasons, we identified service

routineness-channel fit as a dimension of the SCF construct. Following Goodhue and Thomson (1995) we define service routineness as *a regular procedure usually followed by banking customers to perform a given banking transaction*. We define service routineness-channel fit as *the extent to which the routineness of a service fits with the support of a given electronic banking channel for routine services*.

5 Study 3: Quantitative Assessment of the Service-Channel Fit Construct

5.1 Scale Development

Following literature on scale development procedures (DeVellis 2011; Hoehle and Venkatesh 2015; Lewis et al. 2005), we created a survey instrument in four stages. We first screened existing literature for items that had been validated by prior research. As we were unable to find any measurement instrument we could draw on to measure the SCF dimensions, we developed new items for the SCF dimensions based on their construct definitions.

The second stage of the instrument development included two judgment rounds involving experts relevant to the study's context. The main goal of these judgment rounds was to assess the content validity of the scales as well as the wording of the items. The eight judges included two marketing professors, two senior IS researcher, two bank staff, a finance professor, as well as a currency trader. The judgment rounds were organized as face-to-face interviews lasting between 60 and 90 min each. Each judge was asked to evaluate the content validity of the SCF dimensions as well as to re-examine the items collected for this study. Subsequent to the interviews, the scales were refined in light of the experts' recommendations.

The third stage of scale development involved two pretests of the survey questionnaire instrument. The first pretest included five university staff (two administrative staff, one academic staff, and two PhD students) who were asked to complete the survey questionnaire in paper-based form. Subsequently, the respondents were interviewed and asked whether they found items unclear or ambiguous or if they felt confused by some sections of the questionnaire. In addition, the instructions, structure, and length of the questionnaire were discussed. The obtained feedback was then used to adjust the survey questionnaire instrument. The second pretest included 15 university staff/PhD students researching IS. These participants were asked to test the online version of the survey instrument and to provide additional feedback concerning the structure of the survey and wording of the items.

The fourth stage included a large-scale pilot study of the developed survey questionnaire instrument to initially assess the quality of the conceptual research model. For the pilot study, 280 usable responses (140 for financial loans and 140 for account inquiries) were collected from university staff and students using electronic banking to manage account inquiries and financial loan applications. Following these validation procedures, the scales were refined in light of the pilot study and then used during the main study.

5.2 Data Collection

For our main study, we collected data from consumers using electronic banking channels in New Zealand. In an ideal situation, the SCF construct would be tested by gathering data from respondents for all electronic banking channels, and for a variety of banking services. However, this research design appeared unfeasible for two reasons. First, combining items for a number of banking services (e.g., account inquiries, domestic transactions, international payments, or applying for credit cards and/or mortgages) with several electronic banking channels (e.g., ATMs, phone, Internet, and mobile banking) would increase the length of the questionnaire immensely. Second, due to varying adoption rates, it seemed unlikely that respondents would be able to reply to questions related to all electronic banking channels. For this study, then, we focused on a single banking channel and on two different banking services. Internet banking was selected as the banking channel. First, most consumers in New Zealand have experience with Internet banking applications and should have well-formed beliefs about most common functionalities of these services. Second, all New Zealand banks offer a wide range of financial products through Internet banking including simple, medium, and complex banking products.

In order to create a meaningful comparison, account inquiries (checking account balance, viewing transaction history, initiating account statements etc.) and financial loans applications (applying for bank overdrafts, home loans, personal loans, mortgages etc.) were selected to assess the validity of the SCF construct. We operationalized the data collection by using two different versions of the questionnaire instrument (one for account inquiries and another for financial loan applications). The two versions differed slightly from each other to reflect the nature of the corresponding banking service. We conducted a nationwide online survey with the assistance of a market research firm. In total, we collected 340 responses (170 responses for each banking service) from New Zealanders using electronic banking channels for banking services.

A potential threat to the validity of survey data is common method variance (CMV). We followed the

procedure outlined by Liang et al. (2007) to check for this threat. The results suggested that the factor loadings of the unexplained variance variable were very low, indicating that CMV was not present among the data obtained (Liang et al. 2007; Podsakoff et al. 2003).

