Critical Factors in Community Informatics

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ABSTRACT

Community Informatics is a new field of research that studies how information and communications technologies can be used to improve the quality of life of communities.
The use and acceptance of technology is unpredictable. Early Community Informatics research found that deploying information technology with the aim of improving communities was seldom successful. Research has been done to identify the factors that might have a bearing on the outcome, but no definitive answer has emerged, and little work has been done on evaluating the effect of the methodology on the outcome. This research set out to establish what the critical factors were, and to determine whether a specific community informatics methodology could be designed.
The objective of this research was to design a Community Informatics methodology, a way of introducing ICT into communities, that would ensure a successful economic outcome. The strategy was to use tourism as the catalyst for economic growth. The outcome sought was a self sustaining, locally owned and scalable tourism product which would provide jobs initially and in the longer term would bring money into the local economy and lead to a revitalisation of the community.
The research was in two parts. The first part consisted of prototyping ecommerce Internet sites of increasing scope and complexity using a participative methodology within the socio-economic computer systems design paradigm. The work involved four organisations: the Katherine Mansfield Birthplace, the Spa Association of New Zealand and two large hotels. The outcome was a generic ecommerce model and a participative methodology for implementing that model.
The second part of the research involved applying the prototype methodology to communities in isolated parts of New Zealand. The communities involved were located in North Hokianga, Mahia and East Cape. The final outcome was a community owned and maintained ecommerce Internet site that could form the basis for a tourism led economy.
This research has shown that by using the right methodology it is possible to create a viable community based ecommerce application, and that there are four critical factors in Community Informatics: leadership, motivation, consensus and the methodology used.

Acknowledgements

I wish to express to the Doctoral Research Committee my appreciation of the work of Professor Don Barnes on my behalf, and his unfailing help and support throughout the research.

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Note on terminology

Throughout the thesis the spelling has been standardised for some common terms:

When the Internet is being referred to directly it has been spelled with a capital. When the word is being used as an adjective, for example 'internet technologies' it is shown in lower case.

The term Community Informatics is shown capitalised when the text is referring to the academic discipline. When the term is being used as an adjective, or to refer to community informatics generally, it is shown in lower case.

The term 'ecommerce' is spelled thus throughout, as opposed to alternatives such as eCommerce, Ecommerce or e-commerce.

The spelling 'website' has been adopted throughout in preference to 'web site'.

Chapter 1:

Introduction to the Thesis

1.1 Introduction

This chapter outlines the theme of the thesis, its objective and motivation, and its contribution to the field of Community Informatics. The general strategy of the thesis is explained, the choice of methodology and the role of tourism as the vehicle for community development. The next part outlines the methodology used to develop a Community Informatics methodology and the strategy for introducing information technology into isolated communities. The remainder of the chapter briefly outlines each of the subsequent chapters in the thesis.

1.1.1 Theme of the thesis

Community Informatics is the name given to the field of research concerning the application of information and communications technology (ICT) in a community context. The aim is to bring about economic development and social change to disadvantaged communities. Community Informatics (CI) has been applied in a wide variety of projects in many countries and research has shown that some applications have had dramatic and beneficial impacts on communities. However, the findings also show that the majority of attempts to apply ICT to communities have been failures, or at best can be regarded as little more than useful learning for the developers (Jaeger 2001 p.140). It appears that the introduction of technology into a community is one of the most problematic ways that information technology can be applied. Nevertheless, government organisations, community groups, social support networks and voluntary agencies are all actively exploring the potential of ICT within communities (O'Neil 2002).

The reason for the failures is not hard to find: community informatics projects are unavoidably complex and ill-structured. They typically have multiple objectives, conflicting goals, outcomes are hard to measure, participation is entirely voluntary, and there is no way of ensuring continuity. This mix of ill-defined outcomes and uncontrolled inputs eliminates most of the controls built into standard computer design methodologies. The methods used to design computer systems for corporate environments do not work when applied to the situations typically found in community environments. However, that is not to say that the introduction of ICT into communities must inevitably fail. The theme of this thesis is that given a methodology sympathetic to the needs and aspirations of communities, community informatics can achieve a consistently high level of success.

1.1.2 Objective of the thesis

Chapter two shows that there is an extensive literature on Community Informatics, but it also shows that there is little prescriptive literature which addresses the design methodologies used in CI projects. The field of applied CI is so broad that no one methodology can be expected to deal with every contingent situation. The methodology described in this thesis addresses community development through small scale tourism development. The aim of this research was to determine the appropriate methodology to use to deliver sustainable economic development

within isolated areas of New Zealand through the introduction of ICT. Working with communities offered scope for novel applications of ICT, and for developing innovative design strategies. The objective of the thesis then, was to develop an effective systems design methodology capable of creating sustainable economic development in a community situation where the level of ICT knowledge in the user community is very low. A subsidiary objective is to identify those factors which are critical to the success of community informatics projects. A detailed specification of the objectives is given in section 2.5.1.

1.1.3 Motivation for the study

Community Informatics is a growing and important area of research with the potential to transform many sectors of society. At the heart of the wider Community Informatics movement is the belief that a global knowledge economy is being created where 'trading in information and knowledge based goods is becoming as important as the exchange of physical goods' (Day 2001 p.305). Consequently, governments around the world are implementing policies aimed at ensuring their populations are enabled to join the international Internet revolution. Not being online is seen as running the risk of being left behind and losing global competitive advantage. What is true for nations is equally true for disadvantaged areas of a nation's economy (Negroponte 1995). The challenge is to find a way to introduce ICT into communities in a form that will fit in naturally with the values and norms of the community members.

World wide, growing numbers of indigenous communities are being encouraged to turn to tourism as a source of income and employment (Nodder at al 2003). In New Zealand, community tourism tends to emphasise the culture of the original inhabitants, the Maori. Today Maori are over-represented in the unemployment figures, and Maori communities are often at the bottom of the socio-economic scale, hence the NZ government's efforts to target these areas for economic development (Fletcher 1999).

A range of Maori controlled tourism businesses currently emphasise tourism products that revolve around cultural wisdom, use of the natural resource base, and elements of traditional Maori community life. While there are several examples of successful Maori-owned and community controlled tourism operations, they are usually situated in the main tourism centres (Zygadlo 2003).Those communities

and businesses that lie outside the main tourism centres face significant challenges in entering the tourism industry (Page et al 1999).

While technology may offer the potential to assist communities in solving some of these dilemmas, its use and acceptance, even amongst willing participants, is unpredictable. In practice the development of tourism incurs costs before receiving benefits. While both households and businesses may benefit economically it may be difficult to attract the elusive tourist. Residents must also deal with the negative socio-cultural and environmental impacts often associated with the industry. In attempting to develop this form of tourism communities and businesses face four key issues:

controlling the growth and nature of any tourism development

a) attracting suitable clients

b) improving the performance and survival of small tourism businesses

c) improving linkages between tourism and the local economy. (Milne, Mason and Hasse 2004)

It is well documented that a high percentage of commercial computer applications are unsuccessful or are never implemented (Lyytinen and Hirschheim 1987). In general, as applications move from straight forward transaction based processing into less well understood areas, systems become more complex and more likely to fail or be rejected by the users (Gorry and Morton 1989). To date, after more than half a century of continuous advance and the sophisticated use of expert systems, there are still no computer applications which can reliably select the best candidate for a job or design an advertising campaign or diagnose a patient's needs better than a human can. Computer applications are most successful when they are applied to highly structured and controlled situations and least successful where they have to cope with human values and behaviour. It is therefore not surprising that computers and communities have difficulty integrating. However, the transforming force of the information revolution is not technology but rather social and cultural (Loader et al 2002). Growth and development in communities therefore needs a human centred approach, and the underlying concept of this thesis is that computers can be applied successfully in community situations, providing they are designed specifically for that purpose.

The opportunity to develop a more human centred design methodology in this study arose when an ecommerce development programme for an isolated

community in the Far North of New Zealand was proposed. That initial project was to be one of a planned progression of similar projects in remote areas aimed at blending ICT with community development. The projects were funded by NZ government agencies with the primary aim of increasing employment in these underdeveloped areas. The programme called for economic development that would be locally based, locally owned and incorporated local skills and knowledge. After an initial assessment of the proposal it became clear that the level of local skills and knowledge was very low and that for the projects to be successful the development plan would need to develop the community at the same time as the computer system was being developed, and that a methodology would need to be developed specifically to address the issues found in that project. The objective, the timing and the setting offered an ideal opportunity to research ways to develop a community based methodology.

1.1.4 The contribution of the present study

The aim of this research is to make a significant contribution to the field of Community Informatics by the development of a design methodology which will successfully introduce economic development and social change into isolated communities. In this thesis tourism is used as the vehicle for motivating community change rather than the end product itself and the thesis is intended to make a contribution to the field of Community Informatics, not to tourism. As chapter two shows, there are many cases and examples of Community Informatics projects, but most of these are descriptive, and do not specifically deal with issues of the underlying methodology: there is a clear need for this type of work. Indeed there is a need for research into the outcomes of CI itself: 'the success or failure prospects of CI projects have not attracted significant research' (Romm and Taylor 2000b p.4). The lack of research in this area is summed up by 'Every reputable university ... has a faculty teaching management information systems. However, not one department anywhere in the world at the moment is known to be devoted to community information systems' (Gurstein 2003, p.3).

This thesis shows that it is possible to use community informatics to generate a sense of community and to create a viable community network using tools acceptable to the community and at the same time to contribute to the economic growth of the community. It also shows how community informatics can be

developed in a way that is predictable and self sustaining. The methodology described in this thesis breaks new ground in the field of community informatics in understanding the forces and motivations impacting on the success or failure of community based development.

The particular contribution to knowledge arising from this research has been

a) The development of a methodology for the design and implementation of community informatics in isolated and underdeveloped communities.
b) The creation and refinement of the 'web-raising' procedure with the potential for adoption in other community development projects.
c) The design of innovative software to support the introduction of tourism as a driver of community development projects.
d) An evaluation of the validity of critical factors reported in the literature of Community Informatics.
d) The identification of additional critical factors governing the success of community informatics projects.

1.2 The Methodology

The overall aim of the thesis was to establish a computer system methodology that utilised the philosophy of community participation and that could be used successfully in community development projects. The basic strategy was to conduct empirical research in commercial situations to develop a basic design methodology and then apply that methodology to undertake community development in isolated areas. The research approach was to use an action research framework around soft systems techniques.

Before tackling the main community development projects the research undertook to develop a number of smaller projects. These were undertaken in selected urban organisations, using a highly participative methodology. This allowed the research to experiment with different approaches to participation, and to try out various methods of encouraging the organisations to adopt a community focus to their ecommerce. By starting with organisations operating within a standard commercial environment there were fewer confounding factors to deal with and the effects of the participation could be isolated from the general effects of change due to the introduction of new technology. The projects were small enough to allow all

aspects to be monitored and controlled, but large enough to be confident that they had a sufficient degree of complexity and human interaction to contribute new insights to the development of the community design process. The overall research methodology is described in chapter three. The community development methodology which is the subject of this thesis is described in chapter six.

1.2.1 The communities

New Zealand offered many suitable communities which could have been used. For the research to be successful it needed a suitable community, a problem to work on, and an overall approach that had good chance of succeeding. The methodology also needed to be able to partition the research in order to be able to progress from small well defined communities to larger less structured communities. The first community project was with a small community museum in Wellington. This project was designed to develop and test a basic ecommerce model, to ensure that the development methodology was actually producing a viable output. The second group of communities was also business based, namely two hotels which wanted to build community centred ecommerce sites. In these cases the research aimed to utilise two communities associated with the hotels, a business community comprising the suppliers of these major hotels, and the community of staff working in them. In both of these projects the organisations contacted the researcher after having heard of the ongoing research program at conferences or through trade associations. Once the methodology had been ratified by the work in this first stage, the methodology was applied to three communities in underdeveloped areas in the North Island. Each community was different in many ways, but in each the problem was basically the same: a moribund economy, high unemployment and limited opportunities. The research was first undertaken in north Hokianga, the lessons and experience were then applied to a community in Mahia and the final version of the methodology was then successfully applied to a very scattered community in East Cape. Contact with the first community in the second stage, in Hokianga, was facilitated through a local government job creation initiative. The Mahia contact came about through a key person seeing previous work publicised at a conference and the East Cape case was facilitated through a government agency learning of the work in Hokianga.

1.2.2 The prototype development

The prototype projects were carried out in organisations located in Wellington, Rotorua and the Wairarapa. These projects involved ecommerce and Internet technology and all were intended to be full commercial applications when completed. They were chosen because, although restricted in scope in comparison to the community projects, they exhibited the same participative focus and the same exploration towards a final outcome. As with the community projects, the clients knew in general terms what they wanted their internet site to do, but did not have a clear idea of exactly what the final form would be. The development process was largely about working with the organisations' staff to turn their vision and aspirations into a viable ecommerce product. The result of the prototype project section of the research was a development methodology that allowed for the factors peculiar to a heavily participative approach and that could be applied in more traditional community settings. The prototype projects are discussed in detail in chapters four and five.

1.2.3 The community projects

The community projects were located in three localities in Northland and East Cape. Each community project involved an initial visit to the area to meet the community leaders and to get an understanding of their needs. From the initial visit a requirements specification was drawn up and an outline computer application design developed. Using modified soft systems analysis techniques in a follow up visit, the website design was demonstrated to the community members to get their views on what had been done. This encouraged community building and helped to deflect any possible resistance. The process usually went through several iterations and on each visit the community members were encouraged to put forward their ideas and to incorporate their values into the prototype design. Much of the interaction with the community members was designed to educate them to a point where they were able to make informed decisions about the direction and content of the ecommerce site being created for them. The methodology evolved over many iterations to include more and more of the community's views and to ensure that the developers' views did not become dominant by default. The final project demonstrated a methodology which did allow for full community participation and

that produced a viable method of community development. The evolution and final outcome of the community projects are described in detail in chapters seven to ten.

Choice of economic development vector

The role of tourism in this thesis is that of enabler, a means to establish and sustain economic development. The aim of all the projects undertaken in this research was to create viable tourism products through the use of ecommerce and internet technology. In New Zealand tourism is the number one growth industry, and is the second or third largest foreign currency earner. Foreign visitors spent $6.14 billion while in New Zealand during 2002, a 17 per cent increase on the previous year and more than double the $3.03 billion spent during 1997. The spend per visit increased to an average of NZ$3420, 11 per cent up on the previous year. 2,045,000 visitors arrived in the country in 2002, up 7.1 per cent from 2001 (Ministry of Tourism 2003). For a country with a population of only 3.8 million this makes tourism a natural vector for economic development in disadvantaged communities.

Choice of modality

Because the research focused on communities and the effect of introducing ICT to individuals within those communities, the choice of computer design methodology was restricted to those which were highly participative, and which did not rely on any particular level of expertise among the participants. This dictated that the methodology had to derive from the socio-technical school of computer system design. The socio-technical approach to systems design is described in chapter two. The exploratory nature of the research meant that the mode of research had to be proactive and flexible, so the modality chosen was action research. In the field of applied information systems, which includes community informatics, action research is thought to be particularly appropriate because it is a highly practical methodology (Banville and Landry 1989). Community based action research has been called 'a collaborative approach to inquiry or investigation that provides people with the means to take systematic action to resolve specific problems' (Stringer 1996 p. 15). Action research itself has been called the 'touchstone of most good organisational development practice' and 'remains the primary methodology for the practice of organisational development' (Van Eynde and Bledsoe 1990 p27). The method of using action research is described in chapter three.

Choice of development methodology

Action research needs to be applied using a particular methodology. In this case the methodology chosen was the socio-technical change process known as the Checkland methodology (described in detail in section 3.4). The Checkland methodology was chosen because it is participative, and can be used to explore complicated issues with a large number of people relatively quickly. It was also chosen because the researcher had used it in many similar situations and was thoroughly familiar with its use. Advocates of the methodology believe it is ideal for community applications because of its ability to go directly to the heart of the matter and to ensure that the right problem is being tackled. (Checkland and Scholes 1990; Checkland 1999).

Choice of technology

The choice of technology was relatively straightforward. The final application had to be capable of being deployed in remote communities. The technology therefore had to be mainstream, cheap and available everywhere. This meant that the project had to limit itself to the applications offered nationally by the main telecom companies, to use only proprietary development software and to use only those features of the Internet and its associated technology which were supported by standard internet browsers. By the final development stage of the methodology the technology had simplified to standard internet protocols supporting a server for the websites, dial up access for most community members, and access to the website and its database through a standard browser. All the software used in the development was open sourced.

1.3 Contents of the thesis

The thesis describes the design and testing of a methodology capable of empowering and developing communities in New Zealand through the application of information and communications technologies. It describes the issues centred on research, practice and policy for Community Informatics and the experience of the delivery to isolated communities. It then discusses the literature of Community Informatics and cases featuring community based technologies such as telecentres and community networking. Next the issues of the 'digital divide', empowering communities and regional and community networking are discussed in the context of local economic development and local resource management. These issues are used as the guiding principles for the design of a community methodology which

encourages and enables local innovation and infrastructure capacity building. The result of using the methodology was a successful outcome with sustainable development which could be replicated in other places.

1.3.1 Thesis organisation and presentation

There are many factors which influence the form of a thesis: the research perspective taken in the study, the purpose of the text, the expectations of the academic discipline and the requirements of the home institution. The nature of the problem also plays a major part. Satisfying these conflicting aims has led to the evolution of four types of thesis structure: traditional, traditional-complex, topic based, and 'compilations of research articles' (Paltridge 2002). However, each thesis is unique and it seldom happens that any thesis fits neatly into one of these formats. The nature of the research in this thesis meant that controlled experiments were not possible. In action research and case studies each situation is unique and non-repeatable, and there is no way of knowing in advance what the outcome of a particular intervention might be.

Structuring the presentation of this thesis has therefore involved addressing the issue of whether to present the work as a chronology of field research, or to state overarching theories formally and then show how they were applied in each particular case situation. The former approach has merit, but it would mean treating each case as an independent entity and presenting lessons from each as they emerged. The latter approach has the merit of offering formal rigour and conforming to the natural sciences paradigm, but in community situations it is not always possible to separate out the various factors which are in play at any one time. The thesis therefore takes a hybrid approach. The presentation first sets out the themes and theories emerging from the literature review; then presents the series of prototype projects and the design guidelines and propositions derived from those; the third section shows how the prototype methodology was applied in the field. The final section brings together the experience from all the cases and summarises the research findings.

Section 1: Structure of the Thesis

Chapter 1: Introduction to the thesis

This chapter outlines the theme of the thesis, its objectives and motivation, and its contribution to the field of Community Informatics. The general strategy of the

thesis is explained, the choice of methodology and the role of tourism as the vehicle for community development. The remainder of the chapter briefly outlines each of the subsequent chapters in the thesis.

Chapter 2: Review of the literature

The chapter begins with an overview of the research topic and then moves on to define Community Informatics, discussing its characteristics, its underlying philosophy and some of the key themes found in the literature. The chapter shows that the literature on Community Informatics is essentially descriptive and that little empirical research has been done into the methodologies used to implement community projects. The case for a specialised methodology is laid out, along with an outline business model for economic development in New Zealand communities. The final section details the research objectives for the thesis.

Chapter 3: The Research Methodology

This chapter describes the overall methodology used in the thesis and argues for the validity of the methods used. It justifies the role of case study research and shows how case study research integrates with action research. The methodology for implementing community ecommerce is based on action research so the stages of action research are described in detail. Many of the techniques and much of the philosophy of the community methodology were taken from soft systems analysis so the basic principles of the Checkland methodology used in the case implementations are outlined.

Section 2: Developing the Community Methodology

This section of the thesis describes the development of a prototype community informatics methodology. The research used small commercial projects to develop and refine a generic ecommerce model, and having validated that model, to develop and refine an implementation methodology.

Chapter 4: Developing a generic ecommerce model

This chapter describes the first case in the series of research projects aimed at developing a design methodology for community development. The chapter describes how an ecommerce site was designed and built for the Katherine Mansfield Birthplace. The chapter outlines how prototyping was used within a participative framework to enable the staff to define a logical requirements

analysis. This requirements analysis was used to design a generic ecommerce model. The functionality of the model is given, followed by a description of a staged implementation methodology which emerged iteratively from the case. The final part shows the outcome of the implementation and how this was used to subsequently modify the implementation methodology. The implementation itself was not a success although the project showed that the methodology was capable of deriving a successful ecommerce model. This model then had to be tested against other empirically derived models.

Chapter 5: Validating the generic ecommerce model

The ecommerce model derived in chapter four was tested for validity by comparing its design with other major museum websites in New Zealand. The first part of the chapter describes the method used to make the comparisons and the outcome. The results of this analysis showed that the generic model had identified all the functionality that was found on the museum industry websites. However significant differences were found in how these were implemented. The reason for these differences was investigated by interviewing the museum website owners to establish how they had arrived at their website designs. The outcome was a validation of the requirements analysis methodology, and also produced a set of guidelines for applying the methodology in future applications.

Chapter 6: Extending the community methodology

This chapter describes the process of applying and extending the community design methodology by incorporating the concept of a community portal. The revised methodology was first applied to a virtual community by building an ecommerce internet site for the Spa Association of New Zealand. For this project the business model was based around an email forum, intended to create a community relationship between scattered members. The ecommerce site did not achieve its objectives but was valuable in terms of learning outcomes. The second part of the chapter describes ecommerce internet portals built for two large hotels. These were partly successful in that they did create ecommerce websites to the client specifications, but they did not allow the hotels to formalise their relationships with their natural communities, staff and suppliers. The implementation of the sites was halted short of completion due to human factors impinging on the process. The final section of the chapter shows how the prototype methodology again evolved,

and details the component parts needed to ensure the success of the ecommerce sites built for the client organisations.

Section 3: Community Development

The cases in the previous section were designed to prove the concept. The outcome was a generic ecommerce model and methodology for implementing that model. The greater challenge was to apply the principles to larger communities in remote areas with very little infrastructure. This was the subject of the third part of the thesis.

Chapter 7 Hokianga

This chapter describes the community of North Hokianga and how the methodology was applied there in the first of the large community projects. The general ecommerce model was successfully adapted to create a customised business model for the community. Applying the methodology succeeded in generating an enthusiastic reception for the project and support from the community generally. Original content for the site was created by an innovative web-raising technique. The web-raising outcome revealed issues surrounding the use of participation methods in community informatics. The finished website was judged a complete success by the community but did not of itself generate the economic activity it was designed to stimulate. The outcome was a well build professional ecommerce site, but without the planned transfer of technology into the community.

Chapter 8 Mahia

The outcome of the Hokianga case showed that some core assumptions of the methodology needed to be reconsidered. The basic ecommerce model worked well, and the methodology did create a popular and well received community website, but the project failed to get community commitment and sustainability. A revised version of the methodology was therefore designed and applied to a business community in the Mahia district. The objective in this case was to re-apply the successful ecommerce model as the basis for the community business model, but to use a modified version of the community informatics development methodology to create conditions where the project would become community owned and self-sustaining. The first part describes the community situation in Mahia and the steps used to implement the revised methodology. The result was that the community

rapidly took responsibility for the success of the project, but that once again human factors intervened to prevent the desired outcome. The strategy of using the media to generate publicity about the project led greater awareness of the project and the ultimate outcome was that the project was taken over by the local authority who took it through to conclusion.

Chapter 9 East Cape

The first part of the chapter introduces the East Cape case and explains the circumstances of the KiwiTrails community development initiative. A community based business model was developed which was able to create a unique community solution to the problems of lack of infrastructure and poor economic performance. The implementation section next shows how the business model was used to create a community of businesses along the proposed bus route, and how every member of the community was enabled to create and maintain their own ecommerce-enabled webpages. The final section reports of the success of the methodology in enabling the research to achieve its aims and produce a self sustaining and successful community informatics development.

Section 4: Critical Factors in Community Informatics

Chapter 10 Critical Factors

This chapter summarises the research and describes its findings. The first part reviews and summarises the community informatics methodology used in this research and shows how the generic ecommerce model and the implementation methodology took account of the experience gained from the six cases in the thesis. The second part answers the research questions posed in chapter two and shows how the methodology created was able to successfully implement a community informatics project. The final section reviews the critical factors found in the literature examines their impacts on each case. The factors proposed by previous research are shown to be associated with the methodology of implementation, rather than being independent. A reassessment of the previously reported critical factors is made and additional critical factors identified.

Appendices

Details of the appendices referred to in the research.

References

References to literature cited in the research.

1.4 Future Research

The findings of this research provide the basis for developing new research in community informatics. While the outcomes were successful and in line with expectations further research will be necessary to extend the work and test its efficacy in other situations.

Additional empirical research has been called for to make objective assessments of the effects of different cultures, political environments and implementation models (O'Neil 2002).This research has limitations as to its generalisability. The methodology developed in this research needs to be evaluated by undertaking community development projects in other types of community using the same or broadly similar methodologies.

