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# Agility: Customer's Perspective

Maura Atapattu

Queensland University of Technology, [m.atapattu@qut.edu.au](mailto:m.atapattu@qut.edu.au)

Darshana Sedera

Queensland University of Technology, [d.sedera@qut.edu.au](mailto:d.sedera@qut.edu.au)

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# AGILITY: CUSTOMER'S PERSPECTIVE

Maura Atapattu, School of Information Systems, Queensland University of Technology,  
Brisbane, Australia. [m.atapattu@qut.edu.au](mailto:m.atapattu@qut.edu.au)

Darshana Sedera, School of Information Systems, Queensland University of Technology,  
Brisbane, Australia. [d.sedera@qut.edu.au](mailto:d.sedera@qut.edu.au)

## Abstract

*In competitive environments agility is emerging as an important determinant of success. Despite the widely accepted importance of agility there has been paucity in research on this construct, especially the customer's perspective of agility. Rise of digital natives together with growth of ubiquitous information systems has changed the way firms engage with their customers. Firms are finding it difficult to establish sustained loyalty hence the long term sustained advantage over competition. Hence, firms are increasingly investing substantial resources on dynamic Customer Relationship Management systems such as mobile-CRMS to better engage with customers to sense and respond quickly (Agility of the firm) to their demands. This paper investigates firm's customer agility from customer's perspective, and we propose a model to understand firm's customer agility from customer's point of view. The proposed model is derived based on previous conceptions of agility and the expectation confirmation theory (ECT). This paper reports the initial findings of this study obtained through a pilot test. The findings of the study demonstrate that customer's view point on firm's customer agility is an important determinant of achieving success through sustained competitive advantage.*

*Key words: Customer Agility, mobile-CRM, Firm Agility, U-CRM, expectation confirmation theory*

# 1 INTRODUCTION

The significance of customer centricity for contemporary business success is prominent in the current business, management and marketing literature (Kumar et al. 2012; Liang et al. 2007; Wagner et al. 2007). Organizational mission statements often share the notion “to be number one in delivering value to customers”. Hence, how a company is perceived to be performing by its customers is a priority that has been recognized in management tool like the Balance Scorecard (Kaplan et al. 1992), recognizing the importance of ‘how customers see us [firm]? Furthermore, a great deal of discussions could be found around the importance of customer perceptions on products and services. For an example, Buzzel et al. (1987) highlight that the customer perception on product and service quality is an important determinant of business success. Also, customer perception on price is considered a critical factor in customer store loyalty and repurchase intentions (Jiang et al. 2005; Liu et al. 2000; Zhang et al. 2011). Consequently, organizations are finding it difficult to establish loyalty and to establish sustained competitive advantage new generation of customers (Roberts et al. 2012b). They have grown up in a networked world (Vodanovich et al. 2010), where they have access to multiple information sources to make well informed purchasing decisions compared to the previous generations.

Meanwhile the ‘digital natives’, those who have grown up in a digital world, demand that ubiquitous information systems are weaved into the very fabric of their everyday life (Vodanovich et al. 2010). Digital natives prefer personalized, interactive, intuitive, attractive, and social interactions, they seek instant recognition and instant gratification (Vodanovich et al. 2010) hence demands organizations to be extra agile. On the other hand, in digitized environments, every activity leaves information as a by-product (Chi et al. 2010; Zuboff 1988), and provide organizations with an opportunity to analyze such information footprints to gain potentially rich insights about their customers.

In intense competitive organizations, contemporary organizations are eager to gather data of the their customers (Coltman 2007). To gather customer information and to use it effectively for strategic management purposes, companies are investing heavily on pervasive ubiquitous information systems like Customer Relationship Management Systems (CRM). Firms employ CRM systems to understand customer demands and requirements through better sensing (Overby et al. 2006; Roberts et al. 2012a; Roberts et al. 2012b). Similarly, as the concepts of agility highlight, firms must be able to respond to the observed needs of customer. In other words contemporary firms are attempting to be more agile.

Such activities provide opportunities for organizations to sense their customer needs, organization must be able to act on such opportunities or threats with ease, speed and dexterity in order to be agile (Overby et al. 2006). In general, contemporary customer is well aware of how organizations sense their requirements and expect their requirements are met with through close collaboration, and meeting their needs with ease, speed and dexterity (Overby et al. 2006; Roberts et al. 2012a; Roberts et al. 2012b). Perceived failure or perceived lack of response to customer requirements and needs as per customer expectations could be detrimental and may adversely affect firm’s success in hyper-competition.

Importance of high quality sensing and responding capabilities for attaining competitive advantage is well documented in research on agility (Nazir et al. 2012; Overby et al. 2006). For example, significance of customer perception on branding was well researched in both product and service marketing literature (Bose et al. 2013; Muth et al. 2012). Additionally, customer perception and IT use has been discussed extensively in IS literature (Brown et al. 2012; Venkatesh et al. 2003; Verkasalo et al. 2010). Further, According to the Expectation-Confirmation (Disconfirmation) Theory (ECT) (Oliver 1980), customer perceptions are important in their continuance (discontinuance) or repurchase decisions. Researchers have extensively tested the ECT in traditional consumer markets (Hernández et al. 2010; Santos et al. 2003) as well as in IS research (Bhattacharjee 2001; Brown et al. 2012). As mentioned in Bhattacharjee (2001), ECT is widely used to study the relationship between priori customer expectations and posterior evaluations (or their experiences) to their repurchase or continuance decisions in previous research. Expectation-experience paradigm (e.g. perceived performance, perceived usefulness) has been a topic of interest in IS field for nearly three decades

(Bhattacharjee 2001; Brown et al. 2012; Ginzberg 1981). When the ECT studies in IS mainly focuses on internal stakeholders of the organizations, customer perceptions, loyalty and financial performance also being well established in IS literature (Xu et al. 2011).