5.3 Service-Channel Fit Calculation

A key purpose of this research was the assessment and calculation of the fit between a given banking service and Internet banking. Following IS alignment literature (see discussion above), a parallel instrument was created to determine SCF across the identified dimensions. Following our qualitative insights from study 2, our objective was to develop a measure of SCF by calculating a fit score from individuals' perceptions of the characteristics of a banking service regarding its complexity, importance, and routineness, and the suitability of a banking channel to address these characteristics. We felt that this would comprise a richer and more robust approach to assessing SCF than by attempting to assess it via a set of reflective indicators (Chan et al. 1997; Venkatraman 1989). For each individual service characteristic item, a parallel channel suitability item was created, so as to allow us to determine the extent of the fit (or lack thereof) the respondent would perceive between the banking service and the channel for that specific SCF dimension. For instance, the item COMP1 (see Table B1 in Appendix B) asks individuals whether they view financial loan applications as complicated. CCOMP1 (see Table B1 in Appendix B) then inquires whether the individual views Internet banking as well-suited for complicated banking transactions. The responses to these two items can be compared to determine an indicator of the fit of the particular channel with that aspect, or dimension, of the particular service. Table B1 in Appendix B shows the scales used to measure the three dimensions of SCF, i.e., service complexity-channel fit, service importance-channel fit, and service routineness-channel fit. All items were used in combination with seven point Likert scales.

We applied the moderation approach to compute the SCF scores (see also Chan et al. 1997). Multiplying the values obtained for service characteristics with the values obtained for channel support reflects the joint effect of both 'sides' of a SCF dimension. A high fit between a service characteristic and an electronic banking channel would be represented by a high product outcome whereas a low product outcome would imply a low fit. Following this approach, product scores at the item level were computed (see Table B2 in Appendix B for an example). Next, we averaged the moderation scores for

each SCF dimension and used the mean scores as formative indicators for the SCF construct (following Chan et al. 1997).

5.4 Data Analysis

Partial Least Squares (PLS) was used to analyze the data. PLS simultaneously analyzes how well the measures relate to each construct and whether the hypotheses at the theoretical level can be confirmed. PLS allows to conveniently specify second-order factors, following a logic that is comparable to formative indicators (Chin and Gopal 1995). This form of modeling was applied for the SCF construct, which is formed by three first-order constructs. We selected SmartPLS 2.0 as the software package to perform the data analysis (Ringle et al. 2005). We ran the data analysis three times – with the data set from the questionnaire on financial loans, the data set from the questionnaire on account inquiries, and the aggregated data set.

5.5 Results

5.5.1 Validity of the Service-Channel Fit Construct

When assessing formative measures one should evaluate the weights of the items, because they 'form' the latent variable. The results confirmed that all the weights associated with the SCF construct were statistically significant at least at the $p < .01$ level (see Table 2). In other words, service complexity-channel fit, service importance-channel fit, and service routineness-channel fit significantly contributed to the SCF construct for both split samples and the complete data set. Unlike reflective indicators, where multicollinearity between construct items is desirable (illustrated by high Cronbach's alpha or internal consistency scores), excessive multicollinearity in formative constructs is undesirable (Petter et al. 2007). To ensure that multicollinearity is not present, the variance inflation factor (VIF) statistic can be used to determine whether the formative items are too highly correlated (Petter et al. 2007). We checked the VIF statistics for all formative measures using SPSS. All VIF values ranged between 1.1 and 2.7, well below the accepted threshold of 3.3, indicating that multicollinearity was not present among the formative measures.

5.5.2 Nomological Validity

To examine the nomological validity of the SCF construct, we hypothesize that the SCF construct has a positive effect on consumers' intention to use a particular channel for a

Table 2 Weights for service-channel fit construct

Second-order construct	First-order constructs	Account inquiries	Financial loans	Complete data set
Service-channel fit	Service complexity-channel fit	.37***	.28**	.47***
	Service importance-channel fit	.38**	.58***	.25***
	Service routineness-channel fit	.55***	.58**	.57***

* Significant at $p < .05$, ** significant at $p < .01$ and *** significant at $p < .001$

Table 3 Effect of service-channel fit on intention to use

	Account inquiries	Financial loans	Complete data set
Coefficient	.68***	.45***	.67***
R^2	.45	.21	.44

* Significant at $p < .05$, ** significant at $p < .01$ and *** significant at $p < .001$

specific banking service. Previous literature on task-technology fit has confirmed similar causal relationships between TTF constructs and intention to use as a performance outcome in various technology use contexts (e.g., group communication technologies, email, personal computers) (Goodhue and Thompson 1995; Karimi et al. 2004; Suh 1999; Zigurs et al. 1999). Thus, we hypothesize:

H1 Service-channel fit will be positively associated with intention to use a particular channel for a specific service.