Fundamental to this is an examination of how the use of any given methodology affects the outcome of the project it is applied to. More case study research is needed to determine what other methodologies might be applied to particular types of community situations.

The literature has identified factors which are associated with the success or failure of CI projects, but has stopped at descriptive techniques and questions still exist as to what factors contribute to the effectiveness of ICT use in communities. Future research is needed which will bring predictive techniques into play and which will correlate the various factors with different methodologies used in implementing the projects.

1.5 Summary

This chapter has outlined the objectives of the research and the contribution to knowledge of community informatics offered by this research. The objectives were outlined: to create a participative methodology with which to implement economic development in isolated communities; and the identification of critical factors necessary to ensure the success of a community informatics application. A general strategy for developing such a methodology was described and a method for implementing it by using tourism as a vector for economic development was outlined.

The remainder of the thesis describes how the methodology was developed and extended by applying it to cases of increasing scope and complexity.

Chapter 2:

Review of the Literature

2.1 Introduction

The chapter starts by defining the nature of Community Informatics (CI), and the development of the discipline from simple technology-oriented applications to more sophisticated social action models. It then shows how CI has evolved from its roots in the socio-technical movement to a separate discipline of community oriented computer design. The next part describes the literature on Community Informatics and shows how it lacks a systemic theoretical basis and is largely descriptive. One notable omission is the lack of literature dealing with the methodologies used to implement community informatics.

The theme of this thesis is that although the literature describes cases from around the world there is no reliable contingency theory to account for the successes and failures of community informatics initiatives. The thesis proposes to develop a CI methodology to reliably implement community based computer projects. A business model is outlined which uses tourism and the Internet as a way of introducing economic development to isolated communities in New Zealand. The concluding section of the chapter defines the research proposal and the objectives of the proposed methodology.

2.2 Community Informatics

In recent years government agencies, social support networks, voluntary organisations and community groups have become aware of the revolutionary potential which new information and communications technologies (ICT) such as the Internet offers for community regeneration and economic development.

(DOTforce 2001; UNDP 2001). The new technology offers an array of possibilities for isolated and marginalised communities through the convergence of the Internet with digital technologies such as cell phones, pagers, GPS locators and digital television and radio broadcasting (Lentz, Straubhaar, LaPastina, Main and Taylor 2000). ICTs are seen by community activists, policy makers and social commentators as giving new directions for communities. According to its supporters, ICT can strengthen neighbourhood ties, can eliminate cultural isolation and regenerate economic performance (Day 2001; Shearman 2003).

Thanks to new technology much of the traditional disadvantage accruing to time and distance can be eliminated; employment can be transferred between countries; news of events can no longer be controlled by secretive regimes; market information is available twenty four hours a day; ecommerce gives access to global markets. Location ceases to be the barrier it once was.

Many commentators see this as the beginning of the end of the old industrial society and the genesis of a new global knowledge economy. Whether this is true or not, one consequence of this is that governments around the world are funding computer literacy courses, installing social networks, and connecting schools, libraries, employment and social services offices to the Internet (Larsen 1999). The fear is that if each country's population does not get online it might miss the next great economic wave (Annan 2002). However, integrating new technology has never been easy, and sufficient work has been documented to show that the integration of technology and communities has its own unique problems since they build upon, and have to co-exist with, pre-existing complex informal and formal non-computerised systems of communication and information storage (Turk and Trees 2000).

Community informatics is concerned with the needs and objectives of physical and virtual communities and the contribution that technology can make to achieving those objectives. CI as a practical discipline has only become possible because of the widespread adoption and dispersal of ICT which now gives access to information to communities which previously were isolated (Clement and Shade 2000). The field of CI therefore takes in the dynamic interaction between the technology and the user of that technology and the uses to which that technology is put. It also includes the community processes, the usability of the technology and the methods used in systems analysis and software and hardware design (Pigg

1999). The heart of community informatics lies in the study of the successes and failures of ICT in the community, and the development of methodologies needed to change communities through the application of ICT.

2.2.1 Philosophy of Community Informatics

CI begins from the position that information and communications technologies have the capacity to provide a set of resources and tools capable of transforming the lives of those living in disadvantaged communities. In most CI projects, ICT is used initially to provide access to information, so that individuals can learn to manage and process information relevant to them, and ultimately to pursue community goals in such areas as local economic development, cultural affairs, civic activism, and community based health and environmental initiatives (Gurstein 1999). Many governments are worried about a digital divide splitting the world into a technology rich elite and a technology poor underclass. In practice the difference is between those groups with and without access to networked computing. Access to computer networks is necessary or preferable in many areas of life: job opportunities, educational facilities, health information and access to public services are just the most obvious (Morgan 1997). These are the areas in which disadvantaged communities are most often deficient, and therefore any attempt to improve access must inevitably come up against issues of social policy and government intervention (Kling 2000).

The common wisdom is that communities need to learn to use ICT because the Internet has made all of us part of the 'global village' and communities can no longer survive in isolation (Ohmae 1995). The pressure from globalisation means that all communities need to learn to how to recognise and utilise the new economic reality or risk being left behind by technologically driven progress. Many believe that technology also offers a way for communities to reaffirm their social and economic bonds and that the use of community information systems can counteract the sense of disconnectedness experienced by many (UNDP 1999). However, some writers see the opposite, and believe that the widespread use of networked computing has the potential to actually disadvantage communities even further, by eroding the social and family bonds previously maintained by constant daily interaction (Kling 1996). For example, research has found that greater use of the Internet was associated with declines in participants' communication with family members in the household, declines in the size of their social circle, and

increases in their depression and loneliness (Kraut, Lundmark, Patterson, Kiesler, Mukopadhyay and Scherli 1998).

There is no doubt that CI projects have improved communities where it has been intelligently applied (Tatnall, Burgess and Singh 2004). Work in Canada found definite benefits from CI for remote communities: overcoming distance, achieving local ownership, management of local information, enabling teleworking, enabling local influence on information presentation, increased flexibility for small scale distributed production and economies of dis-aggregation (Gurstein 1999). It has also been found that ICT can support community development by helping communities to identify and harness local resources and skills, and by enabling local leaders to coordinate and initiate action through improved communications technology (Doheny-Farina 1996).

The underlying assumption is that communities have underutilised resources and once these can be mobilised through better communications this will lead to the stimulation of economic activity and a better quality of life (Gurstein 2003). Published cases have included: encouraging urban grass roots democracy; establishing urban telecentres; connecting Amazonian tribes to the modern world; teaching technology to slum dwellers; linking elderly people with each other; giving recent immigrants a sense of support; and alleviating the isolation of tower block dwellers (Smith and Kollock 1999). CI can also involve the creation of specialised software, hardware and applications design (for example for managing community networking, on-line voting, community websites); specialised approaches to automated information processing and management; the development of community oriented ICT training, education, and organisational design; and the methodology for developing these (Gurstein 2000a).

2.2.2 Definitions

Community Informatics

Community Informatics integrates the theory of development of information and communication technologies with the practical work of community development (Romm and Taylor 2000a). Community Informatics has been defined as 'a strategy or discipline that focuses on the use of information and communication technologies by territorial communities'(O'Neil 2002 p76). CI links economic and social development at the community level with emerging technologies such as

ecommerce, community networks, telecentres and mobile computing, along with social philosophies based on self-help, advocacy and cultural advancement. While CI in theory embraces all types of communities, in practice it concentrates on socially and economically disadvantaged communities. In its widest definitions CI includes almost any interaction between technology and groups of people. Community Informatics is concerned with the application of information technology to communities:

> *Community Informatics is a multidisciplinary field for the investigation and development of the social and cultural factors shaping the development and diffusion of new ICTs and its effects upon community development, regeneration and sustainability (Keeble and Loader 2001 p3).*

Community

The idea of a community has traditionally referred to a collection of people living together in a semi-closed system, with a relatively clear boundary, with relatively stable membership and showing little linkage to other communities (Anderson 1999). The advent of computer communications technology has reduced the emphasis on location and enabled communities to define themselves more by common interests rather than common geography (Moffitt 1999). The concept of 'Community' in Community Informatics is therefore much broader: for example, a community can be every person in a given geographic location; a voluntary specialist interest group scattered around the world; all the people working for one organisation; or the staff of a department in that organisation. The community can also be a community of businesses. The only criterion is that the group must have something in common and that they get more benefit by working together than they would acting as individuals.

Informatics

The technology associated with CI can be any combination of information and communications technologies, although in practice there is now a particular emphasis on the Internet.

Community Informatics can be summarised as:

the application of information and communications technologies to enable community processes and the achievement of community objectives including overcoming 'digital divides' both within and among communities. (Gurstein 2000b p.2)

2.3 Theories of Community Informatics

Community development is often started and run by outsiders, usually by government agencies and with public funding (O'Connor 1995). Community Informatics projects are typically aimed at increasing the overall welfare of the whole community but have one or more primary objectives.

2.3.1 Objectives of community informatics

In early work Shuler (1996) used the MacIver (1970) model to define the objectives validating community networks. The six core values were: conviviality and culture, education, strong democracy, health and well being, economic equity, opportunity and sustainability, and information and communication. The focus of community informatics is changing and moving away from its roots in social welfare, particularly in urban environments, so these objectives can perhaps be seen as a little dated in an environment where large numbers of individuals today have access to networks through the Internet.

Similarly, Cawood and Simpson (2000) list objectives of the CI projects they studied in the UK as being: to support small and medium enterprises and provide telematics skills and training for employment at a regional or local level; build informatics infrastructures for particular communities; foster the social and economic development of specific communities or groups; and raise the awareness of the 'information society' and its consequences at the local or regional level. However, although these objectives are undoubtedly aimed at increasing the common good, they are unlikely to give any direct benefit to many individuals within the communities. While governments and agencies have enthusiastically accepted the need to embrace the 'information society' the success of these projects is mixed at best. There is no doubt that the agencies have done their part in exposing communities to informatics, but 'the power of any public policy tool is, in considerable part, determined by the budget made available' (Cawood and Simpson 2000 p.153). When the funding runs out, very often, so does the enthusiasm

(Bannon and Griffin 2001). Even when the funding is there, this is no guarantee of successful adoption (Byrne and Wood-Harper 2000; Harris 2000)

Loader, Hague and Eagle (2000) also question the relevance of the objectives behind some attempts to introduceICT to economically and socially disadvantaged groups. They paraphrase the selling proposition adopted by politicians and activists as

> *ICTs are a good thing per se. Those who can access and have the skills to utilize these ICTs will gain obvious advantages (primarily economic) for themselves and will be more useful (primarily economically) to society. Those individuals and communities who do not 'skill up' for the Information Society lay themselves open to economic and social marginalization. (p.92)*

As they point out, this view of the benefits of ICT is a manifestation of 'top down IT policy' and criticise it on each of its fundamentals. ICT is not in fact universally accepted as a good thing in its own right. The use of ICT's is socially determined and can lead to a variety of outcomes, many of which are perceived as a threat to society (Kling 1999). The emphasis on making individuals more economically useful only serves to re-emphasise that these individuals are currently regarded as not economically useful, and the threat of marginalisation is of little concern to people who are already at the margins. Previous work (Mason and Milne 2001) has shown that although rural communities generally take up and use ICT with the same enthusiasm as in urban communities, in the poorest and most remote rural communities there is almost no immediate value to the community in the introduction of ICT.

Loader, Ellison, Pleace and Schuler (2002), and Cawood and Simpson (2000), advocate a 'bottom up' approach to applied community informatics. The approach accepts that exhortations to act for the public good will not inspire people, particularly those who see themselves as victims of history or geography. What is needed is what they call a 'hook': something special to hook people into accepting and using the new technology.

2.3.2 Models of Community Informatics methodologies

Models of applied CI have broadly followed the development and introduction of information technology in the business community. The technology used has

evolved through rudimentary e-mail, bulletin boards, community networks, USENET, and newsgroups, culminating in the features now available via the Internet (see Gurstein 2000a, for a full description of the technologies).

The techniques for the implementation of CI have been reinvented and repeated in various parts of the world (see Marshall, Taylor and Yu 2003) but broadly speaking, models have been either based on telecentres, computer network models or social network theory. There has been little in the way of significant research into CI methodologies and the success or failure of the outcomes (Romm and Taylor 2000b; Gurstein 2004).

2.3.3 The telecentre model

The earliest CI models centred around the concept of a telecentre, a room or building where computers and network communications are located. These are also known in the literature as community access centres or community technology centres. The telecentre concept is based on the idea that if the community does not have access to networks then all that is necessary is to supply that access. The objective is to educate and involve the local community by supplying missing technology opportunities. Various types of telecentres have been used, ranging from a room with a few networked PCs to fully integrated data centres, but simply giving access to the hardware is not enough: the following factors are regarded as necessary capacities of a successful telecentre:

Community-based technical capacity. The physical resources needed to receive and disseminate information to the community.

A social/informational capacity. Needed in order to identify service and information needs of the community, and to package these into forms acceptable to the community.

Organisational capacity to capture external information of use to its community. This is achieved through a network of telecentres, with the main hubs in universities or libraries.

Technical capacity. To ensure the telecentre keeps up with changes in technology, to build expertise in its use, and to identify technology of particular relevance to the community.

Leadership capacity. Staff in the telecentres have to be able to organise and motivate community leaders and overcome issues of reluctance and unfamiliarity.

Social capacity. Staff in the telecentres need to ensure ways in which the community will take up the information benefits offered.

Integrational capacity. Telecentre staff will have to take the lead in organising funding, coordinating elements within the community and establish service delivery priorities.

Linkages and feedback capability. Establish and manage links with other information providers and ensure that feedback information is incorporated into the telecentre's development plan (Gurstein 2000b, p16).

Telecentres are found in communities all over the world. In an extensive review of telecentre usage Fuchs (1998), reported in O'Neil (2002), found the critical factors to be the people involved and the contributions the telecentres could make in increasing local infrastructure development. Fuchs also found that few had policies to guide their development. However, the increase in the availability of technology in the general population has made the mere provision of an access point insufficient and more supportive and integrative models were needed. O'Neil reports two basic social-service models for telecentres: a free-standing model and one where the facilities are embedded in other service agencies such as social services offices or libraries. The research found that the embedded model was more sustainable. Other researchers classify telecentres in three categories: telecentres as described above; cyber cafés, mostly privately run and in urban centres; and information access points, limited versions of telecentres located in public places such as community centres and libraries (Colle and Roman 2003). Research in the USA showed that although some community members did gain job skills from access to the technology, much of the time the telecentres were being used for informal social networking between members, and the technology was not the main focus (Chow, Ellis, Walker and Wise 2000). The spread of internet access and email throughout the general population has lessened the case for the provision telecentres and although their limitations are recognised, they are still being implemented in many remote communities worldwide (Romm and Taylor 2000b; Colle and Roman 2003). The use of a telecentre in this research is reported in chapter eight.

2.3.4 The layer model

Clement and Shade (1996; 2000) developed an integrating model for community access to network services. This is modelled on the seven layer communications transport protocol model, the lower layers emphasising hardware and software and the upper layers emphasising context.

Layer 7 governance. Covers policy concerning the development of the community infrastructure. As well as legislation and regulations, this includes advocacy, online forums and democratic access provisions.

Layer 6 literacy/social facilitation. This covers the skills individuals require in order to take full advantage of ICT, including typing skills, information management, Internet navigation, and how to use spreadsheets and databases.

Layer 5 service/access provision. This layer deals with how the community connects to the information sources. The deals with Internet Service Providers, community nets, schools and other public facilities.

Layer 4 content/services. The information sources that people actually use. This includes e-mail, newsgroups, the Internet and online databases.

Layer 3 software tools. The programs that operate the devices, including Internet browsers, email clients, search engines, word processors etc.

Layer 2 Devices. The actual physical devices that people operate. This includes all kinds of terminal equipment, including telephone, TV, radio, modems, printers etc.

Layer 1 Carriage. The bottom layer deals with transport standards. It defines the functions which store, serve or carry information.

Implied in the model are issues of access. These include physical access to telephone and computer network connections, economic access in terms of costs of using and maintaining the systems, social access found in cultural, educational and social barriers to using the systems, and physical access for the disabled or housebound.

This model is useful because it emphasises the need for information literacy, which is more than just keyboarding skills. Information literacy must include an understanding of the various types and sources of online information, as well as how to access it. The model is more useful as a conceptual framework for planning a community-based information system, than as a methodology for

implementation. It also shows clearly that while only two of the layers are directly applicable to community informatics, (layer four content/services and layer five service and access provision), all of the other layers are essential for a successful application. On the other hand, given the extensive infrastructure needed to implement even a basic ICT application, the model shows how little control communities themselves have, or can have, of the design of information systems that directly impact their lives. It is also noteworthy that the model says nothing about the objectives of the community informatics, nor does it have any provision for the community to articulate those objectives.

2.3.5 The autonomy model

Research on four community network projects in Australia produced the harmony/autonomy model of success in CI projects (Romm and Taylor 2000a). They found that lack of social harmony in communities can lead to project failure, while increased social harmony was associated with successful outcomes. Similarly, higher autonomy was associated with higher probabilities of project success. Autonomy is defined as the degree to which the project is managed by the community itself. Harmony is defined as the degree to which the community is conflict free, especially with respect to the project. The theoretical basis of the work is loosely based on the factors identified by Markus (1994). However, as the authors say themselves, the harmony model ignores a number of exogenous and endogenous variables which have been shown to have an influence on the outcome of CI projects (Romm, Pliskin and Clarke 1997). These variables include motivation, politics and culture, as well as such external variables as the technology used, finance and government policies. This model is useful because although limited, it emphasises the primacy of non-technical issues in practice. However, each of the cases described used different implementation styles and were largely based on ad hoc procedures so the model is more of a way of predicting controlling factors rather than a methodology.

2.3.6 Aims of Community Informatics

Most other surveys of the literature are also aimed at predicting controlling factors. Early attempts at community informatics met with mixed results (O'Neal 2001). Researchers reported many different success factors and impediments associated with CI (see for example, Byrne and Wood-Harper 2000; Gurstein 2000a;

Kavanaugh, Cohill and Patterson 2000; Pigg 1999; Rosenbaum and Gregson 1998; Schuler 1999; Shearman 1999).

However despite the failure to identify generic theories or models some common agreement is beginning to emerge. Among these is the concept of social network strategies and social capital as key factors in the implementation of internet technologies in community development (Putnam 2000; Taylor and Marshall 2002).

When analysing more than thirty ICT/community-related projects conducted between 1994 and 2000, O'Neil (2002) found a wide set of desired outcomes, primarily from US-based CI projects. The analysis of these cases showed that objectives for CI projects fall into five key areas:

Strong democracy

This typically involves attempts at increasing democratic participation within a civic community. In the USA particularly there has been a strong body of work which focuses on giving disadvantaged communities access to the IT and the Internet as a means of fostering involvement in local politics (Doheny-Farina 1996; Hague and Loader 1999). The results have not been easy to substantiate. Some suggested that online voting would increase participation, or email would encourage discussion of community politics, or the Internet could improve knowledge of potential candidates (Doctor and Dutton 1999). However, empirical research, as opposed to theoretical, has shown that in fact the postings to USENET discussion boards have little political content (Wilhelm 1999) and it was found that municipal websites in California did not foster informed political debate (Hale, Musso and Weare 1999).

Democracy is also put forward as the main objective of CI by Miller (2000) in the USA, de Cindio (2000) in Italy, and Pierson (2000) in Holland, but given the mostly negative research findings, this may have had more to do with the objectives of the researchers than the objectives of the community.

Social capital

This is the name given to the relationships that exist between members of a well functioning community. It includes such concepts as trust, loyalty, mutual dependence and solidarity. Early writers speculated that communications technology would enhance social capital (Thompson 1993) but later research

results are mixed. Alkalimat and Williams (2001) found that in an Africa-American community building social capital was the key factor in mobilising community resources and other research suggests that social capital is important to long term economic development (Halpern 1998). Computer networks have been shown to increase social networks and deepen social ties (Kavanaugh et al 2000; Horrigan 2001; Putnam 2000). The introduction of ICT can allow computer networks to facilitate interpersonal networks, and so create the conditions for social capital creation and maintenance (Garton, Haythornthwaite and Wellman 1997). However, other research has cast doubt on the effectiveness of ICT in creating social capital. Merely giving access to computer networking is not a sufficient end: ICT does not itself represent any social capital, it is merely another means of expression for those who already have working social networks (Uslaner 2000). In a review of forty community networks it was found that most community networks run by non-profit organisations are little more than portals to other websites and showed little evidence of processes leading to increased social capital (Tonn, Zambrano and Moore 2000).

Individual empowerment.

Empowerment has been defined as the ability of people to gain understanding and control over personal, social, economic, and political factors in order to take action to improve their life situations (Israel, Schurman and Hugentobler 1992). Participation and empowerment are usually considered together in the literature of Community Informatics. The underlying rationale for linking empowerment to information technology lies in the notion of information literacy, that individuals need to be able to have access to and be adept at using IT (Slowinski 2000). However, empowerment is not without its difficulties. Empowerment always has implied limits: as people get more empowered there needs to be more controls put in place. Nelson and Todd (1999) found that in the organisations they surveyed, the majority who initially allowed end users to design websites had eventually adopted a monopolistic web management strategy to control and limit those users.

Sense of community

As noted above many writers believe that modern living has led to a decline in the importance of community in the lives of most people and that ICT can play a pivotal role in reawakening that sense of community (Kling 2000). A sense of

community is seen as desirable because it is believed that its outcomes - loyalty, civic virtue, altruism, and courtesy - are a necessary prerequisite for a healthy community (Burroughs and Eby 1998). However, not all persons living in the same area think of themselves as part of a community. Wellman (1996) found that people in a given neighbourhood construct mental 'personal communities', consisting of groups of individuals known to them, often living far away, who provide domestic, emotional and financial support for them. It therefore appears that while a sense of community is desirable, it may be difficult to create through community informatics.

Economic development

The use of CI for economic development is usually bound up with aspects of empowerment and information literacy. This an area that has received considerable attention from researchers (Hagel and Armstrong 1997) and is usually seen as the main justification for deploying ICT in communities (Allen and Dillman 1994; Clark, Ilbery and Berkeley 1995; Freeman 1996). Gurstein (1999) also found increased overall community benefits were the main impetus for CI but the objectives were economic as well as social. The research identified three strategies for community development: use it as a marketing tool for small businesses in the community; enable the mobilisation of a wider range of resources; and encourage the emergence of new networks and economies of scale. More recent research shows that the main outcomes are usually indirect: creating infrastructure for development; creating/accessing resources for development; training and skills development; accessing capital; accessing knowledge; creating/enabling the process of development; creating/enabling the means to promote and manage development (Gurstein 2004).

2.3.7 Critical factors in community development

As the discipline of Community Informatics developed and left behind its origins in community networking, and as the technology became more reliable and accessible, research into CI has turned to searching for factors which help or hinder the diffusion of technology into communities. O'Neil (2002) stated that 'little substantive research/theory literature exists on effective ways to measure change brought about by providing access to ICTs (much less use of ICTs) in communities' (p77).

A survey of published cases revealed six major factors critical in project success (Romm, Pliskin and Clarke 1997):

Technology: Since, ideally, the whole community is involved in a community informatics project, there will always be members of the community who are not sophisticated users of the technology. It is therefore essential to ensure that the technology is robust and user friendly. It also follows that there needs to be flexible measures of technology diffusion. The rate of diffusion, that is the increase in the number of users, can be measured quantitatively: the depth of diffusion, who is using the technology and for what, needs a qualitative approach.

Motivation: The degree to which the individuals are motivated to participate in the project is crucial to its success. The CI methodology therefore has to be sensitive to the needs and aspirations of different sections of the community.

Task: The needs of the project sponsors are not necessarily the same as the needs of the community members, so the project has to be designed around what the community wants the system to achieve as a primary concern.

Environment: The project must understand the social and environmental dynamics which govern the community before attempting to change it.

Politics: This factor relates to the interaction, trust and harmony between the community members and the extent to which they share a common vision and aspirations. It is also necessary to identify the natural leaders within the community and to understand the underpinnings of the relationship between the community members and the leaders.

Culture: The goals and methods of the project and its technology must be compatible with the culture of the community.

Rosenbaum and Gregson (1998) found that five factors contributed to the success of CI projects they investigated: integration of the project into the life of the community;

the creation of local content for local needs; active links to local government, schools and social services; procedures to ensure long term sustainability; and ownership of the projects by the communities. They found that the ownership of the project by the community was most important factor positively associated with success.

Gurstein (1999) found that lack of success in CI projects tended to be associated with a failure to link the project with community based economic activity and to a lack of strong leadership within the community; and observed that although technology could unite disparate communities, it was also in many cases causing disharmony in the communities it was supposed to be helping.

