

**U-Commerce:
Exploring The Value And Adoption Strategies
For Medical Scheme Administrators
In South Africa**

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by

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Abstract

The purpose of this research is to assess the true value of u-commerce and to address the problem of adoption. The case research analysis the u-commerce implementations of Discovery Health, a leading South African medical scheme administrator, to uncover sources of value and lessons learnt which inform a proposed strategy framework. The findings suggest that strategies focusing on operational efficiencies alone yield marginal value. Strategies should instead focus on solutions that improve the quality of complex decisions by all actors in the value chain by focus attention on context-rich information while simultaneously conserving attention where interactions are mundane and trivial. U-commerce achieves this by matching the electronic channel, user-interface and information density to the space/time context of the process actor seamlessly and intuitively as they traverse their personal workflow. Implementation threats are rooted in the technology and cultural readiness of the firm and the market. Appropriate leadership, culture and structure are shown to be critical success factors.

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This report is dedicated to wife, Delia, for being there and supporting me through this trying period as well as to my colleagues at Discovery Health for giving of their time, resources and experience so freely. Without your help this would not have been possible.

I certify that, except as noted above, the report is my own work and all references used are accurately reported.

David Hughes

Confidentiality

Discovery Health have agreed in good faith to being the unit of analysis for this study provided the content of the report (excluding the publishable article) be treated as confidential by the University of South Africa School of Business Leadership who will take the necessary precautions to restrict readership to those parties responsible for marking the report.

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1 Orientation

This purpose of this chapter is to provide a clear understanding of the objectives of the study and to fully orientate the reader prior to delving into the details of the foundation of the study, literature review, research methodology, research results and finally the discussion, conclusions and recommendations. It begins by introducing “u-commerce” as the central theme and discusses the scope of the research, the societal importance and focus as well as the environment in which the study took place. Finally the chapter ends with the broad plan that was followed to conduct the research.

1.1 Introduction

The world continues to shrink. People are able to engage with each other across the globe in ever-increasing degrees of richness. Our growing instant gratification society demands access to services “when they want” and “where they want”. In contrast to other resources or utilities, the more people use the internet the more valuable it becomes. As a result, power shifts. Distribution dynamics change dramatically in this new world. In the past, traditional intermediaries such as wholesalers, distributors and retailers added value by breaching the separation of time, space, information and discrepancies in quantity and assortment which existed between buyers and producers. Watson, Pitt, Berthon & Zinkhan (2002) argue that consumers find themselves in markets which are evolving from physical marketplaces to virtual marketspaces (websites on the internet) to u-space. In these virtual spaces buyers and producers breach many of these discrepancies themselves, giving rise to new opportunities for producers and increasing bargaining power for buyers. As Bothma (2005) succinctly states, “[t]he impulse to buy and the purchase itself used to be separated by a combination of physical and mental barriers”. A novel feature of yesterday. Extinct in the u-space of tomorrow.

This evolving new order drives a transition from the traditionally geography-driven firm to what Watson et al (2002) refer to as the network-driven firm. As a collection of stakeholders, the network-driven firm, is able to co-ordinate their activities through the exchange of electronically-mediated messages to achieve greater efficiencies and effectiveness in the production and/or deployment of services to their collective end-customer. Collaboration of this nature is critical if firms wish to compete for that ever-diminishing slice of scarce attention that consumers have left to offer – to be

there, ubiquitously, intuitively and relevant, in that split second when need and attention converge on the same space and time. When they achieve this, they are fulfilling the vision of u-commerce.

What is u-commerce? Its prefix derives from the word 'ubiquitous'. As a recent architectural innovation, it integrates various forms of commerce in a manner that provides a highly personalised, integrated, uninterrupted, 'always connected' relationship between transacting stakeholders (Galaxhi-Janaqi & Nah, 2004). It spans traditional brick-and-mortar commerce, e-commerce, mobile, wireless, voice commerce, silent, television commerce and telematics. Watson et al (2002) define it as the use of networks to support personalised and uninterrupted communications and transactions between a firm and its various stakeholders in a manner that is ubiquitous, universal, unique and in unison.

Galaxhi-Janaqi & Nah (2004) propose that the nature of u-commerce value is to be derived from improved operating efficiencies, enhanced customer services, increased service personalisation, realising continuous supply chain connectivity, continuous interactivity and opportunities for new innovation. At a macro-level, they also propose that the impact of u-commerce on an economy is to remove the friction from the exchange process and allow for greater fluidity and efficiency.

The problem however is that most organisations, unaware of the u-commerce concept, have inevitably taken a parochial view of the components that makes up u-commerce. As a consequence the individual components of u-commerce evolve organically and separately without direction from an informed and holistic strategy that could ultimately yield the true value of u-commerce. Galaxhi-Janaqi & Nah's (2004) research supports this view on a global scale. They state that "a great deal of research effort is required to realise the complete vision of u-commerce and to understand its implications" and is further illustrated by their suggested areas of further study:

- Assessing the true value of u-commerce
- Adoption strategies for u-commerce
- The implications of privacy, trust and security
- The rate of u-commerce technology innovation and adoption

Although the healthcare industry is no stranger to electronically mediated business processes, the idea of u-commerce is far from pervasive. Furthermore, the

healthcare industry suffers many of the market inefficiencies that u-commerce is hoped to address and therefore is likely to be fertile ground for demonstrating the true value of u-commerce.

1.2 Objectives

The objective of this study is to further the research performed by Galanxhi-Janaqi & Nah (2004) by focusing on their first two suggested areas, i.e. assessing the true value of u-commerce and exploring the adoption strategies for u-commerce.

1.3 Scope and Focus of the Study

The study of u-commerce is applied to the real life challenges facing the South African healthcare industry in an attempt to make the assessment of value tangible and the strategy implementation prescriptions relevant. Furthermore, the study takes the healthcare administrators perspective on the industry. Given their scale of economy, bargaining power and positioning as an agent of the healthcare funder and associated members, places them in a unique position of being able to potentially impact the healthcare industry in a significant way through an appropriate u-commerce strategy.

Other emerging issues on privacy, trust, security and the current trends of u-commerce technology raised by Galanxhi-Janaqi & Nah (2004) will be explored through literature review, but the research will set out to answer the specific research questions listed in the chapter on Research Methodology.

1.4 Importance of the Study

Galanxhi-Janaqi & Nah (2004) suggest that the impact of u-commerce on an economy is to remove the friction from the exchange process and allow for a more fluidity and efficiency. Given the regulatory pressures that the private healthcare industry in South Africa is exposed to, it is thought that the value derived from u-commerce solutions could provide necessary relief to the whole system. But there is also a possible positive spin-off for the public sector.

The South African private healthcare medical scheme industry is an R50bn industry and yet it only manages to serve 16% of 45 million South Africans, the rest are regarded as the uninsured by the private healthcare funding industry. In contrast, the state spends only R33bn on the uninsured (Paterson, 2005). The private healthcare industry is substantially more mature in its infrastructure and deployment of technology relative to the state system and is therefore a possible unique and

relevant innovation incubator for developing a blueprint for what may be an urgent and important industry-wide u-commerce solution for the public sector.

The regulator, medical schemes and the medical administrators are faced with the management dilemma of how to make effective healthcare more affordable to a broader spectrum of people in a country rife with socio-economic challenges. Furthermore, through a cost containment balancing act, the regulator attempts to deal with the imperfections of the free market with increasingly complex and burdensome regulations which threaten the virtues of a healthy competitive free market system. As the regulator applies increasing policy pressure on the industry to meet this goal, medical administrators attempt to alleviate this pressure on schemes by deploying increasingly complex business rules and models as well as various information and communication technology solutions to improve operating efficiencies and extract more useful information from healthcare data to manage and control the cost drivers better. The problem with policy and regulatory controls worldwide are their consistent inability to deal with complex markets, such as the South African healthcare market, often resulting in a worsening of conditions. This highlights the obvious preference for an industry driven and self-regulatory solution that meets the same objectives as that of the regulator.

The general lack of understanding, implementation and experience of u-commerce has not escaped the healthcare industry either, which raises an obvious question: given Galanxhi-Janaqi & Nah's (2004) proposition at the beginning of this section, which is that u-commerce is expected to remove the friction from the exchange process in an economy and allow for a more fluidity and efficiency, is there any significant role u-commerce can play to improve matters in South African healthcare?

1.5 Study Environment

Discovery Health administrator, the subject of this case research, provided an environment for study which is best described as maturing, accommodating yet highly time pressured and therefore to some extent constraining. A compensating aspect of the environment arose from the fact that the researcher, being an employee in the middle manager tier of the organisation, was able to gain access to key individuals and primary data to support the objectives of the study at a time when the objectives of the discussion were relatively topical in the organisation.

At the time of commencing the study, Discovery Health administrator had just been through a spate of significant organisational restructures. October / November 2005

saw significant changes in the organisation of the business departments. Re-organisation of Discovery's software departments followed immediately after that in December 2005 and January 2006. The move was predominantly driven by an intent to radically improve operational efficiencies as well as "up the bar" on service excellence; all terminology befitting a firm in the maturing stage of its life cycle.

Early in 2006 an initiative was underway to bring Cognos reporting into the organisation. There was a growing concern in 2005 that the data integrity of the disparate reporting mechanisms in the firm was questionable resulting in conflicting reports and an increasing propensity for making poorly informed decisions. Though this initiative sought to mature the management information system of the firm, it did bring into question the validity of primary sources used for this paper as these in almost every case pre-dated the conversion to Cognos. As a result there was a need to verify primary source data by comparing variances between a myriad of alternate sources. Wherever these variances were untenable an attempt was made to qualify them with what experienced managers would intuitively expect the figures to be by order of magnitude.

As a result, the importance of gaining access to the right knowledge and information gatekeepers in the firm were key to the success of the research. The dominant source of this kind was the software Systems Development Managers in Corporate Health Systems. From the author's personal experience, Systems Development Managers are some of the busiest people at the middle management strata in Discovery. They are typically responsible for teams of between 12 to 60 staff consisting of systems architects, software developers, business analysts. They have on average between 5 to 10 meetings per day with double and triple bookings and can receive as much as 300 to 400 emails per day. The average working week for a Systems Development Manager is anywhere between 55 to 65 hours. These factors underscore the challenge of getting access to them for interviews and information. Research Methodology, discusses the methods used to address this challenge. In consideration of the time constraints, interviews were kept to a minimum. Notwithstanding, the author found the development managers more accommodating than anticipated in terms of providing primary data and assigning resources to clarify inconsistencies or information gaps. The same was true of senior and executive managers who were more than willing to be interviewed, providing invaluable insight into the business of Discovery for the purposes of the study.

Given the general lack of awareness of “u-commerce” as a term in the organisation, meant that no common mental model or terminology existed with which to engage individuals. The Discussion on p155 provides insight into why this is to be expected. Nonetheless, fairly silo-based information had to be extracted from interviews with each of the development managers and primary sources. This information then had to be re-interpreted using a u-commerce evaluation framework in order to analyse the incidental needs-driven implementation of certain of the u-commerce concepts. This re-interpretation gave rise to a reframing or regrouping of functionality using a more generic or abstract terminology foreign to Discovery in order to explain the results of the analysis and needs to be taken into account when reading the research results, discussions, conclusions and recommendations of this report.

1.6 Plan of the Study

The initial survey of literature on u-commerce highlighted a general lack of prior research on the topic, which prescribed a more qualitative and exploratory approach to this study. The immediate an obvious question that emerged was which aspects of u-commerce would be most relevant to study. Guidance was obtained from the paper prepared by Galanxhi-Janaqi & Nah (2004), which suggested several avenues for further study and resulted in the choice for this research.

As a result of limited comprehensive studies on u-commerce, there was a need to inform the research, as a minimum, with at least the latest contemporary academic thinking on topics **related** to u-commerce and the scope of the study. As a result prior academic literature relating to e-commerce, m-commerce, silent commence, voice commerce and telematics were also surveyed.

Additional literature was sourced on the following to ensure a comprehensive understanding of the context within which the study was being performed and contemporary technology management tools and frameworks which may be relevant to u-commerce as a new technology.

- The current state of healthcare economics internationally and at an industry level as it relates to this study
- E-commerce in South African healthcare
- Relevant technology and innovation management theory

The secondary data obtained from the first two bullets above was used to describe the healthcare industry context of the case study and is documented in the chapter

on the Foundation of The Study. Literature Review, discusses the contemporary issues obtained from the literature survey on u-commerce as a concept, the individual components of u-commerce and relevant technology management tools and frameworks.

The theory in these two chapters provide a balanced portfolio of sensitising concepts regarding the case study context and the latest thinking on the components of u-commerce so as to inform the chapter on Research Methodology.

Research Results and Discussion, Conclusions and Recommendations discuss what Discovery Health has done as far as leveraging electronically-mediate servicing, the extent to which the value-add resulted from the integration of the various components of u-commerce and the untapped opportunities which still exist. Ultimately the paper closes by discussing potential adoption strategies for medical administration companies as tempered by the practical real-life learning of Discovery Health.

2 Foundation of the Study

This chapter focuses on describing the South African healthcare industry context within which the unit of analysis, Discovery Health medical scheme administrator, operates. The chapter opens by considering the international trends toward consumer-driven healthcare plans, which is the enduring business model of Discovery Health. It then looks at the South African healthcare industry context and discusses in detail the condition of the industry and the various market and regulatory forces at play. The chapter concludes by reviewing the historical lead up to the current status of e-business in the healthcare industry.

2.1 International Consumer-Driven Health Care Trends

Unlike most other industries that tend to reduce costs over time as learning, innovation and technology improves, healthcare has typically seen exactly the opposite trend with healthcare inflation consistently exceeding GDP growth rates. Some of the most significant drivers identified in the US are new drugs and medical devices, provider price inflation, general inflation, increasing consumer utilisation of services, regulatory initiatives and litigation (Coulter, 2006). South Africa's position is expected to be worse due to exchange rates and the impact of HIV/Aids.

Social behaviour is another key element in the healthcare industry. Again distinguishing itself from most other consumer-driven industries, healthcare affords the consumer the luxurious perception of not actually paying for the services they receive.

Though a popular model in South Africa, the concept of managed care has its roots in the early 1970's when the US government, through the HMO Act of 1973, legislated its use as a means of controlling rapidly rising healthcare costs in the US (Gratzer, 2005). As a supply-side cost control mechanism it brought into play several strategies such as contracted networks of providers, capitated models and incentives to primary providers of care to provide the best possible care at the lowest price (Coulter, 2006). However, it became extremely unpopular with patients as it largely removed them from the decision-making process, and although not founded in any scientific evidence, created the perception of poorer quality of care.

As alternative, the consumer-driven health plan (CDHP) "which seeks to fundamentally change beneficiaries' behaviour and engage them in the effort to control costs by giving them a personal stake in healthcare spending" (Coulter,

2006:26) is a demand-side cost containment mechanism. A key component of the CDHP is the health savings account (HSA); or colloquially known in South Africa as medical savings accounts. The power of the HSA is in its ability to drive increasing levels of consumerism; make people act more prudently regarding their health care expenditure as well as address the shortcoming of managed care by shifting a lot more decision-making responsibility back into member's hands.

A parallel and highly compatible demand-side strategy is the concept of health management, which also targets demand-side control using case management for the severely ill, disease management of chronic ailments and health promotion for the healthy but risky membership segment (Coulter, 2006). This last segment who typically reflects claiming patterns of the occasional injury, acute illness or maternity care typically constitutes 15-20% of overall medical expenditure (Coulter, 2006). Techniques deployed by health promotion include health screening, health education through e-learning and incentives for just being healthy. An example of the health promotion concept in South Africa is Discovery's Vitality product.

Coulter (2006) suggests that the segment of members targeted by health promotion (e.g. Vitality members) is a good starting point for driving increased consumerism.

2.2 South African Private Healthcare

The South African private healthcare medical scheme industry is burdening under financial pressures as can be seen in the following trends obtained from the Council for Medical Schemes Annual Reports 2003-4 (Council for Medical Schemes, 2004) and 2004-5 (Council for Medical Schemes, 2005):

- 12.9% decline in the number of schemes registered with the Council for Medical Schemes between 2000 and 2003. With the number of beneficiaries being roughly constant at approximately 7 million lives, the trend suggests consolidation in the market with movement toward the larger players
- Average annual increase of 14.8% on contributions over the last 5 years (excluding non-health contributions) to schemes by members

Table 1: Scheme Contributions 2000 to 2004

Per Annum Contribution Per Member	2000	2001	2002	2003	2004
Risk Contributions	R334	R406	R471	R536	R574
Savings Contributions	R42	R50	R57	R70	R77
Total Contributions for Health Expenditure	R376	R456	R528	R606	R651

- Total expenditure on benefits increased by 8.6% in 2003 and 7.2% in 2004 of which the hospital expenditure is the greatest concern showing a total annualised increase of 16.9% in 2004. Relative to 1997, private hospitals have enjoyed an inflation-adjusted 103.1% increase in income from private medical schemes. Like most other schemes, hospital expenditure is one of Discovery Health Medical Scheme most challenging cost drivers (Mathega, 2006). The private hospital industry is dominated by 3 large players. The Council raises concern that they operate in a largely unregulated industry and have the balance of negotiating power over the medical schemes (Council for Medical Schemes, 2005). Medical schemes pool their negotiating power through the medical administrators who negotiate a contracted fee on their client schemes' behalf and the aggregate power still seems insufficient against that of the individual hospital groups.
- Average increase of 10.4% in 2003 and 10.5% in 2004 on administration costs, which exceeds the average increase for expenditure on claims.

In summary the cost pressures are arising from increasing provider servicing costs, administration costs, managed care costs, broker fees and medical inflation. Medical schemes, through their administrators, deploy multiple strategies in an attempt to manage these costs and to accurately price for the risk of cover for members. In doing so they provide a non-profit risk pool that must be self-sustaining. Sustainability is also a function of the reserves of the schemes, formally known as its solvency ratio. The Regulation 29 of the Medical Schemes Act required schemes to achieve 25% solvency by the end of 2004. This means that a portion of contributions would need to go to the building up of these reserves. This would naturally place an

even greater burden on schemes to be able squeeze as much out of member contributions as possible to service healthcare needs whilst growing the reserve.

Aggressively growing schemes such as the Discovery Health Medical Scheme (DHMS) experience an interesting dynamic. As members move from other schemes onto DHMS they dilute the solvency ratio of the scheme as they are not entitled to move their portion of reserves to the new scheme. Therefore schemes that are shrinking show excellent solvency ratios and schemes that grow rapidly show poor solvency ratios. Due to DHMS's rapid growth and struggling solvency ratio a revised business plan was negotiated with the Council to achieve the 25% solvency by 2008. This underscores the multiple and stringent challenges facing a progressive scheme and their reliance on their contracted administrator to obtain and provide up-to-date and accurate information with respect to the following:

- Beneficiary health status and diagnoses
- The effectiveness and cost of treatment protocols
- Engaging members and medical service providers in a manner that engenders appropriate decisions and behaviour relating to the choice of treatment

With respect to the last bullet, Discovery's dominant model is to engage members and providers through a consumer-driven healthcare model using the savings account concept to encourage this behaviour.

The Council for Medical Schemes also deploys mechanisms to contain cost. More recently several initiatives have been instituted to achieve this yet ensure quality healthcare and fairness in terms of access to quality healthcare (Council for Medical Schemes, 2005): Prescribed Minimum Benefits, Risk Equalisation Fund, ICD10 diagnosis coding, National Health Reference Pricing List, action against discriminatory benefit design and investigation into the development of a low-cost medical scheme environment.

- **Prescribed Minimum Benefits** identify a minimum set of benefits that all schemes must make provision for and cover in full. Schemes are permitted to manage their risk by a defining a formulary of medicines that they are prepared to pay for in full for the treatment of PMB conditions. Medicines dispensed which fall outside the formulary would then typically be part paid by the scheme requiring the patient to pay the difference. The use of formularies has effectively doubled in 2004 relative to 2003 (Council for Medical Schemes,

2005). The formularies differ between schemes which highlight the informational complexity facing service providers in attempting to unravel the appropriate medication for the patient they are consulting with.

- **Risk Equalisation Fund:** The Council for Medical Schemes is assisting the department of health with the development of a Risk Equalisation Fund that will allow for a common risk pool to be shared in the industry based on risk. Schemes with a lower risk profile will have a net contribution to the pool and schemes with a high risk profile will have a net supplement from the pool.
- **ICD diagnosis coding:** By enforcing the implementation of the ICD10 diagnosis coding schema in the industry the Council hopes to improve the quality of diagnosis related data collected nationally and through the standardisation improve the efficiency of billing in the industry. The coding scheme is central to the programme of initiatives as it provides the means of tracking claims relating to Prescribed Minimum Benefits which fall within the scope of the Risk Equalisation Fund. High fidelity diagnosis coding again places an additional burden on the medical service provider and at present the propensity is for providers to use "cheat sheets" containing typical diagnoses to merely get their claims processed regardless of accuracy.
- **National Health Reference Price List (NHRPL):** A Competition Commission ruling that the previous recommended tariffs and scales of benefits of the Board of Healthcare Funders, the South African Medical Association and the Hospital Association of South Africa were unlawful brought the entire medical schemes industry to the brink of total disruption and chaos (Council for Medical Schemes, 2004). In an attempt to contain the disruption, the Council for Medical Scheme put forward the National Health Reference Price List as a guideline and recommended basis for negotiation between medical schemes and service providers (Council for Medical Schemes, 2005). Again, service providers would need to be able to incorporate multiple price lists for the spectrum of schemes. Failure to submit the correct claimed amount gives rise to patient inconvenience and/or cost as well as operational costs for both the administrator and service provider.
- **Medical Scheme Benefit Design:** The Council has taken a view that the practices and benefit designs of certain schemes are in contravention of section 24(2) (e) of the Medical Schemes Act, in that they discriminate unfairly

against members on the grounds of their state of health. The concern is the increasing trend toward moving benefits out of the risk pool, to be covered by a medical savings account and then to structure total scheme contributions as a function of variable savings account contributions. Their view is that over time the member's actual contributions ultimately approximate a function of their health status and future expected claims, which is contrary to the philosophy of community-rated contribution based on the average cost of care for the medical scheme. It reported a 20.4% increase in the contribution toward medical savings accounts relative to an 11.6% increase to the risk pool. Since medical savings accounts are a central mechanism to consumer-driven health care plans, it is interpreted that the Council is taking a strong stance against such plans in spite of the international trends and this South Africa is one of the few countries who have successfully implemented such plans. Furthermore, high frequency low risk cost drivers such as medication and visits to general practitioners are prime targets for the cost controlling mechanism of these types of plans, whilst hospital visits being low frequency high risk cost drivers are typically managed through case management and the risk pool of funds. Studying the table below, it could be argued that the consumer-driven model seems to be achieving its objective in South Africa.

Table 2: Comparison of Benefits Paid per Beneficiary between 2004 and 2003

Medicines	-8.8%
General Practitioners	-3.0%
Hospitals	+17.1%

Source: Council for Medical Schemes (2004)

Viewing the Council's figures over the longer term from 1995 through to 2004, the trend is enduring; hospital expenditure is almost exponential relative to the comparatively level trend in medicines and GP's expenditure, which further support the argument for consumer-driven healthcare plans.

Notwithstanding, the Council for Medical Schemes issued Circular 8 in February 2006, which furthers this agenda. Broomberg (2006) explains that “[t]his Discussion Document proposes an entirely new benefit structure for medical schemes, with a common set of benefits that would have to be offered across the entire scheme at a uniform price, and with schemes able to offer supplementary benefit packages above the common set of benefits”. The following summarises the most relevant implications of this circular:

1. Eradication of savings accounts forcing schemes to take back more risk. This moves counter to the concept of consumer-driven healthcare
 2. Non-health expenses (such as administration costs) covered by member contributions will be made transparent and regulated to a flat rate per beneficiary
 3. Tighter control and expanded definition of prescribed minimum benefits
 4. Contributions will not discriminate on adults and child dependents
 5. Contributions will be limited to a maximum of 3 dependents
- **Low-Income Medical Schemes (LIMS):** Broomberg (2006) explains that the Social Health Insurance (SHI) policy framework being pursued by the Department of Health has “[a] key objective of extending risk pooling through health insurance as broadly as possible, over time, to all those who can afford to participate in formal risk pooling arrangements”. Within the context of SHI and as a consequence of the Risk Equalisation Fund process, the Ministerial Task Team on Social Health Insurance (MTT) initiated a consultative investigation in April 2005 involving numerous institutions and stakeholders from the industry to investigate (as an interim objective of SHI) the possibility of extending risk pooling to that segment of society who are currently unable to afford medical cover. As such the target market was defined as those households with gross monthly income of between R2,000 and R6,000 per month. The fundamental objectives of the investigation were as follows (Broomberg, 2006:4):
 1. Investigate barriers to low income participation of the target market
 2. Provide recommendations on policy and governance models that ensure market diversity

The findings of the investigation most relevant to this research paper were that at a premium of R200 per month with an employer contribution of 50% and an affordability ratio of between 5% to 15% of their monthly income spent on health insurance, the low-income medical scheme would most likely attract between 1.5 million to 3.6 million lives (Broomberg, 2006). It also reported that although there were no firm findings regarding how medical administrators and managed care organisations would address their costs, the sense were that the Council for Medical Schemes was already engaging with them to keep their costs at a target percentage of premiums and that natural competitive forces will drive these costs down (Broomberg, 2006). Currently the benchmark for administration fees is targeted at 11% of premium by the Council of Medical Schemes (Mathega, 2006). Framing the target LIMS premium of R200 per month with a 50% employer contribution implies an administration fee ceiling of roughly R44 PABPM. Broomberg (2006) emphasises that the implications of Circular 8 discussed have will complicate the LIMS model.

Apart from regulatory pressures, the natural competitive forces of a free market also play a role in containing the cost of non-healthcare expenditure such as administration costs, managed care costs and broker fees. The industry on the whole is in a mature phase of its lifecycle in which consolidation is ejecting inefficient players and creating a concentration of successful competitors who are converging on dominant business models and thereby crowding each other for a share of the market. As a result most of the key administration players are turning to efficiency and service excellence in a struggle to drive a wedge between the cost of their offering and the willingness (and capacity) of their clients (the schemes) to pay for those services, which creates savings for the schemes and ultimately boosts it's long-term sustainability. The regulatory is likely to drive a wedge into the trend toward consumer-driven healthcare plans, but still intends to concentrate efforts on reducing costs and increasing efficiencies in the market.

The next table contrasts key indicators for the top 7 administrators in the industry.

Table 3: Administrator Comparison 2004

Administrator	Contributions as % of Gross Admin Income	Gross Admin Expenditure R/PABPM	Net Claims Paid R/PABPM	Gross Admin Expenditure as % of Contributions	Claims Ratio (Net Claims Paid/ Gross Admin Expenditure)	Net Claims Paid PABPM (R122)
Discovery Health	24%	R708	R83	11.75%	69.35%	R402
Medscheme	16%	R625	R50	8.02%	79.57%	R464
Self-Administered	11%	R752	R56	7.44%	86.16%	R601
Metropolitan Health	9%	R639	R50	7.80%	88.25%	R491
MX Network Systems	7%	R615	R37	6.00%	80.24%	R493
Old Mutual Healthcare	6%	R541	R53	9.78%	88.37%	R446
Sovereign Health	4%	R740	R61	8.22%	81.06%	R494

Definitions:

1. PABPM: Per Average Beneficiary Per Month
2. Gross Administration Expenditure: Includes administration costs charged to both risk pool and savings accounts, CMS defines this as separate to managed care expenditure. DHMS managed care cost is R18 PABPM.
3. Claims Ratio (as known as "loss ratio"): % of contributions paid out in claims

The following observations are made from the table above for Discovery:

1. Discovery has the 3rd highest contributions per beneficiary per month
2. It has the highest admin fee in absolute terms and as % of gross contribution income
3. It has the lowest claims ratio; i.e. the lowest % of member contributions paid out as claims
4. In absolute rand terms, Discovery paid out the lowest in net claims PABPM in 2004

These observations resonate with the Council for Medical Schemes concerns that "[d]espite the concentration of market power in the large administrators, there

appears to be little or no economies of scale reflected in the level of administration fees” (Council for Medical Schemes, 2005). They report that the top 5 administrators’ fees were between 20% and 40% higher than the average fee for open schemes.

However, Mathega (2006), principle officer of DHMS, recognises that the Discovery administrator does have distinctive capabilities to host sophisticated medical insurance products which are able to generate the lowest claims ratios in the market without dissatisfying members. The downside of this is that the market engages with a more complex service offering. Due to this complexity, the member of the scheme often does not fully understand the scheme rules, the benefit design and what the exact available benefits are at the time of recognising the healthcare need. As a result they cannot accurately and consistently predict what expenses will be covered by the scheme which impacts the quality of their rational consumer-driven behaviour. Similarly, the service provider’s challenge is exactly the same except n-fold more complex since they would need to achieve a similar understanding for as many as 133 registered schemes in the country across their patient base. This creates enormous informational and operational inefficiencies which drive up costs to the administrator through increased queries as the membership base and service providers struggle to understand the benefits. The delicate balance for these more sophisticated medical administrators is to ensure that the value of their service offering (savings to the scheme as a result of minimised claims ratio and a satisfied membership base) far exceeds the increment in administration fee due to the complexity of the product suite required to generate the service offering value in the first place. Failure in any of these variables can result in the gradual attrition of membership or the loss of a scheme as client.

The issues discussed above highlights the desperate need to improve the operational and information efficiencies in the delivery, funding and administration of health in the private healthcare sector such that a greater portion of every private healthcare funding rand can be spent on the most effective and appropriate healthcare. The scheme, administrator, member and service provider are all critical stakeholders in this mission.

Obviously, by minimising contributions below a certain threshold (potentially the LIMS threshold of R200 per month) whilst still providing access to quality healthcare, the scheme is able to accommodate the employed but previously uninsured into the private healthcare market. Contributions are directly affected by the following:

- Healthcare expenditure which relates to the frequency and cost of quality healthcare
- Non-healthcare expenditure composed of administration costs, broker fees, bad debt and reinsurance fees

Healthcare expenditure has typically in the past been controlled by supply-side economics through the use of managed care models and more recently through demand-side economics (consumer-driven healthcare models) which attempts to stimulate increased levels of consumerism on the part of patients and members of schemes. By consumerism it is meant that patients and members exercise their own judgement regarding the type, frequency and cost of healthcare that they are prepared to pay for. Rational decision making on the part of the consumer based on complete and relevant information and a decision making model which is consistent with reality, must on the aggregate be in the interest of the patient and the schemes.

The non-healthcare expenditure is more directly in the administrator's control and therefore quite simply becomes a means of minimising the cost of service to schemes as well as managing its risks in a way that maximises the pool of money for healthcare expenditure.

The administrator's challenge of increasing efficiency and service excellence can be approached in many different ways spanning organisational re-structuring, business process improvement, re-engineering and innovation, outsourcing, partnering, etc creating a wealth of management questions that could be explored. However, at least two significant cost drivers are common to all administrators and relate specifically to the financial transaction between the provider, member and administrator:

- Call centre query costs relating to members and providers grappling with the understanding claims processing outcomes
- Resource and infrastructure costs to support the processing of paper claims

These cost drivers are central to the arguments in this research paper.

2.3 E-Business in Healthcare

The private healthcare sector was one of the early adopters of e-business in South Africa. Service providers were using practice management applications in the 80's to schedule appointments, keep electronic patient records and manage stock for

dispensaries. The 90's brought the dawning of the electronic data interchange (EDI) era for the electronic submission of claims to medical administrators.

As a parallel strategy to deal with the high cost of processing the massive volumes of paper claim generated by the industry medical administrators leveraged their scale by making large investments in technology. Expensive document image processing systems including high speed scanners and optical character recognition software, electronic document management systems with automated workflow systems, enterprise office automation, relational databases and executive information systems are typical technologies deployed to varying degrees by various administrators. The nature and size of these 'lumpy' investments underscores the need for significant scale of economy on the part of the administrators and seen as a key consolidation driver in this market. This is in part true also for the institutionalised providers such as hospital and pathology groups.

As the internet grew in popularity, administrators started making more use of the web as a digital presence for members, providers and brokers to further improve efficiencies and to differentiate their service.

3 Literature Review

Having dealt with the industry-specific issues that impress upon Discovery Health in the previous chapter, this chapter is intended to fully cover the results of the literature survey conducted on u-commerce, its various components as well as general technology management frameworks that were regarded as relevant to u-commerce specifically.

3.1 U-Commerce

Much like the silicon chip has become pervasive, finding them in almost any electronic device, so it is expected that intelligent networked computers will be imbedded in most everyday devices, selecting the appropriate channel and communicating with each other seamlessly. Watson et al (2002), suggest that true ubiquity means that this form of pervasive computing will eventually span disposable objects merely to make their presence known to the network of intelligent devices.

Furthermore, digital convergence and standardisation of communicating standards across the globe are beginning to enable multi-platform services to work in unison with the potential of highly consistent yet personalised customer experience. Ultimately, a particular online offering of an organisation could eventually be seamlessly accessible from your desktop computer, your fridge, PDA, MP3 player or cellphone from anywhere in the world.

By leveraging the time, space and context of the customer, u-commerce offers the greatest opportunities for providing the context-rich, relevant and unique service offerings. U-commerce systems will be able to intelligently filter, tailor and format information and commerce interactions to customers' needs based on where they are in the world, what type of device their using (desktop versus cellphone), what type of connectivity they are using, what role they are playing at the time of requesting the service and what other people in similar situations typically do.

The concept of unison and universality applied to a service offering enables an organisation to powerfully impress their brand on their customers in an almost omnipresent manner.

3.2 Components of U-Commerce

The following equation is used to denote the value derived from each form of electronically mediated commerce:

$$UC > EC + MC + VC + iTC + SC + T$$

Where

- UC = Ubiquitous Commerce / U-Commerce
- EC = Electronic Commerce / E-Commerce
- MC = Mobile Commerce / M-Commerce
- VC = Voice Commerce / V-Commerce
- TC = Interactive Television Commerce / T-Commerce
- SC = Silent Commerce
- T = Telematics

This proposes that the true value of u-commerce can therefore only yield when these various forms of commerce are integrated into an architecture such that the u-commerce system as a whole is creates more value than the sum of its parts.

The next few sections provide a definition for each of the components of the u-commerce system.

3.3 E-Commerce

E-Commerce is defined as follows:

- "Electronic commerce is the use of the internet and the web to transact business" (Galanxhi-Janaqi & Nah, 2004:745)
- "All electronically mediated information exchanges between an organisation and its external stakeholders" (Chaffey, 2003:220)
- "[T]echnology-mediated exchanges between parties (individuals or organisation) as well as the electronically based intra- or inter-organisational activities that facilitate such exchanges." (Rayport & Jaworski, 2003:4)

The various sources seem to differ on the scope of e-commerce. Rayport & Jaworski (2003:4) define it as including activities within the organisation, which Chaffey (2003:220) refers to as e-business. Rayport & Jaworski (2003, 4) and Chaffey's (2003:220) definitions could be read to include wireless media of transmission, whilst Galanxhi-Janaqi & Nah (2004:745) differentiate between e-commerce and mobile commerce.

For the purposes of this study, e-commerce will be defined as follows:

- All electronically mediated information exchanges between an organisation and its external stakeholders using the internet and web to transact business or support business transactions over wired media.

3.3.1 Technology Trends and Implications

Hartley & Worthington-Smith (2004) targets South Africa's communications legislation as one of the biggest hurdles holding back widespread adoption of internet applications and e-commerce. This arises from monopolistic and protectionist policies which restricts the entry of competitive entities to deploy more efficient technologies and thereby prohibiting access to reasonably priced international bandwidth (currently part owned by Telkom) and access to the national local loop (currently licensed to Telkom) (Paterson, 2005).

To illustrate the extent of the delays, observe the contrasting growth of the cellular market: within a period of roughly 10 years to 2005. The cellular market was able to acquire almost 23.1 million subscribers against the total of 5 million Telkom local loop access lines.

In 2001 an announcement was made that a second national operator would be introduced. However, since then the process has been marred with in-fighting between shareholders. In addition, the Minister of Communication's major shareholding in Telkom and its jurisdiction over fundamental regulatory issues jointly held with ICASA have further confounded the process with conflicts of interest (Hartley & Worthington-Smith, 2004). Having said, the Electronic Communications Bill which has been in drafting since 2003 intends to open up the market in a managed way, to allow for the second national operator and to address the conflicts of interest mentioned above.

In addition, ICASA has declared Telkom's majority share in the SAT3 cable from South Africa to Europe an essential national resource. Though Telkom argues this is nothing short of expropriation of assets, the position of ICASA appears firm (Paterson, 2005). What this means is that Telkom would eventually be forced to provide access to international bandwidth at wholesale rates.

Paterson (2005) states that although the regulatory framework is evolving in the right direction, it does mean that South Africa has missed the telecommunications boom in which foreign direct investment from international companies would have boosted the infrastructure significantly and rapidly. The pressure on ICASA and government to

resolve these issues are likely to result in a deficient bill which may only cloud issues further and stifle progress.