Scales were identified that had previously measured the outcome variable, i.e., intention to use a particular channel (Venkatesh et al. 2003). These scales were adapted to the context of this study (see Table B3 in Appendix B). We initially assessed the psychometric properties of the reflective construct, i.e., intention to use a channel. The items exhibited reliability as evidenced by Cronbach alpha values and composite reliability values of .90 or greater (see Table B3 in Appendix B). We proceeded to examine convergent and discriminant validity using confirmatory factor analysis. Specifically, we assessed the item loadings as well as the average variance extracted (AVE) (Chin 1998). All item loadings exceeded .80 and the results showed that all AVEs were well above the threshold value of .50 (Fornell and Larcker 1981) (see Table B3 in Appendix B).

Our findings regarding the effect of SCF on intention to use are shown in Table 3. There was a highly significant link between the SCF construct and consumers' intentions to use Internet banking as a channel for specific banking services ($p < .001$) for both split samples and the complete data set. Table 3 also shows the variance explained in the outcome variable. Our conceptualization of the SCF construct explained 44 % of variance in the intention to use

construct (if evaluating the results obtained from the complete data set). Taken together, our results suggest nomological validity of the SCF construct.

6 Discussion

This research developed and validated a measure of SCF in the context of electronic banking. Using a mixed methods research design (Venkatesh et al. 2013), we investigated industry experts' perceptions toward the concept of SCF of electronic banking channels. The findings demonstrated that the concept was perceived as being highly relevant by high-level bank managers. Next, five exploratory focus groups were conducted in order to conceptualize the SCF construct. Following this, a survey questionnaire instrument was developed using judgment rounds and two pretest evaluations. Central to the scale development was the measurement of the SCF construct. Drawing on IS strategy and alignment literatures, a parallel instrument was created in order to determine SCF across three unique dimensions. To validate the scales, 340 responses were collected from consumers using Internet banking for account inquiries or financial loans. The results showed that the SCF construct was a strong predictor of an individual's intention to use Internet banking for both banking services.

6.1 Theoretical Contributions

In the past, many electronic banking adoption studies have applied acceptance theories such as TAM, TPB and/or UTAUT to explain why consumers adopt electronic banking channels. Due to their parsimony, these theories neither account for the unique characteristics of banking services nor do they aim to explain how well electronic banking channels support the specific characteristics of banking services. Our research addresses this gap and provides a conceptualization of SCF in the context of electronic banking. Based on our qualitative study and on prior literature, we conceptualized the SCF construct across three unique dimensions which we measured through a parallel survey instrument. We empirically validated the

proposed SCF conceptualization through a large-scale survey study. Our rich view on SCF should inform future theory development in IS and service operations.

By exploring the nomological network of the SCF construct, we found empirical evidence that consumers' intentions to using particular electronic banking channels are significantly influenced by SCF. Our conceptualization of SCF explained 44 % of variance in the outcome variable. Intention to use was frequently applied by prior research and senior scholars have recently called for research that goes beyond the replication of traditional studies such as TAM, DOI, or TRA (Benbasat and Barki 2007; Goodhue 2007; Straub and Burton-Jones 2007). Benbasat and Barki (2007, p. 215) argued that a “good conceptual starting point for such an endeavor may be an augmented task-technology fit model (Goodhue 1995) that would provide finer and more focused design advice in specific task contexts.” Our study follows Benbasat and Barki's recommendation and our findings can be used by future research exploring this area further.

This study also contributes to literature on instrument development, specifically the use of a parallel instrument approach to formatively measure the perceived SCF of electronic banking channels. The approach illustrated here has several advantages over the fit measurements traditionally employed by TTF researchers. For instance, parallel instruments are an improvement over direct fit measurement since respondents are not asked to mentally ‘calculate’ a fit between a given technology (e.g., Internet banking) and services (e.g., account inquiries and mortgages) they consume. Instead, individuals are required to answer questions regarding a given variable A (service characteristics) and a given variable B (channel suitability). While the focus of this paper is on the SCF of electronic banking channels, future research could investigate other service and technology combinations (e.g., work-related services and ERP systems) using parallel instruments. Moreover, the parallel instrument for measuring SCF suggested in this study could be valuable for future research investigating the emerging topic of omnichannel retailing (Brynjolfsson et al. 2013). When simultaneously using multiple channels, consumers may be unable to mentally calculate varying levels of fit for different channels. In such a context, the novel SCF construct developed in this study may be of particular value for researchers.

