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## Technology Readiness in a B2B Online Retail Context: an Examination of Antecedents and Outcomes

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## **Abstract**

This paper develops and empirically tests a model that examines the role of Technology Readiness (TR) in the Business-to-Business (B2B) context. It examines how the antecedents of TR affect the construct, and how the construct affects evaluations of a complex credence based B2B service. The research investigates how the retailers' TR impacts their evaluation of web solution service providers (WSSPs). It responds to previous research calls by extending the TR construct from the business-to-consumer (B2C) perspective that is traditional in the extant literature into the B2B domain. The key findings of a survey conducted with 133 firms in the retail industry are that TR is an important contributor to the eventual achievement of service quality and satisfaction. The key contributions of this study are; first it develops and validates a measure of TR in a B2B context; second it investigates the antecedents of TR in this domain, demonstrating the impact of past inexperience, industry trust and switching costs on firms' level of technology readiness to adopt online operations; and third, it finds that service quality and satisfaction are outcomes of TR. The key management implication for WSSPs is the need to address the TR levels of existing and potential clients if they wish to deliver successful e-business solutions to them, and that their clients' TR can be better managed by making the offerings more easily understood, building relational rapport, reducing risk perceptions and adopting a client centric perspective throughout the process.

**Key Words:** Technology Readiness, Online Retailing; B2B Satisfaction; B2B Service Quality; Web Service Solution Provider (WSSP)

## **1. Introduction**

Evans & Wurster (1997, p.71) predicted that the Internet would represent the ‘most important wave in the information revolution’. Arguably this prediction has become a reality: the Internet’s commercial influence is highly visible in the retail industry, where online shopping has shifted from a minority to a mainstream activity in less than two decades, and online retailing is predicted to continue to expand rapidly in the future (Experian, 2012; Mulpuru, 2011). As a result, increasing numbers of retailers have responded to these changes in shopping behavior by building web stores and enhancing the online shopping experience they offer, so as to attract and to retain customers in this highly interactive channel (Doherty & Ellis-Chadwick, 2010a). But to succeed in the internet arena, online retailers need access to appropriate resources and capabilities: as these often cannot be sourced internally, they may seek the expertise they need externally, often from third party web solution service providers (WSSPs). Retailers rely on such service providers to make up for their internal skills shortages, and so need to develop strong relationships with them if their online ambitions are to succeed (Ellis-Chadwick, Doherty & Anastasakis 2007). But, in utilizing such external expertise to compensate for capabilities they lack internally, retailers are exposed to potential risks associated with their choice of third party service partners.

Moreover, acquiring this type of external expertise is far from straightforward. As the web industry is still in the early stages of development, there are a complex range of web solution services available, a shortage of skilled web developers and programmers and a general lack of structural assurances, safeguards, guarantees and lines of legal recourse (Chien, Chen & Hsu, 2012, Del Aguila-Obra & Padilla-Melendez, 2006). So, while employing external expertise can deliver positive benefits for small and medium sized retailers by acting as a mechanism that can deliver greater profitability, achieve better competitive positioning online and lower the cost of developing an online presence within constrained budgets (Ray & Ray,

2006; Wagner & Sutter, 2012), there are also potential negative outcomes. For example, retailers can experience a perceived loss of control of their online web operations and/or loss of ownership of their intellectual property when dealing with WSSPs. This can increase their perceived switching costs and potentially create a lack of trust between the retailer and the WSSP (Li, Pienkowski, Moorsel & Smith, 2011). Such uncertainties highlight the importance of the success of the retailer-WSSP relationship, as it is likely to have a significant impact on the former's online performance and longer term success. The service provided by the WSSP can be seen as a credence based service, since it is difficult for the retailer to evaluate due to their own lack of expertise and experience in the on-line arena.

Previous research on technology readiness in the manufacturer-retailer dyad (Richey Daugherty & Roath 2007, Richey & Autry, 2009) has suggested that business interactions and exchanges were easier to coordinate where there was a good technology 'fit' between the two. Technology readiness at the firm level implies that the firm possesses the inclination to embrace and the ability to use relevant new technological assets (Parasuraman 2000; Richey, Tokman & Skinner 2007) - in the specific context of this study, web related technologies. Richey et al. (2008) posit that, from the retailers' perspective, information technology is almost worthless if management is not ready for its implementation. Where retailers and service providers are compatible in terms of technological readiness both parties are likely to enjoy greater payoffs. In essence, if retailers are more 'technology ready' they will be better able to appreciate the potential benefits WSSPs could offer in supporting their retail efforts, and so are likely to be more satisfied with the relationship. In turn, this implies that WSSPs can build and develop retailers' technology readiness by increasing their experience of such services, which will also serve to increase industry level trust for this relatively new credence based service.

This study focuses on the fit between retailers and their external WSSPs by looking at the impact of past inexperience, industry trust and switching costs on technology readiness, and then the effect these antecedents have on small and medium-sized retailers' evaluations of their web developments. This industry sector was chosen as such organizations have often been found to be relatively late adopters of new technology, adopting a "wait and see" attitude to developing online retail channels (Del Aguila-Obra & Padilla-Melendez 2006, Weltevreden & Boschma, 2008). Previous internet retail research has largely focused on the behavior of large firms and on consumers' interactions with virtual shopping environments (Doherty & Ellis-Chadwick, 2010b), rather than exploring issues associated with how businesses get online, and how they develop the technology solutions needed to create and manage retail web sites.

The next section of this paper examines the literature on credence based services and the antecedents and outcomes of technology readiness. This analysis of the existing literature provides a platform for creating a conceptual model on which to base the research hypotheses. A succinct discussion of the study's research methodology follows, after which structural equation modeling is used to test the research hypotheses and the results reported and discussed. Finally, the management implications and limitations of this study are considered, along with suggestions for future research.