To-date, all agility (sense and responding capability) studies evaluated 'agility' by asking organizational managers of what they think were their capabilities of sensing and responding. For example, Roberts et al. (2012a) requested managers to comment on how well they [organization] sense as compared to their competitors. The current study attempts to gauge agility through the perceived customer viewpoint. In addition, we position the customer's perceived sensing and responding of the firm in relation to the growing mobile sensing and responding technologies. Narayanaswami et al. (2011) state that, as technology evolves Smartphones and Smartphone applications are heavily influencing the retailing landscape, making a global shift towards 'everywhere retailing', 'everywhere ubiquitous sensing and responding'.

Through mobile based CRM applications, firms are trying to engage with customers 24x7. For example, the two largest retailers in Australia (i.e. Woolworths and Coles) have launched their mobile applications to device identify customer buying patterns through how customers create shopping lists prior to reaching the retail shop, observe recipes that customers most likely to navigate and combine such statistics with location maps. Such innovations customer engagements allow firms to know their customers better (sensing). On the other hand, customers expect that their 'unique' needs are promoted and provided by the retailer with ease, speed and deftness (responding).

The remainder of this paper proceeds as follows. We first examine the characteristics and origins of the notion organization agility and different perspectives of agility. We then introduce the concept 'customer agility'. Following which, we discuss the measures used to measure sense and response components of agility in the past prior introducing digital natives and system use. Subsequently, we theorize our research model and develop hypothesis before introducing the empirical research design. Following which we discuss the measures and construct development and testing of hypothesis. Lastly, the paper concludes with results, a summary and a research outlook.

## **2 AGILITY AND PERCEIVED AGILITY**

In this research, we adopt the definition of Roberts & Grover (2012a; 2012b) to define agility as the "*Degree to which firms able to sense rapidly changing customer needs, anticipate, identify and respond to the opportunities and threats with ease, speed and dexterity*". Analogous to the definition agility has been discussed in diverse contexts (Bititci et al. 1999; Day 2000; Huang et al. 2012; Nazir et al. 2012; Setia et al. 2008; Sharifi et al. 1999; Tallon et al. 2011).

Despite differences in defining agility (Roberts et al. 2012a; Roberts et al. 2012b), there are some commonalities that can be observed (see Table.1). The table 1 below not intended to be comprehensive of all studies of agility, outline the key concepts of agility discussed in previous different conceptions. Sensing and responding components appear in multiple definitions of agility (e.g. Sambamurthy et al, 2003; Overby et al., 2006; Gallagher & Worrel, 2008; Nazir & Pinnsonneault, 2012) and forms the two main constituents of organizational agility. Sensing component often referred to the firms intellectual ability to find appropriate threats and/or opportunities to act upon (Dove 2001) where it represents the knowledge component of agility (Overby et al. 2006). Responding component of agility describes the firm's physical ability to act on the threats and/or opportunities presented (Dove 2001; Overby et al. 2006) quickly and accurately. Other key attribute discussed in majority of studies is changing environment. Changing environment refers to the changes precipitated as a result of wide change drivers such as competitor actions, changing customer requirements, technological changes, legislative or regulatory changes, and economic shifts (Overby et al. 2006). Whilst the definition agility consists mainly of two components; sensing and responding, a firm may articulate its agility in many areas such as in customer-based processes, in supply-chain interactions or in their day-to-day operations (Roberts et al. 2012b). As such firm's agility can be tested in numerous different areas taking different perspectives. In this study we focus on firm's customer agility taking the perspective of customers.

Concept	Source
Sense / detect (scanning, learning and interpretive activity)	Gallagher et al. (2008); Nazir et al. (2012); Overby et al. (2006); Sambamurthy et al. (2003)
Response / responsive (Action execution by mobilizing existing processes or services upon detection of an opportunity or threat)	Arteta et al. (2004); Bessant et al. (2001); Cho et al. (1996); Gallagher et al. (2008); Goldman et al. (1995); Nazir et al. (2012); Overby et al. (2006); Sambamurthy et al. (2003); Yusuf et al. (1999)
Capability / ability	Arteta et al. (2004); Bessant et al. (2001); Cho et al. (1996); Day (2000); Dove (2001); Gallagher et al. (2008); McGaughey (1999); Oosterhout et al. (2006); Overby et al. (2006); Sambamurthy et al. (2003); Sharifi et al. (1999); Yusuf et al. (1999)
Turbulence / rapidly changing environment / Uncertainty	Cho et al. (1996); Day (2000); Dove (2001); Gallagher et al. (2008); Goldman et al. (1995); Sharifi et al. (1999); Yusuf et al. (1999)
Quick/ speed/ rapid	Bessant et al. (2001); Cho et al. (1996); McGaughey (1999); Oosterhout et al. (2006); Overby et al. (2006); Sambamurthy et al. (2003); Yusuf et al. (1999)

Table 1: *Attributes of organizational agility.*

Often in extant research the employees of the individual firm estimate the firm's responsiveness to customers based opportunities and/or threats (Roberts et al. 2012b). However, considering the context of this research, we argue that the customers are better positioned to determine how well the firm is responding to their requirements. As number of theories in many different fields suggest (e.g. ECT, Branding, Market orientation, Customer orientation, TAM) customer perception is an important element of business success, customer perceived firm's responsiveness is an important component in understanding agility. Also, considering the fact that "a basic activity in any research field is to reach a deep understanding of the phenomena it studies" (Burton-Jones et al. 2007), we argue that the understanding of firm's customer agility require customers' standpoint. When the organizational perspective provides the internal view of firm's customer agility, the proposed customer perspective would provide the much required external view of firm's customer agility.