Overall, the outcomes of community informatics have been summarised as:

- Providing IT resources to people from lower socio-economic groups ('have-nots');
- Providing training to people who do not currently have IT skills ('cannots');
- Improving access to telecommunications facilities (especially in developing countries or in remote areas of developed countries);
- Increasing access to the WWW for education, information acquisition, entertainment and communication;
- Reducing the disadvantages suffered by members of the community with physical disabilities;
- Increasing the penetration of electronic commerce,
- Increasing IT-related employment opportunities;
- Facilitating telework and IT-related home-based economic activity;
- Facilitating public education and participatory democracy;
- Enhancing social processes at a community level (CCNS 2002).

The remainder of this chapter looks at how these outcomes can be achieved in remote New Zealand communities by using tourism as the catalyst for economic development and implementing community informatics with a new methodology.

2.4 A strategy for community development in NZ

Tourism is often the first tool considered for development of underdeveloped areas. It offers a direct and immediate way to capitalise on environmental and cultural resources, which are usually the most these areas have to offer, but research has shown that tourism is not a simple industry to break into (Brohman 1996; Harrison and Price 1996). There is also an extensive and unresolved debate about the extent to which tourism is or can be sustainable in the long term in communities (Butler 1998; Clarke 1997; Garrod and Fayall 1998; Hunter 1997). Even where local communities have managed to create a viable tourism business they often find that

technology hands control to outside agencies, with local interests being overridden or ignored so that the tourism becomes more exploitative than sustainable and serves to reduce rather than enhance the community's quality of life (Mills and Morrison 1992; Mowforth and Munt 1998). The tourism literature has long recognised the importance of incorporating community needs and wishes into the planning process. The seminal work of Murphy (1985; 1988) emphasised local agency, and advocated communities and their constituent members playing an active role in determining tourism's outcomes (see Taylor 1995). Murphy's 'community approach' views locals as being capable of planning and participating in tourism development, of making their voices heard when they are concerned, and of having the capability to control the outcomes of the industry. Murphy (1994, p.284) argues that if host communities can define the types of tourism they wish to attract and can accommodate over the long term, they can shape the type of industry that is most appropriate to their needs. (See NZTS 2001).

The work of Murphy and others who advocate the community approach to tourism development has been criticised in recent years for being overly idealistic (Milne 1998; Taylor 1995). A major criticism of this approach is that it lacks the fundamental tools to effectively and equitably open up the channels of communication for community participation (Hall 1999). The objective of linking CI to the community approach to tourism development has to be to facilitate the process of local involvement.

There are few better ways of getting people involved and putting cash directly into the hands of individuals than a thriving local tourism industry. However, mass tourism tends to be over packaged and over concentrated. The evils of tourism are well-known and well-documented (Rochlin 1997; Swarbrooke 2001). There is an increasing demand for sustainable, eco-friendly tourism and most tourists say they want more personal treatment and more flexibility. The reality is that affordable tourism has to be packaged, commoditised and is less and less tailored to the individual. The profits of this type of tourism are increasingly going to multinational operators and an ever smaller proportion of the tourist dollar is finding its way directly into the pockets of the community (Harrison 2001). World-wide, the costs and impact of tourism are being borne by the community through degraded infrastructure and reduced quality of life. In the long-term this type of imposed tourism is unsustainable.

2.4.1 Tourism development and the Internet

The Internet offers unique advantages to developing tourism areas. Small firms and communities face systemic problems in gaining access to the mainstream tourism distribution system (Swarbrooke 2001). Accessing large scale computer reservation systems is usually prohibitively expensive or open only to associated organisations. International airlines, package holiday companies and major hotel chains have difficulty in integrating with and serving small enterprises because they immediately lose economies of scale. Access to a more diverse range of local facilities would in fact be in the large operators' interests in the long term, but the travel industry's current business model firmly excludes them (Buhalis 2001). The small operators are therefore often left with no alternative but to market themselves independently. The traditional channels are advertising, posters, brochure drops and listing with tourism authorities. All of these are either expensive, limited in reach and flexibility, or of questionable value. As a result of these difficulties increasing numbers of small tourism firms (and to a much lesser extent communities) are turning to the Internet as a marketing tool, as are their clients.

Definitions of community led tourism cover a wide spectrum from 'giving an opportunity to local people to become involved in the decision-making process' (Tosun and Jenkins 1998, p.110), to: 'producing a tourism product that the community as a whole wishes to present to the tourism market' (Murphy 1985, p.37). In simple terms community tourism focuses on community as an integral part of providing a tourist experience that: generates economic benefits for the host population; respects traditional values; is socially acceptable, authentic, ecologically sound and politically viable. This can only be achieved by listening to the needs of communities. A focus on local decision-making in tourism planning began to emerge in the tourism literature in the late 1970s (Gunn 1979). The community is the obvious place to start the analysis and planning of tourism because the local people who are involved in tourism activity 'represent the industry's shop floor, where visitor and host meet, where its impacts are felt most keenly, and where the hopes of corporate and government planning will lie.' Murphy (1985, p. xvi). In recent years the argument that community-based approaches to tourism development are a prerequisite to successful and sustainable tourism development has become commonplace among researchers (Din 1997; Taylor 1995; Tosun and Jenkins 1998).

It is possible to discern two main sub-streams in the way in which 'community' has been analysed in this literature. One considers local residents as largely passive forces in the development process (Britton 1996). In this case the community is seen to be 'serving' the industry's needs rather than vice versa. The other approach emphasises local agency, and sees communities and their constituent members playing an active role in determining tourism's outcomes (Drake 1991; Taylor 1995). This approach views communities as being capable of planning and participating in tourism development, of making their voices heard when they are concerned, and of having the capability to control the outcomes of the industry to some degree. 'Participation is not only one of the goals of social development, but an integral part of the social development process.' (1986, p.2) Din (1997) comments on the fact that while tourism researchers and planners often support the idea that tourism should benefit the community, they do not explain how to mobilise local involvement. Perhaps most importantly there are few clear indications as to how the views of different stakeholders can be communicated effectively to interested parties, including tourists.

The key challenge facing communities that wish to turn to tourism as a source of economic development is how to fine tune tourism product development and marketing strategies. At the same time there is a growing need to ensure a sustainable industry - one which will maximise economic benefits without alienating local people through cultural insensitivity, limited economic returns or adverse environmental impacts (Getz and Jamal 1994; Milne 1998).

2.4.2 The Internet and Communities.

Ecommerce and the Internet are in many ways ideal for small communities (Schon, Sanyal and Mitchel 1999; Gurstein 2000b). For the first time there is an easy way to build a locally owned media presence, capable of attracting and servicing tourists and of forming the basis of a coordinated tourism product. The Internet has several key elements that make it an important alternative to traditional marketing approaches for community tourism development (Lawrence, Newton, Corbitt, Braithwaite and Parke 2002; Loader, Hague and Eagle 2000):

Websites are flexible, the images and text they present can be changed easily and presented cost effectively.

The number of Internet users is growing rapidly and the demographic profile of users (young, wealthy, well educated) is of interest to communities that wish to attract visitors at the high end of the tourist spectrum.

The Internet makes customer relations easier and more individualised.

The Internet decentralises and democratises their access to the customer.

The customer can make more price-conscious decisions through more precise product information and book online.

Internet sites give an international presence. More customers at greater distance have access to in-depth information.

The Internet evens the playing field for small and medium enterprises and community development organisations.

There are cost reductions in distribution, service, marketing and promotion. Revenue prospects for the small firm grow correspondingly.

Partnerships between tourism agencies and tourism promotion offices can be developed more easily.

There are also some unique advantages for community centred sites in particular:

Websites have the potential to reflect community aspirations more effectively than many traditional marketing approaches.

The process of developing a community website can offer an effective way to foster cooperation and networking between different players in the local tourism scene.

Clearly the Internet has potential but turning it into a reality has proven problematic. Primary obstacles are the limited IT skills of community members, and little or no money to purchase the expertise (Bruce 2000). There are also a number of factors which may reduce the effectiveness of the Internet as a community marketing tool:

Website design needs a degree of artistic and marketing skill. Finding these in any given community can be a problem.

Many websites in NZ and elsewhere tend to be 'virtual brochures' rather than actual booking tools. If the Internet is to be used to its full potential then it is essential that it facilitate bookings via email or other approaches. This implies a relatively sophisticated technical knowledge.

While the Internet provides local people with the potential to influence the images and information being presented to the public very few sites appear to actually reflect communities' needs and interests.

It is essential that communities have direct input into website development process otherwise they run the risk of placing the construction of 'place' into the hands of outsiders. In order to ensure that full cognizance is taken of the social understanding, values and practices that are integral aspects of ICT, community tourism development needs a flexible and integrative methodology.

2.5 Research objectives

The primary objective of this research is to develop a design and implementation methodology that will enable ICT to be applied to underdeveloped communities in order to produce sustainable economic development.

2.5.1 Requirements for a community methodology

The practice of community informatics has evolved a design philosophy which is heavily influenced by the socio-technical approach to community development. In fact, it can be argued that CI is simply an extension of the socio-technical approach to systems design, moving the focus from organisations to the community. Community Informatics expands the socio-technical concept to wider groups of stakeholders and is applied to communities as a whole and to the design and delivery of technological applications which enhance and promote the life of those communities (Gurstein 2000b).

Socio-technical thinking originated from work at the Tavistock Institute in London from the 1950's onwards. The original emphasis was on improving the effectiveness and psychological well-being of factory workers. The movement studied the worker in relation to the technologies being used and tried to optimise the balance between them. The concept was applied to information systems design and led to several schools of socio-technical design as applied to computers (See Avison and Wood-Harper 1990; Bostrom and Heinen 1977a, 1977b; Checkland 1999; Mumford and Henshall 1983; Mumford 1996).

Participation and Community Informatics

The primary differentiator of socio-technical methodologies (soft systems) from other computer design methodologies (hard systems) is the emphasis on participation. Computer systems such as a tourism reservation system or a

community network are often conceptualised as monolithic objects when in fact they are a complex interaction involving many people in various roles in relationships with each other and with other system elements; hardware (computer mainframes, workstations, peripherals, telecommunications equipment); software (operating systems, utilities and application programs); techniques (management science models, voting schemes); support resources (training/support/help); and information structures (content and content providers, rules/norms/regulations, such as those that authorise people to use systems and information in specific ways, access controls) (Kling 1999).

In participative methodologies those people who might be affected by changes due to the introduction of a new computer system are called stakeholders. Stakeholders typically include staff, management, customers, suppliers and in some cases external agencies commissioning the changes, as well as the systems analysts and programmers. In most socio-technical methodologies all stakeholders are identified and invited to participate in discussions about the conception, design, installation and use of the technology. Some methodologies use participation as consultation, others give the stakeholders veto power. Participation has been a widely used component of computer systems design in mainstream organisations and has a rich literature cataloguing its success and failures (Avison and Wood-Harper 1990; Avison and Fitzgerald 1998).

Participation is seen as a way to give people a voice, enabling them to express and analyse their problems and priorities. Used well, participation can generate important and often surprising insights contributing to strategies which better serve the needs of local residents and communities (Redclift 1995; Zazueta 1995). The degree and extent of participation can be altered to suit the various stakeholders and can reflect their desired degree of involvement. Different types of participation can be devised to match the needs and preferences of the stakeholders (Kensing and Bloomberg 1998). One way of doing this is to use range of richer modelling tools and techniques such as rich pictures and the Checkland methodology (Avison and Wood-Harper 1990; Checkland and Scholes 1990; Checkland 1999).

Participatory design normally involves iterative prototyping and end-user input into the design process (Greenbaum and Kyng 1991). An iterative methodology has the advantage of constant interaction with the users of the system which allows the users' attitudes, values and culture to be expressed, and not incidentally, exposes

the values and culture of the developers to the users. This gives the users more practical power over the direction of development and allows them to have a say in how change is managed. However, participatory approaches have to used with care. Mismatched expectations, budget squeezes and missed deadlines have been attributed to using systems development approaches that were too participatory and open (Luke et al 2004). Participation also allows the users to understand the options available to them and to follow the system development process.

The development process needs to be considered as a social process rather than a technical exercise. The methodology needs to be cognizant of the culture of the organisation it is being applied to, not only in terms of the user interface but in terms of the approach adopted overall.

Highly participative approaches have much to offer the process of community development as they 'enable local people to share, enhance and analyse their knowledge of life and conditions and to plan, act, monitor and evaluate' (Chambers 1997, p.102). More fundamentally, participation can strengthen the understanding of those in authority and begin to change attitudes and agendas (Chambers 1993). Participation lies at the heart of the philosophy of community informatics (Gurstein 2000b; Loader, Hague and Eagle 2000).

Key concepts of the socio-technical approach

The following key concepts of participative design underpin the socio-technical approach to community methodology (Luke at al. 2004):

- View every participant in a participative project as an expert in what they do, as a stakeholder whose voice needs to be heard.
- Recognise that workers are a prime source of innovation, that design ideas arise in collaboration with participants from diverse backgrounds, and that technology is only one option in addressing emergent problems.
- View the 'system' as more than a collection of software encased in boxes, but rather as overlapping networks of people, practices, and technology embedded in particular organisational contexts.
- Understand the organisation and the relevant activities on its own terms, in its own settings.
- Respect the users of technology and find concrete ways to improve the working lives of co-participants.

- Be conscious of the developer's own role in participative processes; try to be a 'reflective practitioner'.

A successful CI methodology needs to be sympathetic to these principles while still delivering a sustainable economic outcome.

2.5.2 Creating a community informatics methodology

The review of the literature has shown that a methodology for community informatics needs to satisfy multiple criteria.

The design process

The design part of the methodology needs to be fully participative and 'bottom up'. It needs to be self-reflexive, iterative and based on a prototyping philosophy. It must recognise the rights of the individuals in the community and use their skills and knowledge in the design process.

The implementation

The implementation needs to be based on socio-technical principles. Whatever business model is used must integrate into the community, be capable of creating community specific content, achieve active linkages with local schools and local government agencies, and be capable of being sustained in the long term without external intervention. Most importantly the final project must be perceived as owned by the community.

The community outcomes

The community outcomes are those social values that a methodology must aim to incorporate into the final project. The outcomes identified in the literature review were discussed in 2.3.6. For this research strong democracy is not an appropriate outcome to strive for, but building social capital, empowering individuals, and building a sense of community are all outcomes that can realistically be aimed for when implementing a project aimed at economic development of remote communities through tourism development.

The economic outcomes

The finished application must be self sustaining and bring direct economic benefit to the community. It needs to support ecommerce and facilitate direct bookings with community members. It needs to reflect the community's unique values and aspirations, to be capable of being maintained by community members, to give the

community an international presence, and allow partnerships between the community and outside agencies. The remainder of the thesis addresses this requirement: part two (chapters 4, 5 and 6) describes how the prototype methodology was derived; part three (chapters 7, 8 and 9) describes how the methodology was applied in a community context.

2.5.3 Identifying critical factors

The literature suggests that many different factors might be critical to the success of a community informatics project. The factors extracted from the literature are shown in table 2.5.3.

Romm and Taylor 2000a	Gurstein (1999)	Rosenbaum and Gregson (1998)	Romm, Plishking and Clark (1997)
Technology			Technology
Motivation			Motivation
			Task
Politics			Politics
Culture		Integration into the life of the community	Culture
		Active links to community services	Environment
Autonomy			
Harmony			
		Ownership by the community	
	Links to economic activity	Procedures for long term sustainability	
	Strong Leadership		
		Creation of local content	
Finance			
Government Policies			

Table 2.5.3 Factors associated with successful CI projects

From the table it can be seen that there is little commonality between the factors listed by each author and although they are all factors purportedly leading to CI success, some are in fact contradictory. A subsidiary objective of the research is to use the case studies to determine which of these factors, or others, are critical to the successful outcome of a community informatics project.

2.6 Summary

This chapter has reviewed the literature on Community Informatics, defined what community informatics is and described the philosophy underlying it. Then the chapter looked at the theories of community informatics and showed that much of the literature on CI is descriptive, or summaries of reported cases and that there has been very little in the way of theory development in the field. In particular it was noted that there was almost nothing in the literature concerning the methodologies used to develop CI applications. A number of prominent models were described and analysed and the factors identified as critical were identified.

The following section outlined a strategy for applying CI to isolated communities in New Zealand. The strategy proposed the use of tourism as the catalyst for community development and outlined what was known about community led tourism in other areas. Implementing the strategy successfully would require a new methodology and the requirements of that methodology were defined.

The final part of the chapter details the research objectives: to design a community informatics methodology and to determine what factors are critical to community informatics success.

Chapter 3:

The Research Methodology

3.1. Introduction

This chapter describes the methodology used in conducting this research. Chapter one outlined the aims of the thesis and chapter two reviewed the research literature relating to community informatics design methodologies. Section 2.3.2 of chapter two established that while there is a substantial body of research on community informatics, most of it consists of reports on the outcome of Community Informatics projects and the lessons drawn from these, but that there was little explicit consideration of the methodology used to conduct those projects.

The overall aim of this thesis is to add to that literature by establishing and verifying a development methodology for use in Community Informatics projects. The process used to produce these guidelines was to first conduct empirical research in small scale applications, and then to apply the methodology produced by that research in full scale community situations.

The first part of this chapter presents an analysis of the case study method of research, and the second part describes action research, the methodology used in the community projects.

3.2 Case study research

Few of the cases reported in chapter two were based on any underlying theory. They simply used the available technology in an ad hoc manner as dictated by the technology itself. The research in this thesis uses action research in case situations to explore the principles underlying community informatics design.

In studying the interrelations between technology and the community of users, information systems research has turned to social science methods and paradigms, suitably adapted to fit the unique needs and circumstances of the community and the technology being applied (Leedy 1993). Qualitative research methods work well for exploratory studies in new fields. Monitoring the progress of projects can be naturalistic and inductive allowing a holistic view of a dynamic situation (Patton 1990). As information technologies penetrate more and more into everyday life the social and psychological aspects of IT implementation have become more important, and the purely technical aspects have become relatively less important: 'CI projects are driven not by science, but by the values, ideologies, and political interests of the major stakeholders' (O'Neil 2002, p.77). Research in Information Systems has therefore adapted to take account of the needs of research being done in real world situations that are unique, non-repeatable, and open to observer bias. As a result there is a strong case study tradition in Information Systems research (Alavi and Carlson 1992; Orlikowski and Baroudi 1991). The underlying paradigm used is the 'natural science model' (Behling 1980). However the natural science model is more suited to testing existing theories, than to formulating theories: the case study method is more appropriate when there is a need to study the phenomenon in its natural setting; an emphasis on the 'how' and 'why' questions; and a lack of previous studies or sound theoretical understanding (Benbasat, Goldstein and Mead 1987). The series of community based projects in this thesis fit that description. The research methodology therefore utilised case study research using the action research process.

3.2.1 Issues in case study research

Research is, in general, judged on how well it generates new theories to explain observations, or tests existing theory against planned observations. For a theory to be accepted as valid scientifically it must satisfy four tests: it must be falsifiable; the various predictions extractable from the theory must be mutually compatible and not contradictory; the theory must be at least as good at explaining the observations as any other theory; and while falsifiable, the theory must actually withstand all attempts at falsification. Following Lee (1989) the different implications of each of these requirements for the natural sciences and case study research are discussed below:

Making controlled observations

In the natural science model, the relationship hypothesised to exist between different factors is tested by observing the interactions between those factors, while controlling for any confounding influences. In laboratory experiments this done by rigorously excluding extraneous factors; in social sciences it is done using control groups; in statistical experiments it is done by applying statistical controls such as regression analysis. In case studies, because it all takes place in a real world setting, and not in a natural laboratory, excluding extraneous factors is impossible; and examination of the case situation usually produces more variables than data points, effectively ruling out statistical control techniques.

Making controlled deductions

With mathematical propositions, making controlled deductions is axiomatic. However, case studies usually do not lend themselves to quantitative interpretations so the researcher is seldom able to work with numerical data and use mathematical propositions. Instead the case researcher must manage qualitative data and extract meaning from language and behaviour. Making controlled deductions from qualitative data involves more uncertainty. There are fewer conventions to rely on than with quantitative data, and therefore more chance of drawing false conclusions.

Allowing for replication

Laboratory experiments are inherently easy to replicate, can confirm or extend particular findings and to thus ensure the objectivity of the research. However a case researcher is unlikely to ever meet the same conditions or events twice; the timing, situation, social structure, expectations and experience will vary between one case and the next. On the face of it, this makes it very difficult for a second researcher to independently verify the results by replicating the case.

Allowing for generalisability

The power of theories developed under the natural sciences model is their wide applicability: they hold true in a wide variety of situations. However the situations in case study research are generally unique and not replicable, and therefore would seem to be vulnerable to charges that they cannot be generalised to other situations. However, in this thesis the research output is a methodology for community development and although each case is unique, the outcome of applying the

methodology in different cases should be the same, and able to be judged objectively. In so far as the outcome of different situations is a successful project then the tests noted above can be met. The next section discusses how these objections to the case study approach can be overcome.

3.2.2 Rigour in Case Study Research

It is entirely possible to use case study research to satisfy the requirements of the natural science model. Case study research involves the intensive study of a single case or series of cases, observing and recording the actions of individuals, groups, communities and their interaction with information technology and the project methodology but it can be conducted within the scientific method. By following the procedures of natural science, case study research can be equally rigorous and falsifiable.

The core issues of controls, valid deductions, replication and generalisation might be thought to apply only to the case study research method but, in fact, the natural science model exhibits similar problems. Few propositions of science are directly verifiable as true: most concern unobservable entities such as molecules and chromosomes, or abstract concepts such as light waves or electricity. As a consequence, the propositions of natural science are themselves verified by indirect rather than direct means. The basic sequence is to define the initial proposition, the theory which cannot be tested directly, and from this deduce or derive secondary propositions which can be tested directly. The test of a secondary proposition is held to be a test of the primary proposition. If the results of the test are false then the proposition that implies them must also be false. Controlled observation only comes in as the last step in the process.

Natural Controls in cases

By presenting alternative theories and applying those in the case situation, the researcher can compare the deductions or the predictions of each theory against observations in the context of the case. By comparing theories in the same case situation complete control over the confounding factors can be attained: the same confounding factors apply to both theories, therefore any differences must be due to the predictive power of the theories themselves.

In a community development case study the complex interaction between the individuals, the community, the technology and the development methodology

obscure the underlying dynamics, and any controlling phenomena must therefore be inferred indirectly. While the unobservable phenomena cannot be tested for directly, competing theories can be used to derive predictions of what will be seen in the case situations, and so the theories can be verified or falsified.

Similarly, natural controls can be sought among the factors in the case. The researcher can choose predictions from the theory which are testable, and have a high likelihood of being seen in the case situation. In this way the researcher can take advantage of naturally occurring events to test one or more facets of the theories and give the opportunity of falsifying them or not. This type of control is commonly used in other natural sciences that are not amenable to laboratory experiments, astronomy and geology for example. This scanning of the environment for high likelihood events is not significantly different from the statistician identifying independent variables in the data to use as statistical controls in multivariate regression analysis.

Controlled deductions in cases

Making controlled deductions in a qualitative data set is no different from the way they are made in quantitative data. In mathematical analysis the rules for deducing propositions are clear and easily checked by the principles of algebra. However, mathematics is a subset of logic, and it is the rules of logic which determine the rules of mathematical deduction. The same rules of logic apply to propositions stated in words: the formal logic governs what propositions can be derived, not the algebra. The natural sciences have a long history of utilising non-mathematical deductions, evolution and biology being prime examples.

Replicability in cases

It is seldom possible to replicate a case situation exactly or to apply the same theories in that same situation. However, using the theory comparison procedure, another researcher could start from different conditions in a different organisation or community and test the predictions of each theory under those different conditions. The predictions of the theory would have to be matched to the new circumstances and would generate new predictions, but it would be the same theories that were being tested. So although the observations would be different, the case study's findings, that a particular theory was true, would be replicable.

Generalisability in cases

Every community case is unique and non-repeatable. The outcome of a single case study is therefore never going to be generalisable against any other unique case situation. However, this is no different from the situation in the natural sciences. Any one experiment is only true under the particular set of circumstances it was conducted in. It is only when other experimenters using similar circumstances have repeated the findings that the experiment can be said to be generalised. The situation is no different with case research. The findings of one case can only be confirmed or refuted by reference to other similar cases with similar circumstances. Generalisability is a quality of theories which have been tested under different circumstances and applications, and until it has been so tested no theory is generalisable. The generalisability of case study research is therefore directly comparable with natural science research's generalisability.

In looking at the requirements for scientific rigour then, it can be seen that case study research is equally as valid as any other type of research carried out under the natural sciences model.