## **2. Literature Review**

### **2.1 Credence Based Technology Services and Technology Readiness**

Services whose attributes are predominantly credence-based are the most difficult for buyers to verify and evaluate (Darby & Karni, 1973). Such services lack physical evidence of the service process, so customers (who can be organizations) often do not have clear expectations

of what to expect from them: - and such customer uncertainty will be greater when the services are new. Customers may lack the expertise to identify and describe their own needs accurately (Verhoeven & Pruyn, 2006; Eisingerich & Bell, 2007), and this can be an especially problematic issue when they need to source technology based solution services. Galetzka et al. (2006) suggest that clients who don't fully understand what the dominant characteristics of a service are will use heuristic cues or other information available to them about how to evaluate the service encounter, such as service reliability and human contact, and the importance of this relational component between the parties in the provision of solution services has recently been recognized (Sawhney, 2006; Penntinen & Palmer, 2007; Storbacka, 2011).

Technology Readiness (TR) has attracted considerable attention in the academic literature. The Technology Readiness Index (TRI) (Parasuraman, 2000) emanates from a stream of research which posits an individual's personality as being central to their acceptance of technology (Walczuch, Lemmink & Streukens 2007; Lin & Chang, 2011), and measures their readiness to use new technology in general using four personality traits; optimism, innovativeness, discomfort and insecurity. To date, TR studies have been largely confined to the business to consumer (B2C) domain (Lin & Hsieh, 2006; Jung-Yu & Chorng-Shyong, 2010); few have considered technology readiness in an organizational context (Richey et al., 2007, Richey et al., 2008). This is interesting, given that many consider readiness to adopt web related technologies as a crucial indicator in developing an online presence (Lai & Ong, 2010). Research on the readiness of small organizations to adopt technology is even more limited (Kuan & Chau, 2001; Molla, Heeks & Balcells, 2006), which is again interesting as firm size has been identified as influencing the likelihood of firms adopting web related technologies (Doherty, Ellis-Chadwick & Hart, 2003). That said, it is perhaps the context of



past studies - rather than theory per se - which has limited their scope, as small firms are especially reliant on the behavior of key individual employees.

Services purchased from organizations are provided by qualified professionals whose expertise and skills are key to the quality and success of those services (Gounaris, 2005; Ladhari, 2008) - a factor which is even more significant when such services are customized or specialized, such as web solution services. A potential solution to overcoming deficiencies in purchasing firms' technology readiness is for service providers and their clients to form collaborative business relationships to manage the provision of appropriate solutions in competitive high technology business environments more proficiently (Evanschitzky, Wangenheim & Woisetschlager, 2011; Chien et al., 2012).

## **2.2 Constructs**

TR has previously been investigated within the manufacturer-retailer dyad (Richey et al., 2007; Richey et al., 2008; Richey & Autry, 2009), but these studies conceptualized and validated different outcomes of TR to those on which this study focuses. Only limited extant research investigates the components of TR, so knowledge about TR at the firm level is still lacking. Given the novelty of this research stream and the paucity of empirical research into this context, studies of business adoption of the Internet were investigated to identify potential antecedents to TR (Del Aguila-Obra & Padilla-Melendez, 2006; Doherty et al., 2003; Teo & Pian, 2004; Weltevreden & Boschma, 2008). Antecedents such as depth of knowledge, e-business know-how, and innovation experience (Oliveira & Martins, 2010; Pavlou & Gefen, 2004; Bordonaba-Juste, Lucia-Palacios & Polo-Redondo, 2012) were identified, which encouraged us to use past inexperience as a construct.

Another common dimension that has emerged from previous Internet adoption studies has been the importance of switching costs to organizations. Research suggests the costs of switching providers tends to be higher for services than for goods, and particularly for services that are intrinsically difficult to evaluate, or where there are only a limited number of suppliers (Jones, Reynolds, Mothersbaugh & Beatty, 2007, Garry and Harwood, 2009). The final construct examined in this study - that of industry trust - draws from the institutional view of trust (Pavlou, 2002) which has been adopted by e-commerce researchers: McKnight, Choudhury and Kacmar (2002) describe institution-based trust as a critical part of Internet transactions. Firms new to the online trading environment are likely to rely on such institutional mechanisms to reduce their perceived risk, so industry trust was adopted as the most appropriate trust construct for this research.

### ***2.2.1 Past Inexperience***

Research has identified the importance of recognizing clients' previous inexperience in operating online market channels, as this can challenge service providers' ability to deliver good quality solutions. Studies confirm that retailers with little online experience will be more dependent on their WSSPs and may need to adapt their operations more to take advantage of the latter's expertise (Ray & Ray, 2006). However, lack of experience can also result in retailers having unrealistic expectations of how soon their online operations will start to bear fruit - due to the misperception that web related activities have immediate outcomes – which can influence their levels of satisfaction with the solutions their providers deliver, and their impatience may in turn lead to them wasting money switching providers. Retailers with more on-line experience will have more realistic expectations and be better able to exploit the benefits expert assistance, thus reducing the likelihood of them wanting to switch to alternative providers. So a retailer's readiness will not only impact how well they will use the

actual technology, but also on the success of their relationships with the provider of that technology.

### ***2.2.2 Industry Trust***

The role of industry trust is becoming increasingly important in online contexts (McKnight et al. 2002; Pavlou & Gefen, 2004; Kim, Shin & Lee, 2009). Retailers newly adopting this channel as demand for online shopping increases need assurances from service providers about its viability and reliability. As the emerging web services solution industry is highly fragmented, it is of utmost importance for WSSPs to be able to demonstrate institutional mechanisms associated with institutional trust (Pavlou & Gefen, 2004) - such as online security, legal structures and encryption technologies for the secure transfer of information and ecommerce transactions - when dealing with their clients. Furthermore, a positive corporate reputation has also been considered a key factor for reducing uncertainty and instilling trust (Hansen, Samuelson & Silseth, 2008), as it indicates that the WSSP has met its obligations towards others in the past.