Firm's customer agility is measured based on the two key components of agility: sensing and responding (Roberts et al. 2012a; Roberts et al. 2012b). Both sensing and responding measures were heavily influenced by market orientation literature (Jayachandran et al. 2004; Kohli et al. 1993; Narver et al. 2004; Slater et al. 2000). Measurement of organizational responsiveness deeply rooted in to market orientation literature (Jayachandran et al. 2004; Kohli et al. 1993). While Kohli et al. (1993), measured responsiveness using fourteen different likert based questions, Jayachandran et al. (2004) measured customer responsiveness with measurement items in two groups: customer response speed and customer response expertise. Recently, Roberts & Grover (2012a; 2012b) measured firm's customer agility using the adapted measures developed by Kohli et al., (1993) and Jayachandran et al., (2004) in market orientation literature to measure both sensing and responding components of firm's customer agility. In this research, we adapt measures from both market orientations and previous customer agility studies for customer perceived firm's customer responsiveness. For sensing component we use the surrogate measure "degree of mobile-CRMS use" by firm's customers. As such we adapt the measures from "system usage" from previous IS studies spans over four decades (Barkin et al. 1977; Burton-Jones et al. 2007).

Use has been established a prominent topic in information systems (IS) research (Burton-Jones et al. 2007; Burton-Jones et al. 2006; DeLone et al. 1992; Venkatesh et al. 2008; Venkatesh et al. 2003). In this research we employ Burton-Jones et al. (2006) work on use to understand Ubiquitous mobile-CRM system use. Further, Burton-Jones et al. (2012) recent work on agility discuss the concept of effective use where they define effective use as "*using a system in a way that helps attain the goals for using the system*" where it essentially talks about the benefits of using the system to the respective user. However, in such discussions, "customers use of corporate IS" is missing as the extant research was predominantly focussed on the use of IS in organizations. Whilst customer's use of corporate IS has the potential of delivering benefits to both customers and the organizations, such discussion is elusive in the current literature. Meanwhile the emergence of ubiquitous IS (Shahper et al. 2010), and the rise of digital natives (Vodanovich et al. 2010) customers use of corporate IS becoming

increasingly relevant and important in such academic debate. Recent technological developments together with rise of techno savvy new generation of IS users profoundly changed the IS landscape. Ubiquitous IS (U-IS) brings people, processes and information together to transform traditional IS into 24/7, real-time, ubiquitously accessible new breeds of IS (Funabashi et al. 2008; Vodanovich et al. 2010) such as mobile-CRMS. The activities performed in Information Systems have been extended from professional activities in office environment to both professional (employees' use of mobile-CRMS) and personal (customers' use of mobile-CRMS) activities in both office and home environments (Vodanovich et al. 2010). Recently Po-An Hsieh et al. (2011) proposed that enrichment post-adoptive system use by employees can extract more value from already-implemented information technologies. With the evolution of U-IS, we argue that firms could generate more value from their ubiquitous mobile-CRMS by enriching/increasing the customers use of mobile-CRMS. Apparently the new generations who are digitally literate, highly connected, experiential, social, immediate gratification seekers (McMahon et al. 2005; Vodanovich et al. 2010) prefer to spend more time online through different types of digital devices (Vodanovich et al. 2010). As every activity leaves information as a by-product in digitized business environments (Chi et al. 2010; Zuboff 1988), such information foot prints could provide rich insights about their customers. Hence, the firm's are able to learn more about their customers when they perform more activities on digitized environment with increased frequency. Consequently, the enrichment of customer's use of corporate IS in digitized ubiquitous environments provide improved opportunities of obtaining richer insights about their customer through the analysis of resulting information footprints. Therefore, the customer's use of mobile CRMS could be used as a surrogate measure for firm's customer sensing. We argue here that the degree to which customer uses the mobile-CRMS defines the degree to which the firm is able to know about the customer in the context of this study. The use of mobile applications have been measured with self- reported usage scales (Verkasalo et al. 2010) in the existing scholarly work. Following the previous research on IS usage in this study we adopt measures from extant system usage literature to measure customers' use of mobile-CRMS as a surrogate measure for firm's sensing capability. We employ four broad dimensions of usage measures: frequency of use, functionality used, tasks performed and proportion/consistency of use to formulate effective/meaningful use as a proxy indicator for customer sensing in this research.

Whilst customer's use of mobile-CRMS surrogates firm's customer sensing, usage continuance is important for organizations to sustain their customer sensing activity. As notion of ECT revolves around the process by which consumers reach re-purchase intentions (Oliver 1980), Bhattacharjee (2001) employed ECT to understand Information System continuance in the organizational context. In a more recent study Brown et al. (2012) propose a model to study expectation confirmation in information systems and explains the relationship among information system expectations, experiences and use. Whilst originally the ECT holds the notion that consumer repurchase intention of product or continue service primarily determined by their post consumption satisfaction of the product or service (Oliver 1980). By staying true to the original notions of ECT, IS users' continuance decision too determined by their posteriori evaluations (experience) (Bhattacharjee 2001). As elaborated in Bhattacharjee (2001), both IS users and traditional consumers follow an initial acceptance or purchase decisions (in our context initial decision of use and download of the mobile-CRMS app), are influenced by their initial use or consumption (first time use of the mobile-CRMS), and the ex post reversal of the initial decision (discontinuance/continuance of mobile-CRMS use). Following this discussion we apply the lens of ECT to understand the relationship between perceived customer responsiveness of the firm and mobile-CRMS use continuance by the customers.

### **3 CONCEPTUAL MODEL**

When the new IS paradigm potentially changing the boundaries of which systems operate, in the IS in new paradigm (U-IS), customers are becoming an emerging and important group of users. The techno savvy customers who use the mobile-CRMS share the similar notions of digital nativity. As such the customers make their shopping interactions online in digitized environment. Whilst such interactions leave digital information footprints customers' enriched use of the mobile-CRMS allow organizations more opportunities to get rich insights about their customers. The apps allow customers to create

shopping lists, scan bar codes for product catalogues, download recipes, and receive daily discounted items. The retailers receive the purchase information (or intended purchase information<sup>1</sup>) through the shopping lists that are being generated by the customer. Also, through location identifiers in smart mobile phones, shopping locations are ‘pushed’ to customers. For the customer, both retailers provide exclusive daily specials based on their buying (or intended buying) patterns. Additionally they are able to find the location and operating hours of their nearest store, or shop on-line through a secure mobile checkout. These innovative customer engagements allow firms to understand customer requirements better (sensing), whilst customers expect that their ‘unique’ requirements are identified by the retailer (responding). As mentioned above, the extent of mobile-CRM use becomes a proxy for gaining customer insights, we surrogate firm’s customer sensing to the degree to which the customers use the mobile-CRMS. So the respective firm is able to know more about the customers through their use of mobile-CRMS. Consequently, the firm is able to respond to the needs of individual customers with ease, speed and deftness through the learning firms gained from customers’ use of mobile-CRMS. Thus the customers are able to see and experience the firm’s responsiveness to their needs (both potential as well as current) in the course form of customer based competitive actions.