Telkom are quoted by Paterson (2005) as being optimistic about the future of broadband connectivity in South Africa. However, the current DSL products ranging from 192Kbps to 1 Mbps have only reached a penetration of 100,000 lines and are still too expensive for the majority of South Africans.

3.3.2 The Law and E-Commerce

The fact that most e-commerce implementations extend across the globe complicates the protection of intellectual property rights due to the fact that two business entities on opposite sides of the globe are likely to be subject to different regulatory frameworks (Mykytyn & Mykytyn, 2005). They go on to discuss the intellectual property rights issues pertaining to e-commerce as follows:

- **Patents:** In 1998 software in general and business methods implemented in software were deemed patentable. Companies that acquire patents may be able to secure a competitive e-strategy advantage as was proven in the "1-click ordering system" patent law suit of Amazon.com against Barnesandnoble.com.
- **Copyrighting of software** involves the artistic creativity of software. Copying of protected user interfaces even though the underlying software is different. Even unauthorised links to other websites can be viewed as infringements.
- **Trademarks infringements** have emerged on the following:
 - Misuse of meta-tags to mislead and attract internet users to sites via search engines
 - Registering domain names based on miss-spelt famous trademarks
 - Framing, which means viewing the content of a website through another website

Mykytyn & Mykytyn (2005) also identify the heightened risks emerging from e-commerce in relation to defamation and the problem of jurisdiction. In spite of free-speech arguments and that publishers can not be expected to know the laws of all jurisdictions were insufficient in certain legal cases. At this point in time, e-commerce is bound by the same laws as print media and that the liability occurs at the point of download and not at the source of that download. This is supported by Dixon (2005)

who indicates that in the US the same consumer protection rights apply for internet advertising as other media. This leads to a tremendous variability in legal frameworks given e-commerce's global reach.

The issue of email spam has also received much attention. Dixon (2005) talks about the CAN-SPAM act in the US which distinguishes between business related emails for the purposes of maintaining an existing business relationship or transaction and email advertising/marketing. The requirements on the latter is far more strict than the former, where the former merely require accurate header and transmission information, the latter also require an Opt-Out feature, identification of advertisements and advertisers, affirmative consent in order to relax these requirements, and no deceptive advertising or messaging. Moreover, Dixon (2005) notes that law enforcement of CAN-SPAM is required by the Internet Service Provider as there is no legal framework or right to private action.

3.3.3 The Experience of E-Commerce Failures

Pandya & Dholakia (2005) refer to classical theories of innovation diffusion to highlight that the adoption of innovation is dependent on the extent to which the innovations are compatible with existing habits. If change is needed, are incentives presented with the solution? What physical, social, economic and psychological risks are adopters faced with? These requirements are not easily met if one looks at the high failure rate (95%) of innovations in general, which should have been a predictor of the phenomenal failure rates of the B2C ventures innovations seen between 1995 and 2000.

They identify that the majority of these B2C failures resulted from attracting site visitors but being unable to convert them into customers. Their hypothesis is that "B2C firms failed because they failed to perceive correctly the nature and scope of their innovation, and this eventually led to the problems of matching consumer expectations as the context of innovation changed" (Pandya & Dholakia, 2005: 73).

Successful B2C companies, on the other hand, adhered to proven fundamentals of the brick-and-mortar world such as (Pandya & Dholakia, 2005):

- Develop products and services that satisfy the needs of well-defined customer segments
- Stay focused on the core products and services and control extensions
- Avoid leading but unproven technologies

When they did get it right even small to medium enterprises' (SME) were able to derive efficiency related savings from faster transactions and automation of business processes (Côté, Vézina & Sabourin, 2005). These were the primary adoption drivers for the SME's and customers. Additional value-add and adoption achieved through complementarities where multiple value propositions were bundled together created further lock-in.

But where did all the risk come from? Pandya & Dholakia (2005) explain that new products in existing markets address known needs. However in new markets, needs and products co-evolve. These differences giving rise to four need-solution contexts:

- Incremental solution for a known need
- Innovative (breakthrough) solution for a known need
- Innovative (breakthrough) solution for an anticipated need
- Incremental (evolving) solution for an uncertain need

Their hypothesis focuses on the concordance or discordance of views held by the buyer and seller of where the solution lies in these four quadrants. Discordance, in other words the buyer disagrees with the seller that the solution category gives rise to a high probability of failure. Furthermore, increments tend to evolve from customers (the customers voice) and breakthroughs tend to be driven by technologists' voice and may be less readily understood by customers. Evidence of these discordant views emerges in Pandya & Dholakia's (2005) analysis as follows:

- Many B2C merchants saw B2C as disruptive breakthroughs and created "pure plays" while consumers saw them as merely extensions of existing products and services.
- They targeted ultra-thin product niches for which demand hadn't been proven.
- In cases where a known need was met with an online service, customers didn't perceive any differentiated value beyond the brick-and-mortar service already in existence.
- The opposite was also true where first-wave B2C failures saw themselves as providing the same goods/services through an alternate channel and failed. Later more successful B2C companies focused far more on the needs of the customer creating concordant expectations.

Other problems identified by the Pandya & Dholakia (2005) were:

- Misconceptions of first-mover advantage; Internet offers instant market access and as a result competitors can enter almost as quickly as first-movers.
- Misconceptions about network externalities (i.e. the positive impact on all members of an ever-expanding network). B2C seller-buyer networks are typically star-shaped, where each buyer is connected to a single seller.

Pandya & Dholakia (2005) suggest that the B2C operation must be viewed and studied as an innovation and in most cases it will turn out to be incremental in nature. Positioning it as such tends to meet with the lower expectations of the user and creates a greater concordant expectation and better chance of success. The key recommendation of this article is to carefully assess the need-solution context of the customer to create concordance of expectations regarding incremental versus breakthrough solutions and thereby avoiding false optimism or pessimism.

The most significant barrier to adoption of e-commerce for SME's is the size of the investment and payback period required to establish an e-business solution (Côté et al, 2005). Intermediaries and outsourcing partners play a role in lowering this barrier.

3.3.4 E-Commerce Strategy Framework and Infrastructures

Rayport & Jaworksi (2003) devised what they call the "four infrastructures plus strategy" framework for e-commerce to assist business practitioners in dealing with the economic uncertainty arising from the Internet and making the transition from a pure traditional business model to one which embraces e-commerce. The prescriptions in the model are strongly focused on the development of a website-based customer interface and therefore only those high level principles are summarised here which are believed to be relevant to u-commerce and the Discovery case.

The following diagram outlines their framework and is described in more detail in the sections that follow.

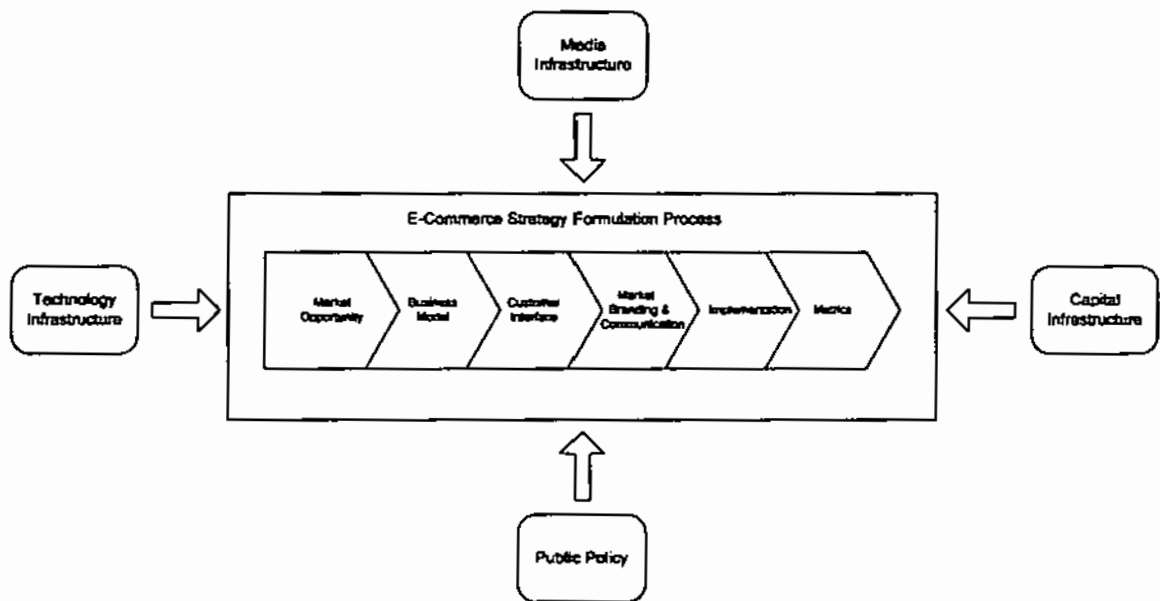


Figure 1: Rayport & Jaworski (2003) E-Commerce Framework

Rayport & Jaworski (2003) acknowledge a distinction between a firm's intended strategy and the 'emergent strategy' which arises as the firm responds in real-time to the changes in the four infrastructures indicated in figure 1.

The Technology Infrastructure includes the process for building the website and the fundamental technical architecture required to economically support the objectives of the service offering.

Capital Infrastructure refers to the system of processes to acquire and manage financial and human capital required to build and deploy the online offering at the various funding stages.

Media Infrastructure considers the convergence of traditional media and the emergence of new media arising from the Internet.

Public Policy Infrastructure considers the evolving legal framework that online firms need to consider in their strategic planning. Rayport & Jaworski (2003) consider 5 regulatory issues: access, taxation, privacy / security, copyright and free speech in their model.

In addition, they also emphasise two factors as being critical to affecting consumer behaviour which can be leveraged extensively using e-commerce:

- Customisation: the ability to personalise the customer experience

- **Interactivity:** the user's ability to conduct two-way communication puts the customer in control of the engagement resulting in a higher probability of a successful transaction.

These factors are expected even more critical within the u-commerce context.

Market Opportunity

A funnel approach is prescribed by Rayport & Jaworski (2003) to assess the attractiveness of a business opportunity and ultimate to answer the question of "where will the firm compete?" The following 7 steps achieve comprehensive coverage by considering the customer, company, technology and competition in the assessment:

1. Identify the Unmet and/or Underserved Customer Need

This is achieved by performing a gap analysis between the detailed as-is and to-be (ideal) mapping of the customer decision process.

2. Identify the Specific Customers a Company Will Pursue

Fundamentally this is a process of market segmentation and the prescription is to ensure that the target segments are actionable and meaningful.

3. Assess Advantage Relative to Competitors

This step involves identifying direct and indirect competitors, their offerings, the reasons why they do not address the unmet needs. A recommended approach is to profile the competitors as direct, indirect or non-competitor relative to the firm in question and against the complete lifecycle of a customer's engagement with the particular product or service. Alternatively, competitors can be profiled against the target segments identified in step 2 above.

4. Assess the Company's Resources to Deliver the Offering

The objective of this step is to identify at least 3 to 4 competitive resources or assets that the firm can leverage to deploy the offering. The firms resources are categorised as customer-facing, internal and upstream (supplier relationships).

5. Assess Market Readiness of Technology

Here the firm needs to assess the extent to which the offering is vulnerable to technology trends and the rate of innovation and adoption of the relevant technologies.

6. Specify Opportunity in Concrete Terms

This step involves crafting an "opportunity story" which covers the following: target segments; high level value proposition; expected customer benefits; required capabilities and resources and why they are a source of competitive advantage; categorise the resources as in-house, build, buy or collaborate; how the firm will capture some portion of the value created for the customers; provide an initial sense of the magnitude of the financial opportunity for the firm

7. Assess Opportunity Attractiveness

The attractiveness of the opportunity is a function of the its long-term profitability and can be characterised in terms of the level of unmet needs; magnitude of the unconstrained (or white space) opportunity; level of interaction between major customer segments; likely rate of growth; size/volume of the market; and level of profitability. After considering these factors individually the firm should rate the opportunity as a whole.

Business Model

The online business model is comprised of four components and is intended to answer the question of "how the firm will win?"

1. Value Proposition and Value Cluster

The elements of the value proposition were determined in the previous stage and are articulated in terms of the target segment, focal customer benefits and competitive resources. Rayport & Jaworski (2003) suggest that the firm limit their choice of benefits to avoid confusing the market with multiple branding messages as well as be cautious of conflicting benefits which require different and potentially competing delivery systems.

2. Online Offering

Three aspects of the offering must be articulated: the scope of the offering, the customer decision process and a mapping between the offering and the customer decision process.

The scope of an offering can either be category-specific dominance which focuses on delivering a single product category (such as the online ordering of flowers) or cross-category dominance (e.g. Amazon.com). A critical consideration is that customers typically think in terms of activities or goals and therefore the cross-category dominance needs to fully understand the customer's cluster of activities or goals when clustering product categories.

Identifying the customer decision process and mapping the steps in that process to the offering is best achieved using an 'egg diagram' (an illustration of this is provided in the results of this case research) as it clearly highlights where the online and offline product offering information, services and products satisfy the customers thought process.

3. Unique Resource System

The identification of the unique resources that will provide competitive advantage is critical for understand the critical dependencies and associated risks in the delivering the offering. The process of identifying these resources involve identifying the core benefits in the value cluster, identifying the resources that support each benefit, determining the extent to which the firm can deliver each benefit, and identifying partners who can complete the resource system.

Rayport & Jaworski (2003) also emphasise several key paradigm shifts when applying the traditional activity-system approach to online offerings:

- i. Consider both physical and virtual resources*
- ii. The benefits under consideration should be those of the customer initially*
- iii. Shift from single to multi-firm systems*

The quality of the resource system should be evaluated in terms of the uniqueness of the system, strength of the links between resources and benefits, strength of the links between resources in the multi-firm system, strength of the synergy between offline and online offerings, ease of imitation.

4. Revenue Model

Typical sources of revenue for an online firm are: advertising, product/service/information sales, transactions, subscriptions, license fees. Rayport & Jaworski (2003) describe the following fundamental online business models in terms of their typical core benefit, value proposition, key resources, revenue model and key threats:

- i. Metamarket Switchboard Model: Bring buyers and sellers together based on activities that customers engage in to meet their goals. Revenue is derived from transactions, product sales and advertising*
- ii. Traditional and Reverse Auction Model: The former brings together large numbers of buyers and sellers where buyers bid up to the point where no further bidding is offered. In the latter, suppliers bid prices down until no further bidding is offered. Revenue is derived from transaction fees or selling auction software or services to run auctions in-house.*
- iii. Freshest-Information Model: Timeliness and accurate provision of the latest information on a given topic. Revenue is generated from advertising.*
- iv. Highest-Quality Model: Firms charge a premium for their products, services and/or information. Revenue is generated from the products, services and information.*
- v. Widest-Assortment Model: Competition between firms based on the breadth or depth of the product categories. Revenue is generated from product sales.*
- vi. Lowest-Price Model: The site promises the customer the lowest prices online. Revenue is generated by extracting a very small percentage of product sales.*

- vii. Most-Personalised Model: The objective of this model is to provide the most unique customer experience. Revenue is generated by product sales or subscriptions*

Customer Interface

Rayport & Jaworski (2003) propose their “7C’s” for website customer interface design as follows:

1. Context: aesthetic and functional look-and-feel to match the purpose of the site
2. Content: refers to what is presented in text, video, audio and graphics
3. Community: allows for interactions between site users
4. Customisation: tailoring by the online firm and personalisation driven by the user themselves
5. Communication: dialogue between the site can take the form of site-to-user (e.g. email notifications), user-to-site (e.g. customer service requests), or two-way dialogues (e.g. instant messaging)
6. Connection: degree of connectivity with other sites
7. Commerce: site support for commercial transactions

Market Branding & Communication

Rayport & Jaworski (2003) put forward a simple branding model consisting of 3 parts: the brand, the customer response to the brand (awareness and associations), and the benefits to the firm and target customers. Given this model they prescribe the following process for building an online brand:

1. Clearly define the brand audience
2. Understand the Target Customer
3. Identify key leverage points in customer experience
4. Continually monitor competitors
5. Design compelling and complete brand intent
6. Execute with integrity
7. Be consistent over time
8. Establish feedback systems

9. Be opportunistic

10. Invest and be patient

Online firms then use a combination of general online communications, personalised communications, traditional mass marketing and direct communications to reach their customers. Direct communication and traditional mass marketing make use of traditional communication mechanisms. Personalised and General Online Approach makes use of the following:

1. Personalised Communication

- a. Personalised permission e-mails
- b. Personalised recommendations
- c. Personalised advertisements
- d. Personalised webpages
- e. Personalised e-commerce stores

2. General Online Approaches

- a. Banner ads
- b. E-mail
- c. Viral marketing
- d. Portal sponsorship / exclusive agreements
- e. Associate programs
- f. Online and offline partnerships
- g. Online transactions

Implementation

A comprehensive, efficient and effective implementation strategy is particularly important for online offerings due to the high visibility of errors, lower switching cost for users, increased complexity in relationships with other firms and a more dynamic competitive environment (Rayport & Jaworski, 2003). They propose that seven elements of implementation need to be planned and executed carefully.

1. **Human Assets:** This aspect deals with the appropriate recruitment, selection, development and retention of the firm's best talent to serve the e-commerce strategy. Professionals in the e-commerce and IT industry as a whole have

become more cautious in selecting future employers due to the large scale lay-offs that occurred during the dot bomb period. High skilled individuals are now less inclined to be lured by large performance incentives and stock options and tend to look for more stable firms.

2. **Processes:** Resource-allocation, human resource management, manufacturing and distribution, payment and billing, customer support/handling processes are considered by Rayport & Jaworski (2003) to be critical to the successful implementation of an online offering
3. **Organisational Structure:** Here Rayport & Jaworski (2003) consider the advantages and disadvantages of implementing the online and offline offerings with the same organisation (single organisation structure) versus running them in separate organisations (dual organisation structure):
 - a. **Single organisation advantages:**
 - i. Higher integration between online and offline allows customers to move between them more fluidly and talks to a degree of ubiquity in terms of the overall service offering
 - ii. Consistent integration of the online and offline services creates a consistent brand and builds trust with the customer
 - iii. Provides growth and retention opportunities for staff and builds on an already established understanding of the business and industry
 - iv. The profits of the offline can be used to offset the initial losses of online and improves the organisations overall tax position
 - v. This structure is typically valued more by investors than the dual organisation structure
 - vi. Scale of economy derived from a single underlying systems platform for online and offline
 - b. **Dual organisation structure**
 - i. Maintaining a single underlying platform of people, processes and systems for online and offline is difficult. Depending on the nature of the service offerings the skill sets and types of assets can be very different and divergent

- ii. It is easier to execute a cannibalistic strategy when the organisations are formally separate
 - iii. It is easier to recruit for online and offline separately as they tend to have different cultures and staffing needs
 - iv. The tax laws for online may be different to that of offline firms
4. Systems: Rayport & Jaworski (2003) identify the several subsystems as critical to setting the structure of how the firm works:
- a. Information Technology: Level of investment and building for reliability and stability versus nimbleness and innovation are key strategic decisions facing executives
 - b. Enterprise Resource Planning (ERP): Well-known brands such as Oracle, SAP and PeopleSoft supply software that allows companies to seamlessly integrate business processes across functions.
 - c. Customer Relationship Management (CRM): By storing and retrieving relevant information about customers these software systems are able to assist customer-facing and marketing staff to better serve and understand the customer. CRM systems are being integrated with ERP systems and are believed to have the potential of increasing a firms sales 40 fold by improving the understanding of customers, service and employee development and performance management. CRM projects do however have a very high failure rate and the key is to remember the following principles:
 - i. The CRM system is only as good as the quality of its data
 - ii. The choice of CRM system, organisational structure and technology elements must be a function of a clearly defined customer strategy
 - iii. Customer privacy is paramount.
 - d. Evaluation and compensation systems: Due to the high upfront investment and lag in ROI, online firms are always under pressure to “make every cent count”. Therefore a performance incentive for staff is typical of online firms and with that comes the information burden of

monitoring, managing and rewarding performance. Rayport & Jaworski (2003) advise on the following when designing these systems:

- i. Employee rewards must be based on outcomes that promote the strategy
- ii. Employee strengths and weaknesses must be exposed
- iii. Rewards should be both monetary and non-monetary
- iv. Rewards should be tailored to the different employee segments in the organisation
- v. Performance judgement should be consistent
- vi. Employees should also be allowed to provide feedback to management

e. Supply chain management systems:

- i. Business-to-consumer supply chains: Avoids the necessity of having stock in retail stores at convenient locations to customers.
- ii. Business-to-business supply chains: Facilitates lower input prices through online auctions, reduced inventory, reduced transaction costs, faster delivery through automated processing of procurement requests and improved customer service
- iii. Consumer-to-business supply chains: fundamentally these systems attempt to aggregate consumer buying power in order to negotiate better pricing from large suppliers using models such as reverse auctions.
- iv. Consumer-to-consumer: A marketplace is provided by the firm which allows buyers and sellers to engage with each other directly

5. Culture: Although most online firms in the dot bomb era had an entrepreneurial culture, the down turn of the industry brought the culture into question. The entrepreneurial culture is characterised by Rayport & Jaworski (2003) as having an external focus with low job specificity in terms of roles, processes and routines. More recently it is believed that the adaptive culture, which combines the external focus of the entrepreneurial culture with higher job specificity, is more appropriate. Bureaucratic cultures which are internally

focused with very high specificity performed poorly in the online space. Depending on whether a new organisation (e.g. dual organisation structure discussed above) is being started or whether online offerings will be deployed into an existing firm (single organisation structure discussed above) determines whether a culture needs to be created or changed. Emphasising values, performing symbolic activities, words, actions, formal and informal training, reward and recognition are ways of creating and maintaining culture

6. **Leadership:** It stands to reason that leadership is instrumental in effective implementation. Leaders are responsible for communicating strategic intent, translating it into actionable plans, building capacity to implement the plans, monitoring and controlling performance, and motivating the organisation to achieve goals. E-commerce start-ups or the deployment of a new business model for an online offering require more than good basic management skills. Rayport & Jaworski (2003) state that "it was commonly held [in the dot boom era] that new-economy leaders needed to operate as high-energy visionaries – racing to bring investors on board, attracting employees willing to work around the clock, sealing strategic partnerships in hours or days – with no need to think about traditional management structures". Even today, long after the dot bomb era, online firms require a leadership style that is flexible, dynamic, responsive, innovative and performance oriented.
7. **Partnerships:** These will vary depending on their purpose (from strategic to functional) and their strength. Several reasons explain why online firms have a propensity for establishing partnerships: complex technology, order fulfilment logistics and the need to develop exposure and web presence quickly. In addition, as communications mechanisms build on the Internet standardise it will simply continue to become easier for firms to establish less formal relationships with lowering switching costs. The biggest folly is to underestimate the activity of managing such relationships and not to dissolve relationships that are costing money.

These seven elements of implementation then need to be integrated and guided using the following principles for strong execution of online offerings (Rayport & Jaworski, 2003):

1. Execution is led by senior management – not the troops
2. Hold people accountable for meeting the numbers

3. It is not just about the numbers – it is also about the process
4. Continuous improvement is still relevant and important
5. The customer is the starting point
6. Hire and develop “doers”

Metrics

Defined metrics helps managers take a different perspective on the business model they have defined through the processes set out above and provides a pragmatic reality check. It also provides a means of communicating the strategy succinctly to the organisation and facilitates a management-by-objectives performance-oriented culture. It enables management to fulfil their responsibility for monitoring the implementation of the strategy and executing control by holding individuals accountable, aligning objectives and informing decisions on how to adjust the emerging strategy as reality unfolds differently to the original plan.

Rayport & Jaworski (2003) identify several shortcomings of the balanced scorecard approach and propose the “performance dashboard”, which enhances the balanced scorecard concept by using their strategic framework (as defined above) for defining the information needs of the measurement system. This has the effect of increasing the focus on the core competitive resources and partnerships identified in the business model step above.

An important consideration is the life cycle of the company (start-up, customer acquisition, monetization and maturity). The emphasis of the measurement system is expected to vary as the firm evolves through its life cycle.

3.4 M-Commerce

The following definitions for m-commerce were obtained from the literature review:

- “The interconnection of portable computing technologies, and the wireless telecommunications networking environments necessary to provide location independent connectivity within the business information systems domain.” (Elliot & Phillips, 2004: 3)
- Frolick & Chen (2004) state that although there is a view that m-commerce encompasses any form of mobile communication with customers, that a counterview is held that there must be some form of monetary gain and as result distinguishes between mobile commerce and mobile information. Even

so, it could be argued that certain forms of mobile information still create financial benefit and may still fall under the ambit of m-commerce.

- “Wireless commerce is a key part of u-commerce, because it creates the possibility for communications between people, business and objects to happen anywhere and at any time” (Galanxhi-Janaqi & Nah, 2004:745)

However, the most comprehensive and appealing definition is presented in Balasubramanian, Peterson & Jarvenpaa (2002) in their “conceptualisation of m-commerce”:

- *It involves communication, either one-way or interactive, between two or more humans, between a human (or humans) and one or more inanimate objects (such as databases), or between two or more inanimate objects (e.g. between devices)*
- *At least one of the parties engaged in the communication must be mobile, in the sense that his, her, or its ability to communicate is not contingent on being at a fixed physical location at a particular point in time.*
- *The ability to communicate must possess the potential to be continuously maintained for at least one of the parties during a substantial physical movement from one location to another*
- *The communication signals between parties must be primarily carried by electromagnetic waves, without direct sensory perception of the signals*
- *If humans are communicating, at least one seeks to benefit economically from the communication, either in the short or the long run. If the communication is entirely between inanimate objects, such communication must be ultimately aimed at creating economic benefit for human or a firm*

3.4.1 Adoption

A study performed by Malhotra & Segars (2005) investigated the adoption patterns of m-commerce users in the US by analysing the following three areas of interest against the 5 generic population groups of the adoption lifecycle (i.e. innovators, early adopters, early majority, late adopters and laggards):

- How each population group rated mobile commerce against the drivers of adoption
- The most desired m-commerce applications for each group

- The most significant customer education areas to facilitate adoption

The following findings of this study are significant for this paper:

- M-commerce adoption is likely to follow a staged evolutionary pattern, the rate of which will be determined by the strategies employed by service providers. Big bang rapid adoption revolution is unlikely.
- The needs of the market are best understood in terms of an automated workflow for everyday life including both personal and business life.
 - Primary needs arise in the area of SMS, email, banking and other financial information. Secondary needs arise in the form of entertainment and information services. Then finally context-based services become important for late adopters.
 - A perceived significant change to an individuals life workflow, i.e. radical behaviour changes to accommodate the service, significantly raises the barrier to adoption. The more intuitive the service is in terms of aligning with existing modes of behaviour the greater will be the success of adoption.
- Target educational marketing of m-commerce to customer segments should accompany any m-commerce strategy

3.4.2 Technology Trends and Implications

Following in the footsteps of European countries, the South African regulator chose to support the GSM (Global System for Mobile Communication) standard over CDMA (Code Division Multiple Access) used in the US, which was launched in 1994 by Vodacom and MTN. The collaborative efforts of Vodacom and MTN to jointly support the GSM 900MHz standard in the interests of interoperability resulted in rapid adoption. By quarter 1 of 2005, the SA market had grown to 23.1 million subscribers (Paterson, 2005).

Although GSM, defined as a 2G technology, is based on digital transmission instead of the analogue mode of 1G, it is primarily configured for voice and not data (Elliot & Phillips, 2004). The next evolution of technology was 2.5G, which was essentially an incremental improvement on 2G by optimising it for improved performance and always-on connectivity. GPRS is a more typical network implementation of 2.5G introduced in South Africa during 2002.

3G technology typically utilises Wideband Code Division Multiple Access (W-CDMA) and is therefore ironically based on the CDMA standard that originally lost out to GPRS in the 2G race for standards in SA (Elliot & Phillips, 2004). 3G's W-CDMA technology provides for enhanced data transfer rates, world-wide connectivity and roaming as well as enhanced spectrum utilisation efficiencies over predecessors.

Although Vodacom and MTN were both testing out 3G during 2004, Vodacom launched its 3G technology in Dec 2004 offering most of South Africa's urban metropolitan subscribers 384Kbps high speed internet access, live video calls, television broadcasts and CD-quality music services. Although only 10% of Vodacom's 6000 country-wide masts support 3G, when the subscriber is out of range, the service seamlessly switches to Vodacom's GPRS network.

MTN has opted for a more cautious approach by backing EDGE in an aggressive roll-out plan. EDGE stands for Enhanced Data rate for GSM Evolution and is colloquially referred to as 2.75G due to the fact that it leverages GPRS technology and aligning with almost all of 3G service capabilities except video calling. MTN saw this as a critical opportunity allowing them to roll-out high performance ubiquitous '2.75G' services at a faster rate than Vodacom could with 3G. This is a fairly significant move if one observes that the voice market is extensively serviced by the oligopoly of all network operators, making data services the next market challenge which at present only accounts for 5% of total revenue.

The following table summarises the key attributes of these technologies:

Table 4: Evolution of Mobile Technologies

	2G	2.5G	2.75G	3G
Roll-out in SA	1994	2002		2004
Network Implementation	GSM	GPRS	EDGE	W-CDMA
Data Rates	9Kbps	Theoretical: 115 - 160Kbps Typical: 45Kbps	Theoretical: 400Kbps Rural: 200Kbps	Theoretical: 2Mbps <120Kmh: 384Kbps > 120Kmh: 144Kbps

Although a 3G platform is rolling out through Vodacom, the development of 3G enabled services and products will be a function of mobile user adoption. The

success of mobile take-up in South Africa has been as a result of the simplicity of purchasing airtime with pre-paid vouchers and low-cost market entry through the use of entry level of handsets. This means that the bulk of the 23 million users in South Africa will either not have the latest 3G enabled handsets for some time or will not be able to afford the current data-oriented packages which are currently priced at around R600 per 1GB of data.

GPRS and EDGE on the other hand are far more pervasive in SA with a larger segment of the mobile user base with compliant handsets. The problem with GPRS based connectivity is that the charge is "per minute of connection" rather than "per data downloaded". This can result in fairly large charges (Frolick & Chen, 2004).

The South African mobile environment is therefore expected to be stratified with SMS still providing the largest low-cost mobile service offerings, followed by an intermediate cost and differentiated GPRS based offerings and lastly a small section of the population in the innovator and early adopter segments of the adoption lifecycle benefiting from high-end 3G service offerings. It is expected that MTN will claim a stake on the intermediate level offerings and Vodacom on the high-end. At very least, the stratification will be cumulative, meaning that every layer of differentiation at least has access to all the benefits of the layer below giving rise to healthy competition between Vodacom and MTN in the lower to intermediate level offerings.

3.4.3 Security Threats

Distinct from internet wired devices, mobile devices have a unique risk profile which arises from their ability to setup what are referred to as ad hoc networks in which devices that are in close proximity can communicate with each other without the need for fixed infrastructure (Ghosh & Swaminatha, 2001). As a result, attackers need not pursue their target, since targets will continuously be roaming into their zone. Furthermore, the mobility of attackers makes them difficult to trace as they do not need any fixed geographic setting to launch an attack from.

Loss and theft risks are enhanced due to the mobility and personal nature of devices; users will be more inclined to store personal sensitive information on their personal mobile device than on their corporate workstations. Gosh & Swaminatha (2001) explain that without the ability to accurately authenticate the user of the device, the risk that privileged access to personal and corporate services and information can be easily compromised.

They also identify web tracking and profiling as more of a problem in the wireless paradigm as it adds another two variables on top of those available to the web: the cellphone number of the user and the geographic location. Attempts on the part of organisations to limit their public liability through the acceptance of legal disclaimers is limited by the handheld devices viewing size; users will not be inclined to read through reams of legal jargon on their handsets.

Three risk areas are reviewed by Gosh & Swaminatha (2001): the channel, the platform (or operating system) and the application software.

Channel security has received a lot of attention and is therefore perceived to be the most secure element in the system. As a result attention is drawn to the elements on either end of the channel; that being the server-side and client-side.

By 2001 neither the engineering of the platform nor the application software for mobile devices had fully leveraged the wisdom gained from e-commerce applications. Gosh & Swaminatha (2001) identified the exposure areas of the mobile platform or operating system as follows:

- No memory protection mechanisms exist to prevent one application from 'spying' on another
- No access control mechanisms exist to prevent unauthorised programs from accessing privilege system resources or data
- No encrypted tunnelling capability exists to establish secure virtual private networks over insecure wireless links
- No strong authentication exists on the mobile devices to confirm the authenticity of the user (i.e. biometrics)
- No software certificate authentication mechanisms exist to certify the installation of software to a particular user

The limited processing power, performance, memory and bandwidth of devices at the time lured software developers into forgoing proper software engineering principles including appropriate security measures.

Furthermore, WAP version 1.2 (Wireless Application Protocol), which was the wireless network architecture standard for providing web-like internet content to mobile devices defined a stripped down version of JavaScript programming language specifically designed for performance-limited wireless devices called WML Script

(Wireless Mark-up Language). In the process of achieving optimal performance on these devices certain security risks arose. Gosh & Swaminatha (2001) saw the biggest risk as being the JavaScript interpreter running on the device which was responsible for executing the WML scripts. It was unable to differentiate between a trusted code local to the device and a non-trusted one that may have been downloaded from the internet. Furthermore, these WML scripts could be 'pushed' to the device and execute, gaining access to privileged user information and system resources such as the complete telephony system on the device. Sensitive information could be damaged, altered and/or transmitted without the knowledge of the user.

Capitalising on the advances in mobile technology such as improved bandwidth networks that support richer mobile services, improved mobile device processing power and memory capacity, alignment of wireless network technologies with the Internet Protocol; WAP 2.0 was released in January 2002.

The WAP Forum (WAP Forum, 2002) identified the following key architectural enhancements in WAP 2.0 which improved the security risk:

- It introduced XHTML scripting to resolve the indiscriminate execution of trusted local or non-trusted foreign scripts; a threat exposed by WML. However, WML is still present in WAP 2.0 for legacy content.
- It created improved alignment between wireless network protocols and internet protocols to address the "WAP Gap" where a server-side WAP gateway translates mobile message from the wireless protocol to the internet protocol. In the WAP 1.x era this translation resulted in message living on the server in clear text for any attacker application to view. With WAP 2.0; a WAP gateway is not required and therefore closes the security risk.

However, as long as legacy systems using WAP1.x exist these threats will remain.

3.4.4 Benefits of Mobile

Frolick & Chen (2004) observe that the true value of mobile commerce comes into play in commercial situations that are sensitive to location, time and personalisation. "The value of M-commerce increases with an increase in user mobility and time sensitivity of the required data or transaction" (Frolick & Chen, 2004:58).

They also believe that businesses that are dependent on a mobile work force can yield significant business value by providing real-time access to information for time-critical decisions.

3.4.5 Challenges of Mobile

Lack of security, unproven benefits and high start-up costs were the most frequently noted reasons cited by IT professionals as barriers to adopting wireless technologies. The concepts of authentication, privacy, integrity and non-repudiation embraced by e-commerce are essential design elements for the mobile space (Frolick & Chen, 2004).

The mobility of devices themselves poses a high physical security risk of loss due to damage, theft or misplacement (Frolick & Chen, 2004).

The variability of mobile devices has far exceeded what the personal computing industry has ever been faced with. This presents challenging software development choices and significant investments.

3.4.6 Strategy Considerations

Frolick & Chen (2004) recommend a well-thought through business solution addressing the following issues followed by a pilot project designed for a small business unit:

- What business problems can be solved by mobile technologies?
- Are our customers and employees likely to use mobile devices?
- Will the mobile platform primarily be used to deliver information or facilitate transactions?
- Is the product or service time sensitive or location sensitive?
- How many of my potential users feel secure in transmitting sensitive information via wireless networks?
- Can the company make a profit or reduce costs from the investment of m-commerce technology, or will the initial investment, transaction cost, and support exceed the profit of the product or service sold?
- Will the investment in m-commerce technology produce any tangible benefits, such as improved customer service or employee morale?

They also recommend that product or service applications be identified and designed before devices and technology is chosen. Once the product and service application is in place, an application roll-out plan including a pilot should be developed on sound principle of technology acceptance model or innovation diffusion theory.

A study performed by Balasubramanian et al (2002) in which a space-time analysis was done on a number of activities in a world with and without mobile technologies highlighted a number of key observations. By plotting these activities on a graph with the vertical axes being the time dimension ranging from fixed time to flexible time and the horizontal axis being the space dimension ranging from constrained to flexible, it was highlighted that “hardly any significant economic and/or utilitarian activities are highly flexible along both spatial and temporal dimensions”. By deploying mobile technologies, these activities migrate on the plot by increasing both the spatial and temporal flexibility of the activities. As a result they put forward a classification of m-commerce applications along 3 dimensions:

1. Location sensitivity of the activity
2. Time sensitivity of the activity (i.e. relating to a scheduled event, quickly depreciating information, or emergency related)
3. Extent of control over the application by the user or provider of the service

The taxonomy of these applications is provided in the table below.