### ***2.2.3 Switching Costs***

Switching costs are those associated with moving from one provider to another (Heide and Weiss, 1995): they fall into three distinct categories - procedural, financial and relational (Burnham, Freis & Mahajan, 2003) - and have been shown to be potentially substantial in electronic markets (Pan, Ratchford & Shanker, 2002). Procedural costs involve the loss of time and effort in finding a new provider; financial costs involve the loss of financially quantifiable resources such as special deals, whereas relational costs are more psychological in nature, and pertain to the emotional costs of breaking bonds between the parties (Burnham et al., 2003; Jones et al., 2007). Research indicates that financial and relational switching

costs tend to have a positive effect on customers' perceptions of the provider, as the customer will have to give up these benefits (special deals or friendships) if they switch. Procedural costs, on the other hand, tend to have a negative effect on customers perceptions, as they will have to endure the time and effort involved in finding a new provider (Jones, Mothersbaugh & Beatty, 2002; Jones et al., 2007). In fast changing technology driven environments, firms have greater incentives to collaborate and build good relationships with relevant service providers, so as to reduce uncertainties and the costs associated with switching (Zeng, Yang, Fam & Li, 2011). The benefits of staying with a provider in an industry such as online retail - which is highly complex and driven by high technology usually outweigh the benefits gained from switching provider (Malhotra and Malhotra, 2013).

#### ***2.2.4 Technology Readiness***

As noted above, the TRI construct has four distinct sub-constructs: optimism, innovativeness, discomfort and insecurity. Optimism relates to a positive view of technology and a belief that it offers managers increased control, flexibility, and efficiency, while innovativeness refers to the tendency to be a technology pioneer and thought leader (Parasuraman, 2000). Literature on technology diffusion agrees that a positive view of its benefits is important at the initial or awareness stage, as it is likely to affect the decision to adopt or reject an innovation (Iacovou, Benbasat & Dexter, 1995). The same effect is evident in the organizational perspective on Internet adoption, where top managers' perceptions of the advantages of web technologies support their belief in their superiority over existing technologies (Kuan & Chau, 2001; Teo & Pian, 2004). Pavlou and Gefen (2004) concur that positive perceptions of web technologies' potential facilitate the growth of trusted relationships with suppliers and service providers in online B2B marketplaces, and that buyers' trust in intermediaries reduces

perceived risk and increased intentions to transact in an online marketplace, thus facilitating commitment towards the supplier.

Discomfort stems from perceptions of lack of control over technology and a feeling of being overwhelmed by it, while insecurity involves distrust of technology and skepticism about its ability to work properly (Parasuraman, 2000). Technical readiness determines how capable a firm is to adopt an innovation (Iacovou et al., 1995; Kuan & Chau, 2001), but the technical complexities inherent in dynamic web technologies demand both technical skills and knowledge about the technology. Where these are lacking, managers may feel increasingly vulnerable to the possibility of being exploited (Mysen, Svensson & Payan, 2011), amplifying their perceptions of risk and therefore reducing their trust in adopting or using the technology (Pavlou, 2002; Pressey & Ashton, 2009).

### ***2.2.5 Service Quality***

The service quality literature offers much in terms of understanding the potential impact of TR, as it is viewed as a determinant of a firms' long term success (Rust & Oliver, 1994). A high level of service quality is positively associated with satisfaction, and loyalty, in both offline (Fullerton, 2005; Rauyruen & Miller, 2007; Williams, Khan, Ashill & Naumann, 2011) and online contexts (Rafiq, Lu & Fulford, 2012), and can give service providers competitive advantage (Chenet, Dagger & O'Sullivan, 2010). Gounaris (2005) suggested that there are four determinants of service quality in a B2B environment: Potential, Hard Process, Soft Process and Output Quality. Potential quality relates to the search attributes customers use to evaluate a provider's ability to provide a good quality service, while hard and soft process determinants refer, respectively, to what is performed during a service process and how it is performed, and output quality to the client's evaluations of the end results. There

have been numerous calls for research to explore extending the service quality concept into the online domain (Gounaris, Dimitriadis & Stathakopoulos, 2010; Rafiq et al., 2012) and specifically into the context of professional credence-type services (Hsieh & Hiang, 2004; Walsh, Hennig-Thurau, Sassenberg & Bornemann, 2010). Research suggests that service organizations share various commonalities in terms of their delivery processes, both within and across industries (Carrillat, Jaramillo & Mulki, 2007). While Durvasula, Lysonski and Mehta (1999) echo this sentiment, they find that service quality measures developed for consumer services should be applied with caution in B2B contexts. Gounaris (2005) concurs, highlighting that industrial markets are quite different from consumer ones as business services are more complex mainly because they are more specialized and technology driven.

### ***2.2.6 Satisfaction***

The literature on satisfaction in B2B contexts draws on its conceptualization in B2C environments, where intensive efforts have been made to clarify and measure the construct (Chumpitaz & Paparoidamas, 2004; Oliver, 1997; Gil-Saura, Frasset-DelToro & Cervera-Taulet, 2009). Considering satisfaction is essential because of its long term effects on relationships and its importance as an indicator of the tangible benefits they can offer (Austen, Herbst & Bertels, 2012). Perceived satisfaction emerges from the evaluation of economic and financial outcomes that emanate from relationships, combined with the attainment of organizational goals (Geyskens et al., 1999).

## **3. Hypotheses**

### **3.1 Antecedents of Technology Readiness**

Research suggests that past experience with operating in an online channel increases a firms' propensity to adopt further web related technologies and services. Their likely inexperience

of technology can be considered a special liability for small firms wishing to grow and exploit innovative opportunities online (Heimonen, 2012): the complex nature of operating in high technology environments creates considerable difficulty for such firms in seeking appropriate suppliers for web technology solutions (Pavlou & Gefen, 2004; Chong, Shafaghi, Wooleston & Lui, 2010, and previous negative experiences with third party web services may further hinder their technology readiness to embrace web solution services. This suggests that:

*H1: There is a negative relationship between past inexperience and technology readiness.*

Research has found that industry trust plays a significant role in the adoption of innovative services such as web related technologies (Pavlou & Gefen, 2004; Kim et al., 2009; Li et al., 2011); this is most likely due to the uncertain nature of the online environment, reinforced by the lack of physical interaction and anonymity involved in the medium (Ratnasingam, 2005). In a relatively new industry where previous experience and familiarity may be limited, structural assurances - such as firm reputation, contractual agreements, escrows, and accreditation - have been found to influence the adoption of innovative technology driven services (McKnight et al., 2002 Ratnasingam, 2005, Kim et al., 2009). It is posited that the presence of industry trust will lead to increased levels of TR as it would bring structural assurances to the e-business market that would remove some of the fear inexperienced retailers might have about going online thus it is argued that:

*H2: There is a positive relationship between industry trust and technology readiness*