We have defined firm’s customer agility as the degree to which the firm is able to sense and respond to customer-based opportunities expertly with ease, speed, and dexterity following the earlier notions of organizational agility (Overby et al. 2006; Roberts et al. 2012a; Roberts et al. 2012b). As per our conceptualization and the previous conceptions of organizational agility, it consists of two main constructs; sense and respond components. Also the previous literature affirms that every activity leaves information as a by-product in digitized business environments (Chi et al. 2010; Zuboff 1988) where firm’s could potentially gain rich insights about their customers by analyzing the information footprints in such digitized environments. Based on this reasoning the information footprints resultant due to customer’s use of mobile-CRMS could assist firm’s customer sensing ability. Hence, we propose “use” as a surrogate measure for firm’s customer (traditional individual customers) sensing.

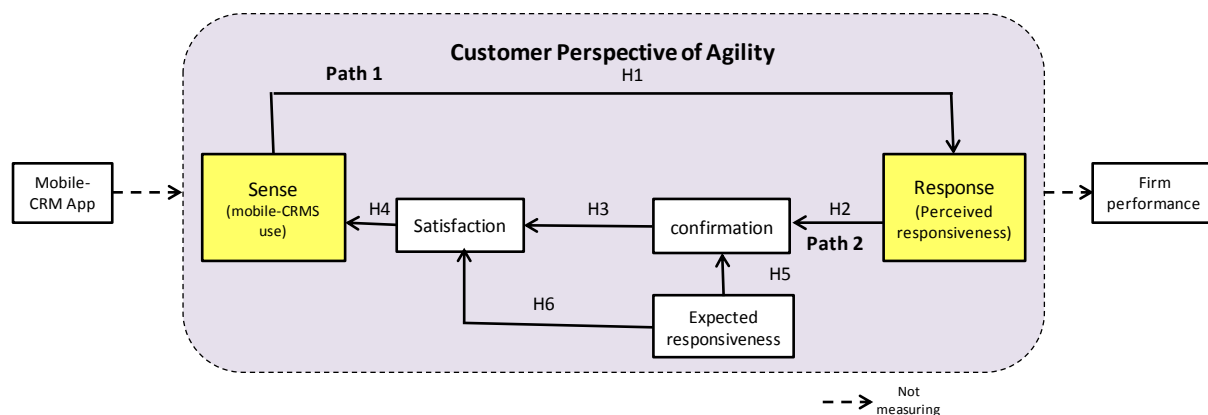


Figure 1 Conceptual model: Customers use of mobile CRMS, customer perceived firm’s responsiveness and firm’s customer agility.

Consequently, the firm understands the customer requirement better and then take necessary responsive actions based on the opportunities sensed. Following which the customers experience the firm’s responsiveness to his/her requirements. Customer may experience the firm’s responsiveness in two ways: speed of the responsiveness or the appropriateness of the response (response expertise). The responsiveness not necessarily be displayed through the mobile-CRMS app but the customer may perceive that he/she is well looked after by the firm by more of an integrated activities (e.g. direct mailers, alerts on the mobile, personalized product/service catalogues and so on). Following the firms responsive actions the customer then evaluates his experience (perceive responsiveness/post consumption variable) against his priori expectations (pre-consumption variable/expected responsiveness) as described in the notion of ECT (Oliver 1980). The resultant confirmation or rejection (disconfirmation) of expectation fulfilment will then define the customer satisfaction (or the

<sup>1</sup> Recognizing that a customer could create a shopping list, but not purchase the list fully, partially or not at all.

dissatisfaction). As previous ECT applications in different contexts suggests (Bhattacharjee 2001; Oliver 1980), satisfaction (or dissatisfaction) has the potential to trigger the customers decision of continuance (or discontinuance) of mobile-CRM use. The decision of continuance or discontinuance will then define the firm's chances of gaining customer insights on customer based opportunities or threats in future. Based on this argument we propose the conceptual model above (Figure 1).

To answer our first research question we apply the conception of agility (Path 1) discussed in previous literature (Overby et al. 2006; Roberts et al. 2012a; Roberts et al. 2012b). As explained in previous literature firms take necessary responsive actions once an opportunity is sensed to gain returns (Roberts et al. 2012a). Whilst well-developed sensing capabilities allow a firm to detect environmental change and identify emerging opportunities, the firm then need to seize such opportunities in a timely manner (Overby et al., 2006). Failing to respond to such opportunities readily will hamper the possibilities of getting sustainably competitive (Overby et al., 2006). According to the Roberts and Grover's (2012a) notion, the sense-response-performance is a process, where firm's sensing capability mediates its responsive actions. In other words a firm's sensing activity intervenes in a firm's responding capability. Applying these conceptions to our study context, we argue that the firm's responding capability depends on its ability to sense an opportunity, which is in turn dependent on the degree, or the extent to which customers are using the mobile CRMS. Based on this reasoning, we hypothesize:

H1: Customer's use of mobile-CRM positively affects firm's customer responsiveness.

