STAGE 2 PROPOSAL

The Medical Selfie: A Study of Value
Co-Creation & Patient Engagement

KARA RENEE BURNS

PHD STUDENT

SCHOOL OF ADVERTISING, MARKETING AND PUBLIC RELATIONS

QUT BUSINESS SCHOOL

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1. **RESEARCH TITLE**

“The Medical Selfie: A Study of Value Co-Creation & Patient Engagement”

2. **PROPOSED SUPERVISORS**

**Principal Supervisor: Professor Judy Drennan**

Professor Judy Drennan, Leader of the Services Innovation Research Program in the Faculty of Business, Queensland University of Technology, has published over 100 refereed academic papers and has won numerous best paper awards in a variety of research areas that includes services marketing and mobile marketing. Judy’s current research interest is the impact of mobile phones on consumer wellbeing. Given her research excellence in services marketing Professor Judy Drennan is a suitable Principal Supervisor for this research, which uses the services marketing approach theory to examine the role of patient-generated medical photography and its effects on patient engagement within the consumer-provider relationship.

**Associate Supervisor: Dr. Shane Mathews**

Dr. Shane Mathews is an award winning QUT academic researcher in the areas of technology and internationalization in the services marketing domain. His reputation for research rigor in case study design will be instrumental in creating three studies with high reliability and validity.

**Associate Supervisor: Professor Gerry FitzGerald**

Gerry FitzGerald is Professor of Public Health in the Faculty of Health at QUT and Director of the Centre for Emergency Management and Disaster (CEMD). Professor FitzGerald has extensive experience in healthcare research with over 50 academic publications in the last 5 years. FitzGerald will oversee the ethical requirements of this research.
3. BACKGROUND AND INTRODUCTORY STATEMENT

3.1 Introductory Statement

Treasury modelling suggests that by 2023-4 the entire budgets of the states will need to be allocated to health if Australians want to maintain the current level of spending (and service) in the health area (Altman, 2014). Given the necessity to reduce costs, while maintaining quality of health care, new models of medicine are being developed. Specifically, there is a shift from the expensive tradition of ‘disease fixing’, to a holistic approach of ‘wellness promotion’, placing consumers (patients) and consumer engagement at the centre of healthcare (Bragazzi, 2013; Cumming G, 2010; Hood & Weston, 2004).

Patient Engagement (PE) has been dubbed the “blockbuster drug of the century” (Taylor, 2013) and a ‘Patient Engagement Framework’ in the United States of America implemented by the Office of National Coordinators of Health IT (ONC) and the National eHealth Collaborative (NeHC) recommends that the PE can be implemented into routine clinical practice through the patients use of Personal Health Records (PHRs) and Patient Generated Health Data (PGHD) (Deering, 2013). This thesis aims to explore the relationship between patient generated health data and patient engagement. Using the theory of Value Co-Creation, this research will examine provider (doctor) and patient acceptance and use of patient generated health data. This research will implement the phenomena into routine clinical practice for an investigation of value, managerial implications and patient engagement.

Patient generated health data is any clinically relevant data, collected by a patient outside the clinical care setting (Shapiro, 2012). A feature that distinguishes it from other data is that consumers control its use and can distribute it to providers and personal networks (Shapiro, 2012). Data can be quantitative, e.g. blood glucose level readings, qualitative e.g. a diary of mood changes or visual, e.g. a series of photographs of a skin lesion that shows changes over time. Patient Generated Medical Photography (PGMP), a form of patient generated health data, aids diagnosis (Armstrong, 2004; Hanu-Cernat, Hall & Barnard, 2009) and improves recognition of healthy behaviours (Boyle, Gilmore, Xu & Soyer, 2011). There many expert opinions speculating the link between patient generated health data and patient engagement (Ahern, Woods, Lightowler, Finley & Houston, 2011; Huba & Zhang, 2012; Shapiro, 2012; Van Doornik, 2013; Washington, 2014). Research in this nascent area is limited and has primarily focused on the diagnostic potential of patient generated health data, with patient engagement as an ancillary finding (Nelsen, 2012). To date, no known research has
emphasised the role of the facilitator (e.g. doctor) or investigates the use and acceptance patient generated health data for patient engagement as a primary outcome.