3.3 Action Research

3.3.1 Action Research and the case approach

The choice of the action research methodology as the underpinning for the cases in this thesis follows logically from the underlying philosophy of community informatics: people and their interactions are central to the process. Action research is a subset of case study research (Galliers 1991). In the standard systems life cycle, integration of the computer system into the social system of the user community only occurs in the final stage of the methodology, if it is consciously done at all. In the socio-technical methodology that underlies community informatics, the integration of technology with social factors and economic benefit is seen as the prime objective, and not an adjunct to the other factors. The socio-technical philosophy is based on empowering the end users to become part of the design environment and to actively participate in all stages of the design cycle. However, this is the statement of an ideal: in practice not all community members are capable or even willing to participate, so design methods have to be chosen which, while complying with the spirit of socio-technical design, do not strictly adhere to the purist position. Action research has developed as the best way of

combining the ideals of participation with the ability to effect significant change in the situation.

Action research combines a specific mix of pure research and empirical processes. The research decision is made to study a particular organisation at a particular time in the search for situation specific knowledge. The researcher therefore deliberately chooses to sacrifice external validity for increased internal validity, and increased relevance. The research then applies the intervention, and by empirical enquiry asks a generalised question to get a generalised answer that will lead to a more focussed question. The cycle continues asking general questions in order to get to more refined questions, until underlying relationships begin to appear. It then possible to use an inductive process to begin to generate 'grounded theory' hypotheses to explain the relationships being uncovered. The theory is then tested by new intervention, and refined according to whether the intervention was successful or not. Without this iterative process the research becomes 'unevaluated, one-shot action' (Swepson 1995) rather than action research.

Action research involves reliance on a theory in choosing the case situation, and planning the intervention. Action research provides a means of substantiating that theory and at the same time it provides material for developing the theory - which may in turn suggest more action. The action researcher is therefore engaged in a process of examining, hypothesising and effecting change in a community where there is the expectation of a contribution to knowledge, and also to produce knowledge that can be directly applied to improve the current situation. The research is sensitive to, and informed by, theoretical principles being used, so that these can be transcended, and new theory developed as the researcher combines the roles of researcher and developer (Gummesson 1991).

3.3.2 Stages of the Action Research cycle

Action research is used to combine action with research, to span the gap between practice and theory. Action researchers participate in the research situation and interact with the phenomena they are studying in order to test an existing theory or to develop a new theory (Argyris and Schön 1989). An action research project involves analysis of a problem situation not under the control of the researcher, the making of plans for an intervention in the situation, and the attempted execution of those plans (Mansell 1991). Action research follows a standard model but the detail

is usually adapted to suit the precise circumstances of its use. The modern five step process emphasises the socio-technical systems perspective (Susman 1983). The basic method is an iterative cycle of planning, action and reflection following a negotiated terms of reference. This sets out the responsibilities and roles of each of the participants and delineates the research environment. The terms of reference may be a written agreement, or more usually, an implicit understanding in how the research is conducted. Once the terms of reference are clear, a research cycle is followed progressing through the stages of diagnosis, action planning, action implementation, evaluation, and reflection.

Diagnosis

This step is concerned with identifying and defining the problem, the reason for the proposed change. This diagnosis involves analysis of the social and organisational structures from a holistic viewpoint. The outcome of this is theory generation, hypothesising reasons underlying the current situation. A crucial aspect of this stage is the role and status of the researcher. In the earliest forms of action research, the researcher acted as an expert, and worked directly only with the senior staff, and regarded the other staff almost as experimental subjects. However, this changed under the influence of the ideas inherent in soft systems methodologies (Checkland 1999), and the socio-technical approach to systems development. The modern approach is one where the researcher, while still regarded as having specialist knowledge, does not assume a superior knowledge, and always works to achieve full participation of all staff.

Action Planning

This specifies the action to be taken to achieve the organisational aims. The actions are informed and directed by the theory arising from, and developed in, the diagnosis stage. The planning stage establishes the action to take, the changes expected, defines the methods of measurement and the targets to be achieved.

Implementation

The exact nature of the intervention varies with each case, but the essence is a close collaboration between the investigator and the participants within the organisation. The actions can be direct, addressed at the heart of the perceived problems, or indirect aimed at changing the environment to see what changes eventuate. The

implementation is usually carried out directly by the action researcher, with the cooperation of the community or organisation.

Evaluation

This stage looks at the situation as it emerges from the planned interventions. The effects may be what was expected or not, and may have changed the problems or not. If the change was successful, the researchers then evaluate whether the change was the result of their intervention, or had some other cause. Where the change was unsuccessful, or only partly successful, the theories need to be revised and reconsidered, or re-examined for unexpected confounding factors.

Reflection

This is actually continuous within the research cycle but is regarded as a separate stage in the model. After measuring the success or failure of an intervention, the researcher and the participants both need to consider the lessons learned from the research. The outcome may mean that the organisation needs to change its structure or procedures, or the terms of reference may have to redrawn, or entirely new interventions planned.

Action research aims to link theory and practice, and to simultaneously achieve an outcome of value to the organisation or community, and outcomes valuable for research. Where a specific methodology or an improvement to methodologies are being studied the action research method may be the only relevant research method available (Baskerville and Wood-Harper 1996). Action research has proved especially useful in multifaceted situations such as managing change where the researcher cannot choose which variables will change. Action research is more than just problem solving: it is an attempt to understand the world by changing it. The action research method is therefore ideal for community informatics research.

3.3.3 Community Action Research

Information technology always operates within a social context – every computer application involves a dynamic mixture of hardware, software and personalities - and information systems design is therefore firmly within the social sciences paradigm. All organisations and communities have to achieve a balance between the people, the technology, the task and the organisational structure. It has long

been known that a change which disturbs any one of these pushes the organisation out of equilibrium and means that compensating action has to be taken in one or more of the other elements to re-establish a new equilibrium (Leavitt 1965). Any intervention in a community context inevitably disturbs the status quo, meaning that the action researcher has to be sensitive to the consequences of every action. The people aspect of Community Informatics is particularly sensitive to research intervention. Action research methods are empirical and locate IS researchers in pivotal roles within the organisations or communities they study. In the process of socio-technical design of computer systems, the analyst is not merely a neutral facilitator. The analyst is seen as having a primary duty to improve the well-being of the user community, and to balance the needs of technological efficiency with the production of the best social outcome.

It is in this spirit that action research takes on 'real world' problems such as those found in community research. Action research is based on small scale intervention in the phenomenon being studied and by definition real world situations are those 'not under the control of the researcher', characterised in the literature as 'problem situations' (Wood-Harper 1985) or 'human activity systems' (Checkland 1999). Among the issues found in community informatics situations in particular are:

- Community members may use concepts alien to the researcher
- Community members may not be objective or truthful.
- Individuals may have their own theories, and preferred solutions.
- Some methodologies may be culturally unacceptable.
- Optimal solutions may be unacceptable or unworkable.

This necessarily means that action research is more suited to medium to long term studies since it frequently happens that both the researcher's and the other participants' outlooks and beliefs undergo change during the course of the project. Time is also needed for both parties to undergo the process of reflection and evaluation called for in the methodology. In particular, the researcher may need to allow time in order to gain acceptance by the problem owner. There is also a risk of the distinction between the researcher and 'the researched' being blurred, where the researchers and their values become part of the problem from the community point of view.

Because of this combination, action research is at the heart of a class of mainstream information systems design methodologies known as soft systems design. Perhaps the best known and most influential of these is the Checkland methodology.

3.4 The Checkland Methodology

The soft systems approach to design starts from the basis that computer systems are human activity systems and that the design process takes place in a within a dynamic environment. The Checkland methodology (Checkland 1999) incorporates real world requirements and logical modelling and has a more formal approach to the evaluation of alternative interventions but the essence of action research, the continuous interplay between theory and practice, is at the heart of the methodology. The Checkland methodology will not directly produce a computer system design, but that is not its intention. It is a methodology designed to provide understanding of, and suggest viable solutions to, 'fuzzy' and ill defined problems. The methodology is strongly participative but concentrates on defining and analysing the problem from the perspective of the various stakeholders in the system. The people involved in a system are not just the analyst and the end users. There are many stakeholders. There will be different classes of end users, the system may have a place within a hierarchy of systems such as the management structure, the system may directly impact customers or suppliers and its success may depend on interaction with related departments and their own information systems. Each stakeholder will have a different perception of the system and each perception needs to be taken into account in arriving at any solution.

The strength of the Checkland methodology is that it considers the problem definition itself to be a problem and insists on accessing the views of all the stakeholders. It challenges the assumption that the problem is as defined by management. It recognises from the start that there will be competing views. For example a company might be plagued by low productivity. The management view might be that workers are lazy and the solution is an improved monitoring system to keep them at their machines. The employee's view of the same problem might be that it is lack of past investment that is holding down productivity and that the workers are in fact doing a heroic job in producing what they do with the tools they have. By seeking out multiple stakeholders, the Checkland methodology ensures

that all relevant viewpoints are considered and thus avoids any superficial solutions being imposed and subsequently resisted.

3.4.1 Stages of the Checkland methodology

The Checkland methodology has been used in many situations and for many years. It is very flexible and the precise structure of the methodology has varied over time. The most common form is known as the seven step methodology, shown schematically in figure 3.4.1. The diagram implies a progression through the stages from one to seven but in practice the implementation is iterative with much backtracking between the stages and at any time the philosophy of keeping the overall aim of the methodology in mind can cause stages to skipped or combined. In the first stage the problem situation is partially defined awaiting analysis. The next stage is the creation of a rich picture and the identification of the primary tasks and issues. In the third stage each task and its issues are defined as root definitions of the relevant system. The fourth stage builds a logical model of what the system described in the root definition would look like if it was perfect. The fifth stage consists of comparing the notional perfect system with the actual system as it exists and stages six and seven are about deciding what remedial action to take, and applying it. The seven stages are outlined below.

1. Reviewing the existing system: The starting point of the methodology is to try to build a systems view of the organisation or of the subsystem of interest. The analyst tries to determine what the system is about, what it is trying to achieve, what purpose the particular subsystem serves. This is not as straightforward as it seems. For example, what is the purpose of a police force? Is it to detect crime or prevent crime? Both are relevant but require different systems. The first task is to identify relevant systems. Relevant systems arise out of an analysis of a rich picture.

2. Creating a Rich Picture: A rich picture is a pictorial representation of what the organisation is supposed to be doing, what the current situation appears to be, how the actors (the various people involved) see things. Figure 3.4.1 is an example of a rich picture. There are no right or wrong ways to draw rich pictures, only ways which are more or less clear. The whole point is clarity of communication. It should be self explanatory and easy to understand.

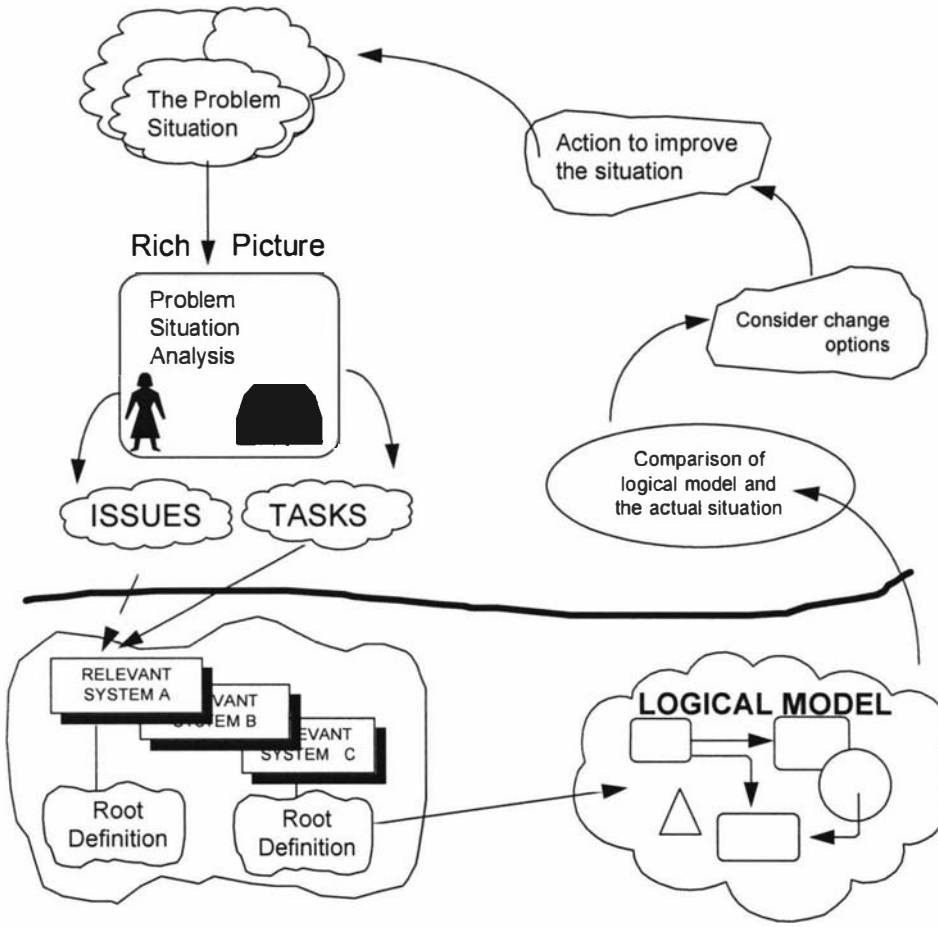

Figure 3.4.1: A rich picture of the Checkland Methodology

The objective of using a rich picture is to suggest some potentially fruitful ways of viewing the situation. By identifying the issues the rich picture helps problem solvers come up with conceptual views of the problem, which may give an insight to possible solutions.

1. Draw a large cloud representing the boundary of the system.
2. Add in the people who are of concern within the system
3. Add on the people who operate or control the system.
4. Add the people and things which affect the system from outside.
5. Show relationships by arrows. Label the arrows if it helps.
6. Identify actual or potential conflict
7. Put in 'think' bubbles of the main people's worries, concerns, issues etc.
8. If necessary expand parts on to separate sheets.
9. Make important things big.

10. Use any symbols you like as long as they are clear and vivid. (Use eyes, ears, reports, lorries, crossed swords, houses, etc.)
11. Show explicit facts but also relationships, attitudes and other people aspects.

Rich pictures are drawn up in order to bring out hidden assumptions, conflicts, worries and other 'soft' information. The analyst will sit down with one of the actors and will sketch out the rich picture as the person describes the problem situation. They will then together revise and refine the rich picture until the actor is happy that it represents their particular view of the process and its problems. The analyst can then repeat the process with another person, either drawing a fresh rich picture and comparing the two afterwards or showing the first rich picture and asking for comments. Either way the analyst and the participants should get a much deeper appreciation of what is going wrong and how different people see things. Where things begin to look overcomplicated and take up room on the page the analyst can divide the problem into subsystems and treat each as a separate situation.

Rich pictures on their own are a powerful tool for capturing and assessing human activity issues.

Analysing Rich Pictures: Things to look for include:

Primary Tasks- does the picture show the main tasks being done?

Structure - are all relevant organisational structures shown?

Process - does the picture show the various processes involved in the problem?

Climate - Is there a good fit between the task and structures meant to control the performance of the task?

Issues - have the issues, worries, complaints been noted? The issues can be more important than the tasks and if left unheeded can wreck the implementation altogether (Wood-Harper, Antill and Avison 1985).

Benefits of Rich Pictures:

- Restricted space forces decisions on what is really important.
- Allows people to visualise and discuss their role.
- A basis for partitioning sub systems.
- Allows expression of worries and highlights areas of conflict.
- Can help clarify the owners of problems.
- Establishes problem boundaries (Wood-Harper, Antill and Avison 1985).

Even if the use of rich pictures went no further than this they would be a valuable tool. Checkland, however, has provided a more structured approach to the use of rich pictures. In the full methodology deriving the rich picture is only one step an iterative process. The Checkland methodology has gone through several versions but the most widely applied version is essentially a seven stage process. (Checkland and Scholes 1990).

3. Identifying Relevant Systems For each relevant system a root definition is constructed. The root definition is a rigorous description of what the system has to do, who is going to do it, and who is responsible for its being done. It also defines who it is being done for, what rules the system operates under and the wider environment under which all this is happening. A relevant system is one which helps the analyst and users think about the issues in the problem situation. A relevant system is one which either performs one of the tasks identified or would prevent the issues arising. The relevant system may or may not be a formal part of the overall system. Some of the actors may not recognise or accept what are clearly relevant systems to other actors. The wording of the root definition is a matter of trial and error but can be checked against the questions of who, why, for whom, etc., asked above.

4. Building a conceptual model. Completion of the root definitions leads to the next stage, the creation of logical models for each relevant system. The conceptual model specifies all the operations, checks and activities needed to carry out the task specified in the root definition. The root definition is deliberately kept at a general level so the conceptual model can be an 'idealised' solution, a logical view of the processing required to carry out the system. The process of designing the logical model will bring out weaknesses and omissions in the root definition and leads to a circular process until the root definition and the idealised system to match that definition are defined.

The 'goodness' of the conceptual model itself can be checked out by applying what Checkland and Scholes (1990) call the three 'E's:

- Efficacy - Does the means chosen actually work in producing the output?
- Efficiency - Is the transformation being carried out with the minimum of resources?

- Effectiveness - Is the transformation actually achieving the longer term aim?

5. Comparison with actuality. The next stage compares the ideal solution with what is actually in place. The actual systems may be very close to the ideal systems or they may be totally missing. The comparison is always instructive and often reveals real world constraints which were not allowed for in the conceptual models and which necessitate a return to the previous stage.

6. Debate and discuss the options. The outcome of the comparison will lead to the next stage. Any variance between what exists and what is needed will throw up opportunities for action. There will normally be many possible actions and many possible ways of doing those actions. This process should generate a debate among the actors until agreement is reached on how best to proceed with change.

7. Take action. The final stage implements the remedial action and after a period observes the effect on the problem situation. If the action causes problems of its own in the particular situation under investigation then the whole process can begin again to solve the resulting problem.

The description given above might suggest a rather longwinded process, but in practice drawing a rich picture and modelling the relevant logical systems can be done quite quickly.

3.5 Chapter Summary

The previous chapter showed that the domain of Community Informatics is the interface between information technology and human activity systems, incorporating a participative design paradigm. This chapter has outlined the rationale for the methodology adopted for the thesis and shown the strengths of the case study approach when used in a participation methodology. It has also shown how action research can be combined with the case study approach and how the action research principles can be allied with soft systems analysis, and in particular the use of the Checkland methodology.

The following chapters show how this methodology was applied and adapted to several community development situations in New Zealand, and how a successful methodology was evolved which met and overcame the problems inherent in working with disadvantaged communities.

Chapter 4:

Developing a generic ecommerce model

4.1 Introduction

This chapter describes empirical research undertaken in order to create and evolve a participative methodology which could be later used in the community development in isolated communities. The Katherine Mansfield Birthplace was the first case used in developing the community development methodology. This organisation was chosen because it exhibited many features that are found in isolated communities and the experience derived from applying the methodology to the museum would be transferable to larger communities. The strategy was to use the general methodology described in chapter three to design and implement a generic ecommerce model. The functions of the generic model are listed in section 4.3. The design of the ecommerce model involved the participation of the museum staff and therefore was the first test of the methodology.

The outcome of this work was a successful design for an ecommerce site that included all the logical information needs of the museum but also reflected the culture of the organisation. At the same time the experience showed that the methodology needed to be reviewed and a revised methodology was created.

4.1.1 The Katherine Mansfield Birthplace case

The heritage industry includes all forms of museums and historic buildings, plus outdoor sites of cultural significance such as Pas and battlefields. In NZ one part comprises the formal heritage sector which is funded and run by various government agencies, the other part comprises a multiplicity of independent privately owned and operated organisations. Most of the private sector heritage organisations are small museums. The private museum sector is characterised by small operators working largely in isolation and chronically short of funds. Some derive a proportion of their income from public sources such local authorities, other depend entirely on visitor donations. As such they are a useful test area as they have many things in common with the isolated communities which were the target of this research: despite being nominally commercial operations they have an uncertain income stream; they are frequently led or even dominated by charismatic individuals; and they are largely self-defining, existing by virtue of their own aims and aspirations. The small museum is seen by its founders as an end in itself, its purpose lies in expressing its chosen subject to the outside world in much the same way as a community defines itself by what it is. Museums also have an idiosyncratic view of the world as expressed by their choice of exhibits and each museum has its own unique cultural values and cultural outlook. In this respect a museum can be thought of as having some of the same features that isolated communities have. The communities at which this research was targeted are of course much more complex, and are impacted more by social interaction, but working with the staff of a museum provided a starting point.

The museum selected was a privately owned and operated museum in Wellington, the Katherine Mansfield Birthplace (KMB). This is the house where Kathleen Mansfield Beauchamp was born. As Katherine Mansfield (1888-1923), she became one of the world's best known short story writers and New Zealand's most celebrated writer. The house (built by her father in 1888) has been restored to near its original state and decorated with antique furniture and objects of the period. The initial expectations of the KMB staff were very limited. The brief expressed by the curator was: '*Just build us a website, we need to be on the Internet like every one else*'. The project was given a three month time horizon and was expected to include all of the functional areas necessary. At all times during the project the

museum was to have a functioning website that would gradually evolve over the life of the project.

4.2 Designing a generic ecommerce model

The aim of this research was to develop a methodology for community informatics which could later be used to develop ecommerce sites in isolated communities. The first iteration had two objectives: designing a generic ecommerce model for use in those communities and developing a prototype methodology for implementing that ecommerce model. The aim was to use the first case to design an ecommerce model that would be replicated for other cases, so that once that model was established the research could concentrate solely on improving the implementation methodology. The finished website design had to satisfy the operational requirements of an ecommerce site but also reflect the culture and aspirations of the staff of the museum. The general outline of the methodology used to develop the ecommerce model and the implementation methodology itself was outlined in chapter three. The case situation required the methodology to create a generic ecommerce website, but was as much about testing and extending the implementation methodology as it was about creating the generic ecommerce model. The following section describes the creation of the generic ecommerce model and the first iteration of the methodology.

4.2.1 Developing the generic ecommerce model

To be successful the methodology was required to create a website that would showcase and market the Birthplace's unique attractions and have full ecommerce facilities. Ecommerce applications are today built from components, and not programmed afresh each time the functions are needed. All the functions required for an ecommerce website can be sourced from standard modules such as inventory management, email clients, shopping baskets, online visitor books, password verification, website visit counters, etc. The ecommerce facilities for the KMB were created by selecting and integrating prewritten modules based on standard programs and generic code. This ensured that the ecommerce system would be error free and easy to maintain. All the modules used were open source programs copyright free and available at no cost. These modules are widely available and can be combined to produce integrated solutions of any degree of sophistication. Effectively this means that the production of an ecommerce capable website is

relatively straightforward and that there was very little risk of failure on the programming side. The problem therefore became one of eliciting a requirements specification which was suitable for a wide range of community situations.
As well as producing a technically efficient ecommerce site, to accord with community informatics principles, the methodology had to produce a website that would be a reflection of the organisation's view of itself and its core values. This meant it needed to reflect the staff's view of the museum and avoid being overly influenced by the ideas, attitudes and values of the person creating the site. The design principles also required that the website design should capture the unique requirements of the KMB, and not simply copy the 'best' parts of existing sites in the heritage sector and assemble a composite of those parts.

4.2.2 Implementing the methodology

Because the research focussed on communities and the effect of introducing ICT to benefit individuals within isolated communities, the choice of design methodology was restricted to those which were highly participative, and which did not rely on any particular level of expertise among the participants. This dictated that the methodology had to be grounded in the socio-technical school of computer system design. The exploratory nature of the research meant that the mode of research had to be proactive and flexible, so the modality perforce had to be Action Research. This combination of participative research paradigm and action research intervention proved highly successful in generating a series of developments in response to the various situations to which the research was applied.
The ultimate aim of the research was to develop a methodology to use to introduce community informatics into isolated communities and to test whether, and under what conditions, ICT can be successfully used to promote development within communities. It was shown in chapter two that this has proven to be problematic in other countries and that the success rate indicated that simply applying the technology without a well researched basis has usually led to failure of the system. Therefore the basic strategy was to approach the development of the methodology in stages. The first stage was to use small community type situations where various options could be tried out in relatively controlled situations. Once the basic ecommerce website model and the methodology had been tested in the small business situations then it would be applied in the field. The details of how the

model and the methodology were developed are given in chapter five. The broad outline of the completed methodology is given below.