Table 5: Taxonomy of Mobile Commerce Applications

Category	Location-Sensitive	Time-Sensitivity	Context	Considerations
Category 1	Yes	Yes	User	Relates to the immediate context of the user. Likely to be consciousness enhancing. Example: cellphones used to activate vending machines
Category 2	Yes	Yes	Product or Service Provider	Relates to the immediate context of the user and may involve opportunities to attenuate information or automate certain processes. Example: Airbag deployment on a vehicle results in a notification to a service provider who then attempts to make contact via cellular network with the driver. If no response then emergency services are deployed to the accident using GPS.
Category 3	Yes	No	User	Typically relate to the satisfying the on-demand information required by the user. Example: request for route directions
Category 4	Yes	No	Product or Service Provider	Typically involves the monitoring and data acquisition which is location specific.

Transaction Initiation	Mobile Initiation	Time Sensitivity	Control	Considerations
Category 5	No	Yes	User	Typically involves the acquisition of time-critical information where real-time decision making is crucial Example: Wireless stock quote request
Category 6	No	Yes	Product or Service Provider	Similar to category 5, but the service provider takes the initiative to push information to the user based on certain event criteria. Example: Stock price alerts
Category 7	No	No	User	Involves the user driven request for information typically held in data repositories Example: Wireless access to digital music libraries
Category 8	No	No	Product or Service Provider	Typically involves the remote update of mobile unit configurations or software Example: Remote update of software

3.5 Voice Commerce

Voice commerce is defined as follows:

- Voice commerce is the deployment of voice technologies such as speech recognition, voice identification and text-to-speech to improve operating efficiencies and customer service (Galanxhi-Janaqi & Nah, 2004:746)

An example of voice commerce in action is the voice commerce gateway built by OkamLogic, a Canadian based company established in 2000. It built a voice commerce gateway that allows callers to say certain commands; the computer system recognises them, retrieves their requested information and reads it back to them using a voice synthesiser (Bolan, 2001). The president of OkamLogic sees a significant value proposition for companies through operational efficiency using such systems.

Gallagher (2001) explains that voice recognition systems pickup where IVR systems end in the voice commerce spectrum, since they are able to receive spoken sentence as an input medium instead of the touchtone keypad of the phone. More sophisticated systems make use of biometric voice printing to identify a caller by voice instead of using a pin number.

A level of integration between e-commerce and voice commerce emerges in the form of 'voice over IP' products in which spoken messages are carried over the internet. This enables parties to collaborate verbally over the same website screen and internet connection; a significant enhancement for call centre based customer services. Howard Sachar of IBM does caution that the quality of voice over the web may still be problematic for large scale adoption as delays and distortions irritate callers particularly in challenging engagements (Gallagher, 2001).

Before embarking on a v-commerce solution, one also needs to consider the frequency and complexity of interaction that must be hosted over the channel. As an example, Gallagher (2001) indicates that the success rate with servicing existing customers is far easier than attempting to sell new customers based on the complexity of the sales process. Another consideration is that v-commerce has significant advantages in a mobile context in which the caller's visual attention is almost fully occupied as when driving a motor car (Biddlecomb, 2000). Where the product or service needs to be seen or experienced in order for the consumer to

make an informed decision are situations where voice commerce will not work. (Biddlecomb, 2000).

Another scenario in which synergies arise between v-commerce and m-commerce arises from the miniaturisation of handsets. It may be more convenient to search the internet using WAP over a mobile handset in mixed mode, where certain user inputs are done by voice rather than attempting to navigate the clumsy mobile handset keyboard. (Biddlecomb, 2000).

Cable And Wireless do not see voice commerce replacing call centres as their still appears enough human resources to meet the current market needs (Biddlecomb, 2000).

Another emerging v-commerce offering is the voice portal which allows a caller to perform a wide variety of tasks using a voice browser. Several large firms are currently developing such voice browsers (Biddlecomb, 2000).

Erich of Nuance (Gallagher, 2001) says that the payback period for a typical in-house develop system is in the range of 3 to 6 months with a net cost saving of roughly 75% to 80% saving per call after about 2-3 years of optimisation. VP of Mark Group retailer operations confirms similar savings where their speech recognition v-commerce solutions had reduced call costs from \$2 to 80-85c (Heun, 2001) for customers checking shipping statuses. Gallagher (2001) cautions these voice systems can be complex and that outsourcing models do exist to minimise the risk to organisations.

One of the big hurdles is one of acceptance and adoption by the general public. As this takes effect the possibilities for deploying voice commerce to more and more applications become easier and less risky (Gallagher, 2001).

The reliability of a speech recognition system depends on the list of recognisable words in its database. A company by the name of Nuance indicates that they've had success rates of 95% which is better than the 90% success rate at which humans recognise words (Gallagher, 2001).

And yet it would seem that speech recognition is critical to overcome the adoption barrier for v-commerce. A Frost & Sullivan report suggests that IVR systems with touchtone menu selection can see as much as 50% of calls terminated or a selection made to speak to an operator. And yet a high proportion of these non-adopters

would be prepared to work with advanced speech recognition systems (Avalone, 2001).

As early as 1998, companies like Motorola, Broadvision, Nuance, VISA were collaborating in building a platform that would integrate e-commerce, m-commerce and voice commerce. Companies would be able to completely reuse business logic built for their e-commerce websites by deploying this new platform as a user-interface layer on top. Their customers could perform much of the same transactions they were doing over the wired net on their cellphones using voice recognition browsers (Nelson, 1998). The leverage took the form of reusing the same business logic used for the website.

3.6 Television Commerce

Television or t-commerce is defined as follows:

- Television commerce opportunities emerge as a result of interactive digital television technology allowing two-way personalised communication with end-consumers. (Galanxhi-Janaqi & Nah, 2004:746)

Galperin & Bar (2002) provide a brief history of the US television broadcast industry, which has seen 3 generations and note that each new generation of broadcast, rather than supplant the previous, builds a new layer of broadcasting opportunities and business models.

They refer to the first generation as the Fordist Television generation and explain that it involved one-way broadcasting of a few video channels in which broadcasters essentially sold a large public viewer base to advertisers (Galperin & Bar, 2002). This is the same model as the SABC business model in South Africa.

The second generation was introduced during the 1970's as a consequence of the introduction of cable television. Again the model was one of one-way broadcasting but to a limited audience base who paid subscription fees in addition to licenses. MNET and DSTV essentially ushered in similar versions of this generation but using encoded radio signal transmission and satellite transmission respectively instead of the cable installations used in the US.

As a result of yet another technological disruption, digital processing and transmission, a third generation of television has been introduced referred to as interactive television.

The British broadcasting regulator defines ITV services as “pull’ services initiated by the subscriber to a MVPD (Multi-channel Video Programming Distributor) that are not necessarily related to any specific video programming” (Galperin & Bar, 2002), which gives rise to two types of ITV services:

1. Program-related services: “[T]he programmer or advertiser will typically contract with an ITV service provider for the creation of programming enhancements, storage of interactive content, and management of return channel data.” Users can obtain additional information relating to the broadcast content, select video feeds from a menu, interact with live shows, sports events or other viewers or to initiate commercial transaction relating to the content being broadcasted
2. Dedicated Services: “Typically, these will be entertainment, information, and transaction services provided by electronic retailers on the basis of contracts with the MVPD, which essentially acts as a platform operator, offering third parties a ‘window’ for t-commerce. Examples of these services already available or in the deployment stage are electronic programming guides (‘EPGs’), video-on-demand, e-mail, game, gambling, and electronic banking.”

Given these two categories, one can see that the South African television broadcasting industry has started to explore the first type with a wave of new television shows such as SABC’s 3-Talk engaging viewers through the mobile channel. In addition, in the last year the market has seen the introduction of integrated home entertainment system set-top boxes such as the Xhibitor from Mecer which integrates the potential of the personal computer, internet, DVD player, MP3 player, multi-media card readers, Dolby surround sound and wireless capabilities in an affordable package and appears to be an early entrant preparing the South African market for ITV.

However, Galperin & Bar (2002) caution that dial-up internet and satellite channels for return channel data has typically shown too much latency for an engaging and pleasing interactive experience for viewers and that a broadband wired or wireless solution is an entry barrier.

From a marketing perspective, television has the greatest potential for holding an individuals attention. Radio tends to detach the customer. The internet puts the user in control of the exploratory process and removes control from the marketer (Davis & Yung, 2005). But television allows the marketer to deploy a message through a

powerful integration of sound and vision. Now through the integration of television and mobile channels, marketers are able to better hold the attention of their market by converting their viewers to active participants. Davis & Yung (2005) cite examples in which the marketers use the power of the television channel to deploy information to viewers and then engage them with the mobile channel. Moreover, it allows the marketer to adjust and tailor the show in accordance with the feedback they are receiving from their audience and to measure and track the audience's sensitivity to certain probes deployed in the television show.

Davis & Yung (2005) also identify the opportunity to leverage our familiarity with the television as a means to make us more comfortable with the mobile channel through interactive television.

The following recommendations for an integrated television and mobile product are extracted from Davis & Yung (2005):

- "Campaign content and applications designed around impulsive play and games will increase interactivity by influencing the audience personally and intimately"
- "Maintaining conversations required TV shows to continually heighten the audience's emotive state, change their attitudes, and frame their mood."
- "Real-time communications [arising from the mobile channel] was a key ingredient of the audiences' perceptions of service quality, trust in the communication process, engagement in game playing, and enticement to interact in the LOOP."
- Viewer participation should influence the development of the TV show.

3.7 Silent Commerce

Silent Commerce is defined as follows:

- "Silent commerce refers to the business opportunities created by making everyday objects intelligent and interactive." (Galanxhi-Janaqi & Nah, 2004:746) Typical applications would be the use of smart cards or radio frequency identification (RFID) chips for tagging and tracking items.

Smart cards and RFID technologies emerge as a result of the need to enhance the data carrying capability, confidentiality risks and durability of magnetic strip cards and barcodes (Strickland & Hunt, 2005).

Strickland & Hunt (2005:222) explain that "Smart cards are essentially credit card-sized mini-computers with a processor and memory chip; a contact pad provides the input/output function". Other forms of Smart card make use of close proximity radio frequency as an input/output interface. Due to its computing capabilities, the card is able to execute algorithms such as data encryption, store dynamic information and output requested information. The only risk with a Smart card is theft and therefore they are typically implemented with security PIN numbers or other forms of biometrics.

Ragbupathi and Tan (2002) describe how smart cards are being used in the US to host electronic patient records and as patients visit out of network or out of state specialists; the smart card keeps track of their evolving medical history.

Other forms of 'smart' cards are optical cards that contain a small patch of laser sensitive material which can be written to once and read multiple times and in effect works like a CD (Stickland & Hunt, 2005).

Stickland & Hunt (2005:222) also explain that "Radio Frequency Identification (RFID) is a generic term that encompasses a number of technologies that use radio waves to transmit data stored on an integrated circuit (IC) memory chip". The underlying principles of this technology were discovered in World War II when they learnt that radar signals can also be used to activate circuits on a target object and receive a signal transmitted by that circuit. The most pervasive use of this technology in the retail sector involves tagging products to detect theft in stores and is referred to as EAS, electronic article surveillance (Strickland & Hunt, 2005). EAS as the first commercial application only indicates the presence of the EAS device and does not transmit any data.

In general RFID systems consist of an interrogator unit and a tag unit. The latter typically consists of an integrated circuit and an antenna. Data transmission from the tag can either be self-powered with a battery and is referred to as an active tag or a passive tag which leverages the induced power resulting from the electro-magnetic waves beamed out from the interrogator unit. Another form of passive tagging makes use of electrostatic charges resulting from the swipe of the card against an electrically powered coil (Strickland & Hunt, 2005). The choice of the various forms of RFID depends on the desired range of transmission with the self-powered unit delivering the greatest range at the greatest cost.

Strickland & Hunt (2005) describe how RFID technology and Smart cards can be combined into various formats from a 'dumb' card that only has a memory chip with the intelligence sitting in the card reader to a true self-powered 'smart' card that is able to transmit its information over some distance to readers.

Strickland & Hunt (2005: 225) caution that "the chip can be read by anyone with a radio frequency "sniffer" operating at the correct frequency – and duplicated". Again the application should ideally be combined with some other form of biometric identification to authenticate the individual. More advanced RFID chips allow for data encryption to address the confidentiality of information and privacy rights of the owner of the device.

A HEALTHCARE Purchasing News article (2006) referred to a study by The National Alliance for Health Information Technology and BearingPoint Inc. in the US of 300 government and commercial healthcare providers, indicates that RFID is already being used in a number of applications in the US; medical equipment tracking, drug counterfeit detection, tracking of drug usage through clinical trials, hospital and medical device asset tracking, inventory management, patient safety systems involving identification and medication administration, patient flow management, access control and security, supply chain system and smart shelving. Although 74% had intentions to invest in RFID solutions by 2007 and the investment in RFID was largely driven by large organisations, a number of factors were retarding the adoption of RFID. 93% of respondents in the abovementioned study saw the costs of these systems as a hurdle, long payback periods, the lack of widespread adoption, and a lack of standards (HEALTHCARE Purchasing News, 2005). A RFID systems senior manager at Zebra Technologies Corp explained that the healthcare industry was still getting a lot of value from barcodes and did not see the business case behind RFID as yet and expected business process changes to accommodate the new technology (HEALTHCARE Purchasing News, 2006). Notwithstanding, Gartner Group and Forrester Research posed RFID as one of the top 10 technologies for 2004-2005 (Janz, Pitts & Otondo, 2005). The vice president of the Healthcare Information and Management Systems Society posed auto-identification using barcodes or RFID as one of the top 10 trends for 2006 (IT Solutions, 2005).

The benefit of RFID tags over PDA's, cellphones and barcodes is that it is a hands free technology that does not require line-of-sight. It allows for faster read rates, larger data capacity, the ability to be re-written, can operate in harsh environments

and requires less labour (HEALTHCARE Purchasing News, 2006). The downside of these tags is that they do use radio frequencies and are therefore susceptible to interference from metals, liquids and other radio devices (HEALTHCARE Purchasing News, 2006).

A RFID proof-of-concept study conducted at the Elvis Presley Memorial Trauma Unit in Memphis, Tennessee in the US resulted in the following recommendations for a successful RFID implementation (Janz, Pitts & Otondo, 2005):

- RFID implementation success is sensitive to the environment in which it is used. The unique factors of the environment, process requirements and product characteristics must be carefully considered.
- A formal project management approach with strong project champions must be adopted as the implementation of RFID involves multidisciplinary and related activities from software development, hardware procurement and deployment to business process changes.
- RFID applications are highly sensitive to supporting software applications. These must be design and built using formal software engineering principles.
- Training and end-user involvement is critical.
- If an RFID applications is to be outsourced ensure high involvement in the development phase to ensure on-the-job training
- Carefully manage end-user expectations. Since RFID applications are relatively unknown, as the user gains an understanding of the possibilities the tendency will be there for scope creep.

3.8 Telematics

Telematics is broadly defined as follows:

- "Telematics is the ability to wirelessly provide information to or extract information from vehicles and industrial equipment such as generators, pumps, and heating and cooling systems" (Galanxhi-Janaqi & Nah, 2004:747)
- "Automotive telematics may be defined as the information-intensive applications enabled for vehicles by a combination of telecommunications and computing technology" (Duri, Elliott, Gruteser, Liu, Moskowitz, Perez, Singh & Tan, 2004)

Ragbupathi & Tan (2002:59) quote Greenes & Shortliffe (1990) as defining medical informatics (including medical telematics) as “the cognitive, information processing, and communication tasks of medical practice, education, and research, including the information science and technology to support those tasks”.

For the purposes of this paper a more generalised definition of telematics is proposed that also more appropriately satisfies the medical industry: Telematics is the ability to provide information to or extract monitoring and surveillance information from remote systems or system components.

To illustrate this definition a number of medical applications are noted below:

- Euphin, which stands for European Union Public Health Information Network, is a typical case of a highly relevant and significant effort to use telematics to monitor the European Union for communicable diseases (Oxford University, 2003). Euphin consists of three subsystems: a health information exchange and monitoring system, a health surveillance system for communicable diseases and an injury surveillance system.
- The application of non-invasive, high-imaging probes is being researched and developed in the medical industry. A device called an intra-corporeal video probe (IVP) is a capsule sized telemetric video probe which a patient swallows and as it progresses through their digestive system captures video images and transmits them wirelessly to a digital processing and information management system for analysis by health specialists (Medical Devices: Improving The Image, 2005)
- CardioNet in the US has developed a cardiac monitoring device that transmits patient condition information wireless to a PDA-type device. This application has been used on more than 35,000 patients (Frazier, 2005). The next generation of the device will have cellphone capability to enable a call between the physician and patient. CardioNet see an entire industry of wireless health monitoring services developing as monitoring and wireless technology becomes cheaper, smaller and more reliable. A similar project is underway in the UK with various medical technology organisations and Oracle that uses a small externally placed sticky pad sensor that monitors electrocardiogram data and wirelessly routes the information via cellphone to a medical monitoring centre (The Doctor in Your Pocket, 2005).

- Tele-pathology (Baruah, 2005) and tele-radiology are two examples where the acquisition of pathology results or X-ray images are remote from where the analysis by a specialist takes place or more significantly when multiple specialists collaborate in different parts of the world on a single case. Applications such as these are particularly significant in third world countries that do not have sufficient specialists to service a large geographic area with poor infrastructure.
- Cellphone manufacturers are entering the health telematics market with cellphones with built blood-glucose meters which are capable of transmitting readings, weighing scales and blood-pressure monitors that route reading via cellphone to a target system (The Doctor in Your Pocket, 2005).
- 75% of the US healthcare spend is on chronic medication. Two applications target this cost driver directly. The first is an application developed in South Africa by a company called SIMpill in which 2000 people use a device that detects if the cap of a bottle of pills has been opened or not and communicates this information to a central computer system. If the system determines that pills have not been taken on time, it sends an SMS message to the patient as a reminder. The second suggested application to encourage exercise by building in a pedometer into a cellphone which results in free phone minutes sponsored by the healthcare funder when the person exercises regularly (The Doctor in Your Pocket, 2005).

The regulatory challenge for medical applications exceeds that of commercial and industrial use based on the type of application; life-sustaining applications being more rigorous than diagnostic and monitoring systems (Cravotta, 2006). In support of this a restricted radio frequency band called Medical Implant Communication Service has been reserved for implanted medical devices. Bluetooth technology is also cited by Cravotta (2006) as wireless communication alternative for implanted devices.

Wireless technology also provides the opportunity to allow for less intrusive upgrades to implanted devices, such that the bulk of the control system of the device is situated outside the body with only the bare minimum electromechanical components or sensors in the body (Cravotta, 2006).

The cellphone therefore becomes a critical component in the networking of these devices. Cravotta (2006) sees it playing the role of a communication gateway between the medical device and medical specialists and support personnel, or even a user terminal for the delivery of feedback information or remote control.

The Economist refers to a report by HBS Consulting in London who state that the global tele-health market "will grow to \$7.7 billion in 2006, up from \$3.2 billion in 2003" (The Doctor in Your Pocket, 2005).

3.9 U-Space Market and Trend Analysis

As a result of Gilder's Law, which predicts that bandwidth triples every 12 months, Moore's Law, which proposes that computing power doubles every 18 months, and that communications channels are tending to converge on a single standard, the Internet Protocol, several principles are driving the new economy (Bothma, 2005). It continues to become easier and more efficient to process information rather than physical products. The world continues to shrink as people are able to engage with each other across the globe in ever-increasing degrees of richness. This is closely associated with a growing culture of instant gratification as people can access information and services when they want, where they want and receive immediate attention. Different to other resources or utilities, the more people use the internet the more valuable it becomes. Distribution dynamics change dramatically in this new world. Traditionally intermediaries added value by breaching the separation of time, space and information, and discrepancies in quantity and assortment which exists between buyers and sellers. The virtual world allows buyers and sellers to breach many of these gaps themselves giving rise to new opportunities for sellers and increasing bargaining power for buyers. As Bothma (2005) succinctly states, "[t]he impulse to buy and the purchase itself used to be separated by a combination of physical and mental barriers."

This evolving new order drives a transition from the traditionally geography-driven firm to what Watson et al (2002) refers to as the network-driven firm. As a collection of stakeholders, the network-driven firm, is able to co-ordinate their activities through the exchange of electronically-mediated messages to achieve greater efficiencies and effectiveness in the production and/or deployment of services to their collective end-customer. Collaboration of this nature is critical if a service is to achieve ubiquity and unleash the benefits that u-commerce promise. The reason for this is based on what Watson et al (2002) refers to as "bounded rationality" in which he identifies

three reasons why consumers' ability to behave rationally in their decision making is limited. At the specific moment in time that a decision is to be made (which could be anywhere and anytime; typically not when they are sitting in front of their desk top dialled into the Internet) they are not aware of all the alternatives available to them. Neither are they fully aware of the consequences of the alternatives that they are aware of and most often they do not have a mental model to help them evaluate the consequences. In order to deal with this complexity, consumers typically develop a simplified mental model of their world to filter out complexity and allow them to make decisions. The quality and rationality of those decisions is a function of how well their mental model maps to reality.

Watson et al (2002) argue that given this problem solving mechanism, consumers find themselves in markets which are evolving from physical marketplaces to virtual marketplaces (websites on the internet) to u-space. They further propose a conceptual framework for u-space along two dimensions:

1. **Space/time specificity** ranging from "localised" to "everywhere" technology
2. **Awareness** ranging from "unconscious" to "ultra-conscious" where technology either attenuates information or amplifies it

These dimensions then give rise to 4 types of commerce as depicted in the following diagram:

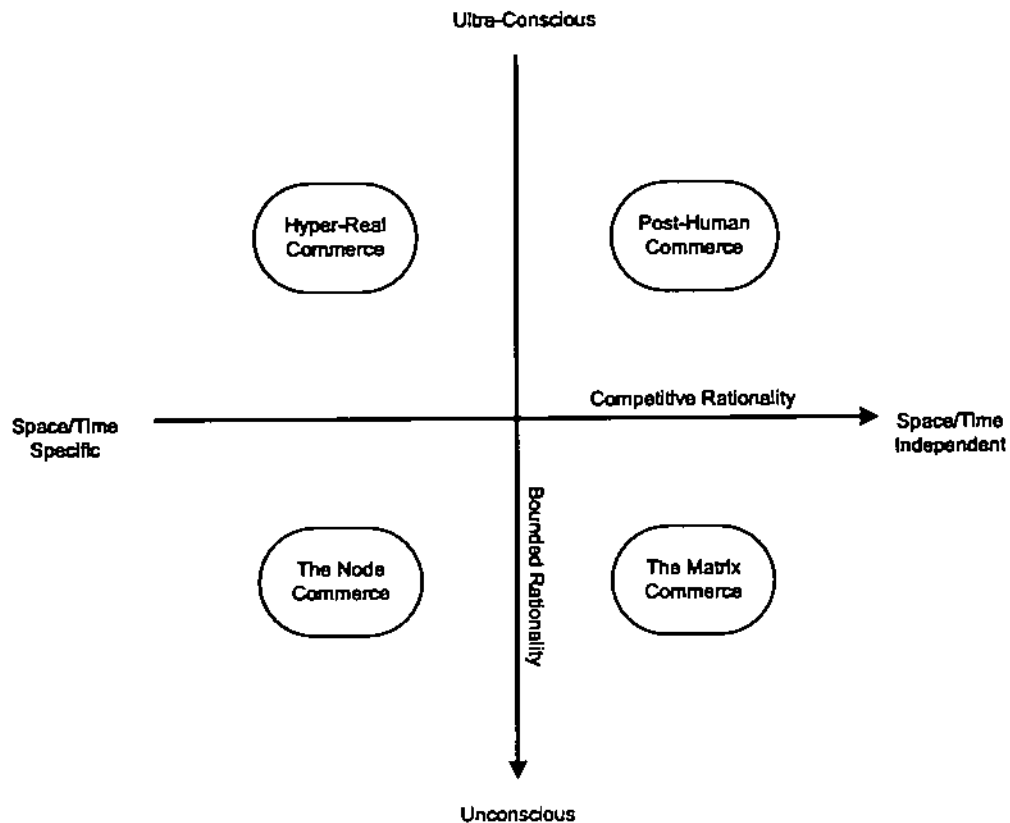


Figure 2: U-Space

“Hyper-Real” Commerce: When technology is used to extend consumer consciousness into enhanced or artificial reality and creates an extraordinary experience through the interaction with a product or service. Examples of this is film, computer generated virtual worlds, or enhanced experience of white water rafting.

“Post-Human” Commerce: When technology is used to extend normal conscious experience of services in a ubiquitous sense, such that it is always available at any place or anytime. An example of this electronic banking which can be access via the web, cellphone or ATM.

“The Matrix” Commerce: By attenuating information to consumers, this form of commerce is essentially silent and attempts to automate transactions that unnecessarily consume conscious thought. Also termed synchronous marketing, the Matrix is omnipresent and learns, propagating such learning to all nodes in the network.

“The Node” Commerce: Similar to “The Matrix”, it attenuates information by automating transactions which typically consume consciousness. However, the node is bound to a specific location; it is not ubiquitous. An example of this is automatic billing on toll roads using e-tags.

Dynamically along the consciousness axis, the model proposes that as u-commerce and the underlying technologies improve what is presented today in an ultra-conscious way (to enhance bounded rationality such that consumers can improve their decision making) will move toward the unconscious in future. Watson et al (2002) emphasises that firms need to view consumer attention as a limited resource and recommends that they perform an attention analysis to determine how to optimise and focus consumer attention on those transactional decisions that truly do require quality decision making. This view concurs with that of Davenport (2000) who states that “[t]he truly scarce resource and thus the most likely currency of the new economy, is actually human attention”. Designs of new online offerings need to employ a principle of “conservation of attention”; for every new category of information introduced for consumers to contend with should be an equal and opposing design to move some other information into the realm of the unconscious. Watson et al (2002) predict that attention management will become one of the key challenges of u-commerce.

Along the time-space specificity axis, Watson et al (2002) argues that through competitive forces (termed “competitive rationality”) and the commoditisation of what are initially unique and innovative, products and services will continually move from the unique and specific time-space to time-space independence thereby becoming ubiquitous.

Watson et al (2002) proposes that the u-space model is a tool that can help organisations determine the future trending impact of u-commerce on their respective industries, particularly given the dynamic prescriptions of the model. In addition, it should help them profile the commerce types which dominate their industry and understand the implications of moving from one of the four commerce types to another.

In closing Watson et al (2002) warns of complacency indicating that e-commerce has fallen short in take-up with consumers as a result of their aversion of using the time-space specific computer interface and their desire to touch and experience products and services in a social setting. Fundamentally, consumers are people yearning for

an “unforgettable experience” and only when technology and computing becomes seamlessly integrated and fully pervasive with their natural and fluid engagement with their environment will u-commerce become a reality.

3.10 Architectural and Radical Innovation

Technological innovation has been analysed in a number of different ways to attempt to understand the impact of new technologies on organisations and industries, and to inform new coping or competitive strategies. Two relevant perspectives are highlighted here. The first, called a *Transilience Map*, Bothma (2005) describes the model put forward by Abernathy and Clark (1985) which is essentially a 2x2 matrix with one dimension being the impact of the innovation on the established linkages the firm has with the market and the other dimension being the impact the innovation has on the established linkages the firm has with technologies.

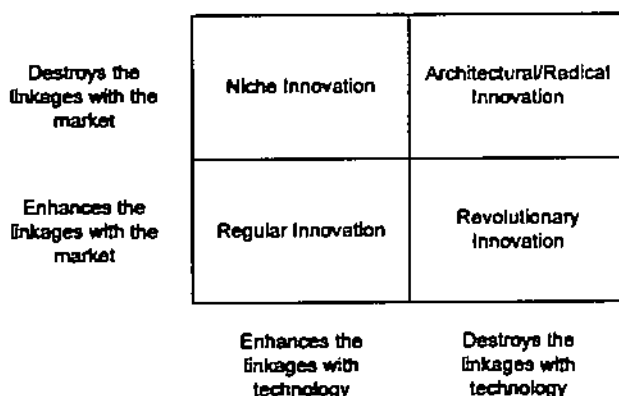


Figure 3: Transilience Map

Bothma (2005) used the map to discuss two competing perspectives that a firm could take on e-commerce as a technological innovation. The first view being “evolutionary” view, meaning that e-commerce will merely extend current business models delivering increasing levels of efficiency and market reach. Essentially this view is that e-commerce will enhance the linkages with the market but destroy linkages with established traditional brick-and-mortar technologies and therefore views e-commerce as a revolutionary innovation. The second view is that e-commerce is a radical/architectural innovation destroying both linkages with established technology and markets giving rise to new business models, new markets and building on new technologies. Bothma (2005) also cautions firms whose

products and/or services are predominantly or wholly information based run a significant business risk if they take the first view; revolutionary innovation. The same can be said of u-commerce and becomes apparent when considering the second perspective of classifying innovation.

Henderson & Clark (1990) looked at systems as consisting of components and architecture. The former embodying core design concepts and the latter determining the unique relationship between those core concepts. Their model is depicted below.

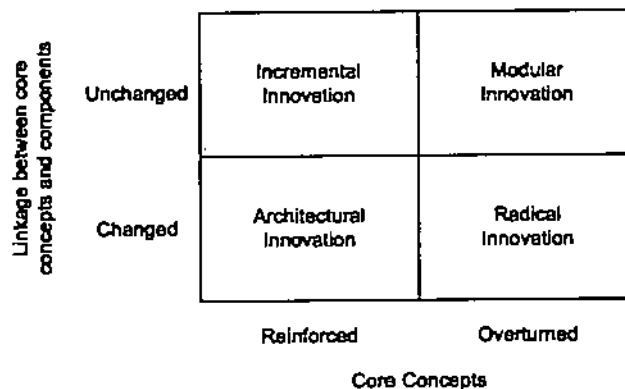


Figure 4: Architecture and Component Based Innovation Classification

Based on this map it is clear that u-commerce is an architectural innovation which creates new relationships between existing core component concepts of e-commerce, m-commerce, voice commerce, silent commerce, etc. Referring back to figure 3 it becomes apparent that u-commerce is expected to destroy the established linkages firms have with their markets as well as their linkages with current technologies.

This observation is critical for two reasons: the implications of S-Curve behaviour for architectural innovations and the challenges facing established firms facing architectural innovations.

Christensen (1992a) describes how firms taking a leading position on innovations that change the architecture of systems (i.e. architectural or radical innovations) are able to create far more powerful and enduring first-mover advantage than firms attempting to disrupt the market with component level innovations (i.e. incremental or modular innovations). Interestingly Christensen's (1992b) points out that new entrants dominated due to their ability to attack the emerging market and not

necessarily through their technology prowess. In addition, his research demonstrates that these disruptive technologies typically evolve in different markets to the one in which they ultimately dominate. Initially the new technology starts out at an inferior performance level serving a different market. The disruption event occurs when the new technology begins to serve the needs of the market in question at a far better price level than the established technology which is charging a premium for over-servicing the market (Christensen, Verlinden & Westerman, 2002). What this highlights is the risk that a dominant player in an industry is exposed to if they are too dependent on an established technological architecture.

The second critical implication of architectural innovations relates to the challenge of implementation. Henderson & Clark (1990) explain that two forms of knowledge develop in a firm: component and architecture knowledge. Typically mature and established firms have settled on a dominant design or architecture and tend to incrementally improve the components of that architecture. In order to deal with the complexity and abundance of information in their world, they organise themselves to reflect their architecture, setting up channels of communication and information filters that filter out “noise” which is not relevant to the current dominant design. Ironically these firms deal with radical innovations quite well since their channels and filters detect component innovation and therefore acknowledge the need for new organisational structures and modes of learning. However, architectural innovations are continuously under threat of failure due to the fact that firms do not identify with the architectural change as they cannot see any component level changes; the architectural change is effectively filtered out. They simply apply existing paradigms, modes of learning and organisation structures to the new innovation and do not reconfigure their culturally embedded channels and filters to accommodate the innovation appropriately.

This explains largely why smaller new entrants are more successful at taking on architectural innovations and blazing a trail through established industries, bring established corporate giants to their knees; they do not have the bureaucracy and cultural inertia which fights against the urgently required re-organisation.

Christensen & Overdorf (1997) identify that organisational capabilities reside in resources, processes and organisational values. In fact they argue that the capabilities migrate from being initially only in resources and then, as a result of competitive forces, are made explicit in processes. Over time these processes

become so entrenched that they begin to manifest in the culture of the organisation. Their prescription of coping with disruptive change is to create a new organisational boundary by doing one of the following:

1. If the capability resides in processes and new processes are required to cope with the disruptive change, then the firm should consider creating a new organisational structure within the corporate boundary. This can be achieved with heavy-weight core team project structure with a dedicated heavy-weight project manager.
2. If the firm's values are likely to reject the processes and value system of the required organisational structure then a spin-out organisation either as a subsidiary or as a autonomous project team (termed "tiger" team) with dedicated resources and heavy-weight project manager
3. Finally, the capability can be created through acquisition. Depending on whether the capability resides in the acquired firms processes or culture will determine whether the firm should be integrated into the parent or not; if it is the latter then absorbing the firm will destroy the capability.

4 Research Methodology

The purpose of this chapter is to detail the specific problems, research questions, investigative questions and methodologies which will be used to study the chosen unit of analysis.

Fundamentally the methodology used for this research report is "case research" applied to Discovery Health administrator as the unit of analysis. The first issue to be addressed is the justification for the methodology.

Perry (2001) provides a synthesised definition of "case research" from several literary sources. The following is quoted from his article:

- 1. an investigation of a contemporary, dynamic phenomenon and its emerging (rather than paradigmatic) body of knowledge (Eisenhardt 1989; Yin 1994; Romano 1989; Chetty 1996; Gable 1994; Bonoma 1985);*
- 2. within the phenomenon's real-life context where the boundaries between the phenomenon and context under investigation are unclear (Bonoma 1985; Chetty 1996; Stake 1994; Yin 1994)*
- 3. when explanation of causal links are too complex for survey or experimental methods (Eisenhardt 1989; McGuire 1997) so that single, clear outcomes are not possible (McGuire 1997);*
- 4. using interviews, observation and other multiple sources of data (Bonoma 1985; Perry 1998a; Robson 1993).*

U-commerce is not in itself a new or additional electronically mediated form of doing business but is instead an architectural innovation which integrates existing forms of commerce seamlessly and in a manner which is intended to yield more value than the individual components operating separately. Operationally, the ubiquity of the u-commerce service across the various channels blurs the boundaries of where one channel added-value starts and the other's end within a servicing event. As a consequence the value of u-commerce cannot be measured as directly as the value generated by the individual u-commerce components. These characteristics mystify causal links between u-commerce and value attribution and therefore satisfy the second and third requirements of Perry's (2001) definition for case research above.

Each of the commerce components of u-commerce have a maturing body of knowledge and are becoming increasingly embraced by various industries. However,

how these components are integrated to form a new whole, which is u-commerce, is relatively void of theoretical frameworks, prescriptions, qualitative and quantitative research. This is evident in the exploratory nature of questions arising from recent research on the topic (refer to the Literature Review chapter) and satisfies the first requirement of Perry's (2001) "case research" definition.

Point 4 of Perry's (2001) definition of case research above emphasises the use of multiple techniques to collect and explore data which characterises the techniques used in this research.

4.1 Problem Statement

Most organisations, operating without a formal knowledge or framework of the u-commerce concept, have inevitably taken a parochial view of the various u-commerce channels allowing them to evolve organically without explicitly investigating and exploring the potential added value of integrating them using an informed and holistic strategy. Galanxhi-Janaqi & Nah's (2004) research supports this view on a global scale by stating that "a great deal of research effort is required to realise the complete vision of u-commerce and to understand its implications" and is further illustrated by their suggested areas of further study which, in research terms, identify the sub-problems facing u-commerce:

- Assessing the true value of u-commerce
- Adoption strategies for u-commerce
- The implications of privacy, trust and security
- The rate of u-commerce technology innovation and adoption

This study focuses specifically on the first two sub problems above.

4.2 Unit of Analysis

Discovery Health administrator operating in the South African healthcare industry is used as the unit of analysis in this research to explore the problem of assessing the true value of u-commerce and adoption strategies.

The justification for using a single organisation as the unit of analysis is justified based on the following:

- Discovery Health was regarded by the ITWeb publication, 'The E-Business Handbook 2004' as the leading e-business organisation in South African

healthcare in 2004 by a substantial margin as perceived by the ICT sector in South Africa (Hartley & Worthington-Smith, 2004)

- Discovery Health is the largest administrator in South Africa administering the largest South African medical scheme and has operations in the US and UK
- As a e-commerce software development manager at Discovery Health the researcher has unique access to essential primary sources within the organisation for the purposes of this study

4.3 Research Questions

The research questions in table 1 below are a variation of the research questions posed by Galanxhi & Nah (2004) and were modified with the intent of making them more relevant to the healthcare context.