Accordingly this research will investigate the link between patient generated health data and patient engagement and its impact on value co-creation within the provider-patient service experience. This may in turn, have benefits for tripartite aim of better, cheaper, safer healthcare (Washington, 2014). The next section addresses the patient as prosumer engaging in data generation.

3.2 The Literature Review

3.2.1 The Patient as a Prosumer

Traditionally healthcare was a place of ‘doctor-knows-best’. ‘Patient centeredness’ was conceptualized (Berwick, 2001) and gained popularity in the early 2000s. In today’s era of Web 2.0 information access, patients are now seeking to become partners in managing their own healthcare (Hewitt-Taylor & Bond, 2012) to the extent that patient-centred care is considered the gold standard of modern healthcare (Kramer et al., 2014).

The term professional consumer, or ‘prosumer’ in the context of this research, was introduced by Alvin Toffler and is aligned with Iedema et al’s (2008) ideas that the patient can be a producer “emphasizing the power of the consumer to define the product of healthcare through negotiating and bargaining” (Fulop, 2012, p. 9). This new ‘patient as a prosumer’ concept endorses the use of marketing theory to understand some of the service dimensions of healthcare. The current marketing paradigm of Service Dominant (SD) Logic (VL, 2004) is a shift away from a tangible goods based schema to a new logic of intangible services, and provides the theoretical perspective for this research.

3.2.2 Service Dominant Logic, Value Creation and Value Co-Creation

The creation of ‘value’ in a SD Logic and service interaction has been well recognized, but poorly researched (Grönroos & Voima, 2013). The concept of ‘value’ is highlighted as key in the service perspective shift and it is accepted that value must be experienced by the customer (Vargo & Lusch, 2008). A customer-centric view of value creation suggests value can be co-created by consumers and providers who have value creation roles (Grönroos & Voima, 2013) (Figure 2). This model incorporates production and value creation perspectives and specifies consumer and provider value co-creation roles and provider value co-creation roles.
An important aspect of this conceptualization of value co-creation suggests patients are independent creators of value and can invite others (carers, providers) to join them (Hardyman, Daunt & Kitchener, 2014). Value co-creation has been expanded to ‘identify ‘roles,’ ‘activities’, and ‘interactions’ that underlie customer co-creation of value in health care (McColl-Kennedy, Vargo, Dagger, Sweeney & Kasteren, 2012). This seminal work determined Customer Value Co-Creation Activities (CVCCA) and the Customer Value Co-Creation Practice Styles (CVCCPS) of Team Management, Insular Controlling, Partnering, Pragmatic Adapting and Passive Compliance.

This study only tells part of the patient-provider story. Fundamental to the success of patient-provider value co-creation and the use of patient generated health data for patient engagement is the providers’ acceptance of this data, even when it is not requested. Using Value Co-Creation theory this research will address this gap, investigating provider acceptance of patient generated health data for patient engagement as the primary outcome.

Figure 1: Value Co-Creation Model (Grönroos & Voima, 2013)
3.2.3 Consumer and Patient Engagement

Consumer engagement is defined in the literature in terms of a psychological state (Brodie, Hollebeek, Juric & Ilic, 2011; Mollen & Wilson, 2010; Patterson, 2006; Vivek, Beatty & Morgan, 2012) however it has also been conceptualised as a dynamic process with Brodie et al. (2011) suggesting it is “as a form of social, interactive behaviour, has been characterized as a transient state occurring within broader relevant engagement processes developing over time (p.254).” Precursors to patient engagement were the notions that biological health and psychological health can be mutually exclusive, and that “illness oriented” medicine is only one part of a wider story of how to treat a patient (Balint, 1969).

Today, an emphasis on quality and safety has “refocused attention on patient outcomes, even if efforts to ensure more consistently positive outcomes sometimes reduce the physician’s prized autonomy (Bardes, 2012, p. 782).” Patient engagement is more than just focussing on psycho-cognitive needs and the patho-physiological needs of the patient and measuring patient engagement through doctor-patient communication (Kaplan, Greenfield & Ware, 1989); it is about radical change in medicine, caused by the shift of the patient role from passive recipient to active consumer (Bardes, 2012; Bragazzi, 2013; Hood & Weston, 2004) Many expert opinions have linked patient engagement to patient generated health data (Ahern et al., 2011; Huba & Zhang, 2012; Shapiro, 2012; Van Doornik, 2013; Washington, 2014), and it has been suggested “a patient engagement system that is largely automated and based on patient-reported data could improve interaction between provider and patient (Boland, 2007).”