Prototyping

Community centred design requires the specification and development to be directed by the ideas of the participants, and therefore the generic ecommerce model was designed and specified within a prototyping environment. This meant that at all times the museum would have a working, even if limited, website that they could inspect and show to others. This was done to encourage the staff to feel that they had a stake in the process, that they would see their input was valued, that they were being listened to, and they could experience their ideas becoming reality. Using a prototyping process for computer systems development means that the analyst does not wait until there is a complete finished requirements specification, rather development proceeds continuously in many small steps. At each step the analyst works with the end users to draw out their ideas and requirements, continuously changing the program to reflect the end users' changing understanding of their own needs. In the case of the Birthplace the museum staff first developed a few outline screens and specified some simple functionality and this was then used to create a rudimentary internet website. This initial website was then shown to the staff for criticism and comment, to show how their ideas had been translated onto the finished page. The staff were encouraged to put forward all and any ideas that came up after inspecting the web pages, and these ideas were discussed and developed in a group situation. At all times implementing the vision of the staff overrode any other considerations, and the technical input was limited to suggesting different ways of implementing the staff's ideas. No work was progressed until there was full consensus among the staff.

The design process

The design process began with an initial meeting with the curator at the museum. Agreement was reached to build an ecommerce site for the museum and one member of staff was delegated to be in charge of the project. The curator arranged introductions, briefed the staff on what the project was about, but was too busy to take an active part. The first step was to meet all the staff and outline the project's aims to them. This led to a series of meeting being scheduled. These meetings were modified versions of focus groups, involving two to five staff and lasting from half

an hour to an hour and held on the museum premises. The meetings initially focussed on what the museum staff expected and hoped from their proposed website.

The main technique used to ensure participation was a modified form of brainstorming. The DCMS Review (DCMS 1999) describes research which compared museum websites by listing the features that appeared on the Smithsonian website and evaluating other museums' websites against that list. Using that Smithsonian list of desirable features as a vehicle for discussion, the museum staff and the researcher started by identifying what functions they thought the website would need. Each feature on the list was considered and used to initiate discussions of whether it might be relevant or not to the KMB.

At each meeting individuals or small groups, facilitated by the researcher, were asked to think about an internet site plan, and helped to draw up a rich picture of their information needs, starting with their museum in the centre and visualising whatever web pages they felt visitors to the site would expect to see. At the start it was very difficult to get the staff to 'think outside the box'. They knew how to service their current visitors but had never really given any serious thought to what they could do to tap into other sources and resources. Much of the time the rich pictures functioned as a vehicle to educate the staff as to what the Internet was about, and what was and was not possible to do with the technology. It was found initially that staff were not able to articulate what they wanted and they had trouble understanding how the technology could be harnessed to enhance the museum. It was discovered that the easiest way to make progress was to show them websites from organisations in other industry sectors and get their views on what they thought worked well, and what they saw that they did not like.

Eliciting the functionality

As the discussions progressed and the staff members became more comfortable with the internet technologies, they were able to identify features that might be useful to KMB. As these were brought into awareness each desirable feature was added to a large sheet of paper in the centre of the table. Wherever possible the conventions of rich pictures were followed and the feature would be drawn as a summarising image, rather than in words. Anyone could add or change what was shown on the paper, and there were numerous revisions and re-drawing as links

were added and conflicts were uncovered. After extensive discussion and explanation of the technical possibilities the staff were able to come up with things that were unique to their museum and that would make their site different from comparable sites. Quite quickly features were identified such as ecommerce for the museum shop, an illustrated life of Katherine Mansfield, a gallery or photographs, the text of the stories, links to places associated with Katherine Mansfield and so on. As these features were proposed and defined, a specification, the root definition, was discussed and agreed for each feature. A process of refinement of the root definition was done jointly and the staff were encouraged to visualise what the final product would look like as a website page, and to continue to refine and expand the root definition and their vision of how the final product would look and function until everyone was satisfied with the design. The rich picture was usually redrawn after each meeting to tidy it up and left with the staff so that they could show it to others and discuss it among themselves on their own. It was used as the starting point for the following week's meeting. The outcome of this series of meetings was a consensus as to what the basic needs of a museum website in general were, and of the needs of the Birthplace in particular. The final version was used as the basis for the design of the generic model.

The implementation process

In order to manager and control the project a memorandum of understanding was drawn up. This specified the general functionality to be produced and outlined the expectations of each side in terms of time and resources. Once a basic analysis of the museum's information needs was done, a plan was formulated for actually building the site. The process included a formal means of assessing the performance of the website and commenting on its layout and content. The plan also specified follow up procedures to note what had been learned and what to include in the next iteration. The participants in turn agreed to make themselves available for consultation to ensure a quick turnaround as programming got under way and decisions were needed on aspects which had not been explicitly covered. As the programming phase began, a procedure evolved to meet with the staff each week, demonstrate what had been done, discuss possible ways to enhance the site, note any suggestions and agree a work schedule for the following week. This defined the next set of outcomes and the resources needed to carry out the work.

These resources were mostly technical, but could also include the staff's agreeing to locate resources such as photographs, logos, etc., or undertakings to supply text for specific pages. As the implementation progressed it became necessary to impose some controls on the process. After several difficulties with coordination a staged approach was developed. This categorised all activities into either simple information display functions or more complicated interactive information management. By separating the functions in this way it was found that the implementation went more smoothly and naturally. A summary of the implementation model is given in section 4.3.

4.2.3 The generic model functionality

That design was programmed into prototype website pages and the interim website was then demonstrated to the staff for comment. The design continued to evolve as the staff saw the actual web pages each week but eventually the staff settled on a set of functions they thought exactly suited their museum.

That outcome showed that the museum needed a design with six major functional requirements. These are listed below. The internet functionalities and strategies identified were:

Information Delivery. This consists of one-way display or delivery of information about the organisation itself, addressed to various potential users of the museum.

Basic Information: This includes all the information normally supplied in brochures and posters about the museum and its exhibits and includes static data such as opening times and how to get there.

Advocacy: This section addresses information to other constituencies of interest, groups other than ordinary visitors. For example information needs to be targeted towards potential funding agencies, local authorities, partners and allies. This would typically consist of items such as press releases, news and publicity materials.

Trade information: Non static information can be provided to other organisations in the value chain such as tour bus companies, booking agencies, caterers, suppliers and contractors etc.

Attractants: The website needs to offer repeat visitors more than information about opening hours. In order to make the site attract multiple visits it needs to

reward the casual browser with activities such as guided tours, online games and links to current issues related to the museum's activities.

Relationships. This aspect of information differs from the Information Push section in being primarily interactive and ongoing. The Internet can be used to foster long term relationships with many groups of museum users.

Personalisation: The website can feature individuals, and give the customer something to relate to, rather than being an anonymous and bland interface to the organisation. The individuals can be members of staff describing their roles and interests, or can be selected customers who can tell of their relationship and experiences with the organisation. These pages help to give a warm and human aspect to the site, to give something the customer can identify with.

Friends and Supporters: This section maintains contact with those private individuals attracted to the museum through a shared interest. These people are often recruited as Friends of the Museum or in a less formal arrangement can be simply on a mailing list. Continuous contact keeps them informed of happenings and can be the basis for appeals for donations or assistance from time to time.

Sponsors: Keeping corporate sponsors interested is vital and keeping them informed is the easiest way to ensure an ongoing relationship.

Agencies: The website needs to offer repeat visitors more than information about opening hours. Publicity is essential to museums and keeping the press and other opinion makers informed will ensure the museum is included in any environmental change planning.

Segmentation. The design envisages the website being at the centre of the museum's marketing strategy, and not being treated as a passive resource. As such there is a need to monitor the website's performance, and so manage growth and maintenance organically, responding to demand in an evolutionary manner, rather than reflecting a supply driven implementation. As a minimum there must be facilities for hit counts, user perception measures, feedback from users and benchmarking against similar websites.

Interactive Enquiries. If a museum is to base its website on strategic marketing then the site needs to be able to handle interactive enquiries. These can be general or specific.

General online enquiries can be serviced by re-formulating the factual material on the website dynamically in response to a request for information.

Specific enquiries are direct from individuals and ask for non-standard information which cannot be provided passively from the website. These need to be handled by staff of the museum.

Income Generation. Ecommerce in this context covers the sales of physical goods, and intellectual property.

Intellectual Property: Access to internally owned knowledge, either tacit knowledge of the individual curatorial staff, or organisationally managed codified knowledge which could be a source of income. Museums can offer consultancy services in a number of areas such as conservation advice, artefact identification and verification. Museums typically have reserves of stored intellectual property such as photographs, artefacts and private records which are unique and best exploited through internet technologies.

Physical Goods: Museums typically have gift shops selling souvenirs, models, postcards, etc. These can easily be converted to online retail sales.

Itineraries. This class of information attempts to give a service over and above what a visitor would experience by a personal visit by leveraging the specialist knowledge of museum staff.

Guides to resources in the subject area, such as might be prepared by a skilled librarian can be constructed within the domain of knowledge of the museum.

Online itineraries: These online guides alert the web visitor to similar museums or to alternate entertainment in the vicinity of the museum, enabling the visitor to create a richer experience for themselves

In keeping with the logical stages of the Checkland methodology, these functions were defined at the logical level and there was no attempt to define how they would be implemented by the technology. Some of the functions above were specific to the museum but in using the generic model in later cases the functions were adapted to suit the particular circumstances of the case. For example, the Itineraries function was adapted in the Hokianga case (chapter seven) to include guides to the area for visitors and web pages devoted to specific subjects such as cooking and medicinal plants.

4.3 Implementing the generic model

The website design derived from the methodology does more than just display web pages. It is a sophisticated combination of static information, dynamic information and interactive relationship management. It incorporates an email communications facility and manages active links to other sites of interest. It also assumes the museum website will be actively managed and be an integral part of the museum's basic marketing strategy. This complex structure means that the implementation has to be planned in some detail. The following section shows the stage model of implementation created from the experience of implementing the KMB ecommerce model. (This model was derived empirically for the KMB but was not complete for that case. The version shown in 4.3.1 is a more advanced version than was actually used in the KMB and is the result of refinements made following experience with subsequent cases). The overall strategy of a community website is relatively simple: make it easy for people to find the site, give them a benefit from visiting it, give them a reason for coming back to it again, and finally, continually monitor and improve it.

The implementation of the generic ecommerce model and the website design is done in two parts. The first part creates a static site with passive information provision. The static part comprises three stages: static information provision, active information management, simple ecommerce services. Static websites can be purely advertising; to take bookings; sell merchandise; or influence opinion. The second part uses a more sophisticated approach to information and is based on active relationship management. The second part has four stages: relationship management, interactive enquiry support, environment management and benchmarking. These more sophisticated websites use internet technologies to create and maintain relationships: between the community and its intended customers; between the community and its business partners; and between the community and the general population. In the detailed explanation below most of the examples refer to museum sites, but the principles apply equally to all community organisation

4.3.1 Implementing a static internet site

The first part of the generic model comprises the display of information which remains unchanged for long periods of time, even though it may include active

contact with the web visitor. Even though this type of website can be quite sophisticated, creating a static site requires very little programming and can be constructed using off-the-shelf software, with only the content needing to be provided by the organisation.

Stage One: Static information provision

In its simplest form, web pages are 'brochureware', primarily marketing material aimed at informing or enthusing the visitor. This type of information is static, covering things related to the organisation itself, such as opening times, facilities, images, photos, sounds etc. A second type is visitor help information, such as local area maps, timetables, booking agencies, tour operator details, etc., designed to help the potential visitor make their way to the physical location.

A more sophisticated development of this type of information provision uses one of the major benefits of the Internet, the ability to personalise. Brochures can be attractive and informative, but because of the expense and difficulty of production, are made as general as possible. Using internet pages allows the creation of an unlimited portfolio of virtual brochures. Additional web pages are essentially 'free'. The Internet can be used to present myriad different profiles to different interest groups. It is easy and relatively cheap to produce pages aimed specifically at school groups, special interest groups, overseas visitors, domestic tourists and so on.

The essential characteristic of this first stage is that the site provides a 'snapshot' view of the organisation: there is no interaction. The information is of course updated from time to time but only in the same way that brochures are replaced when they are no longer accurate, or project a dated image.

Stage Two: Simple Ecommerce

The main use of electronic commerce is the sale of physical goods. This is the simplest instance of interactive use of the Internet. The normal set up has one or more web pages showing illustrations and descriptions of the items for sale, and a form for the buyer to enter their address and credit card details. The programming requirement is relatively simple and there is no real interaction with the customer. The customer does not even need to have an email address to purchase over the Internet. As long as there is a way to capture the credit card details all the processing can be done by normal merchant procedures off line. The knowledge

requirement within the organisation is minimal. It is the electronic equivalent of an order form attached to a brochure.

4.3.2 Interactive site management

The first part represent a simple use of the Internet. Static sites are valuable and cost effective, and put the least strain on the organisation owing the site. To get to the next stages, however, requires a considerable investment in time and understanding, or the use of a sophisticated software package. Organisations need to think carefully before embarking on this part. Achieving stages three to seven can only be successful when using the Internet becomes part of an integrated information management strategy. Organisations therefore need to examine their own readiness before embarking on the interactive part of an ecommerce website. The community website needs to be developed and implemented at a rate that matches the development of the community itself.

Stage Three: Active information management

The third stage of information provision is an extension of the first, but instead of providing pure information, visitors to the site get some kind of reward, and are therefore actively motivated to return to the site. This is still one way communication, and not as effective as true relationship management (stage four), but goes beyond what can be done with brochures. The essence of this stage is that each visit produces something new or some form of entertainment. The change can be a simple rotation of the items featured, or different on-line tours, itineraries suggested according to season and the timing of other attractions, or a constantly updated 'what's new' list. More sophisticated applications seek to become essential to the visitor's life style by providing a constantly updated resource listing events in related areas, news items, status of development projects; generally aiming to become a dependable source of information so as to attract the visitor back on a regular basis. Another approach is to provide rewards directly. It is relatively simple to select images, texts and sound files for visitors to download for their own use. Packaging the offerings and changing these regularly attract visitors back. This can be enhanced further by adopting a 'games' approach, offering images which can be collected to form a set, or on-line quizzes and real time games for junior visitors. For adult visitors attractions such as recipes and lifestyle guides can encourage

loyalty and repeat visits to a site. This stage can be time consuming to manage, and but is a way to attract return patronage if relationship management is not feasible.

Stage Four: Relationship Management

The most effective way to get people to return to the site is to build a two-way relationship with them. Relationship management using the Internet varies in scope and depth.

Push strategies At the simplest, an online visitor's book lets people leave messages and allows the site owner to build up a contact file. A more sophisticated method uses on-line questionnaires to establish the visitor's interests, attitudes and demographics. The success of this depends on actively managing the contact list and offering advantages to the visitor with the aim of converting them from a visitor to a supporter. The advantages offered may be automatic notification of upcoming events, news digests, free digital downloads, preview invitations etc., all based on electronic mail. This is essentially the 'push' model of Internet interaction, as opposed the 'pull' model of static pages.

Co-option Strategy While the push model is better at building relationships than the static stages one and two, the real benefits are more likely to come where there is an interaction on a regular basis. This aims to get the visitor involved in the museum's operations, contributing ideas and suggestions, voting on proposed changes, participating in research - getting commitment from the visitor. Much of what works at stage two is used here, but the attractions need to be personalised, ideally is each person should see the site as being tailored specifically for them. At some point the site visitor should convert from a visitor to a friend, supporter, advocate or sponsor.

Partnering Strategy The relationships also need to be broadened to include interest groups other than potential visitors. The Internet can be used to maintain contact and relationships with supporter groups, sponsoring organisations, government agencies, fund holders, media representatives, tourism boards – any group that has the potential to either help or hinder the organisation in its operations. Keeping these various groups fully informed and involved is the best way of co-opting their goodwill and ensuring the organisation stays in their minds and on their agendas.

Stage Five: Interactive enquiry support

Many groups other than visitors need information. Hotels often need to coordinate with others involved in their logistics chain, including tour operators, caterers, and other suppliers, who may need to know things like projected bookings, visitor counts, maintenance schedules and so on. Then there are people who would like to access details of the holdings, research findings, image files and other material directly related to a museum's primary activities. This information can be provided by static displays but is much better delivered through full on-line interrogation of the host organisation's database. Examples of this are Federal Express' facility to query a package's location, and the Amazon site which lets readers post reviews of the books they have read.

Once a site is searchable a new range of applications becomes feasible and the site moves to an entirely different state. Static sites have to lay out their information in the way that the host organisation thinks is most likely to be of use to the reader. Giving flexible access to information allows enquirers to use the information in the way they find most useful, which may be quite different from that envisaged by the host organisation. It also gives the organisation the opportunity to sell a new product, information itself. For example, museums are intrinsically repositories of information, much of it potentially valuable, but which is underutilised because in most cases the price of the information reflects the staff costs of retrieving that information. If the cost of searching and filtering can be transferred to the user then a new revenue stream opens up. Museums can expose data stores relating to their holdings, their research and their internal operations. Each of these storage types has its own potential client group. The more information the museum makes available the more valuable the resource becomes and the greater the chances of attracting a revenue stream. Some of this may be confidential or at least sensitive requiring access management regimes to allocate passwords and to restrict access to specific areas. Supporting interactive enquiries requires a significant investment in technology, but more importantly requires a disproportionate increase in the information management skills of the internal staff. Technology can be bought, but using it effectively requires a fundamental shift in the attitude of the organisation.

Stage Six: Environment management

The earlier stages are primarily concerned with internal management of the website and its information. The maturity stage in the evolution of an internet site is concerned with managing external links and evaluating the contribution of the website.

Links to a website have both electronic and organisational implications. Links enable the page to found, and offer gateways to associated sites. The minimum requirement is ensuring that the correct meta-tags are in place and that the site has been indexed with the leading search engines. (Meta-tags are indexing words embedded in the web page which the viewer cannot see, but external search engines can). Other electronic linkages are by means of web rings, where independent sites cooperate to enhance the experience of the visitor. For example, all postcard collector sites, or all cultural interest sites in a town will form forward and backward links to each other so that a visitor arriving on one site can move on to the next ring site without further searching. Similarly, the host site will assist its visitors by creating on-page links to other areas which might be of interest to the visitor and which the host endorses by showing the link.

Links need to be actively managed. In particular the site owner needs to ensure that key external sites have links to their site. The site manager needs to be aware of how their site fits into the 'ecology' of their particular segment of the industry. Museums and other tourist destinations do not exist in isolation. They have to be part of the wider tourism experience, and take their appropriate place in the 'food chain'. A small museum, for example, must ensure that it is listed with the regional tourism organisation and in local city or district guides, that it features on all special interest group sites, that it has a presence with tour and ticketing organisations, and that it gets a fair representation on transport or tour operators' sites.

Stage Seven: Site monitoring

The final stage of internet development is concerned with measuring the effectiveness of the site, and with monitoring its development. Some aspects of website provision are easily measured, hit counts or electronic sales for example, others are more problematic. Nevertheless, the site owner needs to estimate the

value of the website to the organisation, and to monitor the cost/benefit ratio, in particular to ensure that the staff time spent in maintenance is worthwhile. Another use of benchmarking is to monitor the visitors' perceptions and so determine what works and what does not. Measurement should be of the site's utility and of the museum experience itself, and of how these compare with competitor's offerings. On line questionnaires are simple to administer and evaluate. Visitor's comments in guest books offer valuable insights, and visitor comments are the best way of judging when the site is getting stale. It goes without saying that the website is the public face of the organisation, and few external organisations will maintain links to a substandard site.

As with the generic model itself, the implementation stages are modified to suit the particular needs of each case situation. A detailed treatment of how the implementation stages are used manage the implementation process is shown in the final case in chapter nine.

4.3.3 Summary of the generic model

The combined process of defining and prototyping the generic ecommerce model and developing the stages of implementation continued in the KMB case through many iterations. The generic model and the staged implementation strategy proved able to cope with quite different and complex business situations in later cases. However, the implementation strategy was not intended to be applied rigidly and depending on the particular circumstances of the case the model's stages could be combined or deferred. A sophisticated community can start with all the ecommerce components in place, a simple community can start with a simple website using only the components for a static website. The over riding consideration was that the community website was developed and implemented at a rate that matched the rate at which the community could assimilate the technology and the changes it brought.

4.4 Implementing the KMB website

Designing and programming the KMB website was relatively straightforward. The finished site showed all the attractions of the museum, gave a biography of Katherine Mansfield and a section where the Internet visitor could purchase souvenirs online. However, the experience showed that creating a logically correct

ecommerce model and implementing it was not sufficient to ensure a successful website. The Katherine Mansfield Birthplace site was completed and demonstrated to the staff, but was never deployed on the Internet despite the fact that the project had kept to schedule, produced everything that had been agreed to, and performed at a professional level.

The project started off well. The objective was clear and the curator supported it. In the beginning all the staff were enthusiastic about planning the site and happily came to meetings to discuss what was to be done. The museum curator took a great interest in the design process in the beginning but tended to stay away from the meetings. The staff also welcomed the weekly demonstrations and participated in the critiques of the web page designs and layout. But their enthusiasm rapidly waned after the initial material had been incorporated into the web pages.

The website started out with simple information provision pages of the 'where is, what's on' type. There was no difficulty in obtaining this type of material since it was largely sourced from existing brochures and leaflets, or taken verbatim from exhibit display panels. As long as the project was producing web pages for the weekly meetings and very little was required from individuals other than talk, everything went smoothly.

But as the project rapidly ran through the materials ready to hand it demanded more of the staff's time to write new material for the next web pages. The result was that employees became more elusive. It became increasingly difficult to get employees to work on the task of writing new material and they finally began to avoid meeting the researcher and making various excuses to explain the non-appearance of promised materials. The lack of materials became a major problem. In order to meet the deadline for completion and to fill out the empty pages on the site, the researcher created image galleries by scanning museum photographs and finally resorted to searching the Internet for other Katherine Mansfield material to obtain non-copyright images that could be used.

This turned out to have been a critical action. The curator had displayed misgivings as the project progressed, and these increased as the enthusiasm of the staff waned due increasing demands on their time. The curator was shown the completed site, agreed it was what was asked for, but would not allow the site to go live. The ostensible reason was that the images of Katherine Mansfield had to be protected, and if the website was displaying photographs of her then '*anyone could download*

them onto their own computer and would print them on to tee-shirts'. It was pointed out that the images had come from publicly available sources, and that the KMB did not own the copyright in the images anyway, but to no avail.
The site was never made public and the impression was left that the museum staff had not really thought through the reality of exposing the museum to the scrutiny of the Internet, and in particular to the critical gaze of other museum curators.

4.4.1 Enhancing the methodology

The KMB case provided some valuable lessons that were incorporated into the methodology for future cases.

a) Commitment

One problem with that version of the methodology was a lack of real commitment from the museum staff and in particular from the curator. The version of the methodology used in this case did not really engage all of the community, the employees of the museum. Only one employee acted as the main contact and liaised with the other staff, organised the weekly meetings and so on. The other staff turned up and gave their opinion on the proposals and inspected the web pages as they were produced but were not really fully involved. The role of the curator was crucial. The curator welcomed the approach, supported the project in principle, but was not enrolled as the project champion.
The main lesson from the KMB case was the realisation that surface participation was easily obtained, but real commitment was never going to happen - the museum staff thought that the researcher should be wholly responsible for producing the site and their responsibility stopped at offering opinions on the quality of the presented output.
In talking many months later with museum trustees not directly involved it emerged that *'there had always been an implicit assumption among the staff that [the researcher] would be responsible for finding and organising new material*': computer development was not their job.

b) Strategy

By the end of the project it had become clear that the objective of simply having a website had not been sufficient motivation to see the project through to completion. While the website was seen as being a useful thing it had not become part of the

organisation's strategic plan and so was not given the resources and support it needed.

c) Content Creation

In retrospect the issue of creating content for the web pages could have been foreseen. Creating a collection of internet pages is not difficult and can be done by anyone with a modest amount of programming skills. However, creating high quality content requires knowledgeable staff to devote large amounts of time to it. Since staff are already busy with their normal full time duties, writing web page material is always going to be allocated the lowest priority. And as long as the content is limited there is little scope for adding on ecommerce or other advanced internet relationship marketing tools. With modern software, creating an attractive looking website is deceptively easy. Putting up a few web pages is well within the capability of the average person to either program themselves, or to specify for a professional programmer. The difficulty arises when the websites extend beyond a few pages. All websites succeed or fail by their content, not their look and feel, and while artistic flair is noticeably in short supply, creating original content is even more difficult. The result is that the first pages of the website are usually conversions of existing brochures and leaflets. But after that the pages become increasing difficult to fill because each page has to be written by a subject specialist: the task cannot be delegated to the programmer if the site is to accurately reflect the values of the organisation.