An important feature of our study was the inclusion of a relevance check with practitioners before empirically testing our research model. Rosemann and Vessey (2008) suggested that researchers should engage in a dialogue with industry practitioners before collecting empirical data. This would indicate if the research is truly valuable for practitioners. We applied their recommendations and organized several interviews with high level managers from three

German banks. All managers were involved in the service and product distribution via electronic banking channels. Overall, we made very positive experiences during the interviews and the practitioners welcomed interaction with academic research. We believe that this positive feedback adds to the credibility of our study and the SCF scales we developed and tested.

6.2 Practical Implications

Our findings also have important implications for practitioners. The findings suggest that service complexity-channel fit is one important dimension of the SCF of electronic banking channels. Banks could pursue different strategies to act in response to these findings. First, they could offer only simple to medium-complex banking products on electronic banking channels and deliver the more sophisticated banking products only via face-to-face branch banking. That way, consumers could manage simple to medium-complex transactions via self-service technologies and visit the branch only if they were interested in more sophisticated transactions. Because consumers indicated that simple transactions are well suited for Internet banking, banks could also consider discouraging consumers from performing these transactions in physical branches (e.g., by charging a small extra fee for conducting such simple transactions in a branch). Consequently, customers would have an incentive to perform these transactions electronically. This would positively impact on the cost structure of banks due to less staff involvement and reduced overhead costs.

Our findings also suggest that perceived service importance-channel fit is an important dimension of the SCF in the context of electronic banking. Banks can use these findings and integrate them in their strategies for high-importance services and those banking transactions that have a long lasting impact on consumers' finances including superannuation products, financial loans, insurance products etc. For instance, the focus group discussions and literature on electronic banking illustrated that consumers appreciate personal assistance for banking transactions that they view as highly important (Reinsch and Beswick 1990). Thus, alternative technologies/applications could be used to guide customers when performing high-importance transactions via self-service technologies. If consumers visit a banking website where they can purchase superannuation products, banks could offer chat rooms or perhaps call center support via Skype or cost-free phone numbers in order to support customers during the product selection process. These mechanisms could positively influence consumers' perceptions of the SCF of Internet banking for high-importance banking services.

Our study suggested that consumers view service routineness-channel fit as highly important for the perceived SCF of electronic banking. Banks possess historic data on the customer-to-bank relationship. Therefore, banks know which kind of products customers have purchased in the past. Using data mining tools, banks could provide personalized support for those services a customer performs routinely/non-routinely. For instance, if customers frequently use Internet banking for account inquiries it is likely that they have developed a routine for those transactions. Thus, inclusion of a chat function, as described earlier, for customers who frequently use these transactions would be an inappropriate use of the bank's resources. On the other hand, if consumers have developed no routine with a banking service at all (e.g., loan applications/international transactions) a chat function could be well-suited since it could increase the customer's perception of the service routineness-channel fit.

6.3 Limitations and Future Research

The quantitative phase of our work has focused solely on Internet banking; neither alternative electronic banking channels (e.g., mobile banking) nor traditional banking channels (e.g., branch banking) were considered. Future studies should examine service-channel fit in the context of other electronic banking channels (e.g., ATMs, phone and mobile banking) in combination with alternative banking services (e.g., electronic check depositing). We would like to note that many participants in our focus groups recurrently considered the suitability of certain banking services for physical banking branches and elaborated on how well these banking services fit with various electronic channels, such as Internet banking. Therefore, despite the limitations of our quantitative study, we believe that the SCF can be used as a springboard for theoretically motivated studies in omnichannel environments consisting of physical banking channels and electronic banking channels.

Our study can be also leveraged for design science studies in the context of consumer adoption and use of emerging banking channels, such as mobile banking applications designed for emerging technologies. For example, it would be interesting to study how consumers differentiate SCF regarding banking applications on different mobile device formats including iPhones, iPads, and Apple Watch (or alternative brands). Such research could leverage our SCF conceptualization and explore if mobile device formats influence consumers' perceptions of SCF.

Lastly, banking services are constantly evolving and banks modify their channel strategies accordingly. For instance, recent mobile banking applications allow consumers to swipe credit cards in consumer-to-consumer

transactions (see <http://www.square.com> as an example) and today consumers can deposit checks via mobile banking applications. We expect that consumers' perceptions regarding SCF will adjust based on these dynamic changes in the financial services industry.

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