This research uses the fundamental propositions of customer engagement (Brodie et al., 2011), guided by a patient engagement classification (Grande, Faber, Durand, Thompson & Elwyn, 2014) that was created to implement patient engagement into routine clinical practice. See Figure 2. In addition this research recognises that the process of engagement can occur before and after the direct interaction of patient and provider, as is the case with the creation of patient generated health data.
This research will build on the theoretical constructs presented above and include the patient generated health data phenomena, created outside the consultation.

3.2.4 Patient Generated Health Data

Patient generated health data is not new (Mazze et al., 1984); however the proliferation of digital techniques to capture the data, mainly through smart phones, and policy shift towards incorporating it into Personal Health Records (PHRs) (Deering, 2013) means the impact of patient generated health data in clinical encounters is larger than ever before (Shapiro, 2012). Early use of patient generated health data tested the accuracy of self-reported measures of blood glucose levels for improved diagnostic use (Mazze et al., 1984) and was indicative of the ‘provider-facing’ approach to the phenomena. Patient generated health data is primarily useful to providers by aiding diagnosis (Mazze at al. 1984; Tang et al. 2006; Huba et al. 2012; Ahern et al 2011). For example, a patient had experienced a transient rash over many years, which was undiagnosed as the condition had never been present during consultations with her physician. After taking images of the condition on a mobile phone when it appeared on a shopping trip, the patient presented the evidence to her physician and she was diagnosed as
having a typical urticarial rash, not a photosensitive manifestation as previously thought (Armstrong, 2004).

Consequences for the provider of accepting unrequested data include risk management, legal implications, duplication of data, technical readability, retention, policy development (Archer et al., 2013) data privacy (Huba & Zhang, 2012) interoperability (Taylor, 2013) and data tagging (Van Doornik, 2013). Data accuracy is an important aspect of patient generated health data (Mazze et al., 1984; Nundy, Lu, Hogan, Mishra & Peek, 2014). In the study by Nundy et al. (2014), it was suggested that data accuracy would be improved by reducing recall bias because patients could log real time data about diabetes management adherence (e.g. How many days in the last week did the patient take their medication?). This contradicted the findings of Mazze et al.(1984) who noted that automatic tracking of blood glucose levels (BGLs) for diabetes management was better than patient reported logs, as patients were likely to report ‘socially desirable’ results. In light of this, patient generated medical photography may have a unique potential to provide evidence which overcomes the patient’s tendency for inaccurate reporting and eliminates recall bias.

Research shows that patient generated health data is accepted by clinicians although 75% of doctors who used the data in a clinical assessment reported it did not impact on their clinical decision making (Nundy et al., 2014). Health information managers approach unrequested data with caution, with one practitioner suggesting it is “unsolicited material” (Archer et al., 2013), likening it to ‘junk-mail’. Yet in the exploratory study by Huba et al. (2012) where twenty-one medical practitioners from 16 disciplines were interviewed about the use and issues of patient generated health data, suggested outcomes were improve patient-provider communication and an improved ability for patients to recognize their own illness.

Analysing the implications of patient generated health data from the provider perspective only tells part of the story. The real impact of patient generated health data is the suspected impact on patient engagement (Ahern et al., 2011; Van Doornik, 2013) through recognition of healthy behaviours (Boyce et al., 2011) and better treatment compliance (Steward, Hofler, Thaldorf & Milov, 2010). Previous studies show that patient generated health data improved patient activation (Nundy et al., 2014; Tang, Ash, Bates, Overhage & Sands, 2006) which is a state characterized by an informed, knowledgeable, active patient (Hibbard, Stockard, Mahoney & Tusler, 2004). Huba et al (2012) reported a suspected link between the use of
patient generated health data, illness recognition and healthy behaviours with one doctor reporting:

“It is not just me learning about them, they are learning about themselves. Um, you know, people come in, let’s say they’ve been tracking their impulsive anger and they begin to realize that they are mostly angry around this particular time for a particular reason. They discover it because they pull it out of the data, which is much more powerful in my business than me figuring it out and telling them (p 3898).”