The extant literature has modeled switching costs both as an outcome of satisfactory relationships between two parties (Dagger & David, 2012), and as an antecedent to such

satisfaction (Jones et al., 2007). The first argument posits that customers who are satisfied with a relationship are likely to perceive the relational and financial switching costs as greater, whereas the second argument suggests that customers use perceptions of switching costs as an antecedent to their evaluation of satisfaction. This study argues that a retailer's evaluation of switching costs has an impact on its level of technology readiness, which is itself an antecedent of satisfaction, and so models that evaluation as an antecedent. When a retailer's perceptions of potential switching costs are higher, it is more likely to try to make itself readier to adopt a new technology, so as to try to reduce its level of dependency on – and thus of being locked in to - one provider (Barroso & Picón, 2012): but when its perceptions of such costs are lower, it may see less need to increase its level of technology readiness. In a dynamic environment such as web services solutions, where new technological enhancements are likely to become available on a regular basis, perceived switching costs are likely to remain high, as retailers will endeavor to increase their technology readiness to try to stay in step with their WSSPs in adopting newer technologies. This interplay between switching costs and technology readiness is likely to persist in technologically complex environments, so it can be posited that:

*H3: There is a positive relationship between switching costs and technology readiness*

### **3.2 Outcomes of Technology Readiness**

Service quality is an evaluative judgment of, in this case, the services offered by the WSSP (Durvasula et al., 1999). Lacking physical evidence, customers are often unclear about what to expect from credence based services, which makes evaluating their quality all the more complex (Woo & Ennew, 2005). Technology readiness should mitigate this difficulty in evaluating outcomes, as retailers who are more technology ready will be better placed to



evaluate such multifaceted services. So it can be expected that higher levels of TR will lead to the retailer viewing the quality of the services received from the WSSP as higher.

*H4: There is a positive relationship between technology readiness and service quality.*

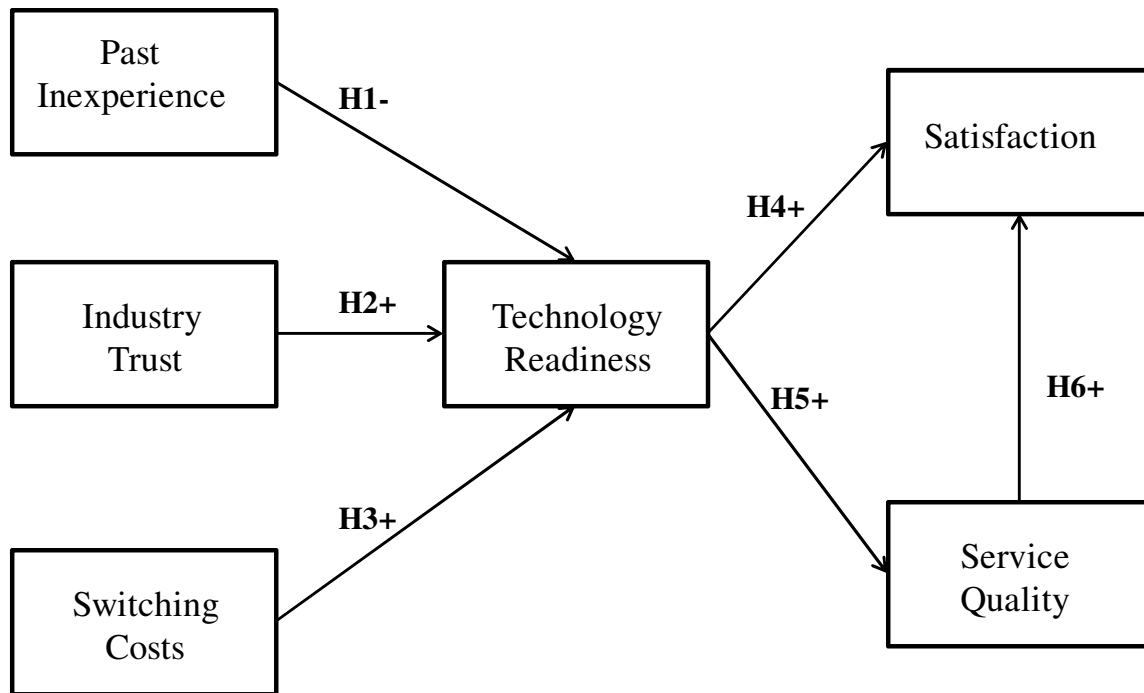
In TR studies in a B2C context, satisfaction is modeled as an outcome (Lin & Hsieh, 2007), as TR should offer a greater potential for positive outcomes, and so lead to greater rewards for adopters, while negative attitudes towards technology readiness can be expected to lead to problems in adopting the technology, and thus poorer outcomes. In their consumer based study, Meuter, Ostrom, Bitner and Roundtree (2003) suggested that anxiety about a technology - which is directly related to technology readiness - significantly affects the satisfaction users can gain from it – so it can be posited that a higher level of TR will lead to the retailer achieving more benefits, and thus gaining greater satisfaction, from the services of the WSSP. In other words:

*H5: There is a positive relationship between technology readiness and satisfaction.*

It is widely accepted at this stage in the literature that buyers with limited knowledge or prior experience will find it more difficult to establish realistic expectations of credence type services – and this in turn makes it difficult for them to evaluate professional service offerings effectively (Woo & Ennew, 2005; Leonidou, Talias & Leonidou, 2008). Recent findings confirm the common sense expectation that perceived service quality is a key contributor to satisfaction with the service provider (Rauyruen & Miller, 2007; Molinari, Abratt & Dion, 2008; Chenet et al., 2010). Given the significant amount of research on the links between service quality and satisfaction in both offline (Williams, Khan, Ashill & Naumann., 2011) and online contexts (Rafiq et al., 2012), it is suggested that the same relationship will operate in the B2B domain:

*H6: There is a positive relationship between service quality and satisfaction.*

Figure 1 presents our conceptual framework of the antecedents and outcomes of technology readiness.