Table 6: Sub Problems, Research Questions and Propositions

<p>Assessing the true value of u-commerce</p>	<p>1. How can the combination of different components of u-commerce implemented by an administrator play a role in making quality healthcare more affordable to a broader spectrum of South Africans?</p>	<p>It is proposed that an administrator with sufficient scale such as Discovery Health can, by making use of u-commerce principles, generate sufficient operational efficiencies which when passed on to its schemes through reduced admin fees can result in a reduction in member contributions to the extent that medical scheme membership becomes more affordable to a broader spectrum of South Africans. This in turn will result in competitive forces in the administrator market space to further drive the industry's average cost of contribution down.</p>
<p>Adoption strategies for u-commerce</p>	<p>2. What is an appropriate or recommended strategy framework for medical administration companies wanting to embark on u-commerce initiatives in the South African healthcare industry?</p>	<p>It is proposed that the current set of strategic tools presented in literature for each of the components of u-commerce and generic technology and innovation strategy tools together with the experiences of Discovery Health can be used to synthesise a recommended strategy framework.</p>

4.4 Research Design

The research methodology was composed of two stages. The first was to address research question 1 which broadly involved a combination of qualitative interviews with selected managers at Discovery Health and the analysis of primary company data. The second stage involved the integration of the findings of stage 1 with the sensitising concepts acquired through the literature review to synthesise a strategy development framework for the implementation of a u-commerce strategy by medical administrators in the South African context.

4.4.1 Methodology for Research Question 1

The methodology outlined in this section addresses research question 1 on the basis of the associated proposition stated in table 1 above. In order to explore the proposition the procedure sets out to answer the following investigative questions:

Table 7: Investigative Questions for Research Question 1

Research Question 1: How can the combination of different components of u-commerce implemented by an administrator play a role in making quality healthcare more affordable to a broader spectrum of South Africans?	
Proposition: It is proposed that an administrator with sufficient scale such as Discovery Health can, by making use of u-commerce principles, generate sufficient operational efficiencies which when passed on to its schemes through reduced administration fees can result in a reduction in member contributions to the extent that medical scheme membership becomes more affordable to a broader spectrum of South Africans. This in turn will result in competitive forces in the administrator market space to further drive the industry's average cost of contribution down.	
#	Investigative Questions
1.	To what extent has Discovery Health made use of u-commerce? Method: a. Prepare a preliminary list of electronic services used by Discovery Health using primary data sources

	<ul style="list-style-type: none"> b. Conduct interviews with the Systems Development managers responsible for these services in order to collect information that will refine the list, describe the services and explore strengths and weaknesses of the services. c. Map the services to the u-commerce components defined in the Literature Review chapter d. Evaluate the extent of integration between the different u-commerce components
2.	<p>What operational efficiencies have been derived from the use of u-commerce components at Discovery Health?</p> <p>Method: (discussed in detail in section the section <u>Claims Business Service Savings Model</u>)</p> <ul style="list-style-type: none"> a. Confirm that the Claims Business Service provided to the scheme by the administrator is most significant cost driver underlying the administrators fee charged to the scheme b. Prepare a mapping of Discovery services to the end-to-end healthcare engagement lifecycle c. Develop a savings model for the business service in relation to the use of u-commerce components which analyses the savings across u-commerce channels and stages of the end-to-end healthcare engagement lifecycle d. Use the savings model to estimate the current operational efficiencies accruing to the administrator and what the estimated administration fee would be if these u-commerce efficiencies were not in place e. Determine the distribution of operational efficiencies across the various u-commerce channels and how they map to the Healthcare Engagement Lifecycle
3.	<p>How do the operational efficiencies correlate with the u-commerce solutions?</p> <p>Method:</p> <ul style="list-style-type: none"> a. Correlate the u-commerce richness and savings for electronic services

Claims Processing and Claims Business Service

For the purposes of this research paper, a distinction is made between claims processing and the Claims Business Service provided to the scheme by the administrator. The difference is based on the scope of activities involved. Millner's (2006) activity-based costing exercise, a key source of primary data for this study, focused on a range of activities which were directly related to the following broad functions:

1. Inbound paper claim logistics (mailroom, sorting, duplicate checking, scanning)
2. Claims capturing into the transaction processing system
3. Manual assessing of paper and electronic claims
4. Quality assurance review teams
5. Manual preparation of electronic claims (i.e. Modifier Linking and Dependant Correction)
6. Cost adjustment teams
7. Ex Gratia teams
8. Claims payment run audit operational teams
9. Call centre servicing of calls related directly to claims queries

Expanding the scope of claims processing to include not only the direct claims processing functions described above but also all the peripheral business service components which facilitate the member and medical service provider engagement through-out the lifecycle of a complete healthcare servicing encounter defines a broader definition, termed "**Claims Business Service**", as a component of the complete portfolio of administration service provided to the scheme by the administrator. Other service components of the administration service would be:

1. Marketing: marketing to scheme to potential clients (individual members and employer groups) and the broker community
2. New Business: the operations supporting taking on of new members
3. Member, Employer and Broker Administration: operations supporting the maintenance of policies and stakeholder relationships

4. Financial Services: the operations supporting the collection of premiums and payment of claims, broker commission, reimbursements, etc

Claims Business Service Savings Model

As indicated in Table 2 above, a savings model was prepared for the Claims Business Service. This section sets out to explain the rationale and structure of this model.

The event which triggers the activities in the Claims Business Service is the decision taken by a beneficiary of the scheme to treat an ailment that they have become aware of, which will lead them through a series of engagements with various medical service providers and the medical administrator.

The Literature Review section discusses the merits of Jaworski's (2004) technique of articulating the customers decision-making process and then of mapping the online products, services and information offerings to this process to ensure comprehensive coverage of all their needs. The logic behind this is that when an online service seamlessly and intuitively addresses all the information and servicing needs of the online shopper through-out the lifecycle of their purchasing engagement then the probability of attracting and retaining online shoppers to a site improves. The same principle applies to the electronically mediated channels which Discovery uses to engage beneficiaries and medical service providers through the lifecycle of their engagements with each other and Discovery as it relates to healthcare servicing. If we provisionally accept that these electronically-mediated services do generate substantial operational efficiencies and savings to the administrator and ultimately the scheme, then the extent to which these services map and satisfy the information and servicing needs of the various actors in the Claims Business Service process becomes a key success factor in encouraging these actors to use them and ultimately realise the true savings potential. This view of electronic service coverage across the business service process is not as important for investigative question 3 as it is for question 4 which explores the future opportunities for further u-commerce efficiencies.

Rayport & Jaworski's (2003) technique for B2C websites was therefore adapted to fit the unique requirements of this healthcare engagement lifecycle as follows:

1. Rayport & Jaworski's (2003) Customer Decision Process was adapted to accommodate multiple actors and referred to as the "Healthcare Engagement Decision Process"

2. Perreault & McCarthy (2004) identify a routinised response path in their "Consumer Problem-Solving Process" which bypasses searching for information, setting criteria, evaluating alternatives and the decision based on this new information, and goes directly to the purchasing action. This concept has also been embedded in the Healthcare Engagement Decision Process
3. Instead of focusing on just the website online offerings, all u-commerce offerings were mapped to the decision process

The high level stages of healthcare engagement lifecycle devised to assist the analysis of this research are summarised in the table below.

Table 8: Stages of Healthcare Engagement Life Cycle

		Description
Pre-Intervention	Recognise A Need	<p>Beneficiary of the scheme becomes aware of the need for healthcare intervention by measuring their condition against health related benchmark information they obtain from their environment (be they explicit or implicit) or because they simply do not feel well; Internally motivated. If they have had prior experience with this ailment or have arranged a programme of treatment and have had success (as defined by them perceptually) then they are likely to have setup a routinised response. In such cases they will skip over the steps below and execute the routinised response which could either involve postponing the intervention or obtaining the routinised medical service. Typical examples of the routinised response would be::</p> <ul style="list-style-type: none"> • "I have a headache. It will pass. I don't need to see a doctor" • "I have a runny nose. I'll go and see my GP." • "I have a chronic disease. My physician has approved a treatment programme for me. Its time for me to obtain my treatment"
	Search For Information	<p>The beneficiary may seek additional health related information regarding the condition as well as information relating to the benefit status of the healthcare plan in order to inform their decision regarding the appropriate healthcare intervention.</p>
	Evaluate Alternatives	<p>The beneficiary determines alternatives for addressing the ailment based on information gathered.</p>

Intervention	Decide On An Intervention	The alternative selected is likely to be a function of the type and intensity of the ailment, degree of access to medical expertise, the financial implications of treatment and to what extent the cost can be funded by their medical plan. Possible outcomes could be to postpone the healthcare servicing intervention.
	Authorise The Intervention	The beneficiary makes contact with the relevant service provider and schedules the intervention. Depending on the cost of the service, the provider, member and/or administrator may engage to determine who will be funding the service and if that entity has the funds available for servicing. For lower cost services, the service provider typically do take more risk and tend to skip this stage going directly to the provision of services. Examples of this are GP visits or the dispensing of acute medication by a pharmacy.
	Perform The Intervention	In this stage the beneficiary presents themselves for servicing by the medical service provider. Again, depending on the nature of the service this could be an extended stay in a hospital, a series of treatments or a once of visit to the local physician. In addition, this stage could result in the referral to another service provider. Examples are the referral by a GP to a Surgeon, or the prescription of medication. Such referral cases are assumed to go back to stage 1 as a new need is recognised.

Post-Intervention	Bill The Intervention	Once the servicing is complete, the service provider will bill for the service provided. Depending on the nature of the service, the funding benefits and rules of the patients medical plan, the patients financial ability to pay for the servicing immediately, and the providers understanding of all of these factors and propensity for financial risk, the service provider will either elect to invoice the patient directly with a paper invoice or submit an invoice either by paper or electronically to the patients medical aid. If the patient receives the paper Invoice, Irrespective of whether they do pay at that point or not, they are likely to send the invoice to Discovery for reimbursement or to allow the claim to accumulate to their Annual Threshold.
	Track The Claim	Assume the claim was sent to the patient's medical aid for payment purposes. Depending on the cost of the service and who is carrying the financial risk, either the patient or the service provider will have a definite need to know the following: <ul style="list-style-type: none"> 1. Has the claim reached the medical aid 2. Have they started processing the claim 3. How long will it take to process? 4. Are there benefits to pay the claim? 5. When will payment be made?
	Understanding The Financial Outcome	Ultimately once the claim is processed and the claim payment to member or provider is different to the amount claimed, the entity with the financial risk will have a need to understand the processing outcome. This is an important step as it is likely to reinforce or attenuate their routinised response in similar situations.

The next step in the analysis procedure was to map all the relevant service components (electronic and non-electronic) to the appropriate Healthcare Engagement Decision Process stages. This provides a view of the coverage that the Claims Business Service and the potential u-commerce solutions have of the complete lifecycle of the Healthcare Engagement Decision Process, and provides useful insight for investigative question 3; analysing the future opportunities for u-commerce.

With the mapping completed, the savings model could be developed. The fundamental structure of the savings model consists of a list of electronic services grouped by Healthcare Engagement Decision Process stages. The savings for each electronic service is then estimated using the calculations as summarised in the figure below. The next chapter, Research Results, expands on the results of the estimations of these input parameters.

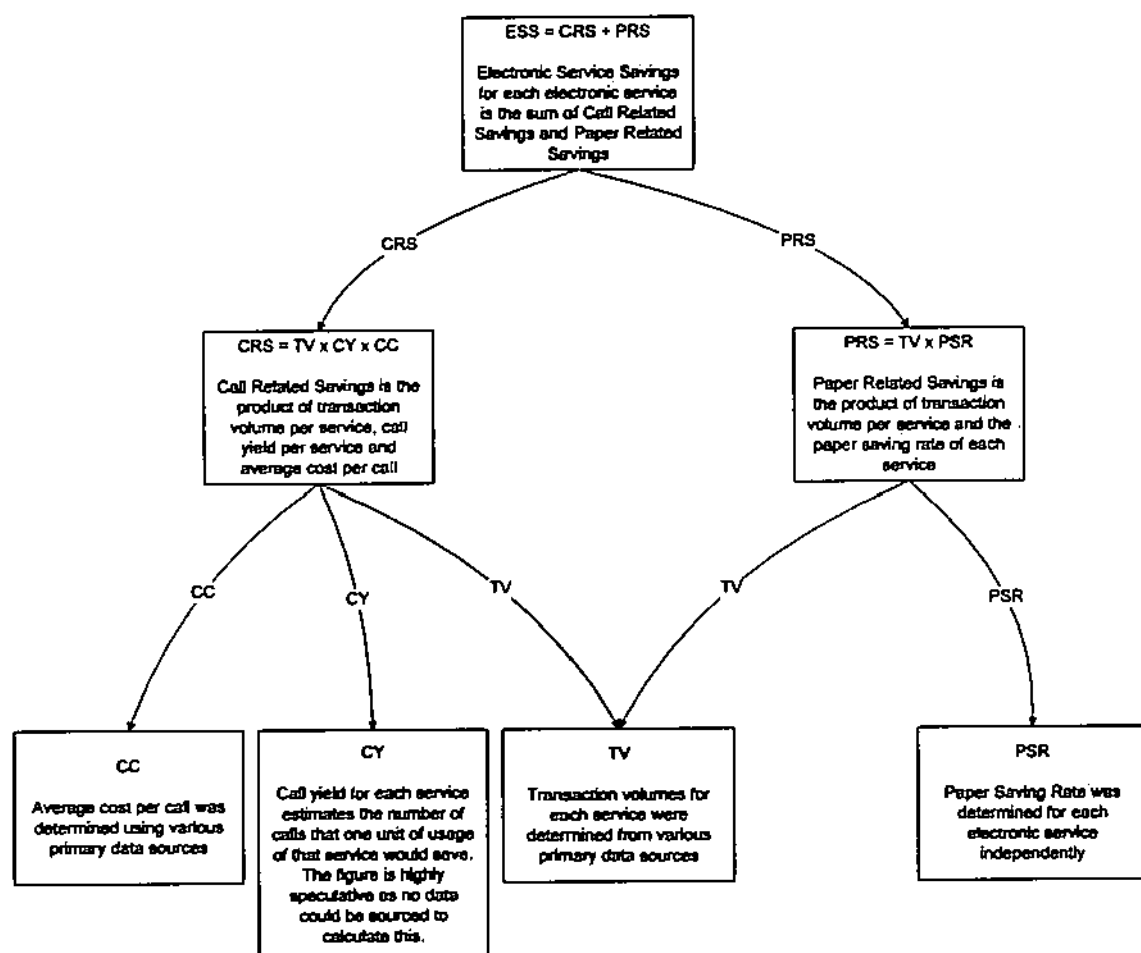


Figure 5: Calculations for Electronic Service Saving

The savings model is structure in such a way that the savings calculated per electronic service can be analysed in terms of the distribution of savings to the various stages of the Healthcare Engagement Decision Process, U-Commerce components, call related savings and paper related savings.

4.4.2 Methodology for Research Question 2

The methodology outlined in this section addresses research question 2 on the basis of the associated proposition stated in table 1 above. In order to explore the proposition the procedure sets out to answer the following investigative questions:

Table 9: Investigative Questions for Research Question 2

Research Question 2: What is an appropriate or recommended strategy framework for medical administration companies wanting to embark on u-commerce initiatives in the South African healthcare industry?	
Proposition: It is proposed that the current set of strategic tools presented in literature for each of the components of u-commerce and generic technology and innovation strategy tools together with the experiences of Discovery Health can be used to synthesise a recommended strategy framework.	
#	Investigative Questions
1.	<p>Do current strategic frameworks exist for any of the u-commerce channels which could be abstracted and adapted for u-commerce?</p> <p>Method</p> <ul style="list-style-type: none"> a. Survey e-commerce, m-commerce, silent commerce, voice commerce, interactive television and telematics literature for mature but relevant strategic frameworks
2.	<p>What strategy considerations and implementation lessons are documented in the literature that could be used to tailor an existing framework?</p> <ul style="list-style-type: none"> a. Survey e-commerce, m-commerce, silent commerce, voice commerce, interactive television and telematics literature b. Survey general technology management literature for strategic tools for managing innovation, adoption and technology disruption

3.	<p>What aspects of the healthcare administration industry should be considered as part of the tailoring process?</p> <ul style="list-style-type: none"> a. Survey international healthcare trends b. Survey local healthcare trends and business context
4.	<p>What strategic tools and considerations did Discovery use in their implementation of u-commerce and what lessons were learnt?</p> <ul style="list-style-type: none"> a. Use relevant observations from interviews conducted for research question 1 b. Interview the Discovery Chief Information Officer specifically on this investigative question

The findings of the four investigative questions will then be integrated to formulate a proposed strategy framework to assist senior management with developing strategies for the identification of u-commerce opportunities and the implementation thereof.

4.4.3 Interview Methodology

Given the exploratory nature of most of the investigative questions, the researcher chose to make use of highly flexible personal interviews as the central mechanism for navigating the exploratory aspects of the research topic. This approach yielded unanticipated insights, primary data sources and additionally recommended interviewees who could further inform the research.

To balance the risk of going outside the boundaries of the study against the need to fully explore the topic in a flexible interview setting two preparatory actions were taken:

- a. The interviewer sensitised himself to the key issues of the topic by reviewing the Literature Review chapter to the interviews
- b. A set of anchor questions or agenda points were prepared specific to each interview type to ensure that similar interviews at least addressed the same broad issues.

To enhance the validity of findings the following three levels of refinement were used:

- System's owner interviews: They would be able to explain the individual services the most accurately, but are least likely to fully understand the

business impact. However, their views would inform the interview with the IT General Manager

- **IT Senior Management interviews:** They provide the organisational linkage between systems and business at a senior level and are therefore most likely to understand and confirm findings relating to the level of u-commerce integration. In addition, as technology managers with an elevated business understanding they are able to provide insight into the impacts of these services on key industry cost drivers to further sensitise the interviews with the business managers
- **Senior Business Management interviews:** As the ultimate customers of the IT solutions, they are best positioned to comment on business related findings of the research and confirm the impact the services have on key cost drivers

Systems Development Manager Interviews

As discussed in the first chapter, Orientation, the incredible time constraints placed on Systems Development Managers presented several issues that needed to be addressed to ensure the success of the programme of interviews:

1. Sufficient interest had to be generated with these individuals to motivate them to accept an invitation to an interview.
2. Given their schedule, any call for preparation of any nature was expected to result in a low invitation acceptance rate.
3. Any expectation generated that they as technology managers need to have some innate knowledge of u-commerce which in all likelihood they have never heard of would have put them on the defensive and was also expected to result in a low invitation acceptance rate.
4. Discovery is becoming increasingly sensitive to confidentiality; not only as it pertains to its stakeholders information, but also its own intellectual capital. Therefore any exposition of information that could be used external to the company would generate an aversion to such an engagement.
5. The probability of attracting their attention subsequent to the interview for another interview or additional substantive clarifications was expected to very low.

6. The interview had to be structure in such a way as to maximise the data collection effort without stifling the exploratory nature of the session.

To address these issues, the following actions were taken:

1. A standard agenda was set for these interviews as indicated in Appendix B. The agenda was structure in a way to address the critical discussion points first and to indicate the full spectrum of data that needed to be collected. Information needs to could be addressed after the session were identified in the agenda to communicate the full spectrum of information required even if some of it needed to be dealt with after the session.
2. A standard two page overview of the research topic was compiled to provide some insight prior to the session to inform them on some of the aspects of this new technology concept in a non-hostile manner, to indicate that they have actually worked with aspects of u-commerce without realising it, to indicate the relevance to their jobs and a further opportunity for learning on the topic through mutual engagement.
3. An emailed invitation was sent to each manager which included the two page research overview and the interview agenda for discussion (refer to Appendix A, B and C for samples). The email emphasised that no preparation would be required on their part and that the issue of confidentiality was in the process of being addressed with John Robertson and would be finalised prior to their interview.
4. A meeting was arranged with John Robertson, the Chief Information Officer at Discovery Health. The outline for the session was to overview the research topic and methodology with the intent of reaching an understanding of what type of information will be collected and how best it can be dealt with in a manner that does not compromise confidentiality. The UNISA SBL's standard approach of adding a page in the front of the document indicating the confidential nature of the research and that it is limited to those parties responsible for marking the research report was regarded as satisfactory. A concern arose regarding the publishable article and agreement was reached that Mr Robertson will review the article prior to it being released to the SBL.

A 100% acceptance rate was received on all invitations to System Development Managers. With the target interviews known, the interview dates were scheduled

quite closely together to allow the interviewer to rapidly develop and refine both the exploratory interview technique specific to characteristics of the set of interviewees as well as piece together a coherent mental model from the interviews. Interviews were conducted with the following Systems Development Managers:

Table 10: Systems Development Manager Interviews

Name	Systems Area of Responsibility	Description of Systems Area	Interview Date
Ralph Holmes	eMMS / CIB	eMMS is the electronic medical management system used to manage the authorisation and loading of hospital events. CIB is the chronic illness benefit management system used to load and manage authorisations for medications and baskets of care relating to chronic illnesses.	8 Aug'06
Greg Peringuey	Website Provider Zone	B2B Discovery.co.za website zone used to engage with medical service providers.	11 Aug'06
Brian Klompas	Website Member Zone	B2C Discovery.co.za website zone used to engage with medical scheme members.	11 Aug'06
Terri Fell	Vitality Partner Integrations	B2B e-commerce subsystems and tools for interfacing with Vitality partner stores.	14 Aug'06
Karen Parsons	Interactive Messaging	Electronic subsystems for communicating to and from the external community using fax, email and SMS.	15 Aug'06
Jay Naidoo	Discovery Mobile / Anywhere	Discovery Mobile is a new initiative looking to more fully embrace and leverage both SMS and WAP based solutions for	16 Aug'06

		cellphones. Discovery Anywhere is also a new initiative exploring the deployment of remote kiosks across the country to more convenient customer engagement.	
Theuns Pretorius	Integration with Financial Institutions	B2B e-commerce sub-systems for interfacing with financial institutions.	17 Aug'06
David Hughes	Electronic Transaction Management	B2B back-end e-commerce sub-systems for interfacing with healthcare service providers and trading parties	N/A Research Author

Given the volume of relatively unstructured information to be captured, a laptop was used in session with a preconfigured Excel template which aligned with the agenda items to facilitate the accuracy and efficiency of data capture.

Senior Management Interviews

The nature of discussions with senior management was more complex in nature compared to those held with the Development Managers. These engagements focused more on confirming the findings of the analysis developed from the various primary sources; interviews and internal company data sources as well as understanding key business concepts and dynamics as they relate to the research topic.

The use of a laptop to record the session was viewed as inappropriate, intrusive and distracting. In an attempt not to stifle the highly interactive and exploratory style of these sessions with intermittent flurries of note taking, the interviewer elected to focus on the engagement with the support of minimal rough in-session handwritten notes. Immediately after the session 'discussion notes' were compiled. The purpose of these 'discussion notes' was not only to document explicit findings but more importantly to convey the mental model with which the interviewer emerged from the discussion. These were sent back to the interviewee for comment regarding the factual accuracy of the 'discussion notes' as well as to sensitise the interviewer to any highly confidential issues which should not be referenced directly in the final write-up of the research report.

The following senior management interviews were conducted:

Table 11: Senior Management Interviews

Name	Position	Reason for Selection	Purpose of the interview	Interview Date
Paulo Dos Santos	General Manager Corporate Health System Discovery (Pty) Ltd	Together with Leopold Malan, Paulo manages all the Systems Development Managers. He has a deep knowledge of both the systems environment as well as the Health business at a strategic level	Review preliminary findings for investigative question 2, 3, 5 and 6 for the purpose of confirming or disconfirming salient themes emerging from the catalogue of electronic services and how these reconcile with the interviewees practical experience of the business.	30 Aug'06
Jacky Mathega	Principle Officer of Discovery Health Medical Scheme	The most senior executive level representative of the scheme and best represents the view of the scheme as the administrators client	Review preliminary findings of investigative questions 5 and 6 for the purpose of confirming or disconfirming the salient themes emerging. Key business concepts and dynamics were clarified. Discussion was held regarding the schemes view on services provided by the administrator in relation to the administration fee charged.	18 Sep'06

John Robertson	Chief Information Officer Discovery (Pty) Ltd	The most senior executive level technology manager who co-founded Discovery and has richest combination of business and technology knowledge of Discovery's evolution	Explore the evolution of Discovery in terms of its electronically mediated business channels from a strategic and implementation perspective.	9 Nov'06
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4.4.4 Sources of Evidence

The following types of company specific primary and secondary information sources were used:

1. Call centre keyword analysis reports
2. Systems weekly performance reports
3. Operations weekly and monthly reports
4. Emails
5. Customer Survey Reports
6. Switching Intermediary Invoice Analysis reports
7. Senior management presentations
8. Interviews with Systems Development Managers, Senior IT Management and Senior Business Management

4.4.5 Assuring Validity

To resolve Perry's (2001) requirement for multiple sources for the case research, the methodology includes the following forms of triangulation as described by (Corner, 1991):

- Data triangulation: multiple sources of primary company data were used in the data collection phase
- Theory triangulation: multiple secondary literary sources were used on the same topic in the literature review chapter
- Methodological triangulation: exploratory interviews with individuals were compared with each other and with primary company data sources

5 Research Results

The purpose of this chapter is to provide the findings which emerged from executing the research methodologies discussed in the previous chapter. The results are structured first by research question and then by its associated investigative questions.

5.1 Research Question 1

Research question 1 addresses the first sub problem noted in the Research Methodology of "assessing the true value of u-commerce" by posing the following question: "How can the combination of different components of u-commerce implemented by an administrator play a role in making quality healthcare more affordable to a broader spectrum of South Africans?"

The following sections each provide the results of the research pertaining to each of the investigative questions identified against research question 1 of the Research Methodology chapter.

5.1.1 Investigative question 1

Investigative question 1 of research question 1 poses the following: ***To what extent has Discovery Health made use of u-commerce?***

The approach taken to answering this question was outlined in table 2 of the previous chapter.

Corporate Health Systems (CHS) is the applications software department which services the Discovery (Pty) Ltd subsidiaries. In the preceding months the department launched an initiative to catalogue all software services provided to these subsidiaries. This would include e-business, OLTP, workflow and document management, CRM, MIS, etc. A review of the list obtained from Gouvias (2006) indicated that it was still an early draft as it merely provided a name for the service without any description and there appeared to be an inconsistent definition of the term service; in some cases channels were listed as services. Nonetheless, the list provided an excellent reference for informing the types of questions to be asked in the series of interviews planned with the Systems Development Managers. The list is provided in Appendix E.

The primary objective of the Development Manager interviews was to identify electronic services that facilitate the direct engagement of parties external to the

organisation; internally focused electronic services were out-of-scope. This filtered out a number of the software services on the CHS software services list which were not externally facing and a deeper exploration of those that were, resulting in a new list that looked quite different to the original CHS list.

Again it proved to be quite difficult to get access to the Development Managers to approve the final list, so the list was cross checked and refined against a wide variety of primary data sources such as regular operational management reports and various analytical reports prepared by business analysts across the business.

Comparing the list of services identified by each Development Manager highlighted the fact that there were clusters of services which provided the same basic functionality or serve the same fundamental information need through various u-commerce channels.

To illustrate with an example: Patient Validation is an electronic service in which medical service providers can validate the scheme membership of a patient. The manager responsible for the provider zone on the website and the voice XML channel identified in his interview that the electronic service is hosted on these two channels, but was unaware that the same fundamental service is also hosted in the B2B back-end integration via switching intermediaries over the internet into the desktop applications of medical service providers.

This observation provided some evidence of u-commerce channels working toward the same goal and triggered a consolidation of the list based on a redefinition of the term 'electronic service'. In this report the term should be read to mean **a collection of electronic service components that operate in various degrees of interconnectedness and across various electronic channels to serve a common transactional or information need.**

Given this definition, the electronic services previously identified by the Development Managers were redefined as "electronic service components" and regrouped around their common purpose termed the "electronic service". Appendix E identifies this hierarchy of services and service components as well as the Development Manager who provided information on the component.

The next step in the analysis process involved mapping each of the electronic services to a u-commerce channel. This done with reference to the definitions provided in the literature review. However in the course of performing this mapping it

became clear that Discovery has recognised the distinctive value of the channels the u-commerce framework.

In the case of the e-commerce channel, Discovery recognised that its external user base will derive substantially different value in the following three types of e-commerce for the reasons indicated:

Table 12: Value Propositions by E-Commerce Variant

	E-Commerce Variant	Value Proposition
1.	Website based	Ideal for situations in which external parties typically want to "fetch" or "explore" large volumes of and/or complex information
2.	E-mail	Ideal for situations in which Discovery wants to "push" large volumes of information and/or complex information to external parties as soon as it becomes available
3.	Back-end systems integration	Ideal for situations in which large volumes of well-structure information need to be processed by Discovery or the external party's system

A similar reason emerges for m-commerce:

Table 13: Value Proposition by M-Commerce Variant

	M-Commerce Variant	Value Proposition
1.	WAP	Ideal for situations in which external parties typically want to "fetch" or "explore" relatively small volumes of information and/or simple information
2.	SMS	Ideal for situations in which Discovery wants to "push" simple and small volumes of information to external parties where the delivery of information is time critical for service quality or in situations where external parties who do not have sophisticated mobile handsets which to "fetch" very small volumes of simple information

As a consequence of this, these additional variants of e-commerce and m-commerce were added to the mapping procedure and resulted in the following complete list of u-commerce channels against which the electronic service components could be mapped. The abbreviated form denoted in brackets

1. Electronic Commerce: back-end integration (EC B2B)
2. Electronic Commerce: Web-based (EC Web)
3. Electronic Commerce: Email-based (EC Email)
4. Mobile Commerce: SMS-based (MC SMS)
5. Mobile Commerce: WAP-based (MC WAP)
6. Voice Commerce (VC)
7. Interactive Television (ITV)
8. Silent Commerce (SC)
9. Telematics (TM)

The final stage of the analysis after the mapping was completed involved the evaluation of the degree of integration between the different u-commerce channels. In order to achieve this, a simple rating system and procedure was devised as follows:

1. Where ever an electronic service component was mapped to one of the nine u-commerce channels it received a **Channel Richness Rating** which represents the richness of information exchange on that channel and is defined as follows:

Table 14: U-Commerce Channel Richness Rating System

Information Exchange		
Static Information	Service user queries or views generic/static information	1
Context-Sensitive Information	Service user queries or views information specific to their context	2
Information Exchange	Service user and Discovery exchange information which results in a change in state variables at Discovery	3

2. Adding all the Channel Richness scores for each electronic service component which support the electronic service would provide a score termed **Total Service Richness**
3. Adding the Channel Richness scores for a particular u-commerce channel across all the electronic service components, and doing this for each of the channels would result in a **Channel Richness Profile** for that electronic service.
4. **U-Commerce Span** is calculated as the ratio of u-commerce channels that participate in the electronic service over the total number of u-commerce channels proposed; which is 9 as indicated above.
5. **U-Commerce Richness** is then finally calculated as the product of **U-Commerce Span** and **Total Service Richness**.

The following table illustrates the rating system outputs for one of the electronic services.

Figure 6: Illustration of U-Commerce Mapping and Integration Rating: Member Status Check

		4	3	2	1	0	0	0	0	0	23.0	56%	12.78
Channel Richness Profile		4	9	0	2	2	6	0	0	0	23.0	56%	12.78
Telephonic MSA Query	Members can query their current medical savings account balance via telephone DTMF/VXML system						2						
Website status check	Members can view the full spectrum of statuses relating to the relationship with Discovery including: MSA, HPA balances, self-payment gap, Vitality status, contribution status personal medical benefits used and limits reached as well as general scheme benefits relevant to their specific plan choice.		2										
SMS Query	Currently in pilot: allows members to submit an SMS short code to which a response SMS is sent by Discovery providing their balances for MSA, HPA, Vitality status and self-payment gap.				2								
WAP Query	Currently in pilot: allows members to log onto the WAP site and view their MSA, HPA balances and self-payment gap.					2							
Fact File/Health Plan Guide	Static content on the plan types and benefits and limit structure for reference by members and providers		1										
Self-Payment Gap Report via Website	Members generate their own self-payment gap report on the website.		2										
Patient validation via VXML	Providers can query the validity of a patients membership to the medical scheme via telephone DTMF/VXML system												

Patient validation via website	Providers can query the validity of a patients membership to the medical scheme via website						2						
Patient validation via PMA	Providers can submit a real-time patient validation request from their desktop application in their practice. This request is switched over the internet via a switching intermediary to Discovery and returns a response message over the same channel in real-time.	2											
Patient Benefit Confirmation via VXML	Providers can query the availability of benefits against a specific patient by processing a virtual claim via telephone DTMF/VXML system						2						
Patient Benefit Confirmation via website	Providers can query the availability of benefits against a specific patient by processing a virtual claim via the provider zone website.		2										
Tax and Membership Certificates	The website allows for the download of tax and medical scheme membership certificates.		2										
Cardholder Files	Cardholder files are generated for pathologists, pharmacy benefit management companies and switching intermediaries to facilitate external validation of claims related information prior to submission. These files are FTP'd to the parties over the Internet.	2											

The underlying assumption of this rating system is that the u-commerce richness of an electronic service is a function of the richness of information exchanged on each u-commerce channel and the number of u-commerce channels utilised. Testing this assumption on the boundary conditions provides a useful mental model. Observe the following variations to the electronic service ratings above:

1. If the same electronic service's components all only used one u-commerce channel at the same levels of channel richness then the U-Commerce Richness Score would have been 2.56 as a consequence of the limited U-Commerce Span of 11% or 1 channel in use. This is lower than the current score of 12.78.
2. If the electronic service utilised all 9 channels at the same level of channel richness then the U-Commerce Score would have been 23, which is higher than the current score of 12.78.
3. If, however the same original channels were used at the maximum level of channel richness for each channel then the score would have been 20.16, which is higher than the current score of 12.78, but lower than the score which utilises more channel at the same richness per channel.

As can be seen from this exercise that the rating model favours the use of more channels than it does richer use of each individual channel. This is an important feature of the rating system as it will highlight those services that span more channels, which is in essence at the heart of the theoretical value of u-commerce.

The full listing of u-commerce mappings and scores are provided in appendix F and provide the input data for the graphs that follow.

The mapping and scoring procedure provides three critical results. Firstly the Channel Richness profile aggregated for all electronic services and service components presents the following bar graph:

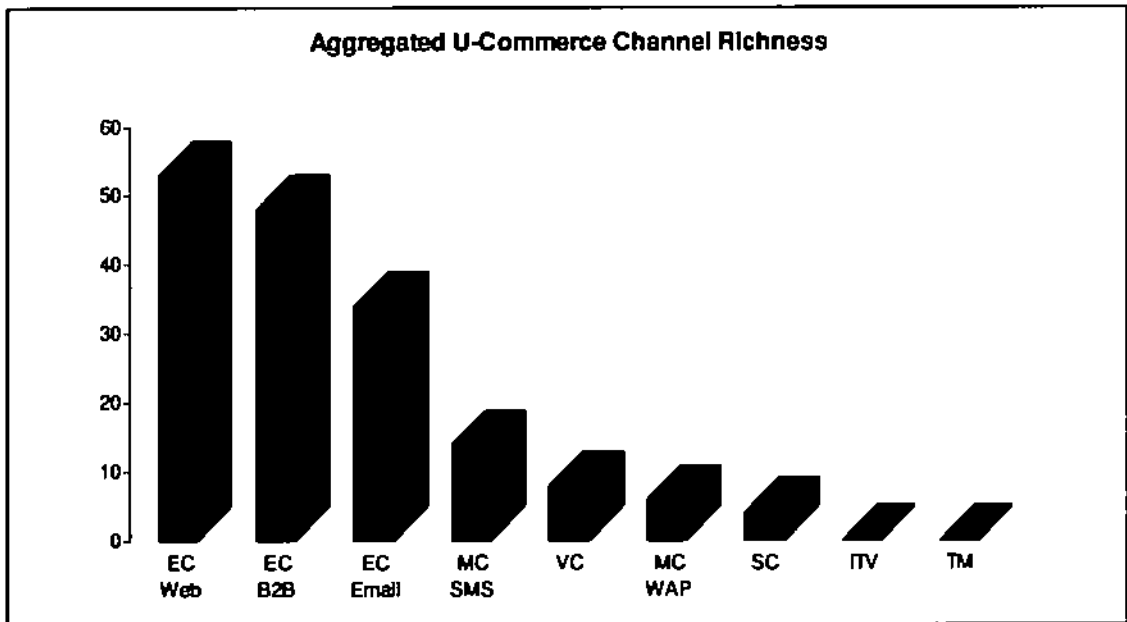


Figure 7: Aggregated U-Commerce Channel Richness for All Electronic Services

As one can observe from this graph, the richest exchange of information is dominated by the e-commerce channels followed by the use of SMS and voice commerce.

The next graph shows proportionally how the functional richness is distributed across the u-commerce channels.