This powerful concept coupled with real evidence that patient generated health data saves patients’ time and money (Frühauf et al., 2012) is a strong motivator for the research of patient generated health data and its effects on patient engagement.

### 3.2.5 Patient Generated Medical Photography

Patient Generated Medical Photography (PGMP) is one form of patient generated health data. Research utilising patient generated medical photography has primarily focused on the diagnostic benefits for the provider, however patients are also benefit recipients. In addition to the correct diagnosis of previously undiagnosed conditions (Armstrong, 2004; Hanu-Cernat et al., 2009; Pourdanesh, Sayyedi, Jamilian & Yaghmaei, 2012) patients reported that the use of PGMP improved their quality of life when managing chronic psoriasis (Frühauf et al., 2012) and improved the recognition of healthy behaviours (Boyce et al., 2011).

In the study conducted by Boyce et al. (2012), patients were instructed to take photographs of their melanocytic skin lesions for remote review. The research demonstrated that photographs sent by patients to providers, had concordant diagnosis rates with face-to-face assessment. Participants said the photography was easy to perform and ‘82% acknowledged that the study made them more aware of the importance of sun protection and of the early detection of melanoma (p.246).’ Interestingly only 49% of the participants took their own photographs, with 51% of images taken by people who are in the patients’ networks (e.g. partner, other family member). Little known research has investigated the patient generated health data and how it impacts on the people who are in the patients’ networks.

In an era where shrinking health budgets are promoting the radical rethinking of medicine to emphasize wellness promotion, over disease management, the ancillary finding by Boyce et
al. (2012) that patient generated medical photography leads to healthy behaviours and early disease detection is important. For this reason the patient facing benefits of medical photography require further research, particularly in respect to healthy behaviour choice, early disease detection, its role in patient-provider communication, patient-network collaboration and its ability to achieve patient engagement.

The identified gaps in the literature are shown in Figure 3. Nine research questions (see page 14) based on the gaps have been developed to answer the overall question:

“How does patient generated medical photography affect patient engagement?”
<table>
<thead>
<tr>
<th>Provider Facing Implications</th>
<th>Proposed Implications of PGHD via Expert Opinion</th>
<th>PGHD Research in Routine Clinical Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost¹ &amp; Time² Implications</td>
<td>Tang et al 2006 (Decrease1.2); Huba et al. 2012 (Increase1.2) Shapiro et al 2012; Archer, 2013; Taylor, 2013 (Decrease1.2) Steward et al 2010 (Increase1.2); Archer, 2013 (Increase1.2) Frühaufl et al. 2012 (Decrease1.2); Pourdanaeesh et al 2012 (Decrease1.2) Nelsen et al 2012 (Decrease &amp; Increase 2)</td>
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<tr>
<td>Data Accuracy</td>
<td>Tang et al 2006 (Improved); Ahern et al 2011; Taylor, 2013 (Noted Issue) Van Doornik 2013 (Noted Issue) Mazze et al. 1984 (Improved); Huba et al. 2012 (Improved); (Nundy et al. 2014 (Improved by reducing recall bias)</td>
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<tr>
<td>Patient-Provider Relationship Changes</td>
<td>Ahern et al 2011; (improved trust)Shapiro et al 2012; Washington, 2014 (improved trust); Nelsen et al 2012</td>
<td>GAP</td>
</tr>
<tr>
<td>Patient Facing Implications</td>
<td>Proposed Implications of PGHD via Expert Opinion</td>
<td>PGHD Research in Routine Clinical Practice</td>
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<tr>
<td>Use Issues</td>
<td>Tang et al 2006 (easy to use); Huba et al. 2012 (misinterpretation) Nelsen et al 2012 Boyce et al. 2011(Easy to use); Frühaufl et al. 2012 (Easy to use)</td>
<td></td>
</tr>
<tr>
<td>Cost¹ &amp; Time² Implications</td>
<td>Tang et al 2006 (Decrease1.2) Ahern et al 2011 (Decrease2) Frühaufl et al. 2012(Decrease1.2) Nelsen et al 2012</td>
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<tr>
<td>Improved Quality of Life</td>
<td>Tang et al 2006; Frühaufl et al. 2012; Shapiro et al 2012 Nelsen et al 2012</td>
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</table>