To answer our second research question we apply the theoretical lens of ECT (Bhattacharjee 2001; Oliver 1980), following the sense-response alignment discussed in previous agility literature (Overby et al. 2006; Roberts et al. 2012a; Roberts et al. 2012b). Whilst customers use of mobile-CRMS allows the firm to detect changes in their requirements and identify emerging customer based opportunities, the notion of agility alignment (Overby et al. 2006; Roberts et al. 2012a) focuses on the sensing and responding synch. Based on this discussion we argue that the firm's responsive actions in customer-based opportunities should be content with what the firm senses about their customers. Whilst a firm's responsive actions are influenced by its ability to sense customers (via customer's use of mobile-CRMS), customers are able to experience the firm's customer responsiveness through the firm's numerous customer based competitive actions. When customers perceive that the firm is responding to their shopping requirements better through customized and well directed competitive actions, whilst satisfying what customers were expected from the mobile-CRMS in performing their regular shopping tasks, the customers are more likely to form positive perceptions on the mobile-CRMS. Following which perceived responsiveness of the firm (as they recognize that the firm is responding to their requirements), then defines the customer's continuance or discontinuance decision of using the mobile-CRMS. In other words positive customer perceptions stimulate customers continued use of mobile-CRMS, where the use (sense)-response process becomes iterative. As conceptualized in ECT customers expected responsiveness, degree to which they confirm their expectations, and post consumption satisfaction mediates the relationship between perceived customer responsiveness and decision of mobile-CRMS continuation (Path 2, in Figure 1 above).

Based on this reasoning, we hypothesize:

H2: Extent to which customer confirms the firms responsiveness is positively associated with their perceived responsiveness of the firm.

H3: Extent to which customer confirms the firms responsiveness is positively associated with their satisfaction of firm's responsiveness.

H4: Extent to which customer satisfied on the firm's responsiveness (we refer customer perceived responsiveness here) is positively associated with their use of mobile-CRMS.



H5: Customer expected firm’s responsiveness mediates the extent to which they confirm their perceived responsiveness.

H6: Customer expected firm’s responsiveness mediates the extent to which they satisfied about firm’s responsiveness (we refer customer perceived responsiveness here).

#### 4 MEASURES DEVELOPMENT AND TESTING

We followed the guidelines recommended by Churchill (1979) for developing measures of our constructs. We first conducted a literature search on firm’s customer agility to specify the domain of the construct (see Table 1). Following the definition of firm’s customer agility, we further reviewed literature to develop sub measures and measurement items for each construct of firm’s customer agility. Where possible, existing measures of constructs were adapted to the context of this study. For new measures and those that require significant changes, we followed the standard scale development procedures stipulated in MacKenzie et al., (2011). Table 3 below lists the sources and items for all construct measures, Appendix B provide the discussion of formative/reflective nature of the measures.

As we surrogate firm’s sensing component of agility to customer’s use of mobile-CRMS, we explore the literature on construct “Use” for developing measures for customer sensing. In doing so we followed the guidelines prescribed for usage constructs development by Burton-Jones and Straub (2006). Then, we generated sample items for organizational responding capability based on the literature from market orientation, customer orientation and customer agility domains and from validated measures of similar constructs (e.g. Jayachandran et al., 2004; Kohli et al., 1993; Roberts & Grover, 2012a, 2012b). Upon generation of sample items and validated measures of similar constructs for both use (Burton-Jones et al. 2007; Burton-Jones et al. 2006; Venkatesh et al. 2003) and perceived firm’s responsiveness (Jayachandran et al. 2004; Kohli et al. 1993; Roberts et al. 2012a) we gave careful consideration to the content validity of the measures since we have adapted them from previous studies. We pre-tested the items for the wordings and meanings with a group of doctoral students to assess the reliability and validity of our measures. Based on the feedback, minor changes were made to the wording and design of the survey instrument. Table 2 below lists the summary of constructs and sub-constructs and their sources.

Construct	Items	Measure source
Customers use of mobile-CRM (Sense)	<p><b>I frequently use this mobile app to.....</b></p> <ul style="list-style-type: none"> <li>– Find products.</li> <li>– Prepare my regular grocery shopping list.</li> <li>– Place orders online.</li> <li>– Provide comments and feedback.</li> <li>– Find a store more convenient</li> </ul>	(Barki et al. 2007; Burton-Jones et al. 2006; Venkatesh et al. 2008; Venkatesh et al. 2003)
Perceived (Customer) responsiveness	<p><b>Woolworths/Coles.....</b></p> <ul style="list-style-type: none"> <li>– quickly react to the fundamental changes in my product requirements by providing me with relevant customized information</li> <li>– is fast to provide information about discounts and promotions based on the shopping list created in the mobile app</li> <li>– is quick to provide information on discounts and promotions when I change my preferred store based on the products I created in my shopping list</li> <li>– can easily satisfy my new and changing needs</li> </ul> <p><b>When I....</b></p> <ul style="list-style-type: none"> <li>– Browse recipes using the mobile app, Woolworths/Coles is quick to provide relevant promotional information for the products required to make that recipe</li> <li>– Continue to purchase a new product (e.g. Baby</li> </ul>	(Jayachandran et al. 2004; Kohli et al. 1993; Roberts et al. 2012a; Roberts et al. 2012b)

	<p>nappies) repetitively, Woolworths/Coles quick to respond to it by providing other associated product information (e.g. other baby products)</p> <ul style="list-style-type: none"> <li>– Pass a nearby Woolworths/Coles store, the mobile app is able to recognize my physical location to prompt discounts and promotions on my usual purchases for the particular store.</li> </ul> <p><b>I can</b> easily find the products required to satisfy my changing needs using the Woolworths/Coles mobile app.</p> <p><b>The product</b> displayed in the specials section of the mobile app reflects my specific requirements</p> <p><b>Overall</b> the information I regularly receive from Woolworths/Coles is useful and matches my preferences</p>	
Expected (Customer) responsiveness	<p><b>I expect Woolworths/Coles.....</b></p> <ul style="list-style-type: none"> <li>– to provide information about discounts and promotions based on my specific requirements</li> <li>– mobile app to be responsive to my changing needs and wants</li> </ul>	(Bhattacharjee 2001)
Confirmation of responsiveness	<p>My experience with using the Woolworths/Coles mobile app for shopping was better than what I expected</p> <p>Responsiveness of the Woolworths/Coles mobile app on my shopping requirements is better than what I anticipated.</p> <p>Overall, most of my expectations from using the Woolworths/Coles mobile app were confirmed or exceeded</p>	(Bhattacharjee 2001)
Customer satisfaction	<p><b>I am satisfied with...</b></p> <ul style="list-style-type: none"> <li>– the purchasing products functionality provided by the app</li> <li>– my overall experience of the Woolworths/Coles mobile app use</li> </ul>	(Bhattacharjee 2001)