The KMB case showed that any competent programmer could convert existing text quickly and easily, using up years of accumulated print output in a matter of hours or days. To populate a comprehensive website requires producing quantities of new material, and creating and verifying that amount of high quality original text by standard means was out of the question. The initial demands of a static site involves little more than finding, editing and collating suitable text materials. However, this was the stage at which the museum failed. The staff were unused to expressing themselves in writing, especially for publication, and consequently could not deliver the sheer volume of information needed.

d) Templates

Changes were made to the methodology to address the issue of content generation. At one point when the staff had been asked to create screen designs they had been

given a printed template to use and 'filling in the boxes' seemed to be much easier for them. It was also noticed that the staff were willing to create something original if it could be done there and then, rather than leaving it until later. Combining these two ideas led to the methodology adopting the use of templates, and these became a standard part of the methodology for information gathering and content creation.

e) Matching and pacing

The speed with which internet applications can be built emerged as an issue. The progression from a static site to an active site requires a change in the organisation's mindset. It was evident that the organisation's response in terms of staff roles and responsibilities was unable to keep pace with the changes in the organisation's internet capability. In fact the technical capability of even a moderated skilled programmer can easily outpace the ability of organisation to exploit the finished product. Organisations must not be allowed to become unrealistically enthused about the Internet, but should be encouraged match the capabilities of their website to their organisational capacity and follow the staged approach In the case of the KMB some of the ecommerce functionality of the site (accepting credit card orders) actually had to be removed because the organisation had not reached the stage where the staff could use that functionality effectively. The methodology therefore incorporated the staged implementation strategy described in section 4.2.2.

f) Getting senior management buy-in

The KMB case showed the importance of aligning the development goals with the key person's personal and business goals. The website had been seen as '*something useful and good for the image*' as was expressed by a senior member of staff, but the objectives of the website were never clearly articulated and never formed part of the museum's strategic plan. This became a core part of the methodology in the next stage of its development. In particular the methodology always sought to identify and enlist a project champion from within the community.

4.5 Summary

This chapter described how the generic ecommerce model used in all the cases was developed and implemented. It showed how the Katherine Mansfield Birthplace museum was used to simultaneously test the methodology and derive the generic

ecommerce functions by engaging the staff in a participative design process. The ecommerce model was successfully designed and built and demonstrated to the staff. However, the case showed that just deriving an accurate design was not enough to ensure the that website would be adopted and used by the community. However, although the website was not integrated into the organisation it was fully functional and did meet all the criteria specified. In order to verify that the generic model created by the methodology was in fact a good design the model had to be compared with ecommerce models used by other museums. That comparison is the subject of the next chapter.

Chapter 5:

Validating the generic ecommerce model

5.1 Introduction

The model of information requirements derived from the prototype methodology described in chapter four was complete in itself and consistent with what the staff of the museum wanted. It demonstrated that the prototype methodology was capable of producing a website design which addressed all the major functionality required for a heritage site, was fully participative and drew on and used the knowledge of the staff, and also took account of the views of the staff in terms of reflecting their personal concerns about how their museum should be presented to the world.

However, the design needed to be tested. In order to assess the validity of the model, the website's functionality needed to be independently verified. In order to do that it was necessary to compare it with other museum websites to ensure that the features that had evolved through trial and error and appeared on other museum websites had also been identified by the prototype methodology. It was therefore necessary to compare the KMB website with other museum websites to check that everything that had been specified was being used on other sites and that there were no significant items found on other museum websites which were missing from the prototype model.

5.2 Validating the generic model

Research was therefore undertaken to analysis a representative sample of NZ museum websites. On checking the target population of heritage organisations it was discovered that the number of pure museum websites was insufficient and so the analysis of heritage websites was expanded to include NZ gallery sites as well. The galleries included were those which had culture and education as their primary mission, and excluded commercial art galleries whose primary function was to display art for sale. This resulted in a total of thirty two NZ museums and galleries with accessible websites.

It is generally accepted that museums and art galleries have fundamental reasons for existence and that these include education, conservation, research and income generation (Weil 1990). It was hypothesised that museum and gallery websites would reflect each organisation's mission, and that the site contents would be in line with their attempts to further their mission. If this is the case then logically a museum or gallery's website should be expected to display features which reflect these basic goals and all museums should have functionally comparable sites. (For the rest of this chapter, the term 'museums' includes galleries, except where specifically noted.)

5.2.2 Model Verification Process

The objective of the website analysis was to examine how the Internet was actually being used by museums and galleries, and to gauge the effectiveness of the information handling on museum sites, in order to compare their features with those of the website produced the prototype methodology. The research population was all museums and galleries in New Zealand. Standard industry usage defines a museum as any place that invites the public to view artefacts of historical, cultural, or artistic significance displayed in a physical setting. This definition excludes virtual museums and historical places that are primarily outdoor experiences.

The museums were initially identified from the NZ Museums Online project listing (MoNZ 1999) which showed 242 organisations defined as NZ museums, galleries or libraries and was the most up-to-date information publicly available at the time. The MoNZ list was crosschecked against national Yellow Pages, White Pages, three major Internet search engines, two regional search engines, and other classification sources to establish the total number of qualifying organisations.

These organisations were then contacted to establish whether or not they had a website. For each museum which reported that they did have a website the URL of the website was checked to establish that it existed and to verify that the host organisations qualified. The count of museums and galleries with a viable Internet site was 32 (12%), from a total of 260 possible organisations (Table 5.2.2 shows the final list).

Museum and gallery sites analysed

ID	Name	Region	Type
1	Glasstime Glass Museum	Northland	Museum
2	The Kauri Museum Matakohe	Northland	Museum
3	Historic Places Trust	National	Other
4	Artspace	Auckland	Gallery
5	Auckland Art Gallery	Auckland	Gallery
6	Howick Historical Village	Auckland	Museum
7	Lopdell House Gallery	Auckland	Gallery
8	Museum of Transport & Technology	Auckland	Museum
9	Whakatane District Museum & Gallery	Bay of Plenty	Museum
10	Elvis Presley Memorial Record Room	Taranaki	Museum
11	Govett-Brewster Art Gallery	Taranaki	Gallery
12	Taranaki Museum	Taranaki	Museum
13	Manawatu Art Gallery	Manawatu	Gallery
14	Whanganui Regional Museum	Manawatu	Museum
15	City Gallery	Wellington	Gallery
16	Dowse Art Museum	Wellington	Gallery
17	Te Papa Tongarewa	Wellington	Museum
18	Wellington Museum of City & Sea	Wellington	Museum
19	National Library Gallery	Wellington	Other
20	Air Force World RNZAF Museum	Christchurch	Museum
21	Arts Centre of Christchurch	Christchurch	Gallery
22	Centre of Contemporary Art	Christchurch	Gallery
23	Robert McDougall Art Gallery & Annex	Christchurch	Gallery
24	Science Alive!	Christchurch	Museum

25	Yaldhurst Museum of Transport & Science	Christchurch	Museum
26	Lakes District Museum	Otago	Museum
27	Larnach Castle	Otago	Other
28	Antarctic Centre	Christchurch	Other
29	National Maritime Museum	Auckland	Museum
30	Physics Room	Christchurch	Gallery
31	Waitomo Museum of Caves	Waikato	Museum
32	National Archives	Wellington	Museum

Table 5.2.2 Museum and gallery sites analysed

5.2.3 Empirical analysis

The research aimed for an objective and repeatable way to compare the quality of museum websites in order to be able rank the prototype design produced for the KMB alongside designs used for other museum websites. The first step in the analysis was to examine in detail six museum websites taken at random from the population. Any type of information displayed, and any services offered were noted, irrespective of whether they were well or badly presented. Any technical features seen, such as email links or image galleries, were also noted. By choosing to note only whether a website showed a particular feature or not, or presented a particular class of information or not, subjective researcher bias could be eliminated: all sites could be compared on a standardised basis. This method eliminated potential biases due to differing opinions as to whether a feature was considered effective or aesthetically pleasing or not. The result was that two different reviewers looking at the same website could reliably agree whether a feature was present or not, and avoided the need to make a subjective judgement as to its usefulness or fitness for purpose.

After consolidation and elimination of any duplicate features found in the first six websites, a second stage tested this list of features against a further ten websites to see if any features had been missed. As the second stage progressed it did produce several more features and these were consolidated into an expanded list of features. By the end of the second stage there were no additional features being found and it was confirmed that all extant relevant features had been identified. The individual features were then clustered into sub-sets to identify categories of similar features.

After several iterations of classifying and consolidating features into categories a checklist was produced that could be used to assess the features of any museum website.

The seven categories derived were based on multiple features, for example the Technical Competency category comprised seven technical features: Navigation, Design, Location, Speed, Content, User-friendliness, Extras. (Appendix 5a shows how the Technical Competency category was derived. Appendix 5b shows the detailed make up of the site functionality categories).

The main attributes of the final seven categories derived were:

1. *Technical competency.* The site has to load efficiently, be navigable and have a layout acceptable by current norms of Internet presentation.
2. *Visitor Information.* There are a number of essential information requirements such as opening hours, floor plans, directions for getting there, etc., which any museum site should have.
3. *Attractions and Exhibits.* As these are a museum or gallery's main asset, each site should display information on exhibits, unique collections and ways to assist in planning visits.
4. *Mission.* It is assumed that all museums and galleries have standard goals of education, conservation, research and so on. The websites were scored on whether these were evidenced or not.
5. *Relationships.* Websites were checked for evidence of relationship management as shown by guest books, email forms, newsletters etc.
6. *Market Needs.* Does the website allow the museum to personalise the experience for visitors? Indicators of this include attempts at market segmentation, foreign language versions, junior clubs etc.
7. *Income generation.* Does the museum offer a cheap and simple way to generate direct income through ecommerce applications? Evidence of this might include booking forms, souvenir sales, etc.

5.2.4 Applying the checklist

A checklist of categories was then compiled and used to evaluate each of the thirty two sites. All the websites were scored against the checklist (including those that had been previously examined in stages one and two). Each site was scored

according to whether a feature was present or not, or was adequate or not, depending on the nature of the feature. No attempt was made to evaluate subjective impressions such as artistic design or colour coordination. No attempt was made to evaluate the merits of the content itself, only whether the information was present or not.

A detailed breakdown and summary of the analysis is shown in Appendix 5c.

5.3 Validating the design output

5.3.1 The idealised presentation model

Museums have an infinite number of ways they can present and display the information about their subject matter. The particular design and layout offered to the public is called the interpretation. Similarly, there are many ways to convert the chosen interpretation and structure as a museum website. All other things being equal, a museum website should give equal prominence to each of the seven

Figure 5.3.1: Idealised Museum model showing the seven main functions equally prominent.

categories of functionality uncovered in the analysis. Figure 5.3.1 is a theoretical model showing how the categories derived from the analysis would be organised in an idealised online interpretation for a museum.

The model shows the various operational functionalities as overlapping circles. Each circle represents a category, an aspect of functionality that needs to be present

to fulfil the basic mission of a heritage site. If the design derived from the prototype design process is correct, then every museum website should display every one of the categories, although the balance between categories will differ for different museums. The various technical aspects (speed, links etc.), are represented as a single category called technical competence. The technical aspects should be the same for every site, since there is a de facto standard expectation for general website performance. The other categories are shown as having equal importance, as there is no logical reason why there should be any significant difference between them.

5.3.2 Developing the empirical model

It is generally accepted that all museums and galleries have fundamental reasons for existence and that these include education, conservation, research and income generation (Weil 1990). It was hypothesised that museum websites would reflect each museum's issues and concerns, and that the site contents would be part of their attempts to address these issues. If this is the case then logically a museum's website should be expected to display features which reflect these basic goals and all museums should have functionally comparable sites. The results of the empirical analysis showed that this is the case: every site had at least some aspects of every category identified by the prototype design. Moreover, none of the museum website analysed showed any functionalities which had not been found in the prototyping process.

The empirical analysis showed also that the functionalities found were not evenly distributed. Most organisations are aware of the importance of an effective and impressive Internet presence and many spend a substantial proportion of their marketing budget on Internet technology (Tufts and Milne 1999). Of the thirty two sites the highest-scoring categories were 'Technical competency' with 77% and 'Visitor information', with a 47% score (see appendix 5c). These percentages are calculated as the proportion of attributes found in that category, compared with the total number of attributes which the site could have had. So for example, if a category has ten attributes and a given site had six of them, the score would be six present out of a possible ten, or sixty per cent. Each category has a different number of attributes, so the proportion score allows comparisons between categories. The next-highest proportional response rate was recorded in the

'Mission' segment (44%). The lowest scoring segments were 'Attractions and Exhibits' (19%), and 'Feedback, Relationships, Links' (12%). The pattern of features present within the sites surveyed shows that there is very little difference between museum sites and gallery sites, and that the feature count of all museums and galleries overall is remarkably consistent between the individual organisations. Averaging out all the sites and calculating scores for each of the categories allows the creation of a proportionally correct model which summarises the typical NZ museum or gallery website (see figure 5.3.2). The category for technical skill is the largest, since it had 77% of ideal.

Figure 5.3.2: Actual Museum Functionality

The other categories are proportionally smaller, and show a marked divergence from the ideal. Overall, there is a tendency for museum websites to be top-heavy, good at simple presentation of basic facts, such as directions and information about physical facilities at the establishment, but lacking the more sophisticated features such as customer relationship management and dynamic exhibit interpretations. The model shows that New Zealand museum and gallery websites are competent in terms of technology and presentation, provide an acceptable level of information about physical facilities at the establishment, and present their goals and objectives

clearly. However, the majority of museums and galleries that were analysed failed to provide many important services on their websites, in particular the opportunity for relationship marketing through the Internet, arguably the cheapest marketing tool available to them. This suggests that several of the museums might not have been clear as to their target market. For example, only two sites had options for international visitors or those who do not speak English. Many sites made no mention of the scope of their collection as a whole and only a few provided details of any on-line archive or library list. Every site actively promoted the organisation and encouraged visitors, but few provided directions to the museum or gallery, and while some had maps of the surrounding area and directions for how to get there, two sites forgot to mention their museum's physical address at all.

5.3.3 Comparing the prototype with the empirical model

The survey showed that museum websites were gravitating towards a common core of features, but that there was still a great variety seen in the format and layout of the websites, and an even greater difference in the prominence given to the various functionalities, especially in the scope and sophistication of their ecommerce functions. It was obvious that the more sophisticated features were not as prominent as were predicted by the prototype model, and that this was the case on all the museum sites. It was therefore necessary to further validate the prototype model and explain how it was that the industry sites did not have adequate ecommerce or relationship management facilities. The possibility existed that the industry had collectively decided that it did not need these. It was also possible that they were in fact needed, but the museums lacked the resources to implement them. If it was the latter case then the prototyping design process would be vindicated, if not, then the process was over specifying the needs of the museums.

5.4 Reconciling the empirical model

5.4.1 Defining the issues

The previous section detailed the findings of a comprehensive survey of NZ heritage websites and found differences in how the standard industry website was presented, compared with how the prototype model suggested a heritage website should be presented. In order to explain these differences and to completely validate the prototype model, a further analysis was conducted. This sought to understand the reasons for the differences observed and involved interviewing a

sample of the website owners to discover why they had weighted the functionality on their websites the way they had.

This research aimed to find out how NZ museums had gone about the task of designing their internet sites, and whether they had consciously used any design paradigms in the design process. The results gave an insight into the motivations and inspirations of the developers, and explained the results seen in the comparison between the prototype and the average industry website.

5.4.2 Selecting the site owners

The comparison discrepancies raised the question of how these various organisations had arrived at their particular design. Every museum which had a website was emailed and permission sought to conduct a telephone interview about their website development experience. Fourteen of the original thirty-two galleries and museums agreed to be interviewed. Repeated attempts were made to encourage completion by the non-responders without success. However, from a sampling validity point of view there does not appear to be any demographic difference between those who responded and those who did not. Each organisation was asked to participate in a telephone interview based around eight core topics and questions were emailed in advance. A few respondents chose to answer by email while the others were interviewed by telephone. (The interview plan is shown as appendix 5d). The questions were put to the respondents and their answers noted down. The sequence of questions varied and inevitably the conversation strayed into other areas, but the interviewer always sought to bring the discussion back to the key areas of the research. Once all the respondents had been interviewed their answers were collated, standardised as far as was practicable, and then entered into a database for further analysis. Where there was any ambiguity the respondent was contacted again and clarification sought. Overall the conversations were friendly and productive, and the organisations seemed pleased to have an opportunity to discuss their websites with an independent observer.

5.4.3 Interviewing the site owners

The following section summarises the answers the respondents gave to the questions in the telephone interview. The question plan was deliberately loose and wide ranging, as there was no way of knowing in advance what factors might underlie the differences between the prototype output and the typical website

provided by museums and galleries. There could be many factors in play: lack of experience with the Internet generally; failure of planning; lack of internal expertise; lack of access to external expertise; funding issues; cultural issues - using a small number of wide ranging questions made it more likely that the key issues would be identified.

How long have you had a website?

This question was designed to establish how much experience each museum or gallery had had with the Internet, so as to put their answers into context. The median age was three years: only one site was less than one year old; the oldest was six years old. This suggests that museums were early adopters of the technology and do recognise the value of the Internet to their industry.

Was developing the website part of your organisation's formal business plan?

This question aimed to establish whether the website was planned and formally resourced, or whether the website had come about as a result of accident and serendipity. Research into the genesis of websites has suggested that websites are created for a variety of reasons, and not always as a planned response to business pressures or opportunities (Mason 1999).

In this survey, eight of fourteen respondents said that the website was not part of their formal business plan. It seems that websites are often developed using spare resources, just to see what could be done with them. Those who did build the website as part of a formal plan had varying objectives. Comments included: '*need to move into the 21st century*; *Originally a marketing initiative, now ecommerce; Internet visitation is part of our Statement of Intent; Part of the promotional strategy; Part of the marketing plan*'.

In most cases there was a clear business purpose, even though the website did not form part of the formal planning of the organisation. One respondent said the '*main purpose of the website was education, both to spread the word, and to capture more of the education market*'. Another hoped the sale of artwork would be encouraged and the arts community be engaged by '*presenting the full life of the gallery*' through the website. One respondent looked at it '*mainly as an advertising tool to retain interest and draw people in further*'.

Several respondents indicated that they saw their websites as part of a larger project and they were attempting to get economies of scale. Two respondents said they

were '*developing their website in parallel with other marketing activities such as magazine publication and CD-ROM preparation*'.

The many reasons advanced for creating the site can be summarised under the headings:

Technological Imperative:	*Part of ongoing effort to promote new technology*
Peer Pressure:	*Pressure to keep up with others; Reaction to what others were doing; Persuaded of the need by outsiders.*
Resource Opportunities:	*Took advantage of offer from another site; Funding was offered so it was taken and used.*
Control:	*Did not like being part of a complicated local authority site, meant the museum was hard to find on the Internet.*

Do you intend developing your site for ecommerce?

The lack of ecommerce facilities uncovered in the analysis could have been the result of lack of expertise, or due to some disinclination to take up ecommerce. This question was designed to resolve the difference. Six of the fourteen said they had no plans for upgrading their sites to include ecommerce. The reasons advanced included: *Finding time is the major factor; Hard to quantify the benefits; Do not have the expertise, and merchandise sales not high enough; Don't have the knowledge of how to upgrade, so have taken the prices off the pages to stop them getting out of date.*

Five said they had ecommerce proposals in various stages of preparation: *Had taken on a person specially to create it; Needs time and money to develop, especially time; Joining a collective venture for ecommerce; Looking at providing an opportunity for visitors to leave comments.*

Three said they either already had ecommerce working on their sites or were near completing their first ecommerce application. One site said they lost out by being too early into it. One organisation reported that they were '*constrained by local authority guidelines on what they could and could not do on their site....not allowed to do transactions on our website*'.

The proposed uses of ecommerce were varied. Most proposed selling art and

artworks, either owned or on commission. The next most popular proposal was photographs. Other proposed uses were space hire for exhibitions, donations, souvenirs and online bookings. One museum said it might use ecommerce for *'selling catalogues and exhibition merchandise but specifically not artworks'*. One museum saw the main use as the sale of surplus assets.

Describe the processes you went through in developing the website.

This question was designed to allow the respondent to bring out the issues that they thought had been important in designing their website by allowing the site owner to develop the story in their own way, without constraining them with questions about specific issues.

The respondents reported a wide range of experiences leading up to the websites' creation. Some of the development experiences were decidedly amateurish. In one museum *'the original staff member has left and no one knows who created the website'*. One museum remarked that *'whoever showed an interest was put in charge of developing it whether they had any training or not'*. One said their site was developed by the curator with *'help from a friend's son'*. Three said they had had enough staff expertise to build it, and two used staff expertise to design the site, but got professionals to take over from there. Six of the fourteen used contractors from the start, although there was a definite move towards taking control of at least the routine changes after that. Several respondents said that the website was developed in conjunction with schools or universities. One site had a complex history of being started by university students, then corrected by a contractor who turned out to be not much better and then finally taken over by a university student project again.

It was discovered that several museums had actually bought their websites ready made. These had been produced speculatively by internet programming entrepreneurs using public information for the content. The programmer then contacted the museums and offered to sell them the site as it stood. These were of course technically excellent, but reflected the programmer's interpretation of what a museum website should be.

Has the website delivered in terms of your initial expectations?

This question was asked to determine whether the restricted functionality of the websites was due to the site owners' not knowing any better, or if the owners in fact

wanted better sites but were prevented for creating them for some reason. It turned out that many owners had no particular goals in mind when they started building their website, or rather, any goals they had were not well articulated, and so they were unable to assess their sites' success objectively.

However, only two of the organisations said they felt disappointed and had not found the benefits they expected. One of these reported few hits, and felt unhappy with the lack of feedback. This principally was frustration at *'not being in control, not knowing who was using the site, or what people really wanted'*. Three sites were unclear as to whether it had or would match expectations. This is perhaps because, like two other sites, they had low initial expectations. The number of hits on a site was not a good indicator of satisfaction. One site said it had good hits, and was pleased to have the site, even though there was *'no clear evidence of any benefit'*. Another reported good hits, but had no verbal feedback on the site. Two sites mentioned the difficulty of getting listings on search engines, and feeling that they were not visible at all. One actually asked '*How did you find us?*'.

Six sites said the initial site had met their expectations. However, three of these said that they were no longer as pleased as they had been, and that their sites needed upgrading to reflect what they had learned, and to take advantage of changes in technology. It was reported that the websites were working for certain functions and not others. One organisation said *'the site has been successful in selling from the collection, but not in terms of education'*. Another said *'emails are coming in from the USA, but not from NZ'*, and *'Only overseas people are using the online guestbook'*, probably reflecting the relative distribution of internet access facilities at the time. One site had experienced positive results on one goal, but had not succeeded in the other. Overall, only one site gave an unqualified 'Yes' to this question.

What benefits has your organisation had from having a website?

This question was asked to find out whether the websites, although not as sophisticated as they could be, were in fact good enough, and that the prototype site design might be over-specified.

Some respondents saw a clear benefit from their sites but others either saw no benefits or mentioned drawbacks associated with having a site. None of the organisations were keeping records of how their websites were being used or

recording direct income associated with them. Only one gallery said they thought there was increased visitation due to the website.

Indirect benefits: Not all the sites were set up with business objectives in mind so some of the benefits mentioned were indirect. One respondent said '*being involved was great fun*', and several mentioned their '*new computer skills*'. Several were able to utilise the website to encourage internal discussion of museum strategy and direction.

Direct Benefits: Those quoted included: Not having to produce information packs, people could get what they needed from the website; Raising awareness of mission at very low cost; Has attracted people interested in facility hire; Another forum for advertising events; Other galleries don't have a website - this attracts artists to our gallery; Encourages direct contact to other interested parties through email; and Shop site has been working well, with many internet shoppers making purchases.

Unquantifiable Benefits: Many of the benefits mentioned by respondents were non quantifiable. Some had to do with perceived image such as improved status in business, e.g. '*URL printed on stationery, leading people to think the organisation is bigger than it is*'. Others included: '*Increased customer awareness; Benefit purely from having a presence on the Internet; Encouraged links with schools through a web camera; Cheap advertising, but wondered if it was hitting the target; Sponsors appreciate being mentioned on the site and having links there; Better international presence; Makes the organisation more approachable and accessible; Pleases artists to know they have global exposure; Ability to archive material for easy public access.*'

Drawbacks mentioned were: Doubts about the design; Concerns about lack of control of search engine placement; Worries about the upgrades to ecommerce '*maintenance is very demanding – big job keeping it current*'.

Several respondents wondered if their site was '*reaching the wrong people*' or sending the wrong message. Others questioned the usefulness of getting so many overseas enquiries which were unlikely to translate into visits. Then there was the problem that increased exposure meant increased exposure to people they would rather didn't contact them – in the gallery's case unsuccessful artists wanting exhibitions. Other respondents mentioned growing numbers of school project

enquiries becoming a nuisance.

What are your future plans for the website?

This question was designed as a check question on ecommerce intentions, but also had the potential to find any functionality that had not been identified in the prototype design process.