**Figure 3:** Patient Generated Health Data Research with Identified Gaps

Ancillary Finding = Research not specifically designed to test finding, but it was reported
3.3 Research Problem and Contributions

This thesis aims to explore the relationship between patient generated health data and patient engagement as a primary outcome. Using the theory of Value Co-Creation this research will examine provider and patient acceptance and use of patient generated medical photography, its effects on patient engagement and any changes in the consumers relationships, both provider-patient and the providers own networks (e.g. family, peers, carers).

Contribution 1
This research will examine providers’ acceptance and use of patient generated health data for patient engagement.

Contribution 2
This research will determine the factors impacting on individual’s uptake and acceptance of patient generated health data.

Contribution 3
This research will develop a practice guide for using patient generated medical photography for patients with visible pathologies, highlighting the opportunity for it to be used for patient engagement.
Through the detailed examination of one element of the larger patient-provider value co-creation discourse this research will contribute to new knowledge by examining the following research questions:

Overarching Research Question:

**How does Patient Generated Medical Photography affect Patient Engagement?**

**Provider facing:**
1. How do providers use patient generated medical photography in a routine setting to encourage patient engagement?
2. How do provider styles differ when using patient generated medical photography in a routine setting to encourage patient engagement?
3. How does the use patient generated medical photography affect data accuracy?
4. How does patient generated medical photography function as an aid in consumer-provider communication to improve trust?

**Patient facing:**
5. How does patient generated medical photography encourage healthy behaviour choice?
6. What does the patient define as the “valuable use” of patient generated medical photography in clinical routine setting?
7. What are the factors impacting on individuals’ uptake and acceptance of patient generated medical photography?
8. How the use of patient generated medical photography impact on the people who are in the patients’ networks?

**Managerial Implications:**
9. What are the benefits, consequences and managerial issues of implementing unrequested patient generated health data into routine clinical practice?
4. RESEARCH PROGRAM AND DESIGN

4.1 Objectives, Methodology and Research Plan

4.1.1 Research Objectives

Based on the overarching research problem, nine research questions were developed in Table 4 that will be explored in three studies.

<table>
<thead>
<tr>
<th>Research Gaps</th>
<th>Research Questions</th>
<th>Research Objectives</th>
<th>Methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overarching Aim</td>
<td>How does PGMP affect Patient Engagement?</td>
<td>Identify relationship between PGMP and Patient Engagement</td>
<td>Study 1,2,3</td>
</tr>
<tr>
<td>1. Nielsen et al. 2012 examined PGHD for patient engagement, using home monitoring technology as the method of facilitation of patient engagement. This research will focus on the provider as the value “facilitator” of patient engagement in a TTF clinical routine setting.</td>
<td>How do providers use PGMP in a routine setting to encourage patient engagement?</td>
<td>Qualitative In-depth Interviews Thematic Analysis using Constant Comparison to develop a model and process incorporating PGMP into routine clinical practice</td>
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<td>2. McColl-Kennedy et al (2013) developed customer co-creation styles and this research will develop Provider Value Facilitation Styles within the healthcare service environment.</td>
<td>How do provider styles change when using PGMP in a routine setting to encourage patient engagement?</td>
<td>Identify different value facilitation styles when PGMP is used to promote engagement in clinical routine settings.</td>
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<tr>
<td>3. Data accuracy was identified as an issue for PGHD (Tang et al. 2006 (Improved); Ahern et al 2011 (Noted Issue) yet data accuracy of PGMP is not yet explored in routine clinical setting.</td>
<td>How does the use PGMP affect data accuracy?</td>
<td>Identify impact on data accuracy of PGMP for provider and any advantages it has over other forms of PGHD.</td>
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<tr>
<td>4. It is suspected that PGHD can function as an aid in consumer-provider communication by improving trust (Ahern et al. 2011 Washington, 2014)</td>
<td>How does PGMP function as an aid in consumer-provider communication to improve trust?</td>
<td>Identify and explain how PGMP functions as an aid in consumer-provider communication to improve trust?</td>
<td></td>
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<tr>
<td>5. Boyce et al. 2012 showed a tactic finding that PGMP was linked with health behaviour recognition, but how it occurred was not clearly defined.</td>
<td>How does PGMP encourage healthy behaviour choice?</td>
<td>Identify and explain how PGMP functions as support healthy behaviour choices?</td>
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<tr>
<td>6. According to Value Co-creation Theory, the provider must facilitate the value of the patient, thus determining what the patient considers as valuable is critical.</td>
<td>What do the patients define as the “valuable use” of PGMP in clinical routine setting?</td>
<td>Identify and define as the “valuable use” of PGMP in clinical routine setting</td>
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<tr>
<td>7. Little known research has focused on the patients’ uptake of patient generated health data.</td>
<td>What are the factors impacting on individuals’ uptake and acceptance of PGHD?</td>
<td>Statistically validate the relationships, defined in the model developed in Study 1.</td>
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<td>8. It is suspected that use of PGMP will impact on the people who are in the patients’ networks (Tang et al 2006; Taylor, 2013; Ahern et al 2011; Van Doornik 2013) although research in this area is limited.</td>
<td>How does the use of PGMP impact on the people who are in the patients’ networks?</td>
<td>Explore if the use of PGMP impacts on the people who are in the patients’ networks?</td>
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<td>9. Research has scoped the potential issues of the use of PGHD (Shapiro, 2012) however the real issues encountered in the clinical setting are not well documented.</td>
<td>What are the benefits, consequences and managerial issues of implementing patient generated health data into routine clinical practice?</td>
<td>Identify the benefits, consequences and managerial issues of implementing patient generated health data into routine clinical practice?</td>
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Table 4: Research Gap, Research Questions, Research Objectives and Methodology
4.1.2 Research Methodology and Design