Table 2: Construct measures (Pilot study)

Next, a pilot test was conducted with a small sample of respondents from fellow doctoral students and faculty members and the analysis placed sufficient confidence in the scales to proceed with the full-scale survey administration of the target sample frame. Following the pilot test, a follow-up discussion with a small group of respondents was conducted to further evaluate the reliability and validity of our measures. Following their feedback we further changed the wording, design and number of items to develop the final survey instrument. Following which, we proceed with the full-scale survey administration of the target sample frame. Multiple sources were employed for the sample frame in order to capture a sufficient number of respondents. An online survey was posted on the user community pages on a social media site of the two case organizations. Additionally the URL of the survey was subsequently emailed to a selected sample of current and potential users of mobile-CRMS comprising of students, faculty members and other staff in one of the leading universities in Australia.

## 5 RESULTS – PILOT TEST

The pilot study employs 30 completed surveys were returned with a response rate of 37.5%. All respondents fully completed their surveys where no missing data were found. Further the respondents

were provided feedback on wording, clarity, structure and the number of questions of the instrument. The feedback gained from the pilot was then incorporated to the final instrument.

Then we analysed our proposed research model using partial least squares (PLS) structural equation modelling (using SMART PLS 2.0 Software: Ringle et al. (2005)), a component based approach (Lohmöller 1989). PLS allows to test the psychometric properties of the scales used to measure a variable (measurement model) and the strength and direction of the relationship between the variables (estimation of the structural model) simultaneously (Xu et al. 2011). As mentions in Xu et al. (2011), assessment of measurement models should examine (1) item reliability of individual measures, (2) internal consistency, and (3) discriminant validity (Barclay et al. 1995). We tested the two paths of our model separately for item reliability, internal consistency and discriminant validity using SMART PLS 2.0 as below.

### 5.1 PLS Analysis of Path A: Mobile-CRMS use-perceived responsiveness from the lens of theory of agility

To support individual item reliability, we examined the loadings of the individual measurement items on their intended constructs and compared them for the recommended tolerances of 0.60 or, ideal tolerance limit of, 0.70. A reasonable number of measurement items were met the tolerance limit (see Appendix B) whilst all of the items met the suggested tolerance limits ( $>0.70$ , Fornell et al. (1981)) for composite reliability and Cronbach's alpha with results reported in Appendix C. Further all construct pairs met the requirement, the root square of the AVE of any latent variable is greater than the correlation between that particular latent variable and other latent variables (Barclay et al. 1995). Additionally, perceived response speed was influenced significantly by mobile-CRM use ( $\beta = 0.71$ ,  $p < 0.05$ ). Further the PLS testing of the model confirms our hypothesized relationships where standardized path coefficients, path significances, and variance explained ( $R^2$ ) for each dependent variable are presented in Figure 2 below.

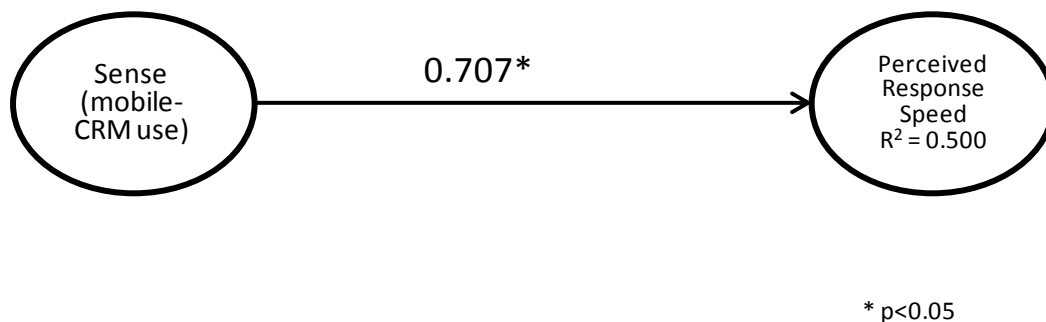


Figure 2 PLS Analysis of the Mobile-CRMS Use – Perceived Responsiveness model.

### 5.2 PLS Analysis of Path B: Perceived responsiveness-mobile app use from the lens of Expectation Confirmation Theory

To support individual item reliability, we examined the loadings of the individual measurement items on their intended constructs and compared them for the recommended tolerances of 0.60 or, ideal tolerance limit of, 0.70. Over 64% of the measurement items were met the tolerance limit (Appendix D) whilst over 90% met the suggested tolerance limits ( $>0.70$ , Fornell et al. (1981)) for composite reliability and Cronbach's alpha with results reported in Appendix E. Further all construct pairs met the requirement, the root square of the AVE of any latent variable is greater than the correlation between that particular latent variable and other latent variables (Barclay et al. 1995). All paths of the model were statistically significant where expected responsiveness has a strong negative effect on confirmation of responsiveness ( $\beta = -0.087$ ,  $p < 0.001$ ) providing support for H5. Consistent with H2, perceived responsiveness shows a significant effect on confirmation of responsiveness. Additionally,

satisfaction was influenced significantly by responsiveness confirmation ( $\beta = 0.66$ ,  $p < 0.05$ ), and expected responsiveness ( $\beta = 0.098$ ,  $p < 0.05$ ) which are consistent with H3 and H6. Mobile-CRM use was significantly influenced by customer satisfaction ( $\beta = 0.577$ ,  $p < 0.05$ ) supporting H4. Further the PLS testing of the model confirms our hypothesized relationships where standardized path coefficients, path significances, and variance explained ( $R^2$ ) for each dependent variable are presented in Figure 3 below.