**Figure 1: Conceptual Model**

## **4 Methodology**

### **4.1 Sampling and Data Collection**

Small retailers with online presences were selected as the research setting for a number of reasons. First, the increasing demand for online shopping is pushing all retail sectors to ‘get online’, or to further develop their existing on-line offers, leaving the smaller retailer - who might previously have been slow to respond to this phenomenon - left with little choice but to respond to the challenge. Second, the target respondents, the owners and/or managers of such smaller retailer establishment, are unlikely to have had the marketing or technical resources in their organizations to develop and/or maintain their own web presences, and so would be

more likely to have to employ a WSSP. Finally, there has been very little research on small to medium sized retail organizations in online B2B relationship contexts.

A list of small Irish retailers was developed using commercial databases supplemented with Internet searches in key categories, which resulted in a total of 843 such organizations being sent a questionnaire (in hard copy) which included an invitation to complete it online. A reminder letter was sent two weeks later, and, finally, to increase responses, retailers were telephoned, reminding them of the questionnaire and asking them again to participate. Respondents were only included in the final sample if they had used a WSSP to develop or manage their website - those who developed and managed their own websites were excluded from the population. A combined total of 133 valid responses from both paper and online versions were collected - a response rate of 16%, which compares favorably to other B2B response rates. Respondents were mainly (91%) from small (less than 10 employees) organizations: a variety of different retail industries were represented, with 'Gift & Specialist' (29%), 'Food and Consumables' (24%) and 'Clothing & Accessories' (19%) being the three major categories. 62% of firms had started as 'bricks and mortar' operations and had gone online subsequently, while a further 29% had started as online businesses, with the remaining 9% having commenced in both formats from inception..

#### **4.2 Measures**

Multi-item scales were adapted from previous studies with some minor modifications to suit the specific context. To assess TRI in this study, the thirty six item scale developed by Parasuraman (2000) was reviewed, but a more parsimonious scale was adopted following Richey et al. (2007) and Richey and Autry (2009). Following discussion with a sample of ten retailers and a pilot test, a reduced set of twenty three items were chosen and adapted to a

B2B online services context. Past inexperience items were adapted from Heide and Weiss (1995) and switching costs items from Heide and Weiss (1995) and Tellefson and Thomas (2005). As discussed in the literature review, the role of industry trust is an emerging theme (Pavlou & Gefen, 2004; Kim et al., 2009; McKnight et al., 2002): the items for this construct were adapted from McKnight et al. (2002), with the second item being developed specifically for this study. Taking into consideration the differences between how businesses purchase and evaluate services (compared to the processes used by consumers for evaluating products) the INDSERV scale (Gounaris, 2005) was used to operationalize service quality as a multidimensional construct, while satisfaction was operationalized following Geyskens, Jan-Benedict and Steenkamp (2000). (Appendix 1 shows the final set of items.) The questionnaire used seven point Likert scales anchored with 'strongly disagree' and 'strongly agree'.

#### **4.3 Validation of instrument**

In order to determine the representativeness of the study sample and the issue of possible response bias amongst respondents, a number of different tests were conducted, such as t-tests to assess differences between the response mechanisms used (Internet or paper) and early/late responders: but no significant differences were found. A number of techniques were employed to minimize the risk of Common Method Variance (CMV), which can be an issue when a single respondent answers all items (Podsakoff & Organ, 1986). First all respondents were either firm owners or senior managers directly responsible for their retail firms' online presence, so it is reasonable to expect that they are aware of the constructs in this study. Many of them also asked for further information about the study's outcomes, indicating their interest in the areas under investigation. Mitchell (1994) argues that these types of respondents mitigate the issue of bias from a single source. CMV can also be reduced by the use of high quality scales, and separation of measurements (Podsakoff,

MacKenzie, Lee, & Podsakoff, 2003). In this study, all items were taken from established scales and adapted to the context under investigation in order to reduce bias, and the measurement of the constructs was also separated over a larger survey instrument, so reducing respondents' ability to employ previous answers to fill in 'memory gaps' and maintain consistency (Feldman & Lynch, 1988; Podsakoff et al., 2003).

## **5. Analysis and Results**

Following Anderson and Gerbing (1988) and Bagozzi and Yi (2012), the analysis was conducted in two phases using LISREL 8.80. First, the measurement models for each construct were estimated using Confirmatory Factor Analysis (CFA) to test reliability and validity, and second, the structural model was estimated to test the direction and strength of the proposed relationships.

### **5.1 Measurement Models**

First order models were run for Technology Readiness and Service Quality but the loadings and fit indices were found to be poor. A measurement model was then run for the Technology Readiness construct which was posited to have a second-order factor structure, with optimism, innovativeness, discomfort and insecurity as its first-order factors (Parasuraman, 2000). After removing the items with low loadings and unacceptable  $R^2$  values in their measurement equations, eleven items remained (as noted in Appendix 1). Model fit was good ( $\chi^2 = 64.05$ ,  $df = 40$ ,  $p = 0.00925$ ,  $CFI = 0.97$ ,  $RFI = 0.89$ ,  $NNFI = 0.95$ ,  $RMSEA = 0.067$ ,  $SRMR = 0.065$ ), and the first order constructs loaded significantly onto the second order factors as follows: optimism (0.852,  $t = 6.817$ ); innovativeness (0.624,  $t = 5.237$ ); discomfort (-0.525,  $t = -3.774$ ) and insecurity (-0.760,  $t = -6.075$ ). The INDSERV scale (Gounaris, 2005) was used to measure service quality. After removing items with low loadings and

unacceptable  $R^2$  values in their measurement equations, sixteen items remained (again, see Appendix 1). A second order factor model as per Gounaris (2005) was tested, which fitted well ( $\chi^2 = 171.78$ ,  $df = 100$ ,  $p = 0.00001$ ,  $CFI = 0.98$ ,  $RFI = 0.96$ ,  $NNFI = 0.98$ ,  $RMSEA = 0.074$ ,  $SRMR = 0.049$ ), with first order constructs loading significantly onto second order factor as follows: potential (0.834,  $t = 10.228$ ); hard process (0.775,  $t = 6.484$ ); soft process (0.957,  $t = 9.959$ ) and outcome (0.860,  $t = 7.730$ ).