4.1.2a Study 1 - A Qualitative Study

This nascent and emerging area of research requires qualitative investigation (Edmondson & McManus, 2007). This study will use a vignette (scenario) study design (Finch, 1987) to test “attitudes, perceptions and beliefs” towards patient generated medical photography (Hughes, 1998). Non-leading scenarios, checked through inter-researcher reliability will describe instances of patient generated medical photography used in a clinical consultation. The scenarios will form the basis of discussion within semi-structured in-depth interviews. Both providers and patients will be asked questions about the patient generated medical photography that relate to the acceptance, use, value and engagement of the phenomena. Fifty to sixty interviews with patients and providers will be conducted, in order to achieve data saturation (Marshall & Rossman, 2011).

A purposive age and sex stratified sample will be used for patients. Providers will be stratified by specialization and seniority. Pre-screening of participants using an SF-25 Adoption of Information Technology Innovation Scale will occur to determine, patients and providers who are technology adopters (Moore & Benbasat, 1991). All participants will be required to own a smart phone.

Analysis of the data will occur through open coding, axial coding and selective coding (Corbin & Strauss, 2008). Inter-coder reliability checks (Cho, 2008) will be conducted and any disagreement on coding will be discussed until 100% convergence is reached. This research will employ continual re-examination of data in the light of developing conceptual relationships, using a constant comparison technique between the data, the a priori knowledge and alternative explanations to ensure rigor (Glaser & Strauss, 1999). A final conceptual model of the will be constructed for use in Study 2.
4.1.2b Study 2  A Quantitative Study
The second study is patient focused and will use structural equation modelling to test the relationships of the model in Study 1 (Hair, Black, Babin & Anderson, 2014).

Research Question:
2a: What are the factors impacting on individuals’ uptake and acceptance of patient generated health data?

A survey will be administered to ascertain uptake of patient generated health data using validated scales to assess the influence of factors such as innovativeness, engagement, perceived usefulness and perceived ease of use, subjective norms and perceived behavioural control on attitudes, intentions and behaviours towards patient generated health data. The final developed model to be tested for Study 2 will be informed by the qualitative research in Study 1. An age and gender stratified random sample of patients representing the overall clinic population who attend the QUT Wound Research Clinics, will be contacted to participate in the online survey. Probability sampling (Babbie, 2001) will determine samples numbers and a minimum of 200 cases will be required to satisfy the ‘normality’ requirements of multiple regression techniques (Hair et al., 2014). The data will be collated in SPSS Ver. 21. Structural equation modelling will be used to determine the relationships in the model.