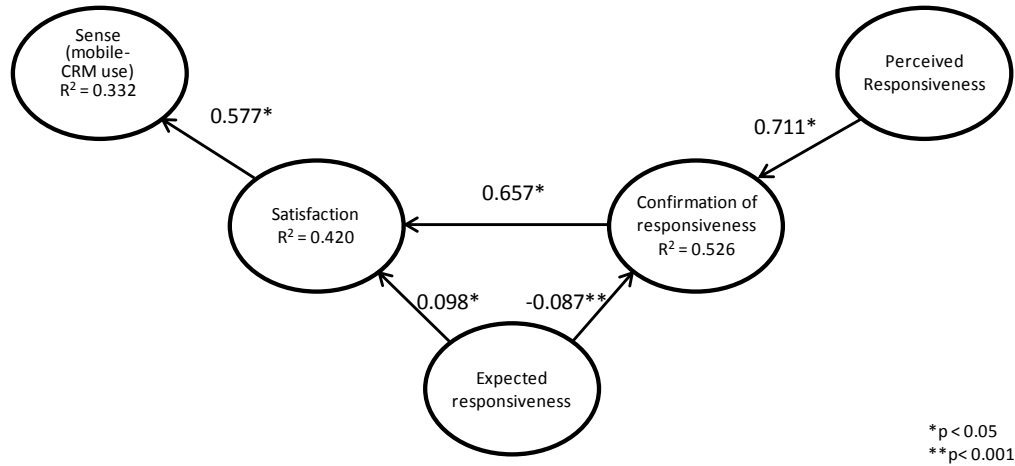


Figure 3 PLS Analysis of the Perceived Responsiveness-Mobile-CRMS use model.

The pilot analysis placed sufficient confidence in the scales to proceed with the full-scale survey administration of the target sample frame. As we expected the relationship between expected responsiveness and confirmation of responsiveness shows a negative relationship whilst between other constructs the relationship remains as we anticipated.

## 6 DISCUSSION

Overall, we found support in our preliminary testing for all the hypothesized relationships in our conceptual model. Findings of the pilot support the idea that customer's use of mobile-CRMS supports organizations customer sensing as suggested in the notions of agility (Overby et al. 2006; Roberts et al. 2012a; Roberts et al. 2012b). Similarly, the findings supports our idea that customer perceived responsiveness then influences the customers decision of mobile-CRMS use. Even though it is not conclusive, the finding of the pilot also suggests that the relationship between perceived customer responsiveness and their continuance (or discontinuance) mediated by their expected responsiveness, confirmation of their expectations and the satisfaction outcome as discussed in previous ECT discussions in other contexts (Bhattacharjee 2001; Brown et al. 2012; Oliver 1980). The findings demonstrate significant relationships among constructs, support our conceptualization of customer agility, our pilot analysis place enough confidence in the scales for us to proceed with the full-scale survey administration of the target sample.

Previous research provides significant insights into the relationship between IT and firm agility (Nazir & Pinsonneault, 2012; Overby et al., 2006; Sambamurthy et al., 2003; Tallon & Pinsonneault, 2011). Meanwhile some researchers studied more specific IT characteristics such as integration, flexibility and digital options and the two key characteristics of agility; the sensing and responding components (e.g. Nazir & Pinsonneault, 2012; Sambamurthy et al., 2003). A firm can demonstrate its agility in various areas, such as its interactions with business partners, customer-based processes, and day-to-day operations (Roberts & Grover, 2012; Sambamurthy, 2003). As Roberts & Grover (2012b) asserts, agility is a domain specific capability that comprised with ability to sense and response quickly to market based opportunities. Conception of agility is diverse and many aspects of it can be studied in number of different domains. Whilst many aspects of firm's agility can be studied, we conceptualized a research model that relates firm's customer sensing capability to the firm's customer responding capability in the context of ubiquitous mobile-CRMS.

Following the emergence of U-IS together with the rise of techno savvy customers and popularity of Smartphone usage individual customers are becoming an important user cohort of corporate IS. Up until now the customers role in corporate IS Sensemaking has never been featured in academic discussions. In this research we hypothesized that the customer's use of mobile-CRM positively affects firm's customer responding capability by arguing customers use of mobile-CRM as a proxy for firm's customer sensing capability. Also we hypothesized that perceived customer responsiveness positively affects customer's use of mobile-CRM where the firm is able to achieve improved opportunities for sensing customer based opportunities. Our empirical testing of the aforementioned hypothesis would contribute to a theory-guided understanding of the sense-response-performance process (Roberts et al. 2012a; Roberts et al. 2012b) of firm's customer agility. Further, this study extends current literature on customer agility to a new perspective by taking the customer's viewpoint of organizational agility. Moreover, we will be able to identify the factors influencing (mediate and moderate) customers use of mobile-CRMS, and be able to understand the influence of customers' use of mobile-CRMS on organizational customer agility. Additionally, the theoretical grounding will help to explain the phenomenon sense-respond alignment, the influence of contemporary mobile-CRMS on firm's customer agility, and the customers' involvement in two key components of firm's customer agility: sensing and responding. This research recognises individual customers as a prominent user group in contemporary ubiquitous information systems paradigm. In doing so this study explores how their use of corporate IS (i.e. mobile-CRM) influence organizations customer agility. In other words, this research contributes to the IT Sensemaking literature by introducing a novel perspective of customer's role in extracting business value from IT in the organizations. This research contributes to the practice by highlighting the factors antecedents to customer's use of mobile-CRM, importance of enriching customers use of corporate IS, and the role of customer perceptions in IT.