Construct validity for the scale items measuring the six constructs were assessed (as shown in Appendix 1) using average variance extracted (AVE), Cronbach Alpha, and Composite Reliability (CR). All AVE estimates were greater than 0.57, and the square root of all AVEs were higher than the inter-construct correlations, while all CR values were over 0.8 and all alpha values greater than 0.7 (Fornell & Larcker, 1981; Bagozzi & Yi, 2012), indicating acceptable internal consistency, convergent and discriminant validity, and construct validity for the scale items used in this study.

## **5.2 Structural Model**

After successfully evaluating the measurement models for each of the six constructs, the paths of the structural model were then analyzed to test hypotheses H1 - H6. Having established the validity of the Technology Readiness and Service Quality measures, they were simplified by taking the mean of the indicators of each of their respective sub-factors. This procedure is employed when (as in this research) there are a large number of items and multidimensional scales to ensure the number of parameters to be estimated in the structural model is appropriate to the sample size (Hibbard, Kumar & Stern, 2001). The subsequent first-order confirmatory analysis of the sub-factors showed an acceptable level of fit (Appendix 2 shows the correlations between the constructs). Controls in terms of size

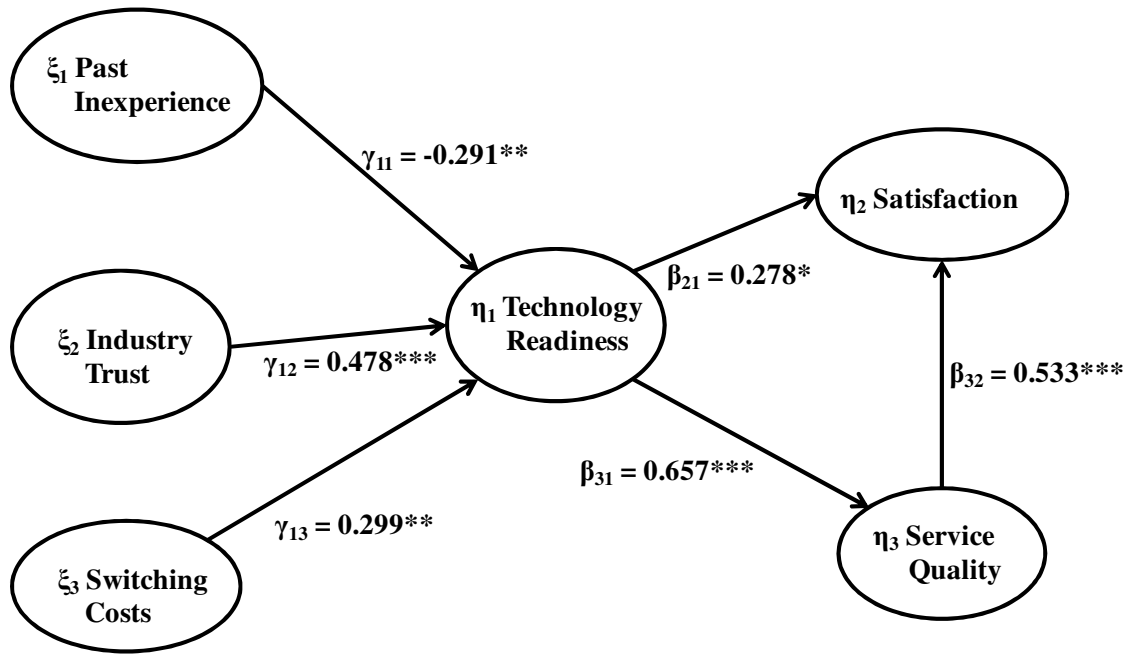
(measured by number of employees), age (measured by years of operation) and industry (measured by the type of product/service that was their major business) were tested: no significant results were found.

Table 2 presents the results of the hypothesis tests, and Figure 2 depicts the model with the estimates for each path included. All of the research hypotheses are supported. Our findings suggest that while past inexperience ( $\gamma_{11} = -0.291$ ,  $t = -2.756$ ,  $p < 0.01$ ) negatively effects Technology Readiness, both industry trust ( $\gamma_{12} = 0.478$ ,  $t = 4.166$ ,  $p < 0.001$ ), and switching costs ( $\gamma_{13} = 0.299$ ,  $t = 2.894$ ,  $p < 0.01$ ) have a significant positive effect thus supporting H1, H2 and H3. It was also found that Technology Readiness has a significant positive effect on both Satisfaction ( $\beta_{21} = 0.278$ ,  $t = 2.101$ ,  $p < 0.05$ ) and on Service Quality ( $\beta_{31} = 0.657$ ,  $t = 5.082$ ,  $p < 0.001$ ) - thus supporting H4 and H5 and that Service Quality has a significant positive effect on satisfaction ( $\beta_{32} = 0.533$ ,  $t = 4.238$ ,  $p < 0.001$ ), supporting H6. The overall model fit was good ( $\chi^2 = 318.5$ ,  $df = 180$ ,  $p = 0.00$ ,  $CFI = 0.94$ ,  $RFI = 0.85$ ,  $NNFI = 0.93$ ,  $RMSEA = 0.076$ ,  $SRMR = 0.089$ ) (Bagozzi & Yi, 2012).

**Table 2: Model Results**

Paths			Path Coefficients			
$\gamma_{11}$	Past Inexperience	→	Technology Readiness	-0.291**	H1	Supported
$\gamma_{12}$	Industry Trust	→	Technology Readiness	0.478***	H2	Supported
$\gamma_{13}$	Switching Costs	→	Technology Readiness	0.299**	H3	Supported
$\beta_{21}$	Technology Readiness	→	Satisfaction	0.278*	H4	Supported
$\beta_{31}$	Technology Readiness	→	Service Quality	0.657***	H5	Supported
$\beta_{32}$	Service Quality	→	Satisfaction	0.533***	H6	Supported

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$



$\chi^2(180) = 318.50, p=0.0, CFI = 0.94, RFI = 0.85,$   
 $NNFI = 0.93, RMSEA = 0.076, SRMR = 0.089$

**Figure 2: Structural Model**

## 6: Discussion

The results demonstrate that past inexperience, industry trust and switching costs are significant antecedents of firms' TR. In the case of the past inexperience construct, the complexity and ambiguity inherent in credence-based professional services creates difficulties for both buyers and suppliers of such services. Difficulties arise for buyers who may have limited knowledge or experience with this type of service - which can make small firms vulnerable to opportunism – while a lack of capital and the skill set to develop their own web solutions increases their need to rely on third party providers who have the necessary capabilities. The model confirms that retailers with limited experience of setting up online channels are less ready to embrace web solution services. This is to be expected, given that these firms' are likely to perceive higher levels of risk associated with technology adoption, and perhaps also consider those risks as being greater than the potential benefits.