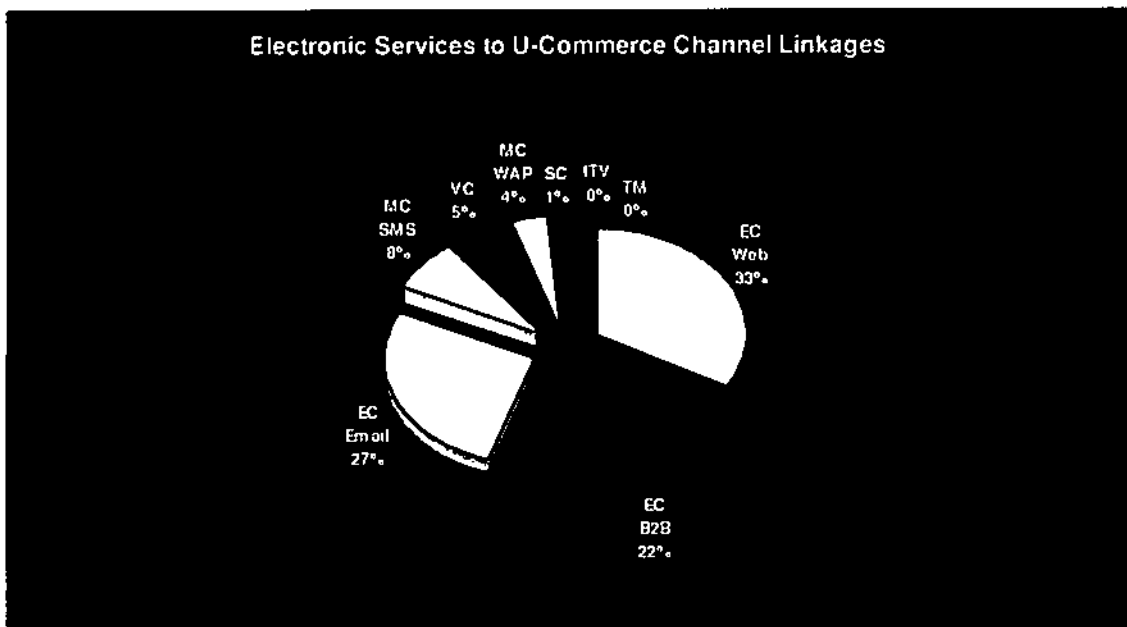


Figure 8: Distribution of U-Commerce Richness across U-Commerce Channels

Not to be confused with operational utilisation which would look at the volume passing through each channel; this graph focuses on how the electronic service functional design concentrates functionality onto each of the u-commerce channel. Again the critical observation is the dominance of the e-commerce channels followed by SMS and voice commerce.

Taking the analysis to a lower level leads the investigation to the U-Commerce Richness scores for each of the electronic services independently. As a reminder, the **U-Commerce Richness** score is calculated as the product of **U-Commerce Span** and **Total Service Richness**. It attempts to capture the proposition of U-Commerce as put forward in the literature review; stated simply that its true value lies in the ubiquitous use of multiple channels to deliver a service. Therefore the distribution of richness across multiple channels is calculated in this score as having an amplifying effect on the U-Commerce Richness.

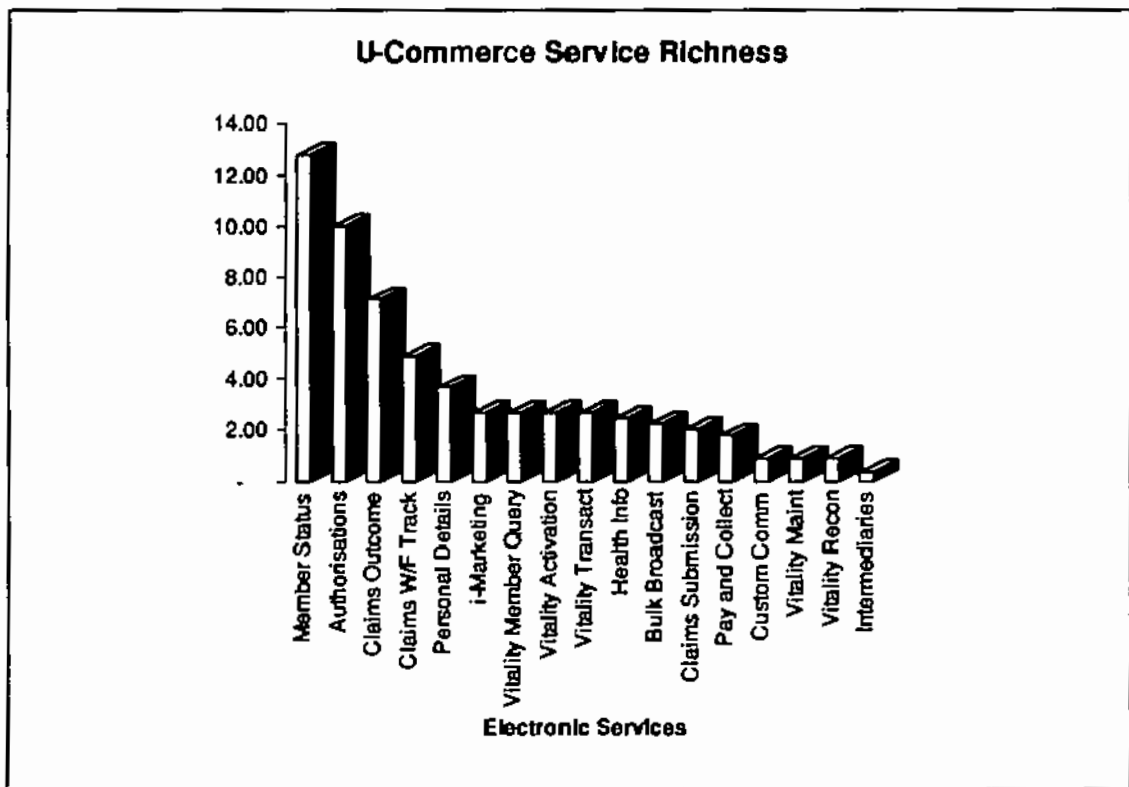


Figure 9: U-Commerce Richness Scores for Each Electronic Service

It has to be emphasised that this graph does not evaluate the actual economic value released to the business as a result of u-commerce, but merely attempt to

characterise each of the services in terms of their distribution of rich information exchange across multiple u-commerce channels.

The immediate observation from this graph is the fact that electronic services for determining the status of a member, managing authorisations for hospital visits and chronic medication, determine the processing outcomes for claims submitted and keeping track of where claims are in the process have the most significant U-Commerce Richness scores. They account for more than half of the U-Commerce Richness in the domain of services under consideration. The common thread through out these electronic services are that they are all related to one of the most significant business service that Discovery Health administrator provides to its clients, the medical schemes, which is claims processing.

Returning to the investigative question posed at the beginning of this section, which is: "To what extent has Discovery Health made use of u-commerce?" Looking at the architecture of the electronic services and how they have been designed to take advantage of the various channels as illustrated in the graphs above it is clear that Discovery has focused on electronic commerce channels as its primary means of engaging with the market electronically. The recent emergence of initiatives such as Discovery Anywhere and Discovery Mobile (discussed in more detail in section 2 of this chapter) are indicative of a shift toward exploring other alternatives, but at this point in time it is anticipated that Discovery is yielding most of its operational efficiencies through these channels. This will be explored more fully in the next section.

5.1.2 Investigative question 2

Investigative question 2 of research question 1 poses the following: ***What operational efficiencies have been derived from the use of u-commerce channels at Discovery Health?***

The approach taken to answering this question was outlined table 2 of the previous chapter.

The first step is to confirm that the Claims Business Service provided to the scheme by the administrator is the most significant cost driver underlying the administrator's fee charged to the scheme.

Two of the most significant operational budget items for Discovery Health administrator are the Health Operations and the Discovery Service Divisions budgets.

The figure below was prepared using data from Millner's (2006) activity-based costing analysis.

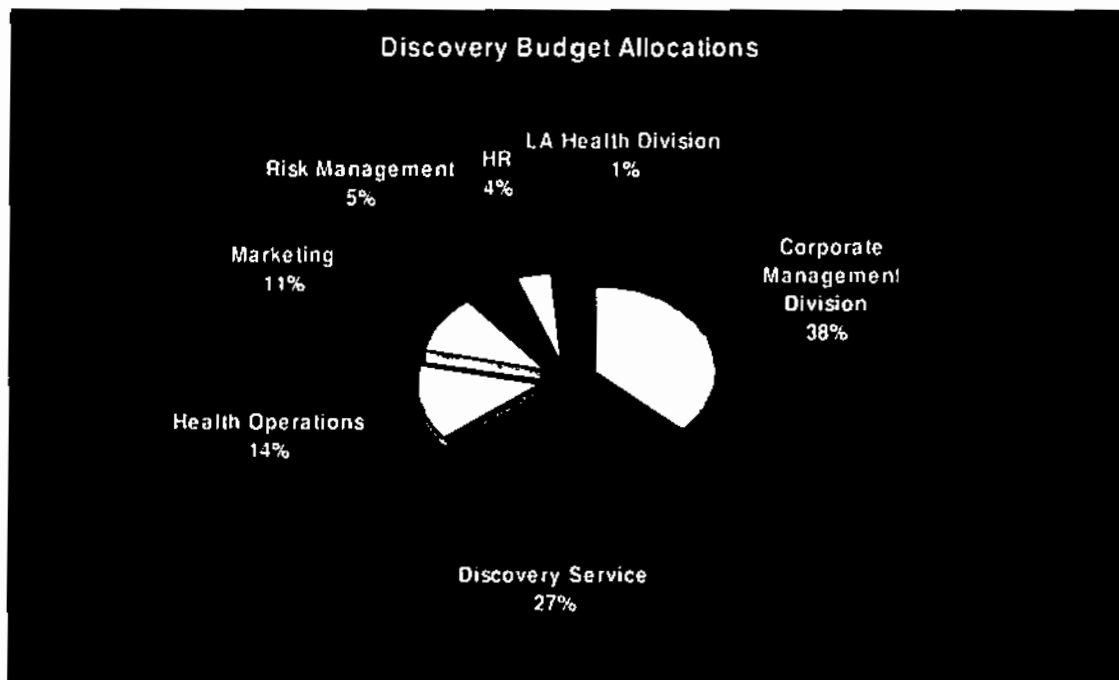


Figure 10: Discovery Budget Allocations

The figure excludes budgets that are not in anyway related to the health business, such as those for the other Discovery subsidiaries. Observe that the Health Operations and Discovery Service budgets are second only to the Corporate Management budget. The latter includes typical support activities to the primary production activities of the business such as Finance, Information Systems, Technology Infrastructure, Building Services, etc and can therefore safely be ignored as being a direct cost driver of the administrators fee to the scheme.

The primary functions of Health Operations and Discovery Service are the processing of claims and engaging with members and providers in support of the claims process respectively. Figures obtained from the Discovery Annual Report 2005 (Discovery, 2006a:62) and forecasted operational budgets used by Millner (2006) in an activity-based costing exercise yield the following relationships:

Table 15: Claims Processing As Key Cost Driver

Cost Item	<u>Health Operations</u> <u>(pa)</u>	<u>Discovery Service</u> <u>(pa)</u>	<u>Health Ops & Discovery Service</u> <u>Totals</u> <u>(pa)</u>	<u>Discovery Total</u> <u>(pa)</u>
1. Operational Cost of Claims Processing	R 122,313,803	R 70,698,543	R 193,012,346	R 282,499,687
Paper	R 92,379,312	R 14,323,985		
Electronic	R 29,934,490	R 56,374,559		
2. 2004/2005 Forecasted Operational Budget	R 157,780,519	R 304,585,825	R 462,366,444	
3. Claims Processing as % of Operational Budget	78%	23%	41.7%	
4. Health Ops & Discovery Service Claims Processing Cost as % of Total Claims Processing Cost			66.0%	
5. Discovery's 2004/2005 Operating and Administration Expenses			R 1,734,000,000	
6. Claims Processing as % of Discovery's 2004/2005 Group Operating and Administration Expenses			11.1%	16.9%
7. 2004/2005 Forecasted Operational Budget for Discovery Corporate Divisions which services Discovery Health			R 1,119,616,977	
8. Claims Processing as % of Discovery's Corporate Divisions 2004/2005 budgets which servicing Discovery Health			17.2%	26.1%

The operational cost of processing claims indicated above was determined by Millner (2006) for paper and electronic claims as carried by Health Operations, Discovery Service and 'Other' supportive divisions for the claims process as defined in the chapter on the Research Methodology. The operational costs for Health Operations were estimated for the following functions by volume of the activity:

10. Inbound paper claim logistics (mailroom, sorting, duplicate checking, scanning)
11. Claims capturing into the transaction processing system
12. Manual assessing of paper and electronic claims
13. Quality assurance review teams
14. Manual preparation of electronic claims (i.e. Modifier Linking and Dependant Correction)
15. Cost adjustment teams
16. Ex Gratia teams
17. Claims payment run audit operational teams

The claims related operational costs for Discovery Service were determined by proportional estimation based on the number of claims related call interactions compared to total call interactions applied to the total budget for the division.

'Other' divisional costs allocated to the business of processing claims in the Discovery Total column were done on a proportional head-count basis and included the following:

1. Information Systems teams support costs
2. Technology Infrastructure teams support costs
3. Building Services support costs
4. Business Risk Services costs
5. HR costs
6. Training costs

Costs which were excluded were:

1. Electronic switching fees paid to switching intermediaries HealthBridge and Medikredit.

2. Any operational costs associated with any other business processes not mentioned above.

Observe in line 3 of the table above that the cost of claims processing makes out 78% and 23% of their operating budgets respectively. Added together, the cost of claims processing makes out 42% of their joint operating budget. By comparing the total cost incurred by these two departments relative to the total costs incurred by all departments for claims processing one can see that Health Operations and Discovery Service carry the burden of as much as 66% of the total claims processing cost in the company. The total cost of claims operations accounts for as much as 17% of the total operating and administration expenses (line 5) incurred by the Discovery group of companies in 2004/2005 (Discovery, 2006a) which also includes costs of operations pertaining to subsidiaries such as Vitality, Discovery Life, Destiny Health, PruHealth. Excluding the cost of operations that have no bearing on Discovery Health (such as those induced by the subsidiaries), then the total cost of claims operations makes out as much as 26% of all the relevant divisional budgets that support Discovery Health.

Again, it is important to emphasise that although these percentages are large for the claims process, they are still expected to be conservative in relation to the cost of activities falling under the definition of Claims Business Service as defined in the Research Methodology chapter.

By adding these supportive service costs into the "claims processing" analysis above such that a cost of operations for "claims business service" is estimated suggests that the claims business service plays an even more critical role as a cost driver behind the administrators fee charged to the scheme that the claims processing cost of operation above suggests.

The next step in answering the investigative question 2 is to expand on this term "claims business service" and present a basic savings model to estimate the orders of magnitude of operational efficiencies delivered into this business service as a result of u-commerce implementations at Discovery. In order to do this the electronic service are first mapped against the Healthcare Engagement Lifecycle.

As outlined in the previous chapter (p78) for investigative question 2, the purpose of mapping the electronic services and their components to the Healthcare Engagement Lifecycle is to provide a view of the coverage of these services across the various stages of engagement that the member, patient, provider and administrator go

through. This provides input into the structuring of the Claims Business Service Savings Model such that the savings can also be viewed from this perspective. Ultimately it assists in the identification of other u-commerce opportunities where the coverage is weak and therefore assists in the answering of investigative question 3 as well.

The figure below, called an egg diagram, illustrates the result of this mapping exercise.

The Research Methodology, figure 5 on p79, provides a schematic which describes the structure of the Claims Business Service Savings Model. The next 3 sections describe in detail how the various input parameters were determined for the list of electronic service components identified in section 1.2 for investigative question 1.

Average Cost per Call

The average cost per call was based on a spreadsheet received by Millner (2006c) from a Discovery Service operational area to support the activity-based costing exercise he was performing. Analysing this spreadsheet indicates that the average cost per call was estimated as follows:

1. Costs directly associated with the service consultant such as cost-to-company salary package, incentives, office rent, computer lease, software licenses, staff entertainment and gift expenses, team building expenses, stationery, UIF, WCA, furniture rent and skills development levy
2. The same set of costs of 1 above for a team leader and their manager allocated per service consultant
3. The cost items above provided an average operational cost allocation per service consultant per month.
4. Dividing this by an average of 1365 calls per consultant gives the average cost per call of R12.66

Although Millner (2006b) determined his own figure of R28.57 per call, he recommended the use of R12.66 as it seemed to be more acceptable to the business area and serves a more conservative calculation in the savings model for this research report.

The average of 1365 calls per month relate to all types of calls received and not limited to those relating to the Claims Business Service. In order to determine what the average cost per call is for calls relating to the Claims Business Service an analysis of monthly keyword reports for February 2006 to July 2006 (Discovery, 2006b; 2006c; 2006d; 2006e; 2006f; 2006g) were performed. These keyword reports are generated off the call centre system based on all calls received for the period of the report. While a service consultant is on a call they select certain keywords which best describe the essence of the call being serviced. The reports then present the

number of calls, total call time and average call duration for calls relating to each keyword.

The six month analysis performed for this research report involved filtering out those keywords that do not have any relevance to the Claims Business Service. Examples of these would be calls relating to Vitality retail partner stores, Discovery Life calls, technical queries relating to the website, Discovery Credit Card sales, etc.

A plot of the number of calls per keyword against the keywords average call duration and the associated descriptive statistics are provided below.

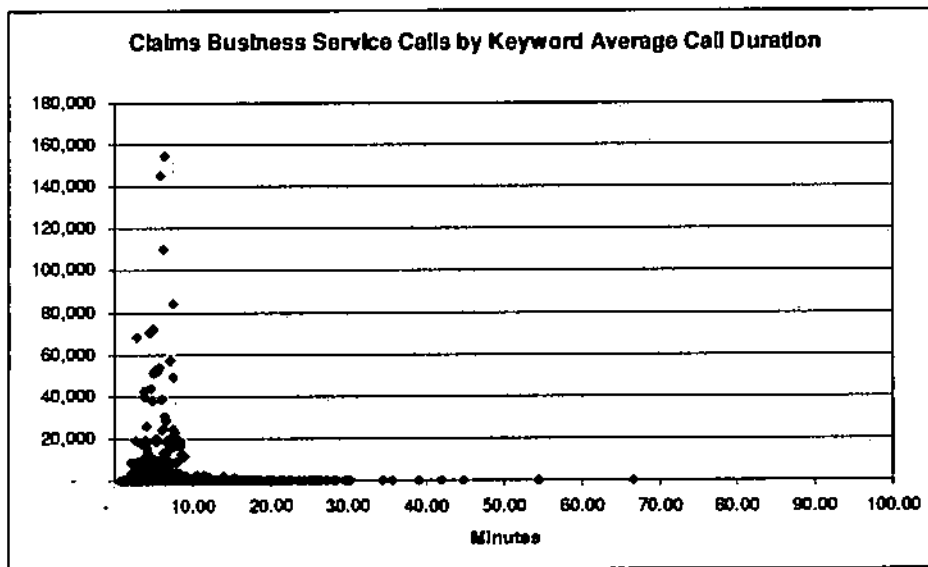


Figure 12: Claims Business Service Calls By Keyword Average Call Duration

Table 16: Descriptive Statistics for Call Plot

	Claims Business Service Keyword Calls Only	All Call Types
Total number of calls (Feb-Jul'06)	2,250,261	3,989,795
Average number of calls per month	374,932	664,965
Average call duration	5.77 minutes	5.56 minutes
Minimum call duration	0.63 minutes	0.08 minutes
Maximum call duration	333.45 minutes	734.76 minutes

There were two areas of subjectivity which are embedded in the calculation of the mean value of 5.77 minutes for Claims Business Service related calls. The first is the fact that the selection of keywords by call centre service consultants is entirely subjective (as is the case with all call types). However, it is expected that this subjectivity is attenuated by the fact that the analysis covered just fewer than 4 million calls in six months.

Secondly, the process of selecting which keywords best map to the Claims Business Service was based on a subjective view on the semantics of the keyword. Considering that the filtering process resulted in 374,932 calls (56%) out of a total of 664,965 per month being associated with Claims Business Servicing, and that the Claims Business Service is the dominant cost driver in the health business suggests reasonable orders of magnitude. This is similar to the figure prepared by Scott (2005) in an analysis of keywords for 167 calls over a 11 hour period in October 2005 which resulted in an estimate of 33% of calls relating directly to claims and excluding benefit related queries which were included in the analysis performed here.

Observe the distribution has a long tail up to the maximum call duration of 333 minutes. The highly leptokurtic curve for the Claims Business Service related calls and the small difference between the average call duration for Claims Business Service calls compared to all call types is indicative of how tightly Discovery Service manage their call durations as it is viewed as a indicator of service excellence and impacts the resource capacity required to service a set number of calls per day.

Applying the small variation of average call duration determined for the Claims Business Service proportionally to the average call cost calculated by Discovery Service as provided to Millner (2006) a revised average call cost is determined for call relating specifically to Claims Business Servicing of **R13.12**.

Call Savings Yield

Call Savings Yield is a term defined for this research report to mean the rate at which an electronic service reduces calls to the call centre. Taking the "Patient Validation via Website" as an example which allows medical service providers to check if a patient has a valid membership with one of Discovery medical schemes. Let us assume that the Call Savings Yield is 25%. This must be read to mean that out of every 100 online queries executed against this particular online service only 25 of these online queries resulted in the elimination of a call to the call centre. There are at least two reasons why this factor is important:

1. Given the ease of access to certain types of electronically mediated services, there may be a propensity for over-usage of the service in contrast with a true need for information which would have motivated a genuine call to the Discovery call centre if the service was not available. Examples of the Patient Validation via PMA electronic service which allows service providers to trigger an electronic request from within their desktop applications. This message is switched through to Discovery via the internet, is processed and provides a response back to the requester in real-time. Assuming the practice has a broadband connection this process is as simple and effortless as a "mouse click" compared to a telephone call. Certain applications could in fact be configured to automatically trigger these messages without the user explicitly requesting them or explicitly requiring the information.
2. Certain electronic services provide unsolicited information. It may be that the user receiving that information had no motivation to call and still has none after receiving the information as may be the case with the "SMS Notification of Claim Received" electronic service component. It may also be that the unsolicited information triggers an unexpected need for information which cannot be serviced online such as may be the case with rich and complex information delivery vehicles such as the "Emailed Statement". In such cases the electronic service event triggers a call where one was unlikely to have occurred in the first place.

Ultimately what this means is that one cannot assume that a one time usage of the electronic service will always result in the saving of a call. Apart from the claims submission electronic service components, there were no sources of information that could estimate what these Call Saving Yields are. In the next section it is shown that this is not a significant issue since the bulk of volumes are on the claims submission volumes anyway. Therefore conservative hypothetical estimates were put in place for these electronic service components using the following model:

Table 17: Call Saving Yield Assumptions

	Electronic Service Component Description	Example	Call Saving Yield Assumption
1.	User-driven request for simple information	Patient Validation via Website	25%
2.	Unsolicited delivery of notifications to subscribers	SMS Notification of Claim Receipt	10%
3.	User-driven request or unsolicited delivery of complex information to subscribers	Emailed Statement	5%

With respect to the claims submission electronic service components, reference is made to a comparative analysis performed by M'kombe (2005) to establish the difference in provider and member call rates relating to claims submitted via HealthBridge versus DHS switching companies. The relevance of this investigation is that the HealthBridge switching interface with Discovery allows for real-time responses on claims processing back to the provider, whilst the DHS interface is a simple electronic EDIFACT batch file delivery model with no delivery confirmation. Although HealthBridge charge switching fees for this premium service, it was always hypothesised that the added value of the HealthBridge real-time responses are that they would manage expectations in the practice in real-time and therefore reduce the number of calls made by providers and members relative to paper and the DHS batch claims. M'Kombe's (2005) yields interesting results in relation to this hypothesis as follows:

1. Using strictly provider call information for the period Sep'04 to Feb'05, the analysis shows that HealthBridge results in a 5c per claim saving on calls relative to DHS; which fell dramatically short of expectation.
2. More concerning was the analysis of member call rates, which showed that when claims were submitted through HealthBridge the respective members would call 0.18 times in the period per member versus the 0.16 times for members who had their claims submitted via DHS.

Using M'kombe's (2005) source data to convert to a per claim basis results in the following summary:

Table 18: Comparison of HealthBridge to DHS Call Rates

Caller Type	HealthBridge (Real-Time)	DHS (Batch)
Provider	0.0085 calls per claim	0.0117 calls per claim
Member	0.1351 calls per claim	0.1237 call per claim

What this suggests is that:

1. Providers submitting claims via HealthBridge (Real-Time) are less likely to call than providers submitting claims via DHS (Batch)
2. Members who have their claims submitted by providers on behalf of them via HealthBridge (Real-Time) are **more** likely to call than members who have their claims submitted via DHS (Batch)
3. Members are significantly more inclined to call than providers in both cases

The first point is consistent with expectations, but the second point is not and is largely unexplained. The third point could be explained by the fact that the source data did not filter out calls that are not related to the Claims Business Service. It is plausible, given the variety of none health related products and services and non-claims related business processes provided by Discovery that members (who are the primary customer of the scheme and administrator) are likely to call more often than providers for any reason including but not limited to issues relating to health encounters. Given the order of magnitude difference between the provider and member call rates, it is also plausible that factors other than HealthBridge, DHS or claims related issues could give rise to point 2 above. As a result, the savings model in this research does not take into account any savings on member calls for the claims submission electronic service.

In order to determine what the Call Savings Yield is for the claims submission electronic service components, one would need to know what the provider call rates are for pure paper claim submissions. Again, unfortunately this information could not be sourced at the time of this research. For the purposes of savings model a figure was estimated as based on the following reasoning:

1. From a provider's perspective, the only difference between electronic batch mode claims submission and paper claim submission is a question of processing turn-around time; i.e. their claim is more likely to be processed quicker so they have knowledge in their claims statement of what happened to

those claims sooner. The reason for this is the electronic submission mechanism reduces delivery time and most of the intermediaries perform certain basic data validation checks before passing the claims onto Discovery.

2. Obtaining knowledge of the outcome of their submitted claim sooner is more likely to reduce calls, however not to the same extent as the real-time response message in the HealthBridge product suite.
3. Therefore it is proposed that, in the sense of call rate saving, the value proposition of the batch claim over a paper claim is less than that of the HealthBridge claim.
4. Because the providers submitting via DHS will ultimately rely on the claim statement to resolve their need for clarity on the processing outcome, the model proposed in table 6 above is used to estimate the Call Yield Rate for batch as 5%.
5. Using the DHS Call Yield Rate and the call rates for DHS and HealthBridge, the Call Yield Rate for HealthBridge is calculated algebraically as follows:

Table 19: Estimation of Paper Call Rate

DHS (Batch) Call Saving Yield	5%
Paper Call Rate	$0.0117 / (1 - 5\%)$ = 0.01232 calls per claim

Given these estimations the Call Saving Yields are calculated as follows:

Table 20: Estimation of Call Saving Yields

DHS (Batch)	$(0.01232 - 0.0117) / 0.01232 =$	5%
HealthBridge (Real-Time)	$(0.01232 - 0.0085) / 0.01232 =$	31%

Although Medikredit also provides real-time claims functionality, their ability to more tightly manage upfront validations is significantly more refined than HealthBridge and in truth should allow for a better Call Saving Yield. But in the interest of taking a conservative view on the savings model, the same figure of 31% will be used for the Medikredit real-time claims submission service component. The figure of 31% was then distributed between the claim submission leg (5%) and the response message leg (26%) for HealthBridge and Medikredit real-time claims electronic service components.

Transaction Volume

The average transaction volumes for each of the electronic service components were sourced from a multitude of internal documents. Appendix G summarises the sources used to finalise the savings model either by providing the actual volume required or by providing parameters used to estimate the volumes.

Paper Saving Rate

Electronic service components attracted a Paper Saving Rate when they either reduced the inbound logistics and workflow costs of claims or reduced the outbound logistics costs of statements. The Paper Saving Rate is defined as the cost saving in these cost drivers per transaction of the electronic service component. As an example, every Electronic Batch Claim received saves R21.74 on inbound logistics and workflow costs; therefore the Electronic Batch Claim service component has a Paper Saving Rate of R21.74 per transaction.

Paper Saving Rates were applied to each of the following electronic service components:

Table 21: Summary of Paper Saving Rates

Electronic Claims Engagement	Saving Function	Equivalent Paper Cost	Cost of Processing	Intermediary Average Submitting Fee	Paper Saving Rate
Batch Claim via EDI Trading Partners	Claims are imported directly into the transaction processing environment and therefore eliminate the inbound logistics costs, paper mail room sorting, manual scanning, header and line capture costs.	R27.99	R6.25	R0.00	R21.74
Real-Time Out-of-Hospital Claims via HealthBridge (Excl Optom claims)			R6.17	R0.00	R21.81
Real-Time Optometry Claims via HealthBridge				R3.00	R18.81
Real-Time Claims via Medikredit			R5.52	R4.51	R17.95
Real-Time Hospital Claims via HealthBridge			R30.34	R6.17	R16.43
Paper Claim with Intelleca Mosaic	Paper claims are received with a printed mosaic barcode which when decoded provides a digital XML representation of the claim content. From this point forward the claim is treated as electronic and therefore eliminates header and line capture costs only.	R27.99	R23.64	R1.02	R3.33

Provider Statement Download from Website	Eliminates the printing and posting of paper statements	R10.38	TBD	R0.00	R10.38
Provider Statement Emailed					
Member Statement Print from Website					
Member Statement Emailed					
Electronic Remittance Advice via HealthBridge		R1,234.49	TBD	R0.22	R1,234.27

Each of the columns in the table above is explained below:

Equivalent Paper Cost per Transaction:

This figures for Batch Claim via EDI Trading Partners, Real-Time Claims via HealthBridge (Out-of-Hospital, In-Hospital and Optometry), Real-Time via Medikredit and Paper Claim with Intellecta Mosaic were taken from Millner's (2006a) activity based costing analysis.

The cost of printing and posting a single printed letterhead is R5.19 (Parsons, 2006). On average member statements are two pages and provider statements vary by the number of patients they see per week. In both cases a conservative view of two pages were used totalling R10.38 per statement.

Hospital statements (relating to the Electronic Remittance Advice via HealthBridge) can be very large given the number of items claimed for in a single visit. An estimation model was therefore put in place to calculate the average number of pages and therefore cost of a hospital statement. Currently the electronic service is only available to the big three hospital groups being Life Healthcare, Mediclinic and Netcare. The average number of claim lines and hospitals was calculated based figures for these three hospital groups for the period December'04 to July'05 in the Health Operations Pack – July 2005 (Discovery, 2005). This gave an average claim line count per hospital per month of 5,948. Using a sample statement for an NHN hospital (Joubert, 2006), the average number of lines catered for on a statement page was determined to be 25 which gives an average of 238 pages per statement typically sent to Mediclinic, Life Healthcare and Netcare. Applying the same calculation to an NHN hospital gave an average of 30 pages which is almost half that of the sample received from Joubert (2006), which indicates that the calculation is conservative.

Applying the cost per letterhead page of R5.19 to the 238 average page statement gives an average cost of a printed hospital statement of R1,234.49.

Cost of Operating the Electronic Service:

This figures for Batch Claim via EDI Trading Partners, Real-Time Claims via HealthBridge (Out-of-Hospital, In-Hospital and Optometry) and Real-Time via Medikredit were taken from Millner's (2006a) activity based costing analysis.

The figure for Paper Claim with Intellecta Mosaic was derived from Millner's (2006a) data and an Intellecta Claims Analysis Report included in the Intellecta Steering

Committee Meeting Minutes of 16 August 2006 (Rethman, 2006c). Firstly the probability of an Intellecta claim successfully bypass the header and line capture workflow processes was estimated from the Intellecta Claims Analysis Report to be 47.5%; i.e. an Intellecta mosaic encoded paper claim will on average be successfully imported directly into the transaction processing system without requiring header and line capture intervention 47.5% of the time. The average cost of header and line capture intervention was estimated from Millner's (2006) activity-based costing data to be R9.16 per claim. An Intellecta claim therefore eliminates on average only 47.5% of this cost per claim, which is equal to R4.35. Therefore the cost of operationally supporting an Intellecta claims is the cost of supporting a normal paper claim less the average cost of header and line capture which an Intellecta claim manages to eliminate on average, which is equal to R23.64.

The operational support costs for provider and member statement and Hospital electronic remittance advices is yet to be determined and not included in the calculation as yet.

Intermediary Average Switching Fee:

HealthBridge charges at a fixed fee per message switched and their fees were obtained directly from the 2006 invoice breakdown (Rethman, 2006a).

Medikredit charge at R3.73 per line of message switched until the total number lines exceed 800,000 in a month then the lines above 800,000 are charged at R1.00 per line (Rethman, 2006b). Using the average claim lines per pharmacy claim from the Health Operations Pack – January 2006 (Discovery, 2006h) of 2.02 and the monthly Medikredit claim volumes (Rethman, 2006b) an average transaction fee of R4.51 per claim was calculated for Medikredit claims.

Intellecta's fees are more complex as they are structured as R1,20 for the first successfully decoded instance of a unique Intellecta claim, 20c for the first duplicate of that claim received and then 10c for every subsequent duplicate thereafter. An average duplicate rate of 17.53% on normal paper claims was sourced from the Health Systems Weekly Report (Discovery, 2006i) and applied to the Intellecta estimate of an average transaction fee per claim of R1.02.

Given that the three critical input parameters (call savings yield, transaction volumes and paper saving rate) are now explained, the next section will review in detail the results of the savings model.

Savings Model Results

A detailed tabular view of the inputs and outputs of the savings model is provided in Appendix H.

The final step in the procedure outlined in the previous chapter for investigative question 2 was to determine the distribution of operational efficiencies across the various u-commerce channels and how they map to the Healthcare Engagement Lifecycle. This is presented in the next series of figures.

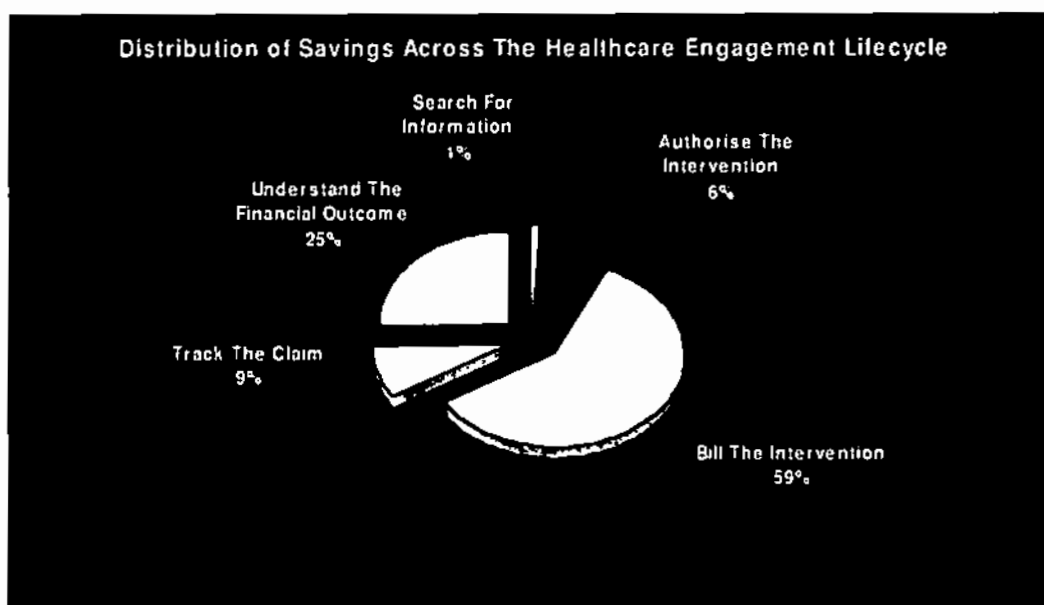


Figure 13: Distribution of Savings across the Healthcare Engagement Lifecycle

The total operational savings generated by the suite of electronic services is estimated to be R 63,524,579 per month.

With reference to figure 6, observe that the “Bill the Intervention” and “Understand the Financial Outcome” stages of the Healthcare Engagement Lifecycle were responsible for 84% of the operational efficiencies derived from the electronic services. This is consistent with an intuitive expectation since these stages of the engagement lifecycle pivot around the large cost driver which is the processing of the claim.

“Recognise a Need”, “Evaluate Alternatives”, “Decide on an Intervention”, “Perform the Intervention” attracted no efficiencies from the electronic services evaluated as part of the scope of the Claims Business Service.

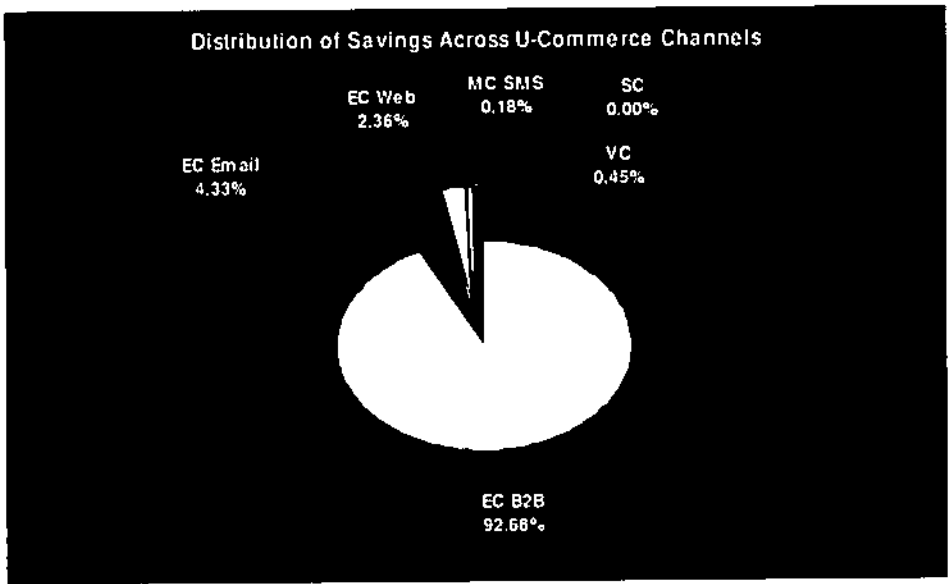


Figure 14: Distribution of Savings across U-Commerce Channels

Figure 7 highlights the dominance of the fully integrated back-end B2B e-commerce channel in generating efficiencies for the business. This is a function of both volume and savings per transaction.