Seven respondents stated that they intended to expand or redesign the site as their first priority: enhancements included searchable databases and improved keywording. The commonest response was a resolve to tidy up the site, make navigation easier. The bulk of the future intentions were about ecommerce. Five respondents name ecommerce directly and six ecommerce activities were mentioned as being planned, making ecommerce the common goal of more than half the respondents. Activities mentioned included online shopping and online bookings. The respondents were also clearly aware of the opportunities for relationship management. Among those specifically mentioned were friends, guestbook, memberships, e-newsletter and an email database. Two respondents had plans to integrate more closely with other sites, particularly with government departments. One respondent was considering hiring a full time developer. The only specific problem mentioned in moving towards ecommerce was lack of funding from sponsors.

If you had to do it all again, what would you do differently?

This was another check question to confirm whether the museums were content with their websites as they were, or whether they wished they had been able to develop a different site. It was expected that most respondents would have clear ideas about what had gone wrong and where they would improve things. In fact most respondents said they were still too close to the process and had not had the chance to stand back and examine their experience. This was unexpected given that the median age of the sites was three years.

The main finding were that if they had to do it again they would spend more time on planning the sites, the structure, the look and feel, and personalising the visitor's experience, rather than concentrating on the technical aspects. Only two organisations said they would not have done anything differently, except they regretted not having the information they have now.

It was clear that better planning rather than iterative growth would have been

preferred. '*Begin with a formal strategic plan outlining the vision and purpose of all electronic media in the Gallery*', said one. '*Plan the website's development into a comprehensive holistic communications/marketing strategy with a three year process with clearly defined six monthly steps and checkable outcomes*' said another.

Five said they would '*spend more time planning the design to start with*', and possibly '*examine other sites more closely*'. Most also said that they would have planned a bigger site, with more pages and better able to be upgraded to ecommerce later.

The concept of personalisation and relationship building was mentioned. Several sites wanted to '*make the visit more personal*', to engage the visitor and '*encourage interaction*'. Features mentioned included showing the organisation's history and staff background.

A common theme was the need to not let the technology drive you, to only use features which contribute positively to the site's function. One organisation said next time they would not allow themselves to get driven to '*get it up there*' instead of thinking from the user's point of view. Similarly, another museum said they would '*spend more time informing other business units of what they were doing and trying to tie the website into their current business processes rather than just concentrating on the technical issues*'.

5.4.4 Resolving the differences

The survey of museum website owners fully explained why their websites did not match the logical model created from the prototyping process. The functionality model predicted that the museum websites would show each of the functions, but only those functions, and give approximately equal prominence to each of them. In fact the empirical test showed that in terms of balance between the functions, the websites diverged widely from the predicted model. As the analysis above shows, in most cases the design that the website owners had arrived at was not the result of careful planning or the outcome of evolutionary pressures to improve. Rather the designs were the outcome of serendipity, chance and opportunistic resource availability. It appears that only two of the thirty two organisations (Te Papa and Wellington Museum of City and Sea), had actually started their websites with a formal plan and followed accepted software industry standards. The others grew in

a haphazard fashion with no strong guiding principles. This explained why the websites lacked many of the features expected, particularly the more sophisticated features, and why there was such variance in the prominence of the different features. The interviews showed that the museums and galleries were aware of the importance of relationship management and ecommerce, and would have incorporated them if they had been able to. The prototype model was therefore validated and had proved its suitability. It was demonstrated that a participative methodology based on a strictly logical view of requirements was sufficient to produce the correct requirements analysis. However, the telephone interviews showed that there would always be a strong human element involved, and that the methodology itself needed to incorporate the guidelines found.

5.4.5 Updating the methodology

Analysing the responses from the telephone survey provided an additional guide to good practice in community design. The comments of the museum managers were used to revise the understanding of heritage organisation abilities and attitudes, and to update the methodology. The main points arising were that the methodology:

a) needs to incorporate a central planning function from the start. In the sites examined lack of planning and opportunistic site creation has led to a situation where museums and galleries are now facing an ongoing problem of maintaining those sites. They also reported a lack of confidence in the design they eventually arrived at. In addition the museums reported needing to rethink their site navigation. This can be avoided by having a predefined site navigation style.

b) needs to be able to reflect multiple objectives, and be able to absorb poorly articulated objectives. Most of the respondents reported that their objectives for their sites changed over time or were developed as the site developed. The design methodology needs to automatically allow multiple viewpoints.

c) needs to recognise and allow for the lack of technology expertise within the client organisation. The methodology needs to be based on a technology which is scalable and not likely to change radically over the medium term and thus avoids the need for continuous upgrades. The museum staff were not in a position to identify opportunities from changing technology and were not able to integrate newer technology without external help.

d) must incorporate ecommerce from the start. Ecommerce failed in the organisations analysed because ecommerce was seen as an add-on, something to be developed later. Little thought was given to the need for internal procedures for handling enquiries and offers received. Ecommerce needs to be included as an integral part of the Internet marketing strategy. Similarly, relationship management must form a part of the original specification.

e) must be capable of showing a clear cost/benefit balance. Income needs to be traceable and the benefits of the website should be clearly demonstrable.

f) needs to emphasise the interaction with staff. Where the museum staff had been involved in the design process they reported how much they had enjoyed the process of design and their personal learning outcomes.

These insights were incorporated into the methodology for the second phase of the prototyping stage: applying the methodology to more complex situations.

5.5 Summary

In order to test the validity of the generic ecommerce model a survey of existing websites of NZ museums and galleries was undertaken. For this survey a logical model of a heritage website was defined, and then the thirty-two websites were checked to see if they conformed to the generic model produced by the methodology. The outcome of the analysis was an empirical model showing how heritage industry websites are actually organised. This empirical model agreed in functionality with the generic model, but the emphasis and implementation of many functions differed significantly. The differences were large enough to warrant an investigation of why they occurred so another investigation, a telephone survey, was undertaken to establish why the differences were there. The outcome of this second survey was an insight into factors affecting the planning, implementation and maintenance of museum and gallery websites. The overall conclusion was that the empirical findings were not at odds with the generic model derived from the methodology. The designs used by the various museums and galleries were the results of poor planning and execution, or of allowing non-specialist staff to take control of the design process.

The results of the second analysis allowed the research to go forward, confident that the methodology was in fact producing a viable and sustainable community

based ecommerce model.

The next chapter reports on the subsequent stage of the development when the methodology was used to implement community ecommerce in larger and more complex organisations.

Chapter 6:

Extending the Community Methodology

6.1 Introduction

This chapter describes the process of applying and extending the design methodology developed in the previous chapters. Chapter four showed how a successful website design could be created using a community-oriented design methodology and chapter five showed that the generic ecommerce model was valid. The next stage was therefore to test the validity of the methodology in other community situations.

Community Informatics is usually concerned with development in remote communities, but CI can also be applied to other types of community. In particular many businesses are actually symbiotic collections of smaller businesses which act together to provide a service or product. Anything which makes the interaction between these individual businesses easier will contribute to the overall efficiency and profitability of the whole community. Similarly, many large organisations also have communities of practice within their workforce, groups of employees who regard themselves as being part of a community. The extension of the methodology was developed in two parts: developing a virtual business community, and developing internet portals for business communities.

The process of implementation in both cases resulted in new insights into to the process and led to the methodology being modified. It was shown that deriving a

design for a successful community ecommerce business model was straightforward, but in each case non-technical factors influenced the final outcome. It was therefore necessary to change the methodology itself in parallel with the changes made to the generic model. Section 6.3 describes the Hotel Portals case and details the revised methodology used which was then applied to the community informatics cases in the next part of this research.

6.1.1 The Portal cases

In order to further extend the methodology two cases were chosen which represented two extremes of community applications: one was for a purely virtual community consisting entirely of network relationships (see 6.2); the other situation involved two long established hotels (see 6.3) where the hotel was the hub of a community of small businesses. For the virtual community, the Spa Association of New Zealand, the challenge was to create a community where no community had existed before, to develop a methodology that could use IT to link remote operators and create a feeling of solidarity amongst them. For the hotel portals, the challenge was to integrate an unknown number of possible partner businesses so that they could continue as independent entities, but form a single online community when they chose to.

6.2 The SPANZ case

The health spa industry was the earliest form of organised tourism in New Zealand, starting in the mid nineteenth century when visitors were taken to Rotorua to view and enjoy the hot springs. However, the spa industry has been slow to capitalise on its early advantage. There was no national association for spa operators and no coordinated industry wide marketing. The typical spa operation in New Zealand is independent and geographically isolated. There are some clusters of operators in close proximity such as in Rotorua, and there are a few large operators such as Polynesian Pools and DeBretts, but in general, spa industry outlets are small and scattered. This poses a fundamental problem for the development of a coordinated NZ-wide spa industry. In order for the industry to attract more visitors, both domestic and overseas, it has long been recognised that it is necessary to make the NZ's spa facilities better known. At various spa industry conferences over the years, speakers advanced their belief that this was best done jointly, rather than

independently. However, all attempts to form a central body for the industry had failed, despite bright hopes at the outset.

In a determined effort to create such a coordinating organisation the City Council of Rotorua was instrumental in arranging a meeting of the principal spa operators, held in Rotorua in 2001. At that meeting, chaired by the Rotorua Development Office, the attendees pledged to support the formation of a national organisation to be known as the Spa Association of New Zealand (SPANZ). This was to be a voluntary association of spa and health clinic operators who wanted to form a national body to promote their various commercial interests. Prior to this meeting the researcher had been in discussions with the Rotorua Development Office and had outlined ways in which a community based methodology could create a viable solution. At the meeting it was demonstrated how internet technology could offer a way of creating a virtual community of spa operators, so that each spa operator could maintain their independence but still act jointly. The concept of a virtual community is being applied to communities worldwide (Lee, Vogel and Limayem 2003), and have been shown to be able to increase living standards by providing functions for relationship building and knowledge sharing (Bieber et al 2002).

After establishing that there was support for an association, a proposal was put forward to build an internet portal for SPANZ members using the methodology being developed in this research. A portal is a website that is designed to act as a gateway to other websites. Portals have been shown to attract large numbers of visitors and to retain them for longer (Tatnall, Burgess and Singh 2004). The portal would use the Internet to create an online business community linking members, customers, suppliers, government agencies and others with an interest in the spa business. This portal proposal was agreed to by a large majority of the spa operators present. A leading personality in the industry undertook to support the project firstly by becoming chairman of the steering committee, and secondly by undertaking to be proactive in its development and keep the operators involved. On this endorsement the project got underway.

6.2.1 Designing the business model

The spa industry is actually a community of businesses and operates within a network of mutual interest and obligations, involving not only customers and

suppliers but also less obvious partners such as investors, regulators and government. The design envisaged a multi-purpose website addressing the requirements of the various stakeholders. The only major departure from the previous design would be the provision of information about the site itself and how it was organised. For direct customer marketing purposes the website would be a single entry point for visitors interested in NZ spas. This section would allow a person browsing the site to see all NZ spas marked on a map and be able to click on individual areas. This would allow the visitor to drill down to the spa operator's existing website (or a generic SPANZ webpage for any member who did not have an individual web presence). It would have links to every independent operator's website; a directory of all spas in NZ; a classified guide to spas by type; and a regional guide. For the casual browser there would be a web ring: each spa site has a pointer to the next spa site in a ring, so that visitors can follow the links and eventually visit all NZ spa sites. Other parts of the site would promote spa tourism - spas as therapy; spas as holiday centres; spas as lifestyle retreats; and reflect the diversity of spa offerings with suggested itineraries and travel and accommodation connections. A section would deal with the history of spas in NZ and provide a photo gallery. Longer term, the website would be further developed to offer spa trails, and other cooperative marketing ventures. Ecommerce income generation in the first instance would be left to the individual operators who could use the portal to sell herbal bath products or other proprietary items.

As well as normal marketing functions, since this was to be an industry representative site, there would need to be a separate business section. This would provide basic facts about the NZ spa industry; a one stop resource for the media and other interested bodies. It would act as a national representation, a single point where national and local government and agencies can access information about the spa industry.

Combined purchasing would be a longer term option. Once the membership had come together into a working community, they jointly would be able to command considerable strength in the marketplace. A joint purchasing function could result in centralised tendering for pool chemicals, spa machinery, cosmetics etc. The theme of business networking would be carried through with joint publicity and industry newsletters aimed at government agencies, community leaders, suppliers and other partner organisations not directly involved in the spa industry. Thus all

the functionality identified in the ecommerce generic model would be implemented in one form or another.

The logical requirements of an ecommerce business model for the Spa Association were not difficult to determine. Discussions at the meetings and interviews with selected spa operators quickly defined an outline set of requirements. All of the elements identified in the original prototype design would need to be present, suitably modified to match the specific situation of the Spa Association.

The architecture of the generic model had to be extended from that used in the KMB case. The KMB model was based on a single organisation; the SPANZ case, and other cases in this research, was more complex. The generic website model was extended to allow the inclusion of multiple organisations. The overall architecture would have a core set of web pages which featured the organisation, provided the marketing functions and delivered information needed by customers as per the KMB model. The difference was that multiple external organisations needed to be featured independently as well. This was to be implemented by providing each organisation with a standardised web page that gave brief details about that organisation and would link to the core organisation web pages and to other external organisations' web pages. Conceptually, the Spa Association internal website would act as portal for the individual spa operators. The portal would attract and inform visitors and then lead the visitor the appropriate operator's web page.

Bearing in mind the design guidelines established in chapter four the methodology was modified to allow a different approach in the SPANZ design. The methodology had to follow an architectural plan from the outset, be capable of handling conflicting objectives, and include elements of ecommerce from the start. It also had to be highly interactive, but not rely on the members for expertise, especially on how the final application would work, and needed to find a way to overcome the potential problem of generating material for the web pages.

Implementing the design methodology in this case immediately ran up against a number of challenges: the spa owners knew how to run their own individual businesses but did not have a clear concept of what a national association internet portal might look like; it was also difficult for them to interact with each other since their businesses were scattered throughout the country.

6.2.2 Reaching the community

There were many possible strategies which could be used to implement the community site for the Spa Association. The Internet is at heart a communications device, and its primary advantage for business is its ability to create relationships and networks of people. The Internet offers the ability to display pictures and text, to receive orders, to coordinate operations, to exchange gossip and to share knowledge - all of which can be utilised to contribute to a community relationship. However, a community website requires a community. It was therefore necessary to devise a way to use the methodology to create a community out of a collection of independent businesses.

The community building method adopted was based on email. Email would allow even the most remote parts of the industry to keep in touch with each other. Using standard email, SPANZ could send formal news and developments direct to members. Informally, members would reach each other and build relationships via a forum tool. At the time of the research email lists were just starting to become an accepted part of internet portals and available as off-the-shelf software. It has since become the most popular tool used in virtual communities (Lee at al 2003). An email forum is an internet program that allows email discussions between any number of participants. Members would go to a web page where they can post a question or opinion: then others can see that question and respond to it. This creates a thread of subsequent responses until the question runs out of interest. Several threads can be running simultaneously. The forum automatically manages an archive of past threads, and a weekly digest. People can choose to log on to the site daily to see what is being discussed and join in or not as they feel like it, or can choose to have the digest of the previous week's postings emailed to them once a week.

The forum reinforced the central concept of networking between the members. The idea was that once the social network was in place and became a regular part the individual operator's routine, it would allow the industry to start to build a joint identity, to develop as a community of businesses. Once that was achieved, contributions from members could be used for various purposes: to fill out the web pages; to build a knowledge base; a problem solving clinic; undertake joint research; or share experience from business.

6.2.3 Implementing the Spa community site

In order to build the core website the content for the web pages had to be created. The lessons from the KMB case made it clear that responsibility for the website needs to be placed with the client community. The researcher therefore did not undertake to collect general health spa information but transferred the task to the membership. The KMB case has shown that commitment from the community was essential, so asking the community to provide the webpage materials would be an early indicator of whether the required level of commitment was there or not.
The first step in getting the Spa Association members involved in the site building process was to get them to design the site. This was to be done in three phases: create the email forum and stimulate discussion and interest; send out a questionnaire to determine what functionality the members wanted; and finally build the site with members' online participation, with them supplying ideas and materials to be integrated into the site's web pages. The plan was presented at a second meeting of spa operators and after some discussion was approved and authorised to go ahead.

Phase one

Phase one was implemented on schedule: the forum was created and the URL address was emailed to all members. There was an initial flurry of interest when the members had a first look at the site and tried out the software. Some members posted questions or observations successfully, proving that the mechanics of the forum worked. However, after a few days it became clear that the forum was not performing as expected. There were very few new postings, and almost no responses to those. The software had been successfully tested by other groups so there was no question about usability. A telephone enquiry to members revealed that they thought '*the forum is a good idea, but there is nothing for me on it*'. It was basically empty, and without a constant supply of postings there was no reason why the members should log on to it. Most had dial up connections, and as well as the time and inconvenience, were being '*disappointed every time I logged on*'.
To overcome this problem a new communications strategy was applied. Each week a provocative or controversial item was posted to the forum by the researcher as bait for responses. The idea was to encourage the members to post something as an immediate reaction and thus induce them to use the forum more often. The strategy

worked in that it did generate, briefly, a few more responses, but it did not stimulate the members to post discussion topics independently. As soon as the centrally posted items stopped, so did the forum activity.

Phase two

It was decided to launch phase two immediately in the hope that the activity associated with the questionnaire would rekindle interest and posting some of the responses on the forum would provide material for discussion and finally allow it to reach critical mass. The questionnaire was sent out several weeks after the forum had been launched. It was well designed, of reasonable length and asked pertinent questions, but after five weeks and two reminders, only a handful of questionnaires had been returned. This was particularly puzzling since the questionnaire had been specifically asked for by the conference delegates, all of whom had demonstrated enough motivation to have personally paid fees to be at the meeting. To try to understand the poor response, every committee member was telephoned and urged to complete the questionnaire, but this did not work either - not even the chairman of the committee got around to answering it. The forum was left in place for some months but it fell into disuse, and the original handful of questionnaires was all that ever eventuated. As a consequence the spa industry community did not take off, and so the third phase, site building, was never reached.

6.2.4 Methodology developments from the SPANZ case

Even though the SPANZ portal did not eventuate, it provided valuable experience for the community design methodology. As far as could be determined, this approach failed because although every member thought it was a good idea, no one was going to get any direct benefit immediately. No one felt personally responsible for its success. Everyone could see the benefits; everyone would use it when built; but no one was willing spend time on something that was incomplete. The key issue was that the community never formed and so a community communication mechanism was not seen as important or helpful.

Discussions with members of SPANZ over the following months provided indicators as to why the association never gelled.

a) Community building

Other than at the meetings to set up the Spa Association, most of the members had never met each other and were accustomed to working independently. The

proposed association was meant to be the means of consolidating the members' interests and creating a sense of shared purpose but this feeling never eventuated. Once the members went back to their own locations it was very hard for them to feel they were part of any community. It appears that when they were invited to participate in the email forum and to give their views in the questionnaire there was no motivation to contribute to the community because they did not feel like part of a community. The methodology therefore developed deliberate procedures to foster community building and to encourage members to feel part of a community when interacting with the researcher and with each other.

b) Project Champion

Perhaps the most crucial omission in the case was the failure to recruit and retain a project champion. The elected chairperson could and should have fulfilled that role but pressures of business kept him away. Without a prominent figure to lead the project and keep the momentum going the project gradually lost its focus. It is outside the scope of the methodology to create such a champion but it became a requirement of the methodology to try to identify a suitable champion early in the design process.

c) Conflicting agendas

Allied to the factionalism was the lack of a committed champion, someone to lead the industry and forge alliances between the various parties. It appeared that there were more agendas in play than were at first apparent. One member remarked '*Too many in the industry want to be in charge, but nobody wants to be responsible*'. There appeared to be several conflicting views of what a spa association should foster. There are many different theoretical approaches to health spa therapy, and deeply held beliefs about what spas should and should not offer. Some members wanted to follow a strict medical model, others say health spas as part of the health and beauty industry. These differences translated into quiet but determined power struggles between the various schools of thought. One faction went off and registered their own spa association name and others worked against the portal, since its success would necessarily impose a de facto view on the industry that would be difficult to dislodge.

e) Time Availability

Time and availability was another issue '*Everyone wants to see the benefits, and everyone is willing to pitch in from time to time, but the guys are too busy running their own [business] to let themselves be tied down to doing certain things at certain times*'. This echoed the experience with the Katherine Mansfield Birthplace project in that it was unrealistic to expect busy people to give up their time for no personal gain.

After this case was concluded the issues of conflicting agendas and time pressures were considered under the reflection and planning stages of the action research cycle and used to redesign a new version of the methodology. It was recognised that while the basic ecommerce model developed for the KMB (chapter 4) had proven to be adequate for SPANZ, the methodology for implementing it had not succeeded in either case. The initial stages were redesigned and strengthened to put more emphasis on creating a rapport between the key members in the case situation and the researcher, and getting greater commitment from the community before moving on the programming stage. The issue of time availability was tackled by avoiding the requirement for people to create their own content directly. In order to simplify content creation, it was proposed to use templates wherever possible and synthesise content by combining answers to standard questions. In this way community members would not be left to their own resources but could use a predetermined structure to shape their responses. These two enhancements were built into the next version of the methodology and tested in the hotel portals cases. The following section describes how the amendments performed in practice, and section 6.4 describes the revised version of the methodology in detail.

6.3 The Hotel Portal cases

The next stage in the development of the methodology consisted of designing and building community based ecommerce sites for two hotels. One was a major hotel in Rotorua and the other was a large hotel in the Wairarapa. Both were important employers in their respective communities and both were long established successful businesses. The Rotorua hotel was an independently owned part of an international chain. The Wairarapa hotel was also part of a franchised chain but

was actually owned by a non-profit licensing trust and had more of a family business feel to it, with the majority of staff having worked there for many years. Examination of the immediate business environment showed that each hotel had a major influence in their local area and exerted considerable economic influence. As well as being major employers, they were the focus for many smaller businesses such as coach and taxi companies, food and drink suppliers, events organisers, conference planners and so on.

6.3.1 Designing the business model

The design strategy attempted to capitalise on the community aspects of the hotels' operations. The basic plan was an extension of the business model developed for the SPANZ portal. The implementation was to begin by building a high quality standalone website for each hotel, using the revised methodology described in above. The second stage would then develop that initial website as a hub for their respective communities. The business model called for the hotel to act as a focal point for the local community, to channel the customers of the myriad of small businesses through the hotel by acting as an internet portal for them.

For example, the Wairarapa hotel is located near many notable vineyards. In the main hotel website there would be a section devoted to the restaurant, showing this week's menu. Associated with each dish would be a wine from a local vineyard. The potential guest would be able to click on the wine suggestion and be linked to the vineyard's home page, to learn more about the wine and the vineyard. The benefit to the vineyard is obvious, but the hotel actually benefits as well because the vineyard's home page would be hosted on the hotel's website. Anyone wanting to access the vineyard's home page would have to go through the hotel's website and so become aware of the hotel's existence and possibly be tempted to stay. The same would be true of every vineyard in the area. Creating web pages for all of the smaller businesses makes the hotel site into a portal for the whole area, and the more small businesses that are listed on the site the more valuable and economically attractive the hotel site becomes. For example, if every small business in the immediate area was listed on the hotel website, then anyone needing any kind of tourism related service would visit the hotel site first in order to access that company's home page. In this way, by being altruistic the hotel makes itself an indispensable portal for the whole community. It also gets a first

mover advantage. A small business really only needs one web page, and if it is created and maintained on the hotel portal then the small business has no incentive to move the page to anywhere else, thus binding the small business into a continuing relationship with the hotel and shutting out any rival trying to offer the same thing. The management of each hotel endorsed idea of the portal business model and committed themselves to supporting it during development.

The standalone website part of the portal architecture incorporated all of the functions of the generic model. The sites gave details of where the hotels were located, the facilities available and allowed potential guests to view the rooms, public spaces and grounds. In particular, the community hub feature of the portal design reinforced the relationships aspects of the generic model. Ecommerce is fundamental to the portal concept and other parts of the website were used to fulfil all the requirements for information provision. Although not set up for full online booking, guests could contact the reception by email and find out most of the things they needed from the site. For marketing purposes the portal model offers many opportunities. For example the restaurant page can feature the chef talking about the 'Special of the Week'. By changing the special dish weekly and publishing the recipe this would attract repeat visits by potential customers, satisfying the requirement to give the customer a reason for visiting the site regularly. In that recipe the chef could feature local fresh produce, giving a link to the producer, and thus emphasising the freshness and uniqueness of their supplies and continually driving traffic to associated businesses. It also gave immediate savings in the provision of brochures and itineraries since these could be provided for downloading by the prospective customer.