Our use of mobile-CRM as the context limited our ability to fully understand firm's develop and leverage its overall ability to sense and respond to their advantage in delivering customer satisfaction and achieving superior firm performance. While the constant advancements of mobile technology, nature of mobile applications, interactivity and their use in the organizational context poses many challenges for developing meticulous measures, future research should develop more rigorous measures of how firm's leverage such technological advancements/tools to achieve superior customer agility via sensing and responding capabilities. We believe that this study adds more detail to the agility construct by introducing the missing customer perspective to the extant body of literature. It reflects the importance of customer perception in today's hypercompetitive business environment. However, in order to understand this critical, yet under investigated perspective, and to build on this work, far more research is required on the nomological network around customer's perspective of agility. Now that we have investigated firm's agility from customers perspective using contemporary mobile-CRM context, future research may extend this work to the other relevant contexts such as supply chain agility, and operational agility to further investigate customers' view of organizational agility. For practice, as our empirical investigation suggests firm's should align the sensing and responding capabilities in order to achieve business benefits and sustained competitive advantage. We suggest organizations to put equal emphasis on nurturing sensing and responding capabilities as well as configuring and organizing themselves in aligning the two capabilities.

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**Appendix A: Multi-item latent variables analysis based on Jarvis et al., (2003).**

Construct	Are the indicators defining characteristics of the constructs?	Do changes in indicators causes changes in the construct?	Do changes in the construct cause changes in the indicators?	Do the indicators necessarily share a common theme?	Does eliminating an indicator alter the conceptual domain of the construct?	Is a change in one of the indicators necessarily associated with a change in all the other indicators?	Do the indicators have the same antecedents and consequences?	Scale type
Customers use of mobile-CRM (Sense)	Yes	Yes	No	Yes	Yes	No	No	Formative
Perceived (Customer) responsiveness	No	No	Yes	Yes	No	Yes	No	Reflective
Expected (Customer) responsiveness	No	No	Yes	Yes	No	Yes	No	Reflective
Confirmation of responsiveness	No	No	Yes	Yes	No	Yes	No	Reflective
Customer Satisfaction	No	No	Yes	Yes	No	Yes	No	Reflective

	Perceived Responsiveness	Sense/Use
PerRes1	<b>0.6171</b>	0.4749
PerRes10	<b>0.3849</b>	0.2099
PerRes2	<b>0.5464</b>	0.3225
PerRes3	<b>0.4355</b>	0.3138
PerRes4	<b>0.8555</b>	0.5708
PerRes5	<b>0.6352</b>	0.3123
PerRes6	<b>0.2895</b>	0.1368
PerRes7	<b>0.4647</b>	0.3563
PerRes8	<b>0.6734</b>	0.5452
PerRes9	<b>0.6603</b>	0.5358
Use1	0.4703	<b>0.8371</b>
Use2	-0.1077	<b>0.1411</b>
Use3	0.1496	<b>0.272</b>
Use4	0.1353	<b>0.4424</b>
Use5	0.7371	<b>0.9177</b>

**Appendix B: Loading and cross loading measures (Path A)**

	Composite Reliability	Cronbachs Alpha
Perceived Responsiveness	0.8229	0.769
Sense/Use	0.6827	0.722

**Appendix C: Internal consistency and discriminant validity constructs(Path A)**

	Composite Reliability	Cronbachs Alpha
Confir	<b>0.798</b>	<b>0.6292</b>
ExpRes	<b>0.9556</b>	<b>0.9095</b>
Per Resp	<b>0.8067</b>	<b>0.769</b>
Satis	<b>0.927</b>	<b>0.8428</b>
Sense/Use	<b>0.7893</b>	<b>0.722</b>

**Appendix E: Internal consistency and discriminant validity constructs(Path B)**

	Confir	ExpRes	Per Resp	Satis	Sense/Use
Confir1	<b>0.7102</b>	0.0989	0.512	0.3189	0.3767
Confir2	<b>0.7666</b>	-0.1566	0.6059	0.3637	0.5002
Confir3	<b>0.7839</b>	-0.2468	0.5205	0.6959	0.5634
Exp1	-0.1273	<b>0.9421</b>	-0.0271	-0.0105	0.0187
Exp2	-0.178	<b>0.9707</b>	-0.1587	-0.0077	-0.0462
PerRes1	0.4551	-0.1562	<b>0.6053</b>	0.3329	0.405
PerRes10	0.4825	-0.1233	<b>0.5356</b>	0.563	0.2178
PerRes2	0.1714	0.0842	<b>0.411</b>	-0.1261	0.1135
PerRes3	0.125	-0.0575	<b>0.3119</b>	0.1095	0.158
PerRes4	0.6613	-0.1523	<b>0.8859</b>	0.649	0.4717
PerRes5	0.2007	0.3782	<b>0.5269</b>	0.2915	0.1307
PerRes6	0.0817	0.0368	<b>0.1869</b>	-0.2899	0.0507
PerRes7	0.5074	-0.2907	<b>0.5544</b>	0.2054	0.3458
PerRes8	0.4751	0.029	<b>0.7042</b>	0.6567	0.5338
PerRes9	0.3255	0.1372	<b>0.6086</b>	0.4117	0.4116
Satis1	0.5973	-0.0615	0.5714	<b>0.9368</b>	0.6011
Satis2	0.5936	0.05	0.6613	<b>0.922</b>	0.4642
Use1	0.547	0.1872	0.4892	0.6163	<b>0.8855</b>
Use2	0.2749	-0.0633	-0.0189	0.04	<b>0.4338</b>
Use3	0.2712	-0.2458	0.1628	0.2527	<b>0.5208</b>
Use4	0.534	-0.3497	0.2028	0.2757	<b>0.6823</b>
Use5	0.4856	0.0604	0.6851	0.3765	<b>0.7095</b>

**Appendix D: Loading and cross loading measures (Path B)**