Recent research also highlights how inexperience is considered a liability that can limit small firms' ability to grow and develop innovative opportunities (Heimonen, 2012), while Sila and Dobni (2012), studying small to medium sized enterprises (SMEs) adopting Internet based supply chain integration, found that 'e-laggards' - firms that were slow to adopt - were skeptical about the technology and had less trust in their trading partners.

Industry trust was found to be positively related to technology readiness, and also to be the most significant antecedent of those studied. Firms operating in emerging industry sectors, such as those utilizing web technologies, may perceive heightened risk and uncertainty about them, and this uncertainty is augmented by small firms' unfamiliarity with assessing and using the web channel as a route to market. This in turn increases their need for strategic guidance and reassurance from business partners - such as specialist technology solution services - if they are to reduce their perceptions of risk and embrace market development opportunities to meet increasing customer demands. Firms that feel they are operating in a safe, secure environment will feel less inhibited by discomfort or insecurity with setting out to use the web as a market channel.

The option exists in all buyer/supplier relationships for the buyer to exit the relationship and switch providers if the service being delivered is unsatisfactory. In such cases, firms will incur some form of switching costs, which research suggests can be perceived positively or negatively depending on the source of constraints (Jones et al., 2007). Our research results show that switching costs have a positive and significant relationship with Technology Readiness, indicating that that are seen as an important precursor of firms' willingness to embrace web technology services. The volatility inherent in a fast moving industry such as web services may be factor in the decision of firms with higher perceived switching costs to

be more technology ready. It has also been suggested that the significance of switching costs can vary depending on product characteristics and industry structures (Edward & Sahadev, 2011). In the highly fragmented and diverse web industry, customized web based solutions have certain idiosyncratic characteristics, which are not easily imitated or transferable, and thus tend to lock retailers in to their current service providers. Firms may find it difficult to compare potential providers on a like-for-like basis in such uncertain and complex environments, and research has also suggested that the cognitive and psychological efforts involved in seeking an alternative provider will tend to prevent buyers leaving such relationships (Pavlou & Gefen, 2004).

Our findings reveal the significant role played by technology readiness in retailers' perceptions about the levels of service quality and satisfaction in credence based business services. From a theoretical perspective, our adoption and validation of the INDSERV scale extends and deepens our understanding of service quality in an emerging services industry. The significance of service quality's relationship with TR and satisfaction strongly indicates that future studies investigating credence based professional services should include the service quality construct. B2B web services are a complex field, and web related technologies inherently uncertain and ambiguous, so providers have been strongly advised to implement strategies - before, during and after service purchase - to ensure the successful delivery of high quality services and thus satisfactory customer outcomes (Gounaris, 2005). Furthermore, the use of Geyskens et al.'s (2000) conceptualization of satisfaction has been in terms of economic gains, which underlines the significance of the financial rewards retailers perceive in staying with providers who deliver high standard services. This measure of satisfaction is important for retailers as it allows them to access specific diagnostic information for evaluating the services they received.

The empirical data provides important insights into the applicability of TR in an online B2B retail context. The validation of the TR construct in this research confirms its suitability in a B2B context, and contributes to our understanding of TR from a small firm perspective, which has been under researched, as well as addressing the calls for research to develop a measure of ‘readiness for technology’ at the firm level (Palmer, Ellinger, Allaway & D’Sousa, 2012). This type of research can generate strategic insights which are much needed, given the numbers of organizations adopting the web as a business channel to gain or maintain a competitive advantage in crowded market spaces. From a public policy perspective, governments worldwide are trying to enhance the competitiveness of their economies - knowing which organizations are more ready to adopt new technologies (such as the Internet) can enable them to target their support to those organizations who can deliver real economic value.

### **6.1 Managerial Implications**

The research findings provide useful insights for buyers seeking to source and purchase credence-based professional services that offer successful web based solutions. The findings suggest that providers should engage with client firms to manage their expectations, and that they must find a way to customize the solutions they offer to match individual firms’ situations and aspirations. Developing a rapport with their business partner (Geyskens et al., 2000) will be key for both sides of the relationship. This may begin with simple issues such as solution providers ‘speaking the same language’ as clients so as not to alienate them, and striving to make their offerings easier to evaluate and verify, e.g., via client testimonials and case studies. It is up to WSSPs to provide information and regulation that can help alleviate small firms’ risk perceptions if the latter are to be encouraged to avail themselves of the market development opportunities that web channels offer.

According to Galetzka et al. (2006), information gathered via the service encounter is used by customers in evaluating credence services, so retailers are more likely to choose WSSPs who have been nominated for or won industry awards, or those referred by trusted business contacts. Firms seeking providers may rely on structural assurances such as up to date technology systems, adherence to technical standards, security procedures, and protection mechanisms. The implication for solution providers is that they should to consider the client firms' perspective and appreciate and satisfy the criteria these firms are most likely to use when selecting and evaluating potential providers. Consideration of the client perspective is greatly facilitated if some type of rapport can be developed between key decision makers in both firms and research has recently recognized the importance of this relational component when providing solution services (Sawhney, 2006; Penntinen & Palmer, 2007; Storbacka, 2011).

Collaborating with specialist service providers will increase small retailers' access to technological expertise, and enable them to embrace and exploit web technologies, facilitating both their strategic decision making and their ability to develop their online B2B relationships (Nieto & Santamaria, 2010). An important implication of our investigation of the key constructs involved is that it reveals that WSSPs need to address the technological readiness of existing and potential clients if they are to deliver satisfactory services that are appropriate to their customers' needs and which will allow them to execute e-business strategies successfully. Knowledge of clients' TR will enable providers to alleviate clients' fears or skepticism about the supplier and the solutions they offer, which increases trust and facilitates the delivery of superior services. Successful outcomes will increase retailers'

economic satisfaction levels, and make it more likely they will feel purchasing such services was money well spent.