The next figure attributes a significant majority of savings to the reduction of inbound and outbound paper relating to the Claims Business Service rather than to a reduction in the number of calls received.

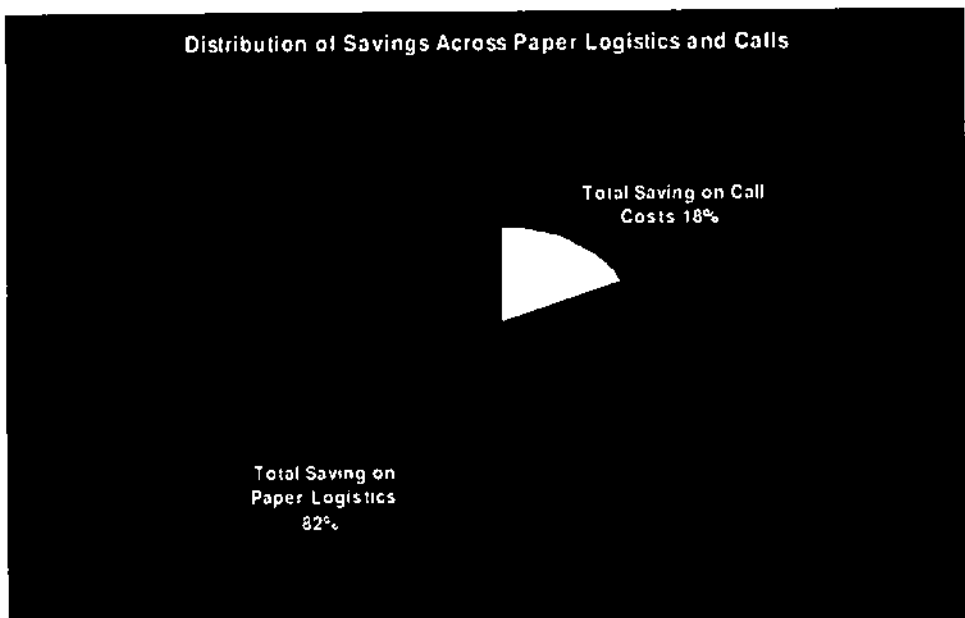


Figure 15: Distribution of Savings across Paper Logistics and Calls

Analysing the savings arising from a reduction in paper in more detail indicates which electronic service components are predominantly driving these efficiencies.

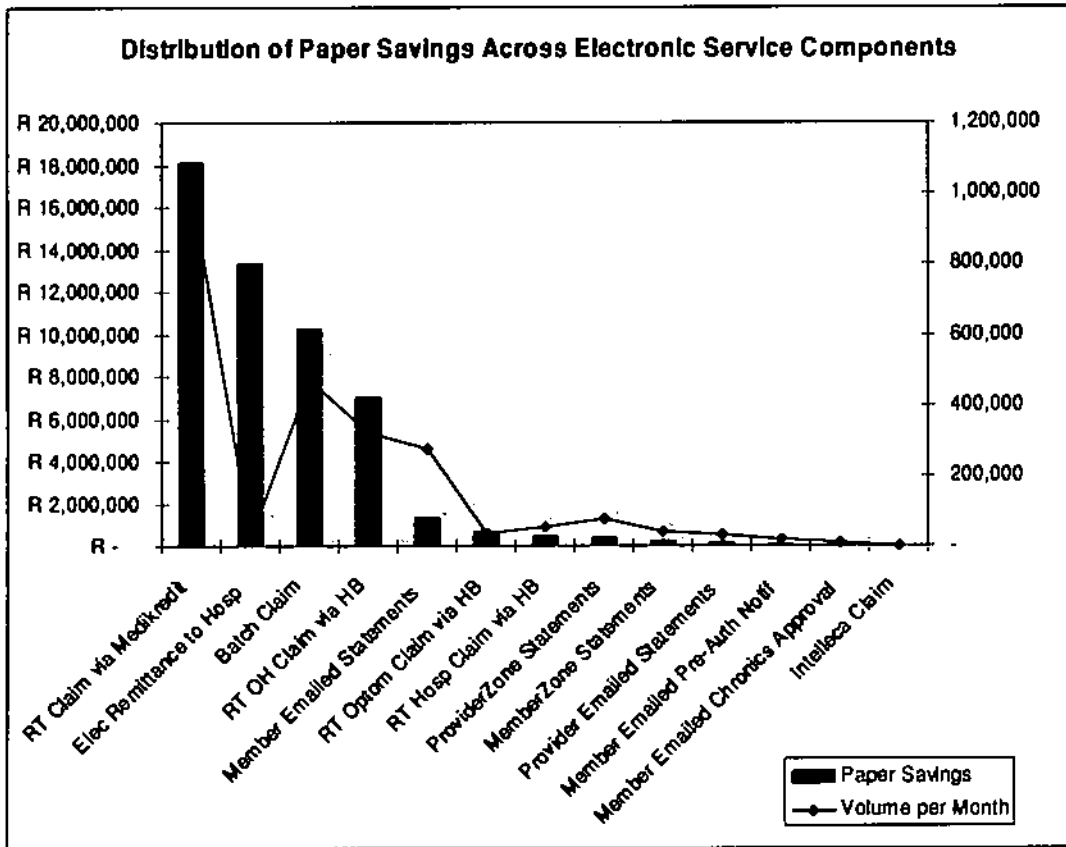
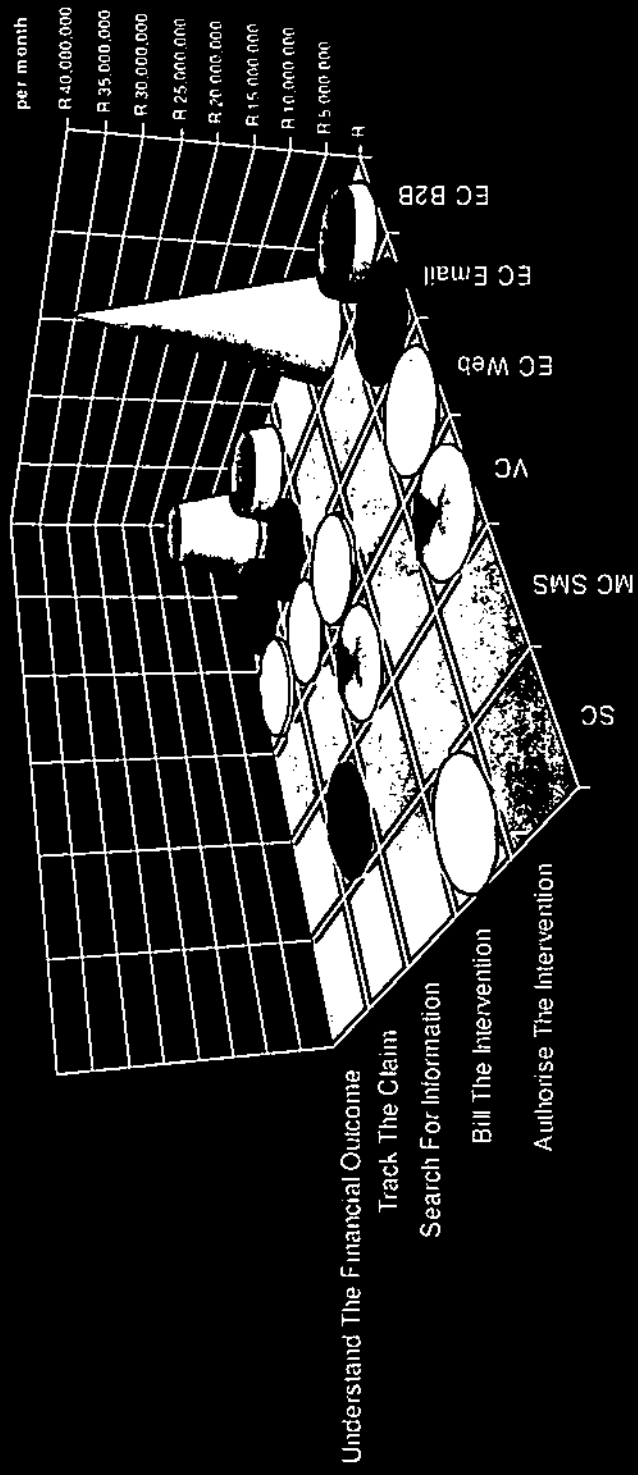


Figure 16: Distribution of Paper Savings across Electronic Service Components

There is a strong correlation between transaction volume and the savings generated by each electronic service component, except for Electronic Remittance Advices sent to hospitals. This is attributed to the fact that printed hospital remittance advices per hospital can be hundreds of pages long. For the hospitals in the Netcare, Life Healthcare and Mediclinic hospital groups these can range from 300 to 500 pages each (Joubert, 2006b). The smaller hospital, as in the case of NHN group, the paper remittance per hospital can be as much as 50 to 60 pages (Joubert, 2006a). There are approximately 156 hospitals in the Netcare, Life Healthcare and Mediclinic groups which receive an electronic remittance advice via HealthBridge instead of printed on paper. With the electronic service displacing the paper printing service of R2.39 per page savings are estimated at R567.46 per electronic remittance advice.

Next figure provides a summary view of the savings by each u-commerce channel and how they map to the Healthcare Engagement Lifecycle stages.

Distribution of U-Commerce Savings Across The Healthcare Engagement Lifecycle



Understand The Financial Outcome
 Track The Claim
 Search For Information
 Bill The Intervention
 Authorise The Intervention

Figure 17: Distribution of U-Commerce Savings across the Healthcare Engagement Lifecycle

Again, one can see here the dominance of the fully integrated back-end B2B e-commerce electronic service components in the "Authorise the Intervention", "Bill the Intervention", "Track the Claim" and "Understand the Financial Outcome" stages. The diagram clearly illustrates that although Discovery has made some use of multiple u-commerce channels to meet the information and servicing needs of the member, patient and provider as they track through the Healthcare Engagement Lifecycle, the operational efficiencies in the Claims Business Service are by far attributed to a single e-commerce channel due to its ability to reduce the amount of paper in the process.

5.1.3 Investigative question 3

Investigative question 3 of research question 1 poses the following: ***What future opportunities for further u-commerce related efficiencies exist?***

The first part of the procedure in answering this question involved analysing functional areas where the use of u-commerce has been relatively weak. To provide the necessary information for this analysis, a plot was drawn of the U-Commerce Richness scores derived for investigative question 1 against the savings figures of investigative question 2 for each of the electronic services. See below

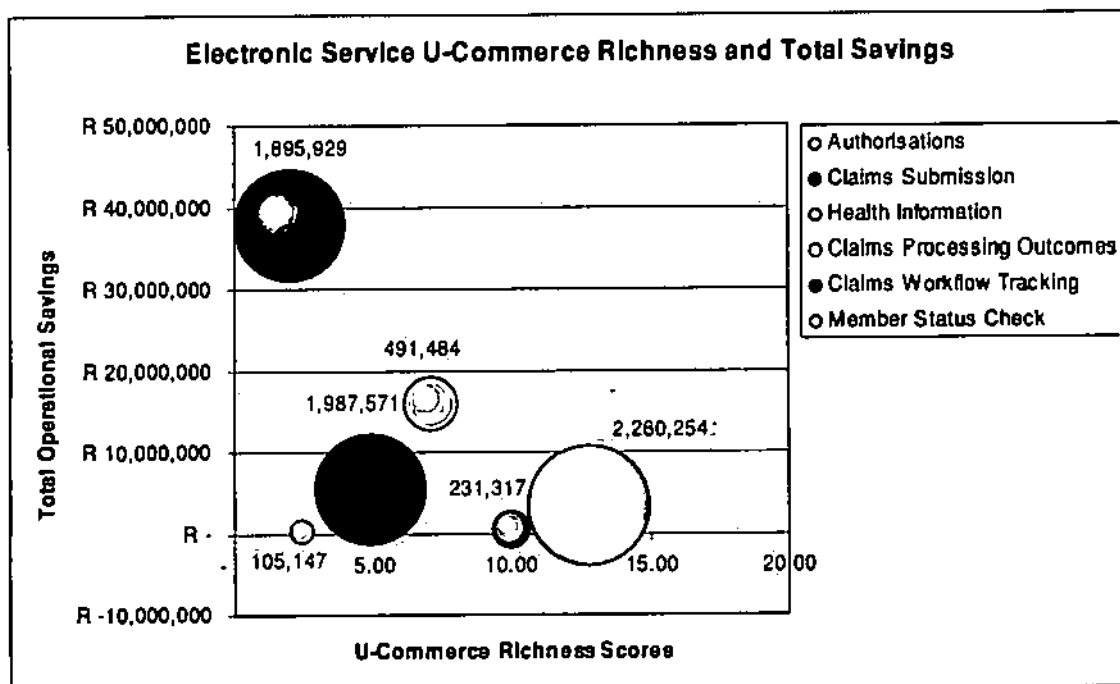


Figure 18: Electronic Services' U-Commerce Richness and Total Operational Savings

The bubble sizes in this plot represent the sum of transaction volumes per month of the electronic service components making up each of the electronic services. The first observation to be made is that in spite of Claims Submissions' lowest U-Commerce score of 2.00, it has generated the highest total operational savings which is a function of its relatively large savings per transaction and the high volumes focused on one specific u-commerce channel. This can be seen in the table below.

Figure 19: Electronic Service U-Commerce Scores and Savings Figures

Electronic Service	U-Commerce Score	Weighted Average Savings per Transaction	Transaction Volume	Weighted Average Savings per Transaction	Total Savings	Call Savings
Authorisations	10.00	R 440,509	231317	R 1.90	R 123,432	R 317,077
Claims Processing Outcomes	7.11	R 15,995,916	491,484	R 32.55	R 15,438,129	R 557,787
Claims Submission	2.00	R 37,784,665	1,895,929	R 19.93	R 36,504,594	R 1,280,071
Claims Workflow Tracking	4.89	R 5,480,973	1,987,571	R 2.76		R 5,480,973
Health Information	2.44	R 344,883	105,147	R 3.28		R 344,883
Member Status Check	12.78	R 3,477,832	2,260,254	R 1.54		R 3,477,832

This view is expanded to all the services in the plot below which shows the degree of correlation between U-Commerce Richness and the Weighted Average Savings per Transaction of each electronic service.

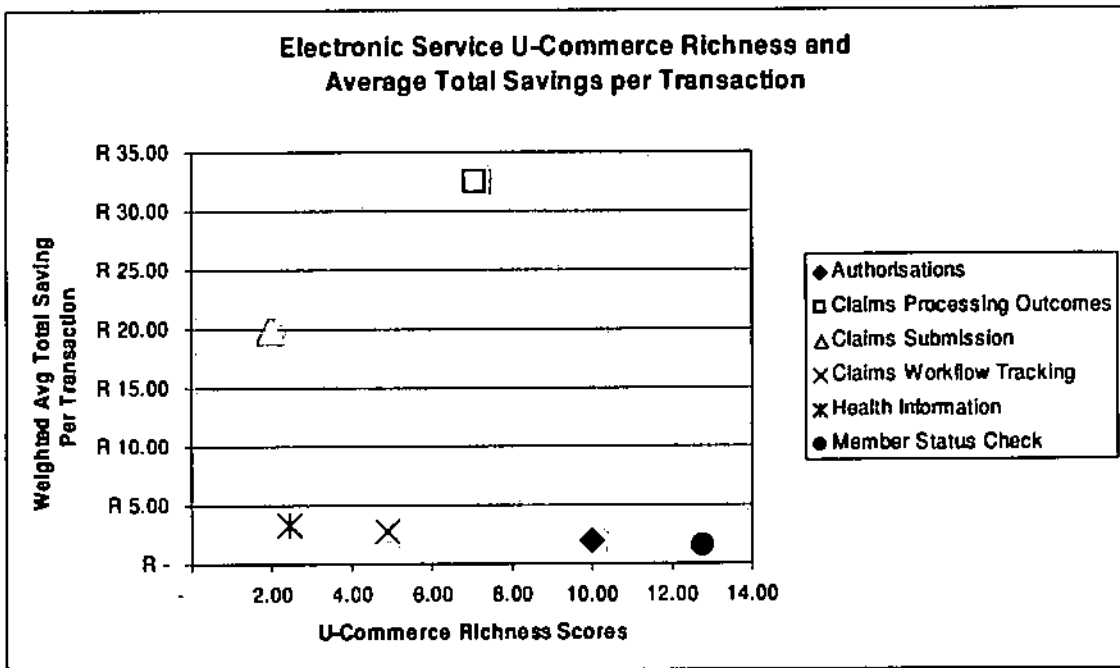


Figure 20: Electronic Service U-Commerce Richness and Average Total Savings per Transaction

This figure clearly indicates is that there is no correlation at all between the Weighted Average Total Savings per Transaction and U-Commerce Richness. If one accepts that the former is a proxy for the value-add per transaction of the electronic service or value density and the latter as a proxy for the u-commerce functional richness of the electronic service, then the figure can also be interpreted to mean that there is no correlation between the value-add and u-commerce richness of the electronic services at Discovery.

5.2 Research Question 2

Research question 2 addresses the second sub problem in the Research Methodology chapter of “adoption strategies for u-commerce” by posing the question: “What is an appropriate or recommended strategy framework for medical administration companies wanting to embark on u-commerce initiatives in the South African healthcare industry?”

The proposed approach for answering this question as stated in the Research Methodology table 9 was to integrate the strategic tools identified through the literature survey with the experience and lessons learnt by Discovery. The literary surveys of investigative questions 1 to 3 were covered in the Foundation of the Study and Literature Review. This section will focus investigative question 4; “what

strategic tools and considerations did Discovery use in their implementation of u-commerce and what lessons were learnt?" The process of integrating the findings of these four investigative questions is addressed in the next chapter.

The primary source of information for exploring investigative question 4 was an interview conducted with the founding member and current CIO of the Discovery Pty (Ltd), John Robertson. As a senior executive with an enduring hands-on approach, he has a highly unique and comprehensive perspective of how Discovery has evolved over the past 14 years. This section provides a consolidated discussion of the relevant aspects of Discovery's history, culture and lessons learned based on the findings of the interview with Robertson (2006) and other interviews conducted in the course of this research.

Discovery Pty (Ltd) started out 14 years ago as Discovery Health with a handful of energetic and entrepreneurial individuals lead by Adrian Gore and driven by a simple core purpose of making people healthier and enhancing and protecting their lives. Gore explains in the 2005 Discovery Annual Report (Discovery, 2006a) that "an obvious translation of this purpose is to build an organisation that introduces and promotes consumerism in both health care and life assurance." This philosophy has endured from the inception of Discovery to its current incarnation resulting in an organisation which is marketing oriented; driven by the needs of its customers.

Discovery leadership have never been enthusiastic about the classical strategic planning process involving the development of a mission statement, setting long, medium and short term goals and formulating a "five year strategic plan". At best the strategic thinking could be characterised as "sense-and-respond" which typically provides a more intuitive and actionable plan by focusing on the customer and thereby reducing uncertainty (Rayport & Jaworksi, 2005:8).

Viewed in light of the immensely dynamic nature of the South African health care industry and ever changing legal framework, this approach does to some extent explain Discovery Health's booming success; the strategic thinking process matches the volatility of the industry context. Robertson (2006) explains that Discovery leadership have always been very good at looking at a market and figuring out how to change the rules of the game.

Where Discovery's strategic thinking process is different to the "sense-and-respond" approach as described by Rayport & Jaworski (2003:8) is that the latter would typically involve sensing what the customer likes and dislikes. However, Discovery's

sensing mechanism has always been focused on anticipating what the customer wants (be that explicit or implicit) given the dynamic nature of the health care economic context in which the customer finds themselves. This subtle yet critical distinction differentiates Discovery's approach from the downfall of "sense-and-respond", which is its inability to generate improvements beyond incremental innovations.

Although, Rayport & Jaworski (2003) explain that sense-and-respond strategy formulation is more appropriate for traditional offline firms and tends to blind firms to the possibility of radical and disruptive innovation, Discovery's special form of sense-and-respond essentially transformed it into an innovation leader, both from a product design and technology implementation perspective; giving rise to the "rule changing" culture of Discovery.

The distinctive sense-and-respond culture had further implications. Its nature of the "sensing" needed an organisation that could "respond" quickly to seize the opportunity. Robertson (2006) describes how Discovery always followed an approach of assembling great people around energy-unleashing outside-of-the-box aspirational and often counter-intuitive goals. In hindsight this fitted well with the youthful rebellious and entrepreneurial profile of its management and staff, and gave rise to a brick-and-mortar culture which simply looked and felt so much like a typical online firm's culture that the step into online would seem natural.

The trigger event that launched Discovery's entry into online occurred roughly at the time the dot.com boom was reaching crescendo. Discovery leadership specifically recruited management expertise to lead the initiative. Robertson (2006) regards this as a critical move and attributes a lot of DiscoveryWorld success to this expertise.

Having said, at the time there simply were not that many firms with much experience with entering online markets. This gave rise to many apprehensions. One which was that Discovery's dominant culture would not be sufficiently entrepreneurial nor have the competencies for the online business. A decision was taken to separate them completely and run them as dual organisation structure (Rayport Jaworski, 2003:245); one being offline and one being online. Contrary to expectation the dual organisation structure had far greater negative ramifications for both organisations. At the time there was a lot of fear about the ability of online firms to cannibalise their brick-and-mortar parents. This fear together with growing animosity in the off-line firm to the perceived intellectual arrogance of the new online firm gave rise to a

destructive competition between the firms. A decision was then taken to merge the online firm back into the original parent and reposition it as a supportive function to the business, which immediately dissipated the destructive trend. The ease of reintegrating the organisations is indicative that the progressive, entrepreneurial and performance culture of the offline business was always sufficiently matched for the needs of the online business. In situations such as these it would seem that a dual organisation structure can do more harm than good.

Interestingly, Discovery, Medscheme and Dimension Data decided to start up HealthBridge at roughly the same time. This online firm would provide a switching service in the health care industry initially focusing on switching real-time claims messages between medical service providers and medical administrators. In this case the dual organisation structure was essential to the survival of HealthBridge. By structuring the shareholding between arch-rivals Medscheme and Discovery as equal stakes it would provide HealthBridge with an immediate critical mass of access to medical aid members (a critical value proposition to the providers of care) as well as the required neutrality in the market (not biased toward any particular medical administrator). By definition this forced it to be run as a separate entity. Although its core business was pure switching, in the early years there still was some concern that HealthBridge may decide to enter the medical administration market and embark on a cannibalistic strategy but this subsided over time as it became apparent that this simply was not their line of business. In this case the dual organisation structure was successful.

The development of DiscoveryWorld was an important organisational learning experience which would define a paradigm for success. In the case of the DiscoveryWorld website the aspirational goal was to build something that people would be excited about and motivated to come back to. The key was in a set of simple design principles that would initiate the building of DiscoverWorld and would ultimately become a philosophy and part of the innovation culture for all future innovation initiatives: solutions needed to be **"Intuitive, real-time and Integrated"**.

In addition, the high concentration of actuaries at senior levels in the organisation also instilled a culture of measurement, analysis and an interesting hard-to-define mix between hard evidence- and intuition-based decision-making.

It is the authors opinion that the resultant implications for the evolution of Discovery was that as new u-commerce channels were added, such as EDI and real-time claims submission, voiceXML, mobile, etc, it was done based on three things:

- Their unique version of "sense-and-respond" strategy building
- Building solutions that are "intuitive, real-time and integrated"
- Continuously measuring whether the solution is satisfying the "wants" of the customer/user-base

Inevitably the "sense-and-respond" approach would result in an evolutionary approach in which functionality would be added when the need arose and not through a preconceived master plan to install u-commerce into the organisation. In fact, at no time was Discovery leadership aware of this term "u-commerce", however, the concept of "intuitive, real-time and integrated" would clearly have driven a journey of discovery (excusing the pun) and design choices that would give rise to the beginnings of what current thinking terms u-commerce.

To illustrate, the current portfolio of Discovery's electronically mediated services can be summarised as follows:

1. Discovery makes use of multiple u-commerce channels to deliver their services. This particularly true of the Claims Business Service in which the Member Status Check, Authorisations, Claims Outcomes, Claims Workflow Tracking and Maintenance of Personal Detail have the richest functional implementation of u-commerce relative to other electronic services.
2. However Discovery has focussed on delivering its electronic services predominantly through the E-Commerce channel with a fairly equal spread of functionality between email, website and fully integrated B2B solutions. The M-Commerce channel, though a fraction of E-Commerce functionality, is dominated by the use of simple SMS notifications.
3. New initiatives are however underway to more fully explore interactive SMS solutions and WAP-based M-Commerce.
4. Very little use has been made of Silent Commerce and is limited to mosaic bar-coded paper claims that are able to eliminate a portion of the manual intervention costs at claims processing time.
5. No solutions make use of Interactive Television or Telematics.

It is clear from this profile that Discovery at present has not deployed solutions that fully embrace the concepts of u-commerce. At best, and by organic evolutions, it can be described as approaching the Post-Human quadrant of u-space (described in chapter 3 p59), as it extends normal conscious experience of services in an ubiquitous sense, such that it is always available at an place or time (mobile, VXML and website services). In the case of electronic claims it approaches The Node quadrant of u-space: attenuating information by automating transactions (the claiming process) which typically consume consciousness; however the node is bound to a specific location (the service provider's premises) and is not ubiquitous. There are no elements of its design in the Hyper-Real or The Matrix quadrants.

The portfolio is unbalanced, not fully integrated and not ubiquitous at this stage, but it is a consequence of building what was needed at the time and has created immense value for the business. Robertson (2006) describes how these electronic service components developed in a largely silo-based manner. This is evident from the interviews with the development managers which indicate a degree of managerial detachment between clusters of electronic service components which serve the broader common purpose of the same electronic business service. Robertson (2006) also emphasises that this silo-based focus and specialisation was an essential part of the maturing process; learning about the particular channel technology and customers that use them.

In response to this maturation and the need for increasing levels of intuitiveness, real-time and integrated solutions, the leadership of Discovery decided to re-organise its various software development departments into a single entity called Corporate Health Systems (CHS) at the beginning of 2006. This department would be solely responsible for developing software for all of the Discovery corporate subsidiaries. So just as on a corporate level the portfolio of business (Vitality, Health, Life) are tightly couple and synergised, the intent was to put in place an organisational structure for the IT systems that would mirror this business integration and provide the potential for similar synergies at a systems level. The most notable example of this was the creation of a new function within CHS called Customer Interaction Management which will be responsible for creating a consistent user experience across all CHS systems. This would lay an important infrastructure that can create opportunities for u-commerce.

Robertson (2006) indicates that although the organisation is still not formally versed in the concept of u-commerce, its current organisational structures and processes are now more than ever geared toward fulfilling its technical aspiration of being “intuitive, real-time and integrated”, which is interpreted as Discovery-speak for u-commerce. All that remains now is for CHS to mature, shed its silo-based thinking and grow into its new shoes. The next two sections give some insight into Discovery’s first steps toward envisioning a future of true u-commerce applications.

5.2.1 Discovery Mobile

Although the mobile channel had been under consideration in Discovery since 2002, it was only in 2005 that a more formal investigation into the potential of the channel was initiated. This section summarises a presentation given by the project leader to the management committee of Discovery’s Corporate Health Systems department on the investigation methodology, demonstration of working prototypes, potential of the channel and recommended implementation strategy (Naidoo, 2006a).

A core team was formulated consisting of a development manager, business analysts, architect and developers to perform the investigation, validate key assumptions about the channel, put in place working prototype solutions to demonstrate the potential to the Discovery business community and thereby obtain business sponsorship for a formal project to build the platform.

The recommendations coming out of the investigation were the following (Naidoo, 2006a):

- 1. Utilise existing infrastructure where possible and thereby sweat existing assets*
- 2. Take a phased approach to the Mobile journey and ensure alignment with business objectives while ensuring support from Marketing*
- 3. Partner with a vendor that can offer a platform that can be used along the entire spectrum of Discovery’s Mobile journey*

The phased approach proposed two phases. The first phase focused on evolving the current SMS notification service to a fully fledged self-servicing mechanism targeting brokers, members, medical service providers and internal business areas. Naidoo (2006a) identifies a myriad of potential products for the SMS service. Examples of service offerings that begin to take the form of true u-commerce solutions:

1. A broker could send an SMS to Discovery requesting member statement to faxed or emailed. Currently this type of request is service telephonically and makes out 75% of broker calls.
2. Discovery Marketing pushes an SMS advertisement to Vitality members to register for the Argus online and provides a website URL which can be accessed either via fixed line Internet or mobile WAP.

The second phase of implementation involves the design and deployment of a full WAP-enabled mobile solution providing functionality such as frequently used web-content suitable for mobile devices. Some examples provided by Naidoo (2006a) are as follows:

1. *Members – Update of Personal details, details on credit card purchase, changing credit card facilities, access to vitality partner details, booking of vitality benefits, gym memberships*
2. *Brokers – viewing of statements, viewing of product information (most recent content – updated real-time by marketing), view leads in pool, member details. Life and Health Brokers can use device to capture all fields necessary and have it sent to the office in real-time for capture and it can be e-mailed directly to client for “Signature” so that the deal is signed within a short period of time. Brokers could also do quotes.*
3. *Providers – Providers may need to check Pre-Authorisation status of member while en-route to procedure, or to check previous medication prescribed. Could even use to check complicated procedure codes (ICD), or to track CPD points*

Again example 2 above is another interesting application of u-commerce by combining WAP and email.

5.2.2 Discovery Anywhere

The Discovery Mobile investigation sparked a lot of interest in the organisation around alternative channels to deal with business problems which current e-commerce and m-commerce solutions do not fully satisfy. This section summarises a launch presentation given by the project leader to the senior management of Discovery on the investigation methodology, demonstration of working prototypes, potential of the channel and recommended implementation strategy (Naidoo, 2006a).

One of the biggest problems in South Africa is the lack of wired infrastructure for high speed PC based internet access and the socio-economic realities which exclude the majority of impoverished South Africans from participating in this type of technology. Mobile gets some way there due to the unrivalled proliferation of mobile devices across every economic stratum in the country. However, the size of the mobile device user-interface limits the richness of content and user interaction, which tends to be more suited for desktop-style webpage content and interaction. In addition, the variability of handsets sophistication aggravates this situation; the majority of devices in use in the market can at best support SMS and not WAP or MMS applications.

This gave rise to the concept of the wireless self-service kiosk; an idea developed using the same methodology and team who developed the Discovery Mobile strategy. A free standing or portable device of wide ranging sizes and sophistication can be used in various settings depending on the objectives for the site. Larger devices are able to accommodate more sophisticated interactions as well as serve as a branding and awareness platform. Smaller more portable devices could be used in settings such as doctor's rooms where multiple parties need to make use of the device in a more personalised setting. If cost is more important than exclusivity, then the device could be shared between organisations; a kiosk in a retail store could host applications for multiple partnering organisations.

Naidoo (2006b) describes the following potential applications for Discovery Health:

- 1. Provider network servicing including the provision of member lists and payment details*
- 2. Electronic claims submission from the providers practicing rooms*
- 3. Details of recent claims*
- 4. MSA/SPG balances*
- 5. Benefit confirmation*
- 6. Product information*
- 7. Updating of personal details*
- 8. Marketing campaigns*
- 9. Video clips*
- 10. Event attendance registration*

As an extension of point 2 above the following u-commerce application involving silent and mobile commerce is envisioned and becomes increasingly feasible with this technology. Currently Discovery Health has managed to convert 85% of all claims received onto some form of electronic submission via the Internet from the service provider's premises. The remaining 15% is elusive as it typically involves cash practices who do not wish to engage with medical administrators directly and often print paper claims for members to submit themselves. Imagine a kiosk is placed in the doctor's rooms or any other convenient location which allows the patient to scan a printed paper claim containing an Intellica bar code (silent commerce). The kiosk converts the Intellica bar code into a digital XML claim and submits it to Discovery via wireless broadband (mobile commerce). Discovery processes the claim in real-time and provides an immediate response back to the member displaying (on the kiosk) how much of the claim will be reimbursed to the member and by when, as well the amount of medical savings account remaining after the transaction is complete. The member reads the reasons for short payment and has a query. The kiosk attempts to clarify the query using an expert system. If it is unable to satisfy the member within a specified time limit, it initiates a call to a call centre agent at Discovery using Voice Over IP. When initiating the call the kiosk is able to provide the full context of the discussion up to that point in time, which reduces the initial context setting overhead on the call duration and improves the seamless service experience for the member. In addition, the VOIP solution allows the agent to visually explain the outcome of the processing rule by using knowledge inventory on the kiosk and thereby uses the call query as an opportunity to "teach" the member how to find relevant information on the kiosk to facilitate future decision making at the point of care without requiring assistance from a call agent.

6 Discussion, Conclusions and Recommendations

This chapter consolidates the findings in the previous chapter with the information contained in the Foundation of the Study and Literature Review chapters by discussing each research question separately. These detailed discussions are then followed by Conclusions which reviews the key findings of the report and discusses the broader implications for u-commerce. The chapter and report then closes with Recommendations for future studies into u-commerce.

6.1 Discussion

6.1.1 Research Question 1

The research question, proposition and relationship to u-commerce sub-problems identified by Galanxhi-Janaqi & Nah (2004) are repeated here for convenience:

- Sub Problem: Assessing the true value of u-commerce
- Research Question 1: How can the combination of different components of u-commerce implemented by an administrator play a role in making quality healthcare more affordable to a broader spectrum of South Africans?
- Proposition: It is proposed that an administrator with sufficient scale such as Discovery Health can, by making use of u-commerce principles, generate sufficient operational efficiencies which when passed on to its schemes through reduced admin fees can result in a reduction in member contributions to the extent that medical scheme membership becomes more affordable to a broader spectrum of South Africans. This in turn will result in competitive forces in the administrator market space to further drive the industry's average cost of contribution down.

The value generated by Discovery's current configuration of electronic services is extensive. The analysis focused on the single largest cost driving business service the administrator provides to the scheme, which accounts for as much as 26.1% of the sum of those corporate divisions' budgets that support the Claims Business Process and 17.2% of the corporate Operating and Administration income statement item for 2004/2005. The analysis was based on the savings generated as a result of reducing paper logistics and reduction of calls to the call centre.

A total savings of R 63,524,579 per month translates into a savings of R40 PABPM in the administration fee. Assuming hypothetically that Discovery did not have any of

these electronic services in place, it would result in an increase in the administration fee from R83 PABPM to R123 PAPBM, more than double that of any other significant administrator in the market. Viewed from this frame of reference one could say that the electronic services have generated a saving of 32% on the administrator's fee. The importance of these electronic services cannot be overstated as they make what are clearly a complex and operationally costly service offering and business model priced competitively.

The question however is, can these savings be attributed to the concepts of u-commerce? Is it a function of the u-commerce idea that the ubiquitous and integrated delivery of services across multiple u-commerce channels results in greater savings than if only one channel is used or if the electronic services were totally disconnected from each other. In answer to this question, this paper has delivered two evaluations; the first looking at u-commerce functionality and the second looking at how the savings generated are distributed across that functionality.

In terms of the evaluation of functionality, section 5.2 of the Research Results observed that although the u-commerce concept of ubiquity has begun to play out, it is more in a sense that a business service such as Member Status Check is being hosted on various u-commerce channels but not the truly integrated sense that perhaps the more recent Discovery Mobile opportunities are being described.

An evaluation of the operational efficiencies distributed across these u-commerce solutions provide an insight into the value-add of u-commerce as implemented at Discovery:

1. Analysing the savings against the Healthcare Engagement Lifecycle indicates a concentration of savings in the Bill the Intervention, Understand the Financial Outcome and, to a lesser degree, Track the Claim stages.
2. However in all the cases the majority of savings yielded from the E-Commerce channel by far. In fact only 0.63% of the savings are attributed to non-E-Commerce channel savings.
3. In all cases the savings were also dominated by the ability of the solution to save on paper logistics rather than call reduction.
4. An important observation was the fact that there was no correlation between the u-commerce functional richness of the electronic services and the value-add (measured by total operational savings) of those services. This was

attributed to the disproportionate volumes or value densities of the Claims Submission electronic service and the Hospital Electronic Remittance Advice electronic service component relative to electronic services hosted on channels other than e-commerce.

Returning to the question posted earlier; can these savings be attributed to the concepts of u-commerce? From the findings summarised above it is clear that there are some savings attributable to u-commerce, but given the relatively low maturity of u-commerce at Discovery compared to pure e-commerce it is not surprising that the majority of total savings generated by the electronic services cannot be attributed to u-commerce.