4.1.2c Study 3  An Experimental Study
This experimental design will use randomly selected patients from the QUT Wound Research Centre to participate in a quasi-experiment (Shadish, Cook & Campbell, 2002). Recruitment will be done via the active patient list produced by the clinic. One patient group will be assigned the medical photography smart phone app PicSafe Medi. Another group will be as the control group. Patients will be instructed to take patient generated medical photographs between clinic visits for use during consumer–provider consultations for a period of three months. Immediately prior to their next routine appointment providers will be asked to fill in a survey that reports levels of patient engagement, through measures of patient activation (Hibbard et al., 2004) and any healthy behaviours performed will be logged. Data collection will be collected longitudinally for three months. The results will be collated in SPSS ver.21 and analysed using repeated measures analysis of variance (ANOVA) for significant changes in patient activation (Hair et al., 2014).
Patients and providers will be asked to participate in interviews to report on the use of patient generated health data, increased wellness activities, value co-creation and changes in consumer-provider relationship. The interviews will be transcribed, coded using open and axial coding. The quantitative survey data, healthy behaviour logs and qualitative interview data will be triangulated for provide the following information to explain understand the effect of patient generated medical photography on patient engagement.

4.2 Resources and Funding
The project requires the free use of a medical photography smart phone app PicSafe Medi for Study 3. Currently the app is free on a 3-month trial and this is the expected duration of the study. Currently this project does not required additional funding. If resources are required, funding will be sought and finalized pending research design finalization.

4.3 Individual Contribution to the Research Team
The proposed research project will work in conjunction with the QUT Wound Research Centre but it does not form part of a collaborative agreement. The doctoral candidate will conduct all research independently with assistance from the supervisory team. All intellectual property rights will be retained by Kara Burns; however, academic papers may be done in collaboration with the supervisory team.
## 4.4 Timeline for Completion of the Program

<table>
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<th>Time Elapsed</th>
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**Coursework**
- IFN001 AIRS
- BSN412 Qualitative Research
- BSN414 Quantitative Research
- BSN502 Research Methodology
- BSN503 Research Seminar

**Thesis Writing**
- Title & Abstract
- Introduction
- Literature Review
- Methodology
- Qualitative Data Collection
- Qualitative Data Analysis
- Quantitative Data Collection
- Quantitative Data Analysis
- Experiment Data Collection
- Experiment Data Analysis
- Discussion
- Conclusion
- Revision

**Ethics Applications**
- QUT Ethics Application

**Research Outputs**
- Conference Papers
- Journals
5. REFERENCES


Fulop, L. E. A., Mark; Clark, Eugene; Fisher, Ron James; Gapp, Rod Peter; Guzman, Gustavo Abel Carrillo; Herdington, Carmel; McPhail, Ruth Elizabeth; Poropat, Arthur Eugene; Vecchio, Nerina (2012). Outstanding Achievement and Lessons Learned about Consumer/Patient-Centred Care in the Australian Healthcare System. Paper presented at the 8th International Organisatioal Behaviour in Healthcare Conference: Patient-centred healthcare teams: Achieving collaboration, communication and care: Dublin University, School of Business.


6. APPENDIX

6.1 Coursework
During the candidature, five coursework units will be undertaken to contribute and provide structure to the overall research program.

The first unit undertaken is the BSN412: Qualitative Research and Analytical Techniques that seeks to equip the researcher with increased knowledge and skills about qualitative research. It is expected to be completed by Semester 1, July 2014.

The second unit undertaken is the BSN414: Quantitative Research and Analytical Techniques that seeks to equip the researcher with increased knowledge and skills about quantitative research techniques.

The third unit undertaken is BSN502 Research Methodology, which equips the researcher to understand the fundamentals of research methodology. It is expected to be completed by Semester 1, July 2014.

The fourth unit undertaken is BSN503 Research Seminar is an introduction to planning a research project and suggestions about how to undertake research on an academic topic. The subject will be completed by Semester 1, July 2014.

The fifth unit that will be undertaken is the IFN001: AIRS that will enable the researcher to be effective and efficient in their use of information and data resources and systems. This unit is expected to be completed in Semester 2, 2014.