## **7. Limitations and Future Research Directions**

This study was constrained by sample size and the fact that the model developed is based on data from a small retailer perspective: SMEs have defining characteristics, so it would be interesting to replicate the research using larger organizations which, by virtue of their size, are less nimble than smaller firms and whose state of technology readiness may also be different. Past inexperience would be particularly interesting to consider in a more detailed manner in larger organizations, where different respondents may have different views as to their technology readiness. As time goes on, the experience levels of such individuals with web technologies - and of the vendors of web solutions - will inevitably increase, perhaps somewhat nullifying the effect of prior inexperience. This paper used managers of smaller enterprises as respondents – again, it might be interesting to test if other organizational members have differing views as to their firms’ readiness to use this technology.

Moreover, while our findings offer initial insights, they should be verified with service categories other than credence based ones. The web service solutions industry is a relatively novel context, and while our study yields interesting findings it also opens the door to other researchers to study the relationships SME retailers form with their WSSPs. Measuring the role TR plays in B2B technology adoption across other fields, building on the extant Technology Adoption Model framework and its extensions, could also yield valuable results.

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## Appendix 1 Constructs, Items, Loadings and Reliabilities

Construct	Items	Loadings (t-value)	Alpha	CR	AVE
Past Inexperience	Overall our firm had limited knowledge about web solution services before we considered employing this WSSP	0.706 (8.72)	0.839	0.850	0.600
	Web service providers were a rather new type of service for our company	0.835 (10.71)			
	We had limited information when we were defining specifications for our web solutions	0.858 (11.09)			
Industry Trust	The web industry has enough safeguards to make me feel comfortable to do business with web solution service providers	0.825 (10.33)	0.757	0.840	0.570
	I feel confident that legal structures are adequately in place to protect SME companies operating in Ireland from being exploited by WSSP companies	0.823 (10.30)			
	I feel confident that encryption and other technological advances make it safe for me to do business online	0.681 (8.20)			
Switching Costs	Dealing effectively with a new WSSP would take a lot of time and effort.	0.909 (12.50)	0.856	0.860	0.690
	Developing working relationships with a new WSSP would be a time-consuming process.	0.917 (12.67)			
	The cost of switching to another WSSP would be prohibitive.	0.638 (7.91)			
Satisfaction	My relationship with our WSSP has provided our company with a dominant and profitable market position in our sales area.	0.736 ( $\lambda = 1$ )	0.870	0.870	0.580
	My relationship with our WSSP is very attractive with respect to special offers	0.639 (7.01)			
	I am very pleased with the decision to adopt this WSSPs services since their high quality increases traffic.	0.846 (9.25)			
	The web marketing services of our WSSP enable me to get my work done effectively.	0.834 (9.14)			
TR: Optimism	Web technology makes me feel more efficient in business. I find I am doing more activities now with web technology than a couple of years ago.	0.740 ( $\lambda = 1$ ) 0.768 (7.87)	0.810	0.812	0.591
	I like doing business with web technology because I am not limited to regular business hours.	0.795 (8.04)			
TR: Innovativeness	In general I am among the first of my competitors to acquire new web technology when it appears	0.707 ( $\lambda = 1$ )	0.811	0.808	0.587
	I keep up with the latest web technological developments in my area of interest	0.874 (7.76)			
	I find I have fewer problems than my competitors in making web technology work for me	0.708 (7.20)			
TR: Discomfort	When I get technical support from our WSSP I sometimes feel as if I am being taken advantage of by someone who knows more than I do.	0.550 ( $\lambda = 1$ )	0.706	0.953	0.877
	With new web technology, I often risk paying a lot of money for something that is not worth much.	0.556 (5.09)			

	The hassle of getting new web technology work for me usually makes it not worthwhile.	0.942 (5.06)			
TR: Insecurity	I do not consider it safe to do any kind of financial business with my WSSP online.	0.767 ( $\lambda = 1$ )	0.711	0.839	0.745
	I worry that information I send over the Internet will be seen by my competitors.	0.722 (5.71)			
Please indicate the extent to which your solution provider provides quality service where you believe they:					
SQ: Potential	Have the required Personnel	0.916 ( $\lambda = 1$ )	0.925	0.920	0.810
	Have the required facilities	0.905 (16.32)			
	Have the required management philosophy	0.877 (15.21)			
SQ: Hard Process	Use local networks	0.646 ( $\lambda = 1$ )	0.793	0.800	0.570
	Stay within budgets	0.724 (6.92)			
	Look at details	0.891 (7.67)			
SQ: Soft Process	Understand our needs	0.781 ( $\lambda = 1$ )	0.938	0.940	0.720
	Accept web projects enthusiastically	0.824 (10.62)			
	Listen to our problems	0.888 (11.74)			
	Open to suggestions / ideas	0.794 (10.12)			
	Have a pleasant working approach	0.882 (11.63)			
	Look after our interests	0.931 (12.53)			
SQ: Outcome	Have a notable effect on my business	0.687 ( $\lambda = 1$ )	0.938	0.870	0.640
	Contribute to our image	0.760 (7.98)			
	Are Creative	0.888 (9.12)			
	Are consistent with our strategy	0.848 (8.79)			

## Appendix 2: Correlation Tables

	Potential SQ	Hard SQ	Soft SQ	Outcome SQ	TR: Optimism	TR: Innovative	TR: Discomfort	TR: Insecurity
Potential SQ	1.00							
Hard SQ	0.65	1.00						
Soft SQ	0.80	0.74	1.00					
Outcome SQ	0.72	0.67	0.82	1.00				
TR: Optimism					1.00			
TR: Innovative					0.53	1.00		
TR: Discomfort					-0.45	-0.33	1.00	
TR: Insecurity					-0.65	-0.47	0.40	1.00

	Satisfaction	Service Quality	Technology Readiness	Past Inexperience	Industry Trust	Switching Costs
Satisfaction	1.00					
Service Quality	0.72	1.00				
Technology Readiness	0.63	0.66	1.00			
Past Inexperience	-0.17	-0.17	-0.26	1.00		
Industry Trust	0.30	0.32	0.48	-0.07	1.00	
Switching Costs	0.13	0.14	0.21	0.20	-0.05	1.00