The final question remaining is that of, should Discovery have an appetite to deploy more u-commerce embracing solutions, how much remaining operational efficiencies are left to be squeezed out of the Claims Business Service. Let us focus on the highest value density electronic services, i.e. those which generate the most savings per transaction, which are:

1. For paper savings:
 - a. Claims Submission
 - b. Claims Processing Outcomes
2. For call saving:
 - a. All electronic service components which support user-driven requests for simple information

In the case of Claims Submission, Discovery's current average for claims received on paper is 16% with the complement of 84% received electronically.

Hospital Electronic Remittance Advices via HealthBridge is an important electronic service component of the Claims Processing Outcomes electronic service due to its high value density. Currently these ERA's are sent to Life Healthcare, Mediclinic and Netcare hospitals which make out 87% of claim lines (the cost driver for paper statements).

Using the savings model developed for this research paper and assuming that ERA's could be put in place for the remainder of the private hospital market and claims submission are totally converted to electronic by introducing further u-commerce solutions to engage the market in a way that would reduce the barriers to adoption,

then the total additional operational savings per month attributed to the Claims Submission electronic service and the Hospital ERA service component is estimated at R10.2 million per month. Although the current volumes for other electronic services are quite low and suggest potential opportunities for u-commerce, their current value densities are so much smaller by an order of magnitude and therefore any effort invested in them are likely to yield marginal operational efficiencies on the figure quoted above.

Let us look at call driven savings. Discovery currently receives approximately 375,000 calls per month relating to the Claims Business Service which the current electronic services are not able to eliminate. Assuming half of these calls could be addressed through the use of u-commerce to engage the market differently. At an average call cost of R13.12 this would generate a further savings R2.5 million per month in operational efficiencies.

Adding the paper driven savings to the call driven savings gives a total of R12.6 million savings per month. This saving could be channelled in two ways: to the shareholders for further value creation or to the scheme by reducing the administration fee or some blend of the two.

Should the savings be channelled to the shareholders as additional earnings then the annualised savings as a percentage of the 2005 net profit for the Discovery group attributable to ordinary shareholders of R 585,000,000 (Discovery, 2006a) is 26%. This figure is significant if viewed in context of Discovery's average basic earnings per share growth for diluted shares (Discovery, 2006a) represented in the table below.

Table 22: Discovery Group Net Profit Trend

Financial Year	Net Profit (R million)	Change (%)
2002	239	
2003	362	51%
2004	418	15%
2005	585	40%
Average Growth		36%

Assuming all of the savings were channelled to the scheme to improve Discovery's administration fee competitiveness, the figure would mean a reduction in the administration fee by 9.52% from R83 PABPM to **R70 PABPM**.

Research question 1 asks the question, "How can the combination of different components of u-commerce implemented by an administrator play a role in making quality healthcare more affordable to a broader spectrum of South Africans?" The proposition in this paper was that an administrator with **sufficient scale** such as Discovery Health can, by making use of u-commerce principles, generate **sufficient operational efficiencies** which when passed on to its schemes through **reduced administration fees** could result in a **reduction in member contributions** to the extent that medical scheme membership becomes more affordable to a broader spectrum of South Africans. This in turn will result in competitive forces in the administrator market space to further drive the industry's average cost of contribution down.

Given Discovery's market dominance and growth trajectory, it does have the scale to induce the required competitive dynamics proposed above. It already has generated tremendous operational efficiencies to support a highly complex product suite and costly service offering at a competitive administration fee that continues to support its growth trajectory. Assuming u-commerce can be used to generate further efficiencies to yield the R70 PABPM administration fee, could this be enough to cross a threshold that will allow a significant portion of the lower income segment of the employed-but-not-insured market to enter the private health insurance market?

With reference back to the discussion in section 2.2 p14 on the Low-Income Medical Schemes consultative investigation a contribution of R200 per month with a 50% employer contribution is expected to be affordable for roughly 1.5 to 3.6 million lives in the target market of households earning R2,000 to R6,000 income per month. With the Council for Medical Schemes targeting administration fees at no more than 11% of gross contributions it places a ceiling on the LIMS administration fee of roughly R44 PABPM. The following table contrasts these figures showing Discovery's best case administration fee and contribution based on attaining a ceiling in operational efficiencies driven by the exploitation of further paper and call cost saving solutions, whilst holding constant the products and services that Discovery offers its clients:

Table 23: LIMS and Discovery Comparison

Breakdown	LIMS Target	Discovery Best Case Cost Reduction on Current Product and Services
Contribution	R400 (including employer portion)	R694
Administration Fee	R44	R70

Compared to the LIMS targets it is clear that the answer to research question 1 for making quality healthcare more affordable to a broader spectrum of people cannot lie purely in further incremental improvements in operational efficiencies, through u-commerce or any other means for that matter. At the boundary conditions, let us assume the administration fee is set to zero this will only bring the contribution down to R624. This view is consistent with the Consultative Investigation into Low Income Medical Schemes report (Broomberg, 2006) which states:

“It is clear that administrators and managed care companies will need to develop different business models in order to profitably serve the LIMS market. Current business models, involving complex service offerings, intensive call centre support etc, will simply not be sustainable in the anticipated very low price LIMS environment. Instead, administrators and schemes will need to focus on benefit design and service offerings which minimise cost in order to ensure profitable participation in the LIMS environment.”

6.1.2 Research Question 2

The research question, proposition and relationship to u-commerce sub-problems identified by Galanxhi-Janaqi & Nah (2004) are repeated here for convenience:

- **Sub Problem:** Adoption strategies for u-commerce
- **Research Question 1:** What is an appropriate or recommended strategy framework for medical administration companies wanting to embark on u-commerce initiatives in the South African healthcare industry?
- **Proposition:** It is proposed that the current set of strategic tools presented in literature for each of the components of u-commerce and generic technology and innovation strategy tools together with the experiences of Discovery Health can be used to synthesise a recommended strategy framework.

The Literature Review reflected on contemporary literature relevant to u-commerce as a whole, the individual u-commerce channels and general technology management issues. Section 5.2 of the Research Results chapter discussed the results of the Discovery case research. This section integrates these findings into a recommended strategy framework.

The first decision to be made by the firm is a choice of perspective. Does the firm have a paradigm that u-commerce is simply an extension of current business practices and by implication only means to extract operational efficiencies from the u-commerce implementation or is it regarding u-commerce as an architectural and potentially radically disruptive innovation? One which is likely to ultimately alter the structure of the industry and probably change the firm's linkages with technology.

Since the business of medical scheme administration is predominantly information based, the strategy framework proposed here for u-commerce solutions presumes the architectural/radical innovation perspective and is an adaptation of Rayport & Jaworski's (2003) "four infrastructures and strategy" framework for e-commerce discussed in section 3.3.4 of the Literature Review. Although their framework is limited to developing a business, implementation and measurement strategy for website based e-commerce, at a certain level of abstraction the basic philosophy of the model is still regarded as relevant for u-commerce implementations. Furthermore the strategy considerations and tools identified in the Literature Review are "clipped on to" the framework as recommended supportive techniques which tailor the framework to address the key issues identified in the literature review and from the information derived from the Discovery Health case.

Only those parts of Rayport & Jaworski's (2003) framework are discussed here which involve tailoring for the u-commerce solution context. Those parts that are not discussed should be assumed to be directly extendable to u-commerce. A more complete overview of the framework is provided in the Literature Review, section 3.3.4.

Market Opportunity

The objective of the market analysis step in the Rayport & Jaworski (2003) model, which is to decide where the firm should compete, can be extended from the e-commerce to the u-commerce context. The seven recommended steps referenced in section 3.4.1 of the Literature Review are summarised below:

1. Identify the unmet and/or underserved customer need by performing a gap analysis of as-is and ideal to-be customer decision process
2. Identify the specific customers a company will pursue through a market segmentation and target market selection process
3. Assess the firm's advantage relative to competitors through profiling competitors against the customer engagement lifecycle or target segments
4. Assess the company's resources to deliver the offering by identifying at least 3 to 4 customer-facing, internal or upstream competitive resources or assets that could be leverage to make the product distinctive
5. Assess the market readiness of the technology in terms of vulnerability to trends and disruption
6. Specify the opportunity in concrete terms
7. Assess the opportunity overall attractiveness

The u-space market and trend analysis of Watson et al (2002) is believed to be of value in steps 1 and 2 above. By analysing the customer decision process and specifically attempting to identify those points in which insufficient or excessive information will result in "bound rationality" decision making, the firm identifies opportunities to enhance the customer's mental model for decision making, bringing it closer with reality and improving the quality of the decision. The u-commerce opportunity emerges as a result of not limiting the solution to any particular component of u-commerce but allowing the specific setting or context of the customer to dictate the appropriate u-commerce component or mixture of components to be used.

By identifying where on the two dimensional Awareness and Space/Time Specificity plot the decision making context should ideally be placed determines which of the following forms of commerce solutions are more suitable: "Hyper-Real", "Post-Human", "The Matrix" or "The Node". The dynamic nature of the model then predicts in which direction the commerce is likely to move going into the future and informs the solution definition process for long-term sustainability.

Watson et al's (2002) research also emphasises the need for viewing the customer's attention as a limited resource which should be consumed wisely. This immediately implies both opportunities to conserve and redirect customer attention to high value-

adding decisions and to sublimate to the unconscious those decision processes which can be automated.

The other benefit of the model is in helping the firm assess (step 3 above) the competitive position of other firms with respect to the u-space plot and predict what there likely future trajectory could be.

When considering various opportunities and how to address unmet or underserved needs, firms need to be cautious in terms of how broadly they intend their innovation to be. As pointed out in section 1.10.2, firms need to evaluate the extent to which their products and service are information-based. The greater the dependency on information rather than physical goods the higher the risk that information-based new entrants could disrupt the market place with new innovative internet based business models based on radical or architectural innovations. Fully integrated u-commerce solutions are classified as architectural innovations. Such attacks typically do enjoy powerful and enduring first mover advantage. The question to the incumbent is whether to take the lead by assuming a "radical/architectural innovation" perspective on u-commerce or perpetuating existing business model paradigms into the u-commerce framework with an "evolutionary" perspective and run the risk of being disrupted and potentially displaced by a new entrant.

Step 4, assessing the market readiness of the technology, talks to two key issues. The first is obviously determining the domain of technologies that could be pertinent to the opportunity in question. Once established, the firm will need to take a view on the current state of adoption of the technology in the market, rate of adoption going forward and how compatible this is with the required rate of return of the opportunity.

In terms of evaluating adoption the obvious model of choice is the Technology Adoption Life Cycle and the prescriptions of Moore (2004) in dealing with "crossing the chasm" which emerges between the visionaries and pragmatists. Moore (2004) states that "the key to a winning strategy is to identify a single beachhead of pragmatist customers in a mainstream market segment and to accelerate the formation of 100 percent of their whole product" as opposed to attempting to build a solution to meet the needs of several target market needs which will ultimately be relegated to mediocrity by only partially satisfying some of their needs. The model therefore also assists in identifying initial target markets to attack.

The second issue which step 4 should investigate is the chosen technology's vulnerability to disruption by new innovations. Signs of this are to consider where the

current proposed technology is being used at a premium and is over-servicing the needs of the customer-base with little apparent alternatives for the customers. This situation has a high risk exposure to the entry of a disruptive technology. The worst kind of disruption is an architectural innovation since they tend to create enduring first-mover advantage, often developed in alternate markets and are not easily detected by established firms due to their sense-making paradigms which are component innovation based. Hence the importance of this analysis.

Business Model

Rayport & Jaworski's (2003) e-commerce framework requires that the business model be defined in terms of the value proposition and value cluster, the online offering, the unique resource system and revenue model. Only some of the elements of this part of the framework are relevant to u-commerce and the medical administrator, and are discussed in the next two subsections.

Defining the U-Commerce Offering

The process of defining the online offering pivots around analysing the customer-decision process; in this case the medical scheme members decision process. In the healthcare industry this is somewhat more complex, but still regarded as a critical activity for identifying unmet needs and opportunities for the u-commerce offering. The high level process defined in the Research Methodology, section 4.4.1 on page 78 should be considered as the healthcare equivalent of a retail customer-decision process. Termed the "Healthcare Engagement Life Cycle", it follows the following high level stages each stage described in more detail in the indicated section:

1. Recognise a healthcare need
2. Search for information
3. Evaluate alternatives
4. Decide on an intervention
5. Authorise the intervention
6. Perform the intervention
7. Bill the intervention
8. Track the claim
9. Understand the financial outcome

Another unique aspect of this healthcare decision process relative to typical retail customer decision processes is that it acknowledges the role, challenges and decisions facing multiple actors: the patient, the service provider and the medical administrator. Particularly the patient and service provider are exposed to a high propensity of "bounded rationality" due to the complexity of the South African healthcare industry. By analysing their collective process, mapping offline and proposed u-commerce offerings onto this process the opportunities for managing their attention onto critical decision points and presenting appropriate information to facilitate quality decisions become more apparent. The mapping tool of choice is the Egg diagram as illustrated in Research Results section 5.1.2 on p108.

The process mapping can be enhanced considerably by plotting the actors' flexibility in terms of space and time as they progress through the process in order to identify where process steps will benefit from mobile solutions.

Unique Resource System

The prescriptions of Rayport & Jaworski (2003) for the identification of the unique resource system which will provide a distinctive offering are as critical to the u-commerce business model as the e-commerce business model. The following key paradigm shifts discussed on p30 of the Literature Review are extended and tailored to the healthcare industry as follows:

- i. The benefits under consideration should not only be limited to the customer (the scheme member in this case) but should consider all the actors in the healthcare engagement lifecycle. Unless there is value accruing to each actor in the process, there is the risk of that actor not adopting the change in process and associated technologies.*
- ii. Shift from single to multi-firm systems. In the South African healthcare industry this is particularly important. Switching firms, mobile operators, practice management application vendors, pharmacy benefit management companies and banks are bring their own systems to the network. Outsourcing or partnering with complementary actors in the process is expected to be critical to the success of the offering.*

Customer Interface

The primary decision that needs to be made in the u-commerce solution context is which u-commerce components should be used at each stage in the customer decision process.

It is proposed that once the to-be decision process is defined, that each step of the process be characterised in terms of the following 5 dimensions:

1. **Location:** how sensitive is the process step to location or can it be performed anywhere?
2. **Time:** how sensitive is the process step to time or can it be performed anytime?
3. **Consciousness:** is it essential that the process actor's attention be focused on the process step or does it provide a value-adding opportunity to attenuate information and reduce the step to the unconscious?
4. **Complexity:** is the information or interaction complex?
5. **Degrees of freedom:** which of the following does the process actor have access to at the time of the process step: hands, vision, voice, auditory senses?
6. **Application Control:** who will have control over the process step? The u-commerce service provider (the administrator in this case) or the user?

Once completed, the following table provides a starting point for identifying the most appropriate u-commerce channel for the process step:

Table 24: U-Commerce Channel Selection Matrix

U-Commerce Channel	Application	Location	Time	Consciousness	Channel Capacity for Complexity	Dominant Degree of Attention Required	Application Control
E-Commerce	Website	Specific	Unspecific	Enhancing	High	Hands, Vision	User
	Email	Specific	Unspecific	Enhancing	High	Vision	Provider
	B2B Integration	Specific	Unspecific	Enhancing or Attenuating	High	Hands, Vision	User Provider
M-Commerce	WAP	Unspecific	Unspecific	Enhancing	Medium	Hands, Vision	User
	Email	Unspecific	Unspecific	Enhancing	Medium	Hands, Vision	Provider
	SMS	Unspecific	Unspecific	Enhancing	Low	Vision	User Provider
Voice Commerce	IVR	Unspecific	Unspecific	Enhancing	Low	Hands, Auditory	User
	Voice Recognition	Unspecific	Unspecific	Enhancing	Low	Voice, Auditory	User
Interactive Television	Programmed For Television Set	Specific	Specific	Enhancing	High	Hands, Vision, Auditory	Provider

	On-demand For Television Set	Specific	Unspecific	Enhancing	High	Hands, Vision, Auditory	User
	Programmed For Mobile Device	Unspecific	Specific	Enhancing	Medium	Hands, Vision, Auditory	Provider
	On-demand For Mobile Device	Unspecific	Unspecific	Enhancing	Medium	Hands, Vision, Auditory	User
Silent Commerce	Passive RFID tagging	Specific	Unspecific	Attenuating	Low	Hands, Vision	User
	Active RFID tagging	Specific	Unspecific	Attenuating	Low to High	Hands, Vision	User
	Passive Optics	Specific	Unspecific	Attenuating	Low to High	Hands, Vision	User
Telematics	Wired	Specific	Unspecific	Attenuating	Low to High	Depends on application	Depends on application
	Wireless	Unspecific	Unspecific	Attenuating	Low to High	Depends on application	Depends on application

After the appropriate u-commerce channels are identified for the various steps in the customer-decision process then the following factors need to be considered for each type:

E-Commerce

- For website design consider the model proposed by Rayport & Jaworksi (2003) as outlined in the Literature Review on p32
- Email service should always provide the recipient with an “opt-out” option and due care should be exercised in not spamming the customer with unnecessary emails. A principle of “the conservation of customer attention” should be employed.

M-Commerce

- Security and confidentiality are of particular concern with mobile devices. The process flow and choice of technologies should be mindful of the degree of confidential sensitivity of application. Frolick & Chen (2004) state that the concepts of authentication, privacy, integrity and non-repudiation embraced by e-commerce are relevant for m-commerce.

V-Commerce

- Voice recognition in the US has shown success rates of 95% which is roughly 5% better than the ability of humans to recognise speech. However, experience at Discovery with speech recognition demonstrated such poor recognition rates that the service was terminated. The primary cause for this was attributed to difference in languages and colloquial speech in South Africa. Therefore it is critical that the target market be carefully analysed in terms of determining the extent of this variability.

Interactive Television

- Television is regarded as one of the most consciousness-enhancing media of all the u-commerce channels. However, the interaction with the television broadcast is typically contingent on the internet, satellite or mobile devices for the return path.
- For real-time engagements between the television broadcast and the viewer, dial-up internet and satellite have shown too much latency. In such cases a broadband connection is crucial. Dial-up and satellite return paths are

expected to be satisfactory in the case of pre-selecting on-demand broadcasts that do not require interaction with the broadcasted material.

Silent Commerce

- RFID solutions such as Smart Cards are susceptible to physical and data theft and therefore must include the implementation of pin numbers or biometric verification.
- The benefits RFID tags are that they do not require line-of-site but are affected by interference from metals, liquids and other radio devices.

Telematics

- Combining telematics with mobile devices provides a powerful non-intrusive means of collecting data in a non-specific space/time manner.

General

- Is it believed that the following recommendation made by Malhotra & Segars (2005) for m-commerce is universally true for u-commerce solutions: A perceived significant change to an individual's life workflow, i.e. radical behaviour changes to accommodate the service, significantly raises the barrier to adoption. The more intuitive the service is in terms of aligning with existing modes of behaviour the greater will be the rate of adoption.

Implementation

The implementation model prescribed by Rayport & Jaworski (2003) can be extended to the u-commerce solution context. However, special consideration needs to be given to the human factors upon which the implementation of u-commerce is contingent.

As discussed in Literature Review on p65, Christensen & Overdorf (1997) points out that organisational capability first manifest in its people, which emphasises the importance of recruitment. Over time the patterns of thinking, interaction, coordination, channels and filters of communication become routinised and are referred to as the organisations **processes** (be they implicit or explicit). With experience, the organisation learns which factors result in good outcomes for the firm and which are negative; these factors become inculcated as highly prized principles for decision making and are termed the organisation's deeply embedded and implicit **values** (often different to their conscious and espoused values). Ultimately these

values determine a dominant pattern of behaviour which is described as organisational culture.

Starting with the end in mind, Rayport & Jaworski (2003) prefer **adaptive cultures** over **entrepreneurial** cultures for online firms as they blend the best of the entrepreneurial spirit (i.e. externally-focused opportunity seeking mindset) with a more rigorous and scientific approach to goal determination and a unrelenting focus on value-adding outcomes.

This gives rise to a series of questions facing the leadership of the organisation. Assuming the leadership have recognised u-commerce as a radical/architecturally disruptive innovation, they must then evaluate their current organisations ability to absorb the necessary changes that they would need to undergo to meet the challenge. The first is a question around how different the current organisational culture is relative to the recommended adaptive culture. Referring to the matrix of Rayport & Jaworski (2003:257) below, the firm can get a sense of the degree of change involved.

Market Orientation	External	Entrepreneurial <ul style="list-style-type: none"> • Unbounded by rules and precedents • Willing to take risks • Flexible • Innovative 	Adaptive <ul style="list-style-type: none"> • Proactively identifies issues • Good at planning and setting goals • Responsive to market changes • Outcome-oriented
	Internal	Committed <ul style="list-style-type: none"> • Emphasises internal cohesion, participation, teamwork and loyalty 	Bureaucratic <ul style="list-style-type: none"> • Emphasises stability, established routines and formal authority
		Low	High
Specificity of Roles and Processes			

Figure 21: Generic Organisational Culture Types

Assuming there is a significant gap between the current organisational culture and the required adaptive culture; very careful consideration would need to be given to how this cultural change will be made since cultural change in general is extremely

treacherous and resource consuming. Implementing the wrong change management tactic for the right cultural target could still be the demise of the firm.

Furthermore, the cultural requirements for u-commerce are expected to place a significantly higher burden on the organisation beyond that which a typical move to online would ordinarily do. There are two reasons for this. Firstly, u-commerce by definition will require exceptional levels of e-business integration in order to deliver the ubiquitous and seamless service experience across the various u-commerce channels. This requirement appears to be inconsistent with the dual organisation structure discussed by Rayport & Jaworski (2003); one of their alternatives for taking a brick-and-mortar firm into the online website marketplace. It therefore appears inevitable that firms that are able to deliver u-commerce as a single organisation are more likely to succeed. However, the cultural gap required by u-commerce and the established firm may be too large for them to co-exist and it is highly likely that attempts at building the new culture within the established firm will result in the ejection of the new culture. In such cases it may be necessary for the firm to plot a cultural journey that can prepare it first before introducing u-commerce as a concept.

The second reason relates to the Literature Review of Architectural and Radical Innovation, section 3.10, p63. Established firms, whether they include an online business or not, typically establish implicit channels and filters of communication which reflect their current business and technology architecture. This gears them particularly well for the type of incremental innovation typical of maturing firms where efficiency and cost reduction are critical. These firms are fairly comfortable in the experience that their dominant architecture has brought them success and therefore slowly but surely entrench the architecture as part of its culture. Architectural and radical innovation requires a different organisational configuration at a subtle level where implicit channels and filters of communication need to be re-organised. It almost talks to rewiring the firm's "instinct" to incrementally improve. In fact Christensen & Overdorf (1997) argue that architectural innovation (such as u-commerce) is even more difficult for these firms to sense-and-respond to because it does not highlight any radical change to the components they work with everyday; as a result they are highly likely to brand u-commerce as just more of the same and thereby increase the probability of failure. These patterns of behaviour will resist the leadership's attempts to introduce a new paradigm at an architectural level.

Reflecting on Discovery as a case, it is clear that the firm was born from the roots of an entrepreneurial culture. In many respects this explains why it was quite comfortable reintegrating DiscoveryWorld back into the organisation and running as a single organisation structure; as a brick-and-mortar new entrant it already had the look-and-feel of a dot.com. However, now the need for increasing levels of "intuitiveness, real-time and integration" is creating a cultural distortion in which over the last couple of years Discovery is slowly moving toward what the author perceives to be a more adaptive culture. This is evident in the formalisation and standardisation of project management, software development lifecycles, HR performance management systems and the consolidation of similar support functions into single departments across the holdings company. This is probably Discovery's most trying time as it reconfigures its "instinct", its subliminal codes of behaviour, channels and filters of communication to recognise a new more integrated business and technology architecture. Even given Discovery's progressive culture and new structures, Roberston (2006) still believes there is some way to go before Discovery grows into its new structure. Until that time it will continue to fight itself and the pockets of cultural distortion that emerge from time-to-time as it finds itself caught between the instinctive memory of yesterday and the new paradigms of tomorrow.

The central role of human factors in the implementation of u-commerce underscores the unquestionable importance of strong dynamic energy-unleashing and motivating leadership in the change process.

Technology Infrastructure

In the world of u-commerce, technology components and production staff merge into fully integrated a seamless e-business delivery system. As a result, the issues raised above regarding architectural disruption have as much an impact on people as it does on technological aspects of the production system. Although it is expected that the technology changes are expected to be simpler and potentially less costly.

Most fairly established firms are faced with legacy systems that evolve in the balancing tension between the organic demands of the business and the need for architectural integrity. Over time, just as with culture, successful systems also tend to take on a nature that positions it quite well for its current domain of challenges and potentially not so well for disruptive innovation. In Discovery's case the immense pressure for rapid to-market delivery and the need for specialisation in the various u-commerce channels have created divergence between the ideal fully integrated e-

business system and what was needed at the time. Second only to the cultural challenges, this appears to be the biggest challenge facing even dynamic firms such as Discovery: legacy and limited integration.

Alongside the organisational structure changes discussed in the previous section, Discovery management has recognised the need for re-architecting the IT systems to achieve increasing levels of service integration and increasing returns on economies of scale for the holdings company. The mechanism for inducing the re-architecting used by Discovery is a combination of structure and process.

In terms of structure, an Architecture Working Group under the leadership of the GM of Corporate Health Systems is responsible for designing and championing the blueprint architecture for Discovery and governing development standards. To serve the enduring design values of “intuitive, real-time and integrated” the architecture will be based on a 3 tier service oriented architecture consisting of the business tier, web tier and client tier. The business tier is the key to u-commerce as it exposes the fundamental business logic to the various u-commerce channels via different web and client tier components.

In terms of process, the programme management function allows for the infusion of architectural change either as separately motivated technical projects (for quantum change) or incrementally as part of the scope of business projects. This approach assures the firm that every time the software is touched it is moved closer to the blue print.

6.2 Conclusions

As the Internet matures, information becomes increasingly digitised and communication technologies converge on TCP/IP as a standard protocol, so to do the possibilities of pervasive computing become more plausible. The ability to be able to access information and services from any convenient device at any time and anywhere, ubiquitously, brings with it the dawning of a new era of electronically mediated commerce termed “U-Commerce”. As an architectural innovation it brings together e-commerce, mobile commerce, voice commerce, silent commerce, interactive television (iTC) and telematics in a ubiquitous and integrated sense which promises more value than the sum of its individual parts. At a macro-level, Galanxhi-Janaqi & Nah (2004) proposes that the impact of u-commerce on an economy is to remove the friction from the exchange process and allow for greater fluidity and efficiency. But the true value of u-commerce is yet to be fully demonstrated. The

dominant adoption strategies for u-commerce, yet to evolve. These are two of a few fundamental problems facing u-commerce which this report set out to investigate.

At a macro-level, the South African healthcare industry is one plagued with inefficiency, spiralling costs, regulatory pressure and an impoverished population desperate for affordable care. The private healthcare sector only serves a fraction of this population due to the high cost and even in this sector the middle class increasingly find the cost of care beyond their means.

Discovery Health, the largest medical administrator administering the largest private medical scheme in the country is regarded as one of the most progressive and market leading firms in terms of its implementation of e-business solutions and its consumer-driven healthcare products. This positions Discovery Health within the South African healthcare industry as a unique and ideal unit of study into the problems of true u-commerce value and adoption strategies.

This report translates the two problems facing u-commerce into the Discovery case scenario as the following two research questions:

1. How can the combination of different components of u-commerce implemented by an administrator play a role in making quality healthcare more affordable to a broader spectrum of South Africans?
2. What is an appropriate or recommended strategy framework for medical administration companies wanting to embark on u-commerce initiatives in the South African healthcare industry?

The hypothesis underlying the first question was that u-commerce could generate sufficient operational efficiencies within an administrator of Discovery's scale and that by passing these savings onto its client schemes and members it would generate downward competitive pressure in the market to make medical scheme contributions paid by members more affordable to a broader spectrum of South Africans.

The analysis of Discovery's implementation of u-commerce is gives rise to the following findings:

1. Discovery makes use of several u-commerce channels which collectively generate substantial savings for the business. If the business was run purely as a brick-and-mortar business then its current administration fee of R83 PABPM may have been as high as R123 PABPM

2. These savings arise by far as a result from paper logistics savings generated by its B2B e-commerce channels with medical service providers.
3. There is no correlation in the Discovery case between u-commerce functional richness and value-added through these operational efficiencies

Three conclusions are drawn from this. The first is that Discovery Health's exceptionally high levels of claim logistics operational efficiencies stem predominantly from its current e-commerce solutions and not its u-commerce solutions. Secondly, although Discovery Health delivers the lowest claims payout ratio in the market, the complex consumer-driven health product suite responsible for this performance also gives rise to the highest operational cost position reflected in the premium administration fee charged to the scheme. This relationship supports the tension that exists between increasing complexity and the objectives of consumer-driven healthcare. Lastly, the fact that administration fees only make out 11% of the total medical scheme contribution cost which members are exposed to, supports the view that administrator operational efficiencies alone cannot ultimately result in a meaningful reduction of contributions to allow a broader spectrum of South Africans access to the private healthcare sector. This is supported by the industry investigation into Low Income Medical Schemes investigation.

The implications of these findings are two fold. Firstly, operational efficiencies alone in the administrator are unlikely to yield any meaningful differential value to the firm or industry beyond that already achieved by e-commerce and certainly is not recommended as the business case for u-commerce. Secondly, bounded rationality is a relevant cost driver for the scheme and the industry as a whole. Therefore u-commerce strategies employed by the administrator to optimise the rational decision making process of actors in the healthcare engagement lifecycle are expected to yield meaningful differential value beyond what can be achieved by a loosely coupled non-integrated system of current commerce technologies.

Speaking competitively from the administrators perspective, u-commerce initiatives translates into a differentiation strategy rather than a low-cost provider strategy as it pursues an objective of increasing the value for the client (the scheme and member) rather than cost reduction for the firm. On the surface this suggests that u-commerce and the Low Income Medical Schemes framework are mutually exclusive. Provided the administrator, in pursuing profits as it should, translates u-commerce added value into membership growth rather than administration fee increases, then it is possible

that a synergy emerges in which a much broader spectrum of the South African population can benefit from.

6.3 Recommendations

Firms interested in u-commerce need to consider several important questions before propelling their organisations into the darkness of uncharted u-space. Is their industry predominantly information intensive? Is bounded rationality creating market inefficiencies? Are they pursuing a differentiation strategy? Do they perceive u-commerce as a significant architectural disruptive innovation?

If the answers to these questions are all “yes” then the firm is likely to be presented with a meaningful opportunity, a compelling business case and the correct perspective on a journey which is not for the faint hearted. As a firewall against organisational denial, the following recommendations are emphasised as key to the development of a robust and comprehensive u-commerce strategy:

1. Everything you have learnt about e-commerce, m-commerce, voice commerce, etc is still relevant. Do not leave those tools behind.
2. Do not allow your organisation to be blinded by its own arrogance. The organisational architecture, culture, channels and filters of communications it uses to cope with complexity and which was in all probability responsible for its success also sets up an inertia that could propel it into extinction. The special organisational needs of u-commerce as an architectural innovation are the most difficult to detect and accept under these conditions.
3. Your organisation is going to need an adaptive culture to succeed. One that encourages its entrepreneurship but also embraces a degree of discipline and structure that proactively identifies issues, is good at planning and setting goals, responsive to market changes and is outcome-oriented. Do not repeat the same mistakes of the dot.bomb era where the enthusiasm and energy of unconstrained unbridled entrepreneurship produced little more than a lot of share market hot air.
4. Ubiquity, unison and universality are inherent and defining requirements of u-commerce that are unlikely to be served well by dual organisation structure (i.e. brick-and-mortar separated from online) and less so by disparate silo-based technology infrastructure. A service-oriented architecture that provides

a single underlying set of data and business rules exposed to all u-commerce channels cannot be over-emphasised as a critical success factor.

5. Analyse the actions and decision of all the actors in the engagement process with the market. Nobody escapes bounded rationality and everybody needs a good reason, some benefit or motivation to participate in the process rationally. These are expected to be the anchor points of u-commerce opportunity.
6. Disrupt or be disrupted. Use the dynamics of technology innovation and disruption to forecast your technology vulnerabilities and technology opportunities
7. Respect the individual's personal workflow. Make your solution fit in with them. As Discovery says: "make it intuitive, real-time and integrated". Select user-interfaces that match their location, time and degrees of freedom as well as the complexity of information, level of consciousness required by the transaction and who the driver of the process is. The Technology Adoption Lifecycle model is critical in assessing the markets readiness for emerging user-interface technologies.
8. Use u-space and its modes of commerce as a telescope into the future and to help you map a journey for your market engagements from ultra-consciousness to unconsciousness, from space/time specific to space/time unspecific.
9. Attention is a scarce resource – conserve it.

Turning to the question of u-commerce as a research topic, several areas of further study are apparent as a result of this work effort. The research focused predominantly on the ability of u-commerce to generate operational efficiencies. The exploratory nature of the research methodology gave rise to the potential of u-commerce in healthcare as it relates to bounded rationality. Future studies should investigate this further; u-commerce's ability to expand bounded rationality and to manage attention as a critically constrained resource. An example of this could be: "the impact of u-commerce on the cost and quality of care delivered within the context of a consumer-driven healthcare plan through enhancing the bounded rationality of members and medical service providers".

The Healthcare Engagement Lifecycle, as a pivotal multi-actor process definition for the decision making processes of the member and the service provider, is central to the proposed strategic framework put forward in this report. It is recommended that the process definition be expanded to include other actors such as the administration staff of the service provider and the business owner of the practice as these individuals are likely to be positioned in very different parts of the technology adoption lifecycle and are likely to expect very different information on very different u-commerce channels.

No comprehensive rating model could be found in the literature review or at Discovery to facilitate the analysis of the functional richness of u-commerce solutions. A simple yet untested model had to be developed economically for this report. Future studies should consider evaluate more critically the validity of the instrument by comparing the calculated u-commerce richness to perceived richness as rated by customers and the firm.

Although the case research provides in-depth understanding of one industry-leading organisation's u-commerce efforts, it is expected to have only provided an estimate of the probable u-commerce maturity level of the large administrators in the industry. Further research should consider a comparative study of adoption across an industry as well as on different types of players in that industry to provide insight into the variability of implementation in the industry.

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7.2 Appendix A: Invitation to Systems Development Manager Interview Session

Hi <Development Manager>

I'm in the process of completing a Masters of Business Leadership at UNISA this year. The three year part-time program culminates with the submission of a research paper in September 2006. Naturally it makes sense to do research on a topic that synergises in some way with what I do at work. As a result, I selected a topic in a relatively new area of study called U-Commerce and have chosen to do a case study on Discovery.

As part of the case research methodology, I've planned to meet with a number of managers in CHS and related business areas to discuss their experiences, views and opinions on their area of expertise and how it relates to the research I'm doing. Your particular experience with the <xyz> system would contribute immensely to the research effort and I would really appreciate if I could set up a 1 hour one-on-one session to explore a couple of specific areas pertinent to the topic.

I am meeting with John Robertson on Tuesday to discuss the research in general, the methodology and any concerns relating to confidentiality.

There isn't any need to prepare for the session as I'm expecting the discussion will be quite exploratory around a loose framework which I'll lead you through. I have however attached a brief summary of the research topic and what it aims to achieve so that you have some idea of what I'm working on.

Please let me know if you'd be open to meeting with me.

Regards

David Hughes

7.3 Appendix B: Agenda for System Development Manager Interviews

**U-COMMERCE RESEARCH
DEVELOPMENT MANAGER INTERVIEW**

	Agenda
1	Brief Intro for the discussion
2	Identify electronic services in your area
3	Briefly describe the services
4	Weakness of the channel / service
5	Strengths of the channel / service
6	Closing

The following can be handled offline if need be:

7	Source / Reference documents
8	Business owners?
9	Access to Stats?

7.4 Appendix C: Summary of Research Topic

U-COMMERCE

Research Overview

(By David Hughes, 3 September 2006)

U-commerce derives its prefix from the word 'ubiquitous', meaning omnipresent. It is a relatively recent architectural innovation that attempts to integrate various forms of electronically-mediated commerce components in a manner that provides a highly personalised, integrated, uninterrupted, 'always connected' relationship between transacting stakeholders. It spans traditional brick-and-mortar commerce, e-commerce, mobile / wireless commerce, voice commerce, silent commerce, television commerce and telematics. The proposition of this research is that through a carefully designed integration of these components, the value proposition of the 'whole' would be more than the sum of the value of the individual components. Stated algebraically:

$U\text{-commerce} > E\text{-commerce} + M\text{-commerce} + V\text{-commerce} + \dots$

However, organisations have typically taken a parochial view on these components, developing separate strategies for each to leverage their individual potential. The academia have very little to offer the business world in terms of formal research, guiding principles and strategies. At best Galanxhi-Janaqi & Nah in 2004 recommended that further research be done into the assessment of the true value of u-commerce as it is not fully understood, adoption strategies, implications for privacy, trust and security and the rate of u-commerce technology innovation and adoption. They also suggest that the probable impact of u-commerce on an economy is to remove friction from the exchange process and allow for more fluidity and efficiency. If one considers the escalating financial pressure and complexities in the South African healthcare industry, the telecommunications industry dynamics and the social and digital divide between 1st and 3rd world population groups, then opportunities to re-organise linkages in the healthcare economy using new technology paradigms such as u-commerce to create more fluidity and efficiency become not only relevant but imperative. Furthermore, by studying what the innovation and thought leaders are doing in an industry, such as healthcare, saturated with such extreme stresses will inform the u-commerce body of knowledge as to whether u-commerce can in fact add true value and be a mission critical paradigm at a macro-economic level. Discovery Health administrator was rated by ITWEB in 2004 as the leading e-business organisation in South African Healthcare as perceived by the ICT sector. It therefore serves as an ideal case study of the type of electronically-mediated forms of commerce that have stood the test of time and the latest strategies that are considered instrumental for sustainability going forward. Furthermore, given the scale of the organisation in the private healthcare sector it is certainly expected to have a direct or at least influential impact on private healthcare economics.

7.5 Appendix D: Terms, Definitions and Abbreviations

Term	Abbreviation	Description
Corporate Health Systems	CHS	Applications software development and maintenance department of Discovery (Pty) Ltd
Transaction Processing System	TPS	"Manage[s] the frequent external and internal transactions such as orders for goods and services that serve the operational level of the organisation" (Chaffey, 2003)
Consumer-Driven Health Care Plan	CDHP	Medical scheme designed for demand-side cost control by engaging members in the healthcare decision making process using medical savings accounts.
Discovery Health Medical Scheme	DHMS	The largest private healthcare medical scheme in South Africa and client of Discovery Health administrator.
Health Savings Account	HAS	As an important component of the CDHP's, it is the vehicle used to leverage consumer behaviour of members to control medical expenditure
Per Average Beneficiary Per Month	PABPM	Typical dimension used in the South African healthcare industry to compare costs and contributions between schemes and administrators

7.6 Appendix E: CHS List of Software Services

CHS Systems Area	Software Service
Admin&Billing	Bill
	Debit Order
	Statements
	Unit allocation and funding
	MSA replenishments
	MSA transactional movements
	MSA/Threshold Provisions
	Year-end bulk communications
	Vitality Points conversion
	Discovery 911 Services
	Discovery 911 Maintenance
	Year end product renewals
	Member certificate
	Renewals
	Tax certificates & reports
	Bill administration (Policy maintenance)
	Suspended and withdrawn report
	Download member list
	Download member list per employer
	Policy Maintenance
	Employer Maintenance
	Health Workbench/employer query
	Workflow processes
	Reports
	Commission recalc notification including limit recalc notification
	Vitality sync
	HealthPolicyEntityHist Maintenance
	EntityPolicyConHist Maintenance
	Backdated bill movements
	Flexible billing
	Premium Calculator
	Eligibility
	Policy contribution service
	Online Premium service
	Health Plan details
	Contribution
	Company details
	Member List
	Bill Statement
	Linked Profiles
Claims Processing	Online Benefit Confirmation
	MSA Balances
	CIB Event Tracking
	98's Component
	Medi-Clinic Network Rates
	Script Calculator
	Limit Allocator
	Nappi Import
	Suspensions Reprocessor Electronic Processor

	Electronic Retrievers
	Intelleca Component
	Excess Component (Pru)
	Service Provider Locator
	Policy Lookup
	CCL (Calculate Claim Lines)
	CSS Limits (Limit Screens)
	MMS Limits (MMD Limit Lookup)
	Scheme Exclusion lookup
	Service Provider Lookup
Providers	BHF Import
	Health Partner Details
	Health Partner Entity Creation
	Health Partner Claim Details
	Health Partner Statements
	Health Partner Flags
	Health Partner Networks
	Health Partner Benefit Confirmation
	Benefit Confirmation
	Hospital Pre-authorization
	Provider Cpd Courses
	Nappi Code Search
	Claims Search
	Benefit Confirmation
	Member Validation
	Patient List (Key Care and Claiming Patients)
	Provider Statements
	Provider Statements Print Run Cycle Dates
	Provider Communication Details(Subscriptions)
	Provider Health Partner Programme
	Add Member Dependants
	Hospital Rating Index
	Claims Reconciliation
	Keycare Limits
	Chronic Illness Benefit Tracking
	Discovery Health Rates
	Health Partner Details
	Health Partner Entity Creation
	Health Partner Email Statements
Staff Portal	Update details
	Medicine pricing tool
	Additional reports
	Standby roster
	Clinical product tracker
	Product decision database
	Clinical review forum
	Plan comparison tool
	Binary converter
	Crime reporting tool
	Procurement
	SMS Manager
	Leads

	Change Control
	Poll
	Update details
	Portal g11n framework
	Content Services (MK)
	Search
	Alerts
	Star awards
	News dashboard
	Inet feeds
	Reporting
	Quick tools
	Quick content
	Promotions
	Who's Who
New Business	Bulk Import (screen, Controller, Store)
	Application Capture (Screen, Controller)
	Application Requirement(PR)(Controller)
	Entity Creation (Controller)
	Underwriting
	Medical Requirements & Exclusions(Screen, Controller, Store)
	Notifications(Controller)
	Activation & (Welcome Packs)(Screen, Controller)
	Leads Administration Console
	Leads Questionnaire
	New Business Tracking Report
	New Business Tracking Email
	SME Quoting
	Application Capture
	Application Requirement
	SME U/W Calc
	SME Premium Calc
	Online Quoting
	Premium Predictor
	MI for Online Quoting and Application
	Questionnaire Maintenance
	Nexus
	Update to Admin
	Notifications
	Activate & Welcome Packs
	Application validations
Vitality	Discovery Age
	Discovery Baby
	Cell C
	Clicks
	Digital Planet
	Funeral Benefit
	Greyhound
	Internet Solutions
	Kaizer Chiefs
	Look & Listen
	MTN Contract

	MTN Prepaid
	Vodacom Prepaid
	Orlando Pirates
	Planet Fitness
	RunWalkForLife
	Sony
	Ster Kinekor
	Telkom
	Touchline
	Travel BA
	Kulula
	Southern Sun
	Avis
	Virgin Active
	Vitality Motor
	Weighless
	Vitality Mall
	FNB Homeloan
	Cannons
	Holmes Place
	JJB
	LA Fitness
	Gym n Trim
	Living Well
	Park Club
	Nuffield
	Policy Maintenance
	Benefit Maintenance
	Status Calc
	Partner Communication
	Partner Page
	ODS
	Common Components
	Vitality Statements
	Stress Centre
	Nutrition Centre
	Finance Debtors
	Finance Creditors
	Wellness Network
	Online Non Smokers Declaration
CIM	Paradigm program used to capture/update a complaint
	Prudential Temporary Contact Details
	Access to online quoting system
	Paradigm program used capture coupons
	Prudential Generic Pack notification
	Prudential Small Medium Enterprise notification
	Paradigm program used to link a promotion to an entity
	Paradigm program used to do bulk offer updates
	Paradigm programs used to maintain Campaigns, Offers and Promotions
	Prudential Inquiry process
	Pru Outbound Calls
	Database procedure used to query Agency information
	Database procedure used to query Contact details

	Database procedure used to update promotion linked to entities
	Database procedure used to update Temporary Contact Detail information
	Database view of Campaign data
	Database view of Offer Promotion data>
	Database view of Promotion data
	Database view of User Campaign data>
	Database view of Temporary Contact Details data
	Discovery Inquiry Processes
	Discovery Outbound Calls
Discovery Care	HIV Add a line
	HIV Appeals
	HIV Workflow
	Chronics Add a Line
	Chronics Appeals
	Chronics Workflow (CFF) – Chronics Workflow
	Extended Supply of Medication
	MMD Case Management Workflow
	Oncology Workflow
	Daily imports – Insight
	Daily imports – Mediscor
	Oncology Add a Line
	Oncology Appeals
	DiscoveryWorld functionality
	Keycare Acute Exceptions
	Chronic Disease Behavioural Model
	Fax run
	eMMS Load process
	eMMS Edit process
	De-Coder
	Electronic messaging
	VXML
	Member notifications (Chronic and Disease Management)
	Member notifications (eMMS)
	Provider notifications (Chronic and Disease Management)
	Provider notifications (eMMS)
Interactive Messaging	Covus & Formscape Rendering
	Email Management
	HAL Batch System
	I.M Component Monitor
	mPod (Mobile Platform)
	Notification Engine
	Subscription Services
Finance	CHEATAH
	CREDITORS
	DEBTORS
	Expresso
	IDU
	Pandora
	RECON/FINANCIAL CLEARING HOUSE
	Credit Card Interface(NOMAD/FNB)*

ETM - HealthBridge Channel System Services	Patient Validations
	GP / Specialist Real-Time Claims
	GP / Specialist Real-Time Claim Reversals
	Hospital Real-Time Claims
	Hospital Real-Time Claims Reversals
	Hospital Electronic Authorisations
	Hospital Electronic Remittance Advices
	GP / Specialist Electronic Remittance Advices (under construction)
ETM - Medikredit Channel System Services	Pharmacy / GP Real-Time Claims
	Pharmacy / GP Stand-In Processing
	Cardholder File Generation and Transmission to 3rd Parties
	Switchback processing (under construction)
	Support for Swift On Line (under construction)
ETM - EDI Channel System Services	EDIFACT batch claims
ETM - Intelleca Channel System Services	Industry standard XML validation of claims
	Discovery mandatory field validation for electronic claim processing
ETM - Other Services	B2B E-commerce innovation
	Project management and consulting
	System functionality maintenance, support and enhancements
	System monitoring, alerting and reporting
	Disaster recovery for all systems
	Afterhours standby and support
	Provision of maintenance, support and operations tools for business operations staff
Cognos&DataWarehouse	Cognos Power Play
	Cognos Query Studio
	Cognos Report Net
	DataDoctor
	DW Architecture
	DW Data Mining
	DW Security Interface
	DNA reports (both Crystal and Operational Reports)
	Adhoc reporting
	Operational Data Stores
Credit Card	Credit Card
Intermediary Services	Broker House Management
	Broker Management
	Broker Policy Connection Management
	Commissions Calc
	Consultant Management
	Distribution
	Franchise Management
	Intermediary Zone

AMT	AMT
Devsched	Devsched
FSS	FSS
Security Access Control (SACS)	Security Access Control (SACS)
Payroll	Payroll Subsystem
Perception	Generic Questionnaire
Entities	Entities
	Entity Validations
	Generic Facts
	Generic Diary
	Entities Online
Workflow & Document Management	Engine Monitoring
	Unified Messaging
	Workflow
	Workflow Deployment System
	Workflow Image Archiving
	Workflow Process Archiving
	Workflow Objects

7.7 Appendix F: Electronic Services and Service Components

			Development Manager
Claims Submission	Batch Claim	Provider submits claims electronically from a desktop application in the practice to an intermediary who collates them into a single large batch file of claims. These are transmitted via FTP to Discovery. The file is automatically imported and validated before submitting to the claims processing system.	David Hughes
	Real-Time Claim	Provider submits claims electronically from a desktop application in the practice to an intermediary who switches the claim in real-time to Discovery for processing. The claim is validated after which an initial response is sent back to the provider confirming delivery and indicating any validation failures where applicable. Successful validation results in the claim being submitted into the claims processing system. After the claim is processed an adjudication message is sent back to the practice via the switching intermediary to indicate the processing outcome. The adjudication response can be returned in real-time where no manual intervention is required on the claim.	David Hughes
	Intelleca Claim	A digital mosaic is printed on paper claims representing the contents of the claim in an XML format. When the paper claim is received at Discovery, the mosaic is decoded into XML and submitted through the normal validation and processing systems. The mosaic decoding replaces the traditional claims capture workflow process.	David Hughes

Claims Workflow Tracking	ProviderZone Claims Search	Website provider zone enables service providers to search for claims submitted and indicate the status of the claim in workflow.	Greg Peringuey
	ProviderZone Statement Dates	Website provider zone provides static content on when claims payment runs are and when statements should be expected.	Greg Peringuey
	MemberZone Claims Tracker	Website member zone enables members to track where claims are in the Discovery workflow system.	Brian Klompas
	Real-Time Claim Responses	Provider submits claims electronically from a desktop application in the practice to an intermediary who switches the claim in real-time to Discovery for processing. The claim is validated after which an initial response is sent back to the provider confirming delivery and indicating any validation failures where applicable. Successful validation results in the claim being submitted into the claims processing system. After the claim is processed an adjudication message is sent back to the practice via the switching intermediary to indicate the processing outcome. The adjudication response can be returned in real-time where no manual intervention is required on the claim.	David Hughes
	Email Claim Delivery Notification	Depending on the members preferred choice of communication, an email is sent to the member indicating the details of the claim received for processing.	Karen Parsons
	SMS Claim Delivery Notification	Depending on the members preferred choice of communication, an email is sent to the member indicating the details of the claim received for processing.	Karen Parsons

Claims Processing Outcomes	ProviderZone Statements	Website provider zone enables service providers to download their payment statements in CSV, HTML or Excel formats.	Greg Peringuey
	Provider Emailed Statements	After claims payment runs, statements in HTML form are emailed to those providers who elected email as their preferred delivery mechanism for statements.	Greg Peringuey
	ProviderZone Claims Recon Assist	Website provider zone enables providers to analyse the processing outcome of their recent history of claims to better understand the reasons for a particular outcome.	Greg Peringuey
	MemberZone Claims History	Website member zone enables providers to analyse the processing outcome of their recent history of claims to better understand the reasons for a particular outcome.	Brian Klompas
	MemberZone Statements	Website member zone enables members to download an HTML version of the statement or interim statements prior to claims payment run.	Brian Klompas
	Member Emailed Statements	After claims payment runs, statements in HTML form are emailed to those members who elected email as their preferred delivery mechanism for statements.	Brian Klompas
	Member WAP Claims Query	Currently in pilot: allows members to log onto the WAP site and view the 3 most recent claims and their processing outcome.	Brian Klompas
	Member SMS Claims Query	Currently in pilot: allows members to submit an SMS short code to which a response SMS is sent by Discovery providing the claims processing outcome for the most recent claim received.	Brian Klompas

Member Status Check	Telephonic MSA Query	Members can query their current medical savings account balance via telephone DTMF/VXML system	Greg Peringuey
	Website status check	Members can view the full spectrum of statuses relating to the relationship with Discovery including: MSA, HPA balances, self-payment gap, Vitality status, contribution status personal medical benefits used and limits reached as well as general scheme benefits relevant to their specific plan choice.	Brian Klompas
	SMS Query	Currently in pilot: allows members to submit an SMS short code to which a response SMS is sent by Discovery providing their balances for MSA, HPA, Vitality status and self-payment gap.	Jay Naidoo
	WAP Query	Currently in pilot: allows members to log onto the WAP site and view their MSA, HPA balances and self-payment gap.	Jay Naidoo
	Fact File/Health Plan Guide	Static content on the plan types and benefits and limit structure for reference by members and providers	
	Self-Payment Gap Report via Website	Members generate their own self-payment gap report on the website.	
	Patient validation via VXML	Providers can query the validity of a patients membership to the medical scheme via telephone DTMF/VXML system	Greg Peringuey
	Patient validation via website	Providers can query the validity of a patients membership to the medical scheme via website	Greg Peringuey
	Patient validation via PMA	Providers can submit a real-time patient validation request from their desktop application in their practice. This request is switched over the internet via a switching intermediary to Discovery and returns a response message over the same channel in real-time.	David Hughes

	Patient Benefit Confirmation via VXML	Providers can query the availability of benefits against a specific patient by processing a virtual claim via telephone DTMF/VXML system	Greg Peringuey
	Patient Benefit Confirmation via website	Providers can query the availability of benefits against a specific patient by processing a virtual claim via the provider zone website.	Greg Peringuey
	Tax and Membership Certificates	The website allows for the download of tax and medical scheme membership certificates.	
	Cardholder Files	Cardholder files are generated for pathologists, pharmacy benefit management companies and switching intermediaries to facilitate external validation of claims related information prior to submission. These files are FTP'd to the parties over the internet.	David Hughes
Personal Details Maintenance	Maintenance via website	Users are able to maintain their profile of personal details, roles, contact details, banking details and communications preferences.	Brian Klompas / Greg Peringuey
	Profile view via WAP	Currently in pilot: the WAP service allows users to view the contents of their profile only.	Jay Nalduo
	Address Validator	Allows Discovery to validate an address of any entity in real-time using a webservice to a 3rd party host.	Theuns Pretorius
	Bank Validator	Discovery receives a fixed format file from the banks on an adhoc basis to ensure the latest branch details.	Theuns Pretorius

Authorisations	Hospital Pre-Auth Query via VXML	Specialists and hospitals can obtain details of a pre-authorised event via telephone DTMF / VXML system	Ralph Holmes / Greg Peringuey
	Hospital Auth via Hospital System	Currently in pilot: the hospital system sends a real-time pre-auth request message over the internet via a switching intermediary to Discovery. The request is validated and processed with a approve/decline response sent back to the hospital system	Ralph Holmes / David Hughes
	Hospital Pre-Auth Member Notification	Approval of a pre-auth request can also be sent to the member via SMS, email, fax or letter depending on their preferred channel of communication.	Karen Parsons / Ralph Holmes
	Chronic Medication via Website	Allows members to view the status of chronic medication applications as they track through the workflow process.	Ralph Holmes / Greg Peringuey
	SMS notification of Chronic Approval	Depending on the members preferred communication channel, SMS notification is sent to the member as soon as the chronic medication application is approved.	Karen Parsons / Ralph Holmes
	Email notification of Chronic Approval	Depending on the members preferred communication channel, email notification is sent to the member as soon as the chronic medication application is approved.	Karen Parsons / Ralph Holmes
	Chronic meds authorisation imports	Allows for the electronic receipt and import of chronic authorisation files generated by 3rd party pharmacy benefit management companies such as Mediscor and Insight.	Ralph Holmes

Health Information	Health Info Centre	Website static content relating to health issues including health databases	Greg Peringuey
	Health Info Articles	Health related issues are also bulk emailed to subscribing members and providers.	Karen Parsons
	Medicine Nappi Search	Allows users to search for medicines by description or Nappi code.	Brian Klompas
	Medicine Pricing Tool	Allows users to query the recommended price for medication items.	Brian Klompas
	Hospital Rating Index	Allows members to search for hospitals with the highest ratings on selected procedures in chosen geographical locations. The service is only hosted on the website. The rating index is manually calculated from pre-authorization data, hospital claims, related doctor and Allied Health Professional claims and verified by random coding audits.	Brian Klompas
	Provider CPD Online Courses	The website hosts a number of online courses for providers to accumulate their required annual CPD points. However, adoption rate has been fairly low and the future of this service is in question.	Greg Peringuey
Bulk Broadcasting	Discovery Plans Year End Communication	Every year schemes make adjustments to their plan structures, rules and benefits. This information is presented on the website in static form and emailed to those stakeholders who've selected email as their communication channel of choice.	Karen Parsons
	Member Newsletter	Bulk emailed with generic content	Karen Parsons
	Provider Newsletter	Bulk emailed with generic content	Karen Parsons
	eDiscoverer	Bulk emailed with generic content	Karen Parsons
	Discovery Baby Newsletter	Bulk emailed with generic content	Karen Parsons
	Stress Newsletter	Bulk emailed with generic content	Karen Parsons

	Nutrition Newsletter	Bulk emailed with generic content	Karen Parsons
	Discovery Card Newsletter	Bulk emailed with generic content	Keren Parsons
	Employer Newsletter	Bulk emailed with generic content	Karen Parsons
Bulk Customised Communication	Member medical tax certificates	Bulk email with customised content	Karen Parsons
	Provider member network lists	Bulk email with customised content	Karen Parsons
	Provider capitation reports	Bulk email with customised content	Karen Parsons
	MSA refund letters	Bulk email with customised content	Karen Parsons
Interactive Marketing	Delivery of Promotional Content	Details of a particular promotion are presented to the target audience via print media, website, email and/or SMS.	Karen Parsons
	Email Response Handling	Target audience responds using SMS short code.	Karen Parsons
	SMS Response Handling	Target audience responds using predetermined email address.	Karen Parsons

Payment and Collections	Discovery Card Online Services	FNB host and administer the Discovery Credit Card. A real-time interface between Discovery and FNB is used to maintain card details at FNB and view credit balances. The user-interface is a webpage.	Theuns Pretorius
	Discovery Card Transaction Reconciliation Services	FNB host and administer the Discovery Credit Card. Discovery has complete control over a bucket of funds dedicated to claims payment called the HPA in the credit card and can therefore manage the authorisation of payment directly. A batch file is sent to FNB once per day to synchronise FNB with these transactions and to effect payment	Theuns Pretorius
	Payment/Collections Service	Discovery interfaces with HyphenTech, a switching company for credit cards in the banking industry for all payments and collections with banks other than FNB.	Theuns Pretorius
	ACB Service (Automatic Clearing Bureau)	This is a batch file interface using FTP to an ACB service which manages the electronic transfer of funds between banks for the payment of claims to providers and members.	Theuns Pretorius
Intermediary Services		Services to brokers are provided on the website.	Theuns Pretorius
Vitality Partner Member Query	CSV file exchange via email	Allows a Vitality partner to query the Vitality membership of a customer.	Terrl Fell
	Webpage	Allows a Vitality partner to query the Vitality membership of a customer.	Terrl Fell
	Back-end batch file Integration	Allows a Vitality partner to query the Vitality membership of a customer.	Terrl Fell
	Real-Time webservice integration	Allows a Vitality partner to query the Vitality membership of a customer.	Terrl Fell

Vitality Partner Activation	CSV file exchange via email	Allows a Vitality partner to notify Discovery of a Vitality member application to obtain access to the partner benefits.	Terri Fell
	Webpage	Allows a Vitality partner to notify Discovery of a Vitality member application to obtain access to the partner benefits.	Terri Fell
	Back-end batch file Integration	Allows a Vitality partner to notify Discovery of a Vitality member application to obtain access to the partner benefits.	Terri Fell
	Real-Time webservice integration	Allows a Vitality partner to notify Discovery of a Vitality member application to obtain access to the partner benefits.	Terri Fell
Vitality Partner Transaction	CSV file exchange via email	Allows a Vitality partner to notify Discovery of Vitality member transactions.	Terri Fell
	Webpage	Allows a Vitality partner to notify Discovery of Vitality member transactions.	Terri Fell
	Back-end batch file Integration	Allows a Vitality partner to notify Discovery of Vitality member transactions.	Terri Fell
	Real-Time webservice integration	Allows a Vitality partner to notify Discovery of Vitality member transactions.	Terri Fell
Vitality Membership Maintenance	CSV file exchange via email	Allows Discovery to notify a Vitality partner of Vitality memberships that are discontinued.	Terri Fell
	Back-end batch file Integration	Allows Discovery to notify a Vitality partner of Vitality memberships that are discontinued.	Terri Fell

Vitality Usage Recon	CSV file exchange via email	Allows Discovery to send the Vitality partner a reconciliation statement of the number of transactions for the month for which benefits will be paid.	Terri Fell
	Beck-end batch file Integration	Allows Discovery to send the Vitality partner a reconciliation statement of the number of transactions for the month for which benefits will be paid.	Terri Fell

7.8 Appendix G: U-Commerce Mapping and Rating

			Channel Usage Across All Services											
			20	26	26	6	3	4	0	1	0			
			Channel Richness Rating Across All Services											
			46	49	43	13	6	8	0	3	0			
Electronic Service	Electronic Service Component	Description	EC B2B	EC Web	EC Email	MC SMS	MC WAP	VC	ITV	SC	TM	Total Service Richness	U-Commerce Span	U-Commerce Richness
Claims Submission		Channel Richness Profile	6	0	0	0	0	0	0	3	0	9.0	22%	2.00
	Batch Claim	Provider submits claims electronically from a desktop application in the practice to an intermediary who collates them into a single large batch file of claims. These are transmitted via FTP to Discovery. The file is automatically imported and validated before submitting to the claims processing system.	3											
	Real-Time Claim	Provider submits claims electronically from a desktop application in the practice to an intermediary who switches the claim in real-time to Discovery for processing. The claim is validated after which an initial response is sent back to the provider confirming delivery and indicating any validation failures where applicable. Successful validation results in the claim being submitted into the claims processing system. After the claim is processed an adjudication message is sent back to the practice via the switching intermediary to indicate the processing outcome. The adjudication response can be returned in real-time where no manual intervention is required on the claim.	3											

	Inteleca Claim	A digital mosaic is printed on paper claims representing the contents of the claim in an XML format. When the paper claim is received at Discovery, the mosaic is decoded into XML and submitted through the normal validation and processing systems. The mosaic decoding replaces the traditional claims capture workflow process.									3				
Claims Workflow Tracking		Channel Richness Profile	2	5	2	2	0	0	0	0	0	0	11.0	44%	4.89
	ProviderZone Claims Search	Website provider zone enables service providers to search for claims submitted and indicate the status of the claim in workflow.		2											
	ProviderZone Statement Dates	Website provider zone provides static content on when claims payment runs are and when statements should be expected.		1											
	MemberZone Claims Tracker	Website member zone enables members to track where claims are in the Discovery workflow system.		2											
	Real-Time Claim Responses	Provider submits claims electronically from a desktop application in the practice to an intermediary who switches the claim in real-time to Discovery for processing. The claim is validated after which an initial response is sent back to the provider confirming delivery and indicating any validation failures where applicable. Successful validation results in the claim being submitted into the claims processing system. After the claim is processed an adjudication message is sent back to the practice via the switching intermediary to indicate the processing outcome. The adjudication response can be returned in real-time where no manual intervention is required on the claim.	2												

	Email Claim Delivery Notification	Depending on the members preferred choice of communication, an email is sent to the member indicating the details of the claim received for processing.			2									
	SMS Claim Delivery Notification	Depending on the members preferred choice of communication, an email is sent to the member indicating the details of the claim received for processing.			2									
Claims Processing Outcomes		Channel Richness Profile	0	8	4	2	2	0	0	0	0	16.0	44%	7.11
	ProviderZone Statements	Website provider zone enables service providers to download their payment statements in CSV, HTML or Excel formats.		2										
	Provider Emailed Statements	After claims payment runs, statements in HTML form are emailed to those providers who elected email as their preferred delivery mechanism for statements.			2									
	ProviderZone Claims Recon Assist	Website provider zone enables providers to analyse the processing outcome of their recent history of claims to better understand the reasons for a particular outcome.		2										
	MemberZone Claims History	Website member zone enables providers to analyse the processing outcome of their recent history of claims to better understand the reasons for a particular outcome.		2										
	MemberZone Statements	Website member zone enables members to download an HTML version of the statement or interim statements prior to claims payment run.		2										
	Member Emailed Statements	After claims payment runs, statements in HTML form are emailed to those members who elected email as their preferred delivery mechanism for statements.			2									

	Member WAP Claims Query	Currently in pilot: allows members to log onto the WAP site and view the 3 most recent claims and their processing outcome.					2							
	Member SMS Claims Query	Currently in pilot: allows members to submit an SMS short code to which a response SMS is sent by Discovery providing the claims processing outcome for the most recent claim received.				2								
Member Status Check		Channel Richness Profile	4	9	0	2	2	6	0	0	0	23.0	56%	12.78
	Telephonic MSA Query	Members can query their current medical savings account balance via telephone DTMF/VXML system						2						
	Website status check	Members can view the full spectrum of statuses relating to the relationship with Discovery including: MSA, HPA balances, self-payment gap, Vitality status, contribution status personal medical benefits used and limits reached as well as general scheme benefits relevant to their specific plan choice.		2										
	SMS Query	Currently in pilot: allows members to submit an SMS short code to which a response SMS is sent by Discovery providing their balances for MSA, HPA, Vitality status and self-payment gap.				2								
	WAP Query	Currently in pilot: allows members to log onto the WAP site and view their MSA, HPA balances and self-payment gap.					2							
	Fact File/Health Plan Guide	Static content on the plan types and benefits and limit structure for reference by members and providers		1										
	Self-Payment Gap Report via Website	Members generate their own self-payment gap report on the website.		2										
	Patient validation via VXML	Providers can query the validity of a patients membership to the medical scheme via telephone DTMF/VXML system												

	Bank Validator	Discovery receives a fixed format file from the banks on an adhoc basis to ensure the latest branch details.	3												
Authorisations		Channel Richness Profile	6	2	4	4	0	2	0	0	0	0	18.0	56%	10.00
	Hospital Pre-Auth Query via VXML	Specialists and hospitals can obtain details of a pre-authorised event via telephone DTMF / VXML system						2							
	Hospital Auth via Hospital System	Currently in pilot: the hospital system sends a real-time pre-auth request message over the internet via a switching intermediary to Discovery. The request is validated and processed with a approve/decline response sent back to the hospital system	3												
	Hospital Pre-Auth Member Notification	Approval of a pre-auth request can also be sent to the member via SMS, email, fax or letter depending on their preferred channel of communication.			2	2									
	Chronic Medication via Website	Allows members to view the status of chronic medication applications as they track through the workflow process.		2											
	SMS notification of Chronic Approval	Depending on the members preferred communication channel, SMS notification is sent to the member as soon as the chronic medication application is approved.				2									
	Email notification of Chronic Approval	Depending on the members preferred communication channel, email notification is sent to the member as soon as the chronic medication application is approved.			2										
	Chronic meds authorisation imports	Allows for the electronic receipt and import of chronic authorisation files generated by 3rd party pharmacy benefit management companies such as Mediscore and Insight.	3												
Health Information		Channel Richness Profile	0	9	2	0	0	0	0	0	0	0	11.0	22%	2.44

	Health Info Centre	Website static content relating to health issues including health databases		1											
	Health Info Articles	Health related issues are also bulk emailed to subscribing members and providers.			2										
	Medicine Nappi Search	Allows users to search for medicines by description or Nappi code.		2											
	Medicine Pricing Tool	Allows users to query the recommended price for medication items.		2											
	Hospital Rating Index	Allows members to search for hospitals with the highest ratings on selected procedures in chosen geographical locations. The service is only hosted on the website. The rating index is manually calculated from pre-authorisation data, hospital claims, related doctor and Allied Health Professional claims and verified by random coding audits.		2											
	Provider CPD Online Courses	The website hosts a number of online courses for providers to accumulate their required annual CPD points. However, adoption rate has been fairly low and the future of this service is in question.		2											
Bulk Broadcasting		Channel Richness Profile	0	1	9	0	0	0	0	0	0	10.0	22%	2.22	
	Discovery Plans Year End Communication	Every year schemes make adjustments to their plan structures, rules and benefits. This information is presented on the website in static form and emailed to those stakeholders who've selected email as their communication channel of choice.		1	1										
	Member Newsletter	Bulk emailed with generic content			1										
	Provider Newsletter	Bulk emailed with generic content			1										
	eDiscoverer	Bulk emailed with generic content			1										
	Discovery Baby Newsletter	Bulk emailed with generic content			1										
	Stress Newsletter	Bulk emailed with generic content			1										
	Nutrition Newsletter	Bulk emailed with generic content			1										

	Discovery Card Newsletter	Bulk emailed with generic content			1									
	Employer Newsletter	Bulk emailed with generic content			1									
Bulk Customised Communication		Channel Richness Profile	0	0	8	0	0	0	0	0	0	8.0	11%	0.89
	Member medical tax certificates	Bulk email with customised content			2									
	Provider member network lists	Bulk email with customised content			2									
	Provider capitation reports	Bulk email with customised content			2									
	MSA refund letters	Bulk email with customised content			2									
Interactive Marketing		Channel Richness Profile	0	1	4	3	0	0	0	0	0	8.0	33%	2.67
	Delivery of Promotional Content	Details of a particular promotion are presented to the target audience via print media, website, email and/or SMS.		1	1									
	Email Response Handling	Target audience responds using SMS short code.			3									
	SMS Response Handling	Target audience responds using predetermined email address.				3								
Payment and Collections		Channel Richness Profile	6	2	0	0	0	0	0	0	0	8.0	22%	1.78
	Discovery Card Online Services	FNB host and administer the Discovery Credit Card. A real-time Interface between Discovery and FNB is used to maintain card details at FNB and view credit balances. The user-interface is a webpage.		2										

	Discovery Card Transaction Reconciliation Services	FNB host and administer the Discovery Credit Card. Discovery has complete control over a bucket of funds dedicated to claims payment called the HPA in the credit card and can therefore manage the authorisation of payment directly. A batch file is sent to FNB once per day to synchronise FNB with these transactions and to effect payment	2											
	Payment/Collections Service	Discovery interfaces with HyphenTech, a switching company for credit cards in the banking industry for all payments and collections with banks other than FNB.	2											
	ACB Service (Automatic Clearing Bureau)	This is a batch file interface using FTP to an ACB service which manages the electronic transfer of funds between banks for the payment of claims to providers and members.	2											
Intermediary Services		Channel Richness Profile	0	3	0	0	0	0	0	0	0	3.0	11%	0.33
		Services to brokers are provided on the website.		3										
Vitality Partner Member Query		Channel Richness Profile	4	2	2	0	0	0	0	0	0	8.0	33%	2.67
	CSV file exchange via email	Allows a Vitality partner to query the Vitality membership of a customer.			2									
	Webpage	Allows a Vitality partner to query the Vitality membership of a customer.		2										
	Back-end batch file integration	Allows a Vitality partner to query the Vitality membership of a customer.	2											
	Real-Time webservice integration	Allows a Vitality partner to query the Vitality membership of a customer.	2											

Vitality Partner Activation		Channel Richness Profile	4	2	2	0	0	0	0	0	0	0	8.0	33%	2.67
	CSV file exchange via email	Allows a Vitality partner to notify Discovery of a Vitality member application to obtain access to the partner benefits.			2										
	Webpage	Allows a Vitality partner to notify Discovery of a Vitality member application to obtain access to the partner benefits.		2											
	Back-end batch file Integration	Allows a Vitality partner to notify Discovery of a Vitality member application to obtain access to the partner benefits.	2												
	Real-Time webservice Integration	Allows a Vitality partner to notify Discovery of a Vitality member application to obtain access to the partner benefits.	2												
Vitality Partner Transaction		Channel Richness Profile	4	2	2	0	0	0	0	0	0	0	8.0	33%	2.67
	CSV file exchange via email	Allows a Vitality partner to notify Discovery of Vitality member transactions.			2										
	Webpage	Allows a Vitality partner to notify Discovery of Vitality member transactions.		2											
	Back-end batch file Integration	Allows a Vitality partner to notify Discovery of Vitality member transactions.	2												
	Real-Time webservice integration	Allows a Vitality partner to notify Discovery of Vitality member transactions.	2												
Vitality Membership Maintenance		Channel Richness Profile	2	0	2	0	0	0	0	0	0	0	4.0	22%	0.89
	CSV file exchange via email	Allows Discovery to notify a Vitality partner of Vitality memberships that are discontinued.			2										
	Back-end batch file Integration	Allows Discovery to notify a Vitality partner of Vitality memberships that are discontinued.	2												
Vitality Usage		Channel Richness Profile	2	0	2	0	0	0	0	0	0	0	4.0	22%	0.89

7.9 Appendix H: List of Sources for Transaction Volumes

Document Type	Reference	Methods Used/Component
Discovery Call Centre Weekly Summary Report	(Peringuey, 2006a)	MSA query via VXML
		Patient validation via VXML
		Patient Benefit Confirmation via VXML
Discovery Website Functionality Matrix and Usage Analysis Report	(Killian, 2006)	Medical Info Centre on website
		MSA Details via website
		Fact File/Health Plan Guide via Website
		Benefits Used via Website
		Do We Cover? via Website
		Medicine Pricing via Website
		Chronics via Website
		Self-Payment Gap Report via Website
		Patient validation via website

		Patient Benefit Confirmation via website
		View application progress on website
		Claims Search on website
		Statement Dates on website
		Provider Statements downloads from website
		Recon Assist on website
		Claims Tracker on website
		Claims History on website
		Statements (incl Interim) downloads from website
		Hospital Rating Index via website
Discovery Website PartnerZone Weekly Stats Report	(Peringuey, 2006b)	Pre-Auth Reconfirmation via VXML
ETM Weekly Stats Sheet	(Hughes, 2006a)	Patient validation via PMA
		Real-Time OH claims via HealthBridge

		Real-Time claim from hospital system via HealthBridge
Health Operations Monthly Report - January 2006	(Discovery, 2006h)	Batch claim via EDI trading partner
		Real-Time claims via Medikredit
HealthBridge Invoice Breakdown	(Rathman, 2006)	Re-Auth request via Hospital System
		Pre/Re-Auth confirmation of details back to hospital system
		Electronic Remittance Advices sent via HealthBridge
Intelleca Daily Volume Stats Report	(Boshoff, 2006)	Paper claim with Intelleca encoding
Interactive Messaging Monthly Subscriptions Report	(Parsons, 2006)	Provider Statements emailed
		Email notification of claim received
		SMS notification of claim received
		Member Statements emailed
Health Systems Weekly Report 2005	(Discovery, 2006i)	Pre-Auth request via email (E-Auth) Hospital Pre-Auth Member Notification –Email Re-Auth Request via Email