6.4 The methodology in action

The implementation methodology had been created in the KMB case and then refined in the light of the museum managers' comments, and refined again following the SPANZ case. The procedure shown below outlines the methodology as applied to the hotel portals. The procedure itself went through many revisions as the methodology was applied in various iterations, so the form shown below was that finally defined after the experiences from the portal case itself was included. The steps are shown as linear but in practice they are not always applied in order and some are done simultaneously with others.

6.4.1 Building the portal first stage

a) Obtaining Management Buy-in

The key person on the staff was briefed on the research project's aims and objectives, and asked if their organisation would be willing to participate in the research by having an ecommerce website built for them using the research methodology. Once agreement was reached a series of meeting were set up. The first meeting was usually between the senior manager and one or two of their senior staff, usually including the marketing manager. This small group was shown the research and the expected outcome was described.

b) Ensuring Management Participation

This normally led to a second meeting at which a larger group of management staff were present and this group were then also briefed about the project. This meeting was used to clarify the objectives of the website and to meet any objections that might be raised. When general consensus had been obtained the group would be introduced to the idea of participative design and asked to work collectively or in small groups on a rich picture showing their ideas about the opportunities and constraints of the project. This always brought up further issues. These were discussed by the whole group and further changes made to the outline business design. The process sometimes was completed in the meeting and at other times carried on over several meetings. The use of the rich picture was intuitive and easily accepted by the managers present. The subsystems identified by the rich picture were discussed in outline but no attempt was made to create a formal root definition.

c) Keeping a single focus

The rich picture exercise was used to partition the problems and clearly identify which relevant systems would be included in the project, and which were outside its scope. Once this was done the managers were encouraged to identify themselves with one or more of the relevant systems in order to get a commitment from them to assist in its development, but this seldom worked and was subsequently dropped. For each subsystem explicit deliverables were defined and agreed. This often resulted in a fresh round of debate and ideas as general concepts were translated into specifics. During this part of the design stage the scope of output was constantly redefined to prevent function creep. Curbing staff enthusiasm was a

constant issue, as once they began to see the possibilities of an online site they continually came up with more and more extensions to the project.

d) Building Rapport

Once the general outline of the design had been accepted by the management team, they were introduced to the internet technology. As the cases progressed the extent of this interaction was increased. It was found that the best method was to encourage all members of the management team to learn how to produce a simple home page for themselves. This was done one on one or in small groups with the researcher leading the manager through the steps of creating a web page with text and photographs, and explaining concepts as they arose. This process allowed the senior management to interact one on one with the researcher in a supportive environment and had the effect of allowing the managers to ask questions freely in a non-threatening environment. It proved an especially good way to allow senior managers to get comfortable with the technology without looking unprepared in front of other staff. Using education as an entry point to participation also meant that it also allowed the researcher time with the senior in a natural role and encouraged two way interaction, so that the researcher could also ask pertinent questions in a non-threatening context. More importantly it allowed the researcher to build rapport with the managers and to gain an insight into the workings of the business. As the senior staff got to know what the technology could do and how easy it was to create a website their enthusiasm increased and they become more open to the idea of allowing operations staff to become involved.

This part of the design process proved to be extremely valuable as it built lasting relationships and understandings between the researcher and managers at all levels.

e) Involving non-management staff

Once the management team were happy with the concept of the website the other staff were invited to meetings to have the research explained to them. This was done in groups or singly, in formal meetings or at their workplace, depending on what was most convenient to them. Computers and a data projector were taken on site to the hotels and a mini-classroom set up where the staff could be led gently through the procedure for designing and programming a home page for themselves. The whole project was explained from the beginning and the relevant systems to be computerised were identified and described. The staff were invited to participate in

the creation of the website and the various ways that they could contribute were discussed. In all cases the staff were enthusiastic about the project and welcomed the chance to be involved.

f) Workloads

The management and staff were fully involved in the conceptual design of the business model with the object of heading off any resistance before it had a chance to start. Part of the strategy was to ensure that the staff did not form the impression that they would have extra workloads imposed on them, and that all contributions were voluntary.

g) Content creation

Most of the content for the websites was collected from existing publicity and marketing material, but some had to be created for particular web pages. At first the staff were asked directly to produce this material, but this proved problematic. A better method of creating content was introduced after the first two cases. It was discovered that people are not good at creating written material unaided, but that almost everyone finds it easy to fill in a template when the requirements are broken down into small sections which specify exactly what is wanted. In later cases this principle was extended by presenting the user with an internet form where all they had to do was answer questions on screen when prompted and their answers went into a database and then were used to generate their own web page.

h) Personalisation

The process of gathering images and text from staff and suppliers served as a precursor to the 'web-raising' strategy developed later on. The template method of involving the staff and suppliers encouraged them to come up with short pieces of content which were fresh and relevant without taking up a lot of their time. The use of good quality but non-professional digital photos also gave an immediacy and intimacy to the site which professional photographs did not. The text and photographs were used to create web pages featuring members of staff such as the chef which gave a feeling of warmth and personal relationships.

i) Equity and Equality

Early on in the prototyping process it became clear that some of the community members were conscious of the implied status of being featured on the website. In

order to avoid issues of this type the methodology used templates wherever possible so that every person and every organisation would be equally prominent. Those who had developed their own resources such as their own websites were able to put a link on their community page, but other wise every page was identical in form and content.

j) Portal concept

The portal concept that was first explored in the SPANZ case proved to be an essential concept for the methodology. By visualising the ecommerce website as a portal, all members of the community could orient themselves within the concept of the community and see exactly where they or their family, or workgroup, or personal enterprise fitted in. It also encouraged members to think in terms of progression, that they might at some future time migrate to being a discrete node in the portal rather than sharing one with others, and thus there was a development path waiting for them. The separate page devoted to each supplier was a useful innovation which influenced the design of the methodology. By using the template concept any number of businesses could be associated with one core business, or even associated with a notional core business such as a community which might not actually have any physical existence.

k) Matching and pacing

The prototyping method used in developing the websites uses a process of iteration, making changes and checking back with the client for comment and then making more changes in the light of those comments. When building the ecommerce websites, because the same basic model was being re-used, some of the repeat visits were not strictly necessary from a programming point of view. However, the extra repeat visits were made because they did allow the researcher to introduce the evolving website in stages to ensure that the speed of development did not outpace the speed at which the organisation could absorb the changes.

l) Community Building

The methodology was fully participative in all stages. This was to ensure that the design incorporated all the relevant factors, and to avoid any resistance by ensuring that everyone was consulted and that their views were respected, even if not acted upon. The other reason for the insistence on participation and consultation was to give the community some common point to interest, something they could focus on

that was being done for the benefit of the whole community. By using this mechanism, the process of community building was fostered as members exchanged views and came to see that they were an important part of a larger community project. The use of education as a strategy for introducing the IT to individuals had the effect of building familiarity and rapport between the member and the researcher, but it also gave members an experience they could share with each other and find common interest in. The process of gradually introducing more of the members to the technology at each subsequent visit meant that some members regarded themselves as more experienced than others and had a natural inclination to offer advice and instruction to those who had yet to be introduced. By ensuring that the more senior members of each community were the ones introduced first their status in the project reinforced and ensured that they would feel comfortable discussing the project with other members from a perceived position of strength.

m) Action Research

Throughout the prototyping process the principles of action research were followed. Although not formally laid out, in each case the cycle of action research guided the detailed activity and the action stages of planning, implementation, evaluation and reflection were consistently applied to the situation being studied. The implementation and evaluations stages were always done using the precepts of the Checkland methodology, particularly the use of rich pictures as a communication and participation tool.

By using the standard ecommerce model in all cases the researcher was able to concentrate on refining the development process and to use that to evolve the community methodology. The methodology described above conceptually involved two cycles. The outer cycle managed the entire process of creating the methodology within the action research model, going through each of the stages of diagnosis, planning, taking action, evaluation of the results and reflection on what action to take next. Within this cycle, each individual stage was treated as an action research project carried out using the techniques and concepts of soft systems analysis, at all times paying attention to the human aspects of the design and mindful of the possible impacts on other stages.

While applying individual techniques such as rich pictures and encouraging community members to identify relevant systems, the was a continuous conscious effort to find ways of building rapport and encouraging the creation of a community spirit, by going through a cycle of seeking resistance, noting the underlying causes, explaining the situation and incorporating a way of avoiding the problem into the next interaction. In this way the methodology grew and evolved into something that sought out human centred issues as a normal and inevitable part of the community process and thereby strengthened itself.

6.4.2 Building the standalone website

Overall, the information gathering part of the design process went smoothly. The management staff were able to provide basic information about the hotel and its activities so identifying the logical requirements was relatively straightforward. Managers from different parts of the hotel's operations were interviewed and helped to create and critique rich pictures summarising the objectives of the portal website. Basic information was collected from brochures and guest information sheets. As the information was gathered and checked it was incorporated into the prototype website pages and these were forwarded to the hotels for comment and correction, and as before, progress was made iteratively and no faster than the hotels could absorb it. There were several visits to each hotel to clarify points and to get decisions on points affecting the design and operation of the websites. In a precursor to the 'web-raising' strategy developed later, each visit was used as an opportunity to take digital photos for the website and its photo galleries. Using the methodology proved to be easy and flexible. The management of both hotels were very pleased with the standalone websites created for them in the first phase and were continually making suggestions for upgrading theirs.

6.4.3 Moving towards the portal second stage

Adopting the portal concept was aimed at capitalising on the communities associated with the hotels. Both hotels had two communities in common: the staff community and the community of local businesses. Part of the task of the methodology was to enable these to go online, but also to a certain extent to create and sustain those communities.

Once the main hotel sites had been created the projects were ready to proceed to the second phase and make them into community portal sites.

Workplace communities: To create the workplace community the idea was that the hotel would feature its staff and give them a page where they each could express themselves and reinforce their associations with the hotel. This page would be available to customers and anyone considering booking a room would be able to see not just the hotel manager, but the person who would be cleaning their room and the chef who would be cooking their meals, and the housekeeper who would have washed the sheets they would be sleeping in. Each staff member would be provided with a template into which they would paste a photograph of themselves at work, a little about their background and interests, and have the option of posting a 'funniest story about a guest' or similar. The idea was to make overall the website more personal, more human and to let guest know they were going to be staying in community run by real people, not automatons. Members of staff were enthusiastic about the idea: many felt that guests did not appreciate what they did for them because they never got to see or hear about it. One example was the hotel engineer at Rotorua who was immensely proud of the energy saving methods they used and wanted the guests to know how eco-friendly the hotel was. Similarly, the laundry manager wanted to show guests their industrial sized operation and what happened to their towels once they had dropped them on the bathroom floor.

The second stage for the workplace communities consisted of interviewing the staff, telling them personally what the project was about and answering any questions they had. In general the staff had already heard about the project over the grapevine and were positively disposed towards it. Staff were invited to have their photos taken, to contribute ideas for the website and to tell stories about their work and experience in the hotels. The quality of the material produced was variable, but some of the stories were fascinating and fully justified the design principle of encouraging the community to contribute to the design process.

Business Communities: All of the associated businesses were enthusiastic about the portal concept when it was explained to them. The idea of using a standard limited template, developed for the SPANZ site, was welcomed by the associates, and accepted as good practice since it prevented bigger suppliers getting greater prominence than others. A problem did arise of businesses where some businesses already had a website of their own. This was solved by creating a link to their home page, but this created further compatibility problems, only revealed once a number of businesses were incorporated into the site. It was later decided to treat all

businesses identically by creating a template for each irrespective of whether they had their own website or not. This minimised maintenance problems when businesses later acquired their own websites; each template had the option of accepting a website address and creating an automatic link to that website. The task of collecting information for the templates proceeded quickly and without encountering any technical difficulties. Each supplier was interviewed at their place or work or in the hotel when they called there, and filled out their details on a laptop computer through a standard form. By getting the information there and then the community members were able to give all their details ready for mounting on the website without taking up a lot of their time or exposing their lack of skill at producing polished writing.

6.4.4 The outcome of the case

The initial phase website showing the hotels' features and facilities had gone well and the management were pleased with the results. During that phase the workplace and business communities had been consulted and getting their agreement and cooperation went smoothly. The template strategy for creating individual web pages was proving to be effective and easy to use and no particular problems were foreseen in extending the website to include the workplace and business communities respectively. However, when suggestions were made to move on to the second phase and start including the staff and suppliers on the websites the management of both hotels began dragging their feet. The managers' suggestions for improving the main site continued and any upgrades were enthusiastically accepted but for various reasons it seemed nothing was possible on the community aspects. Suggested visit dates were postponed, events were rescheduled until '*after the financial year end*' or until some key person '*comes back from extended leave*' or some other future time.

To bring matters to a head visits were made to both hotels. The Wairarapa hotel manager was evasive about when work could start on the suppliers' portal and finally admitted that he was having second thoughts about it. He agreed that idea was good in principle, but it eventually became clear that he just could not bring himself to agree to promote other businesses. Various logical reasons were put forward - '*We might leave ourselves open to legal liability*', '*... not sure we are willing to make an association with unknown quantities*' unconvincingly. The

Wairarapa management appointed a member of staff as part time website administrator and said that any '*further development would have to wait until he has been trained to take over*'. The website was in fact developed beyond the original version built for them, but kept to the basic single organisation format and did not pursue the portal model.

The Rotorua hotel visit produced similar issues. The manager had no real objection to associating with long term suppliers, they already had agreements in place, but when it came to the staff pages the manager just could not see a way to feature workers who were not on the management team. Again the reasons put forward were a mix of logical and otherwise '*no other hotel does this*', '*guests don't really want to know the backroom people*', '*the staff wouldn't like it, staff couldn't do it*' - but the impression was that this was just too big a departure from corporate practice to be comfortable. Eventually the Rotorua management said that the project could not be developed any further because the international chain they were part of was implementing a global identity for their franchised hotels and all websites would have to conform to that. The website built for them continued in use for many months after the project ended but no further development was made on the community portal.

6.5 Summary

In both these cases the technology worked perfectly and both hotels got a high quality, tailored, professional looking website that they were pleased with; but in both cases the project did not progress as planned because of the unexpected intervention of human factors. Producing a well defined requirements model does not necessarily mean that that it is the optimum model to use. In normal program development the success of the application depends crucially on the quality of the developers, and the client's responsibility usually goes no further than production of the specification. However, in highly participative situations, as organisations move through the stages of website development, the demands made on the host organisation change in both nature and scope and the methodology has to recognise that.

This chapter described the development of the methodology as it evolved from the earlier prototype to more complex cases. The first case was an attempt to create a virtual community using the technology to link scattered businesses. The second

aimed to build a community business portal for two hotels. The second case was used to describe the methodology which evolved to ensure that the ecommerce sites were built successfully. The generic model proved robust enough to be applied to widely differing situations and the methodology gradually incorporated the awareness that in community situations the human aspects need to be managed as carefully as the technical aspects. The SPANZ project demonstrated some of the limitations of internet technology when not well matched with the human aspects of a community application. The hotel portal cases reinforced the experienced gained in the museum project by illustrating the importance of getting full commitment from everyone at the outset, particularly any significant stakeholders. The hotel portal experience also demonstrated the value of templates to enable participants to create original content easily and quickly.

The next part of the thesis shows how the methodology described above was applied to more complex community situations, and how it adapted to the particular conditions found there.

Section 3:

Applying Community Informatics

The spread of computers into the general population and the rise of the Internet has made profound changes to the way people use computer technology (Frew 2000). However, the introduction of internet technology has not improved the basic structure of small scale tourism. The current situation is that the centralised airline-travel agent reservation systems still handle most of the tourism services sold, and focus on the larger tourism suppliers. Worldwide, eighty-five percent of accommodation providers are not represented at all on the international tourism systems (Werthner and Klein 1999). This means that most small tourism businesses are not listed on the travel agency databases, and therefore will never receive bookings through them.

While small and medium tourism businesses may have difficulty being recognised by the international computer booking systems, the tourism businesses in remote areas often have difficulty reaching the Internet at all. New Zealand has many isolated areas where they are few tourism businesses, very little infrastructure to support them and in many cases very little understanding of how the Internet can be applied to tourism (NZTS 2001).

The final part of this research therefore sought to design a simple and reliable way for isolated communities to improve their development prospects by using internet technologies.

Some of the particular problems in creating an ecommerce solution with community informatics are:

Financial constraints: A typical small business might have a part-time owner with a turnover that may not justify the expense of a computer with Internet access, let alone a website. Some businesses in the regions researched could not even afford a telephone line.

Infrastructure constraints: Many areas of New Zealand are not covered by either of the two cell phone networks. In some remote areas, even standard telephone lines do not reach everywhere. In New Zealand, eighty-five percent of tourism businesses employ less than five people and many tourism businesses have no Internet access at all (NZTS 2001).

Competency constraints: Economical deprivation often goes hand-in-hand with low levels of education and technology literacy. This is particularly true for many of the target communities in this research.

Integration constraints: The power of international computer reservation systems is that they are able to sell a complete package: accommodation in conjunction with travel or an excursion. An small tourism website, no matter how good, cannot thrive independently, it needs to link to other suppliers to maximise its contribution.

Despite these problems it is possible to integrate embryonic businesses into communications structures with global reach. The challenge has always been to do this at an economical price, not the difficulty in supplying the services. Community informatics seeks to 'level the playing-field' and allow the marginal business to catch up with the mainstream through targeted intervention.

Many of these problems reinforce each other. Previous work (Mason and Milne 2001) has shown that in rural communities there is almost no immediate value to the community in the uptake of information and communication technologies. Loader, Hague and Eagle (2000) suggest that some obvious economic or social advantage is required to make it worthwhile for people to acquire the necessary technology and skills. If these problems are not addressed, they enter a self-reinforcing feedback cycle. For example, a business with a dial up email account but few enquiries may decide that a daily email check is not worthwhile and so will only log on once a week. Messages go unanswered, so fewer messages are left, which in turn gives less incentive to check for them. Similarly, a website with few links to it is never going to generate the revenue to develop it further and so it gets neglected and generates ever fewer links.

Design requirements for Community Informatics

In order to utilise information and communication technology successfully in this context, it was necessary to find a viable design that would address all of these problems simultaneously. In order to be successful, a rural community tourism ecommerce solution must meet the following requirements:

a) The ecommerce solution must allow small businesses to establish a web presence so they can be seen by prospective tourists

b) The access to the ecommerce solution must impose little or no cost on the business
c) The access to the ecommerce solution must be easy enough to allow the web presence to be established without extensive technical knowledge
d) The interaction with the ecommerce solution should be brief and simple enough to enable 'proxy businesses' to use the system on behalf of real businesses where they do not have the required skills.
e) The ecommerce solution must enable the businesses to 'network' their web presence with that of other businesses and the wider community, without the need for maintenance or web programming skills.
f) The ecommerce solution must deliver a tangible economic benefit to the community.
g) The community must have a sense of ownership over and above that of individual businesses.

The following section of the thesis describes three cases in isolated parts of New Zealand where the community informatics methodology was applied and was successful in meeting all of the requirements.

Chapter 7:

Community Informatics in Hokianga

7.1 Introduction

This chapter shows how the prototype methodology described in the previous section of this thesis was applied to a community in North Hokianga, and how the methodology was revised and extended as a result. The aim was to empower an isolated community with few resources and no ICT skills to create a community owned tourism infrastructure designed by themselves for their specific needs.

The strategy was to build an Internet presence which would advertise the region, handle enquiries, take bookings for the scattered tourist facilities available and allow the people to actively pursue their market segment. The website was to be a foundation, rather than an end in itself, aimed at creating the nucleus of a self sustaining industry owned and operated by local people. It capitalised on the strengths of the people and their region. However, the driving force in this instance was not simply the creation of an ecommerce website. What the community wanted was an ecommerce site which reflected the community's values and aspirations, and which used these to attract the world's attention.

The methodology used succeeded in building a viable ecommerce website and making the area known to the world. However, although the experience led to several innovations in content creation and overcame several deep seated community problems, it ultimately did not succeed in being self-sustaining. The

final section of the chapter explains what was learned and how the methodology adapted itself to avoid the problem in future cases.

7.2 The Hokianga Community

As noted in the literature review (2.3), community based tourism is often proposed as the best way of helping rural communities escape the poverty trap. However, in practice establishing a viable tourism infrastructure is fraught with difficulties and although the technology can easily be injected into the community, its use and acceptance is unpredictable.

The objective in this case was to use tourism as the catalyst for economic growth. The outcome sought was a self sustaining, locally owned and scalable tourism product which would provide jobs initially and in the longer term would bring money into the local economy and lead to a revitalisation of the area.

Demographics

North Hokianga is an isolated part of New Zealand. Although Auckland, New Zealand's main tourism destination, is only two hundred kilometers away, it takes about five hours to get there by road which makes it unattractive as a destination for day trippers, and there is little accommodation available in the area which dissuades overnight visitors.

North Hokianga is very thinly populated, with only about 1500 residents. The communities are mostly (57%) people of Maori descent (Statistics NZ 2001). In such a small community everyone knows everyone else, there is strong sense of tradition and close links to the land. Although there are not a great many obvious indigenous icons such as vernacular buildings or public carvings, the Maori cultural heritage, as expressed in thoughts, behaviour and identity, is strong.

The region's attractions

The main tourist attractions in North Hokianga are centred on ecotourism, forest trails, sandy beaches, water activities and cultural experience. These are all high potential assets, and could be exploited in various ways. One of the clear strengths of the area is the fact that Maori culture is quite intact. Studies have shown that Maori culture is one of the main attractions for overseas tourists (Zygadlo 2003), so this provided a basis on which to build a tourism product.

Local attitudes

Interviews with the community showed that generally the people of North Hokianga are well disposed towards tourists, and in favour of tourists doing the obvious 'touristy' things while visiting the area: visiting and staying on a marae, hearing Maori stories, having homestays with Maori families, and even learning to speak Maori. Having tourists exposed to cultural experiences, such as making and buying handicrafts, seeing cultural performances, learning to cook local dishes, etc., was considered good for the community. Most people thought the best way to sustain the community and its society was to '*control access*' by tourists: '*we don't want to get over run*'. There was a general feeling that '*residents would be friendly to tourists*' and '*meeting tourists wouldn't get boring*'. Many looked forward to '*making friends and meeting people from other nations*'. People did not feel tourism was likely to do any damage to the culture, but that having tourism would not bring any major benefits to the culture, either. The main feeling about tourism was that '*There should be an emphasis on showing tourists authentic culture*'. The population was aware of other tourism ventures offering a glimpse of Maori culture, notably in and around Rotorua, but felt that '*very little of it is authentic*'.

Economic resources

Residents believed tourism would bring economic benefits, but were quite realistic that they were not going to get rich quickly. '*More jobs*' was the most commonly expected benefit. The economic conditions of the area are quite depressed. People on average have low educational levels, and few people are in 'professional' occupations or self-employed. In fact few people have jobs at all, unemployment rates are typically over 20% and very few have jobs in tourist compatible trades (for example, restaurants). The result is that average income in the area is very low, in 2001 the median annual income was $11,800 (Statistics NZ 2001). This means very few people have the capital to start even a small tourism project, such as a small motel or transport service, on their own initiative.

Development and culture

The community life in North Hokianga revolves around its social institutions, including respect for seniority, communal assets, shared responsibility, and action by consensus. The people asked for community based tourism which was based on

and above all, respected Maori values. The people were clear that they did not want to have to lie to the tourists, to show things which were not authentic parts of the Maori lifestyle. Therefore some options were ruled out immediately: The populace did not want mass tourism, '*coaches running through our villages*', nor '*hamburger stands on the beaches*'. '*We are not going to dress up in 'native' costume and get photographed*'.

While cultural authenticity can bring positive factors in favour of a sustainable product, these can also detract from the practicalities of day to day tourism operations. There is no history of successful community owned enterprises and the few tourist facilities in place are all owned by individuals from outside the area. The North Hokianga area has an economic history that has led, at present, to widespread unemployment and reliance on government income support (Statistics NZ 2001). The situation is that most people live reasonably secure lives within this system, which allows them time for involvement in community and social activities. It was found that many Hokianga residents spend up to fifty hours a week in support of group social and cultural activities. The upshot is that people are already busy, even though they are not employed full time, and change can be difficult, particularly when government reduces the safety net for people who go out on a limb to set up a business. This makes it much more difficult to motivate such people for the longer term. Moving out of the system by starting up a tourism business could be very risky economically, and could be very disruptive to their lives and to the people who depend on them.

Measurement:

Measuring the success of the project means establishing suitable benchmarks. Besides measuring the more usual things like the number of visitors or revenue generated, there are unique qualitative issues to be considered. Any evaluation of success or failure must take into account the capture of local knowledge, increased indigenous skills and the preservation of indigenous culture. For community development to be sustainable, the community must understand the use of ICT at more than just a conceptual level. Individuals within that community must be able to use ICT effectively and so there also has to be a capture of new knowledge.

These social expectations and the history of previous failures to implement lasting economic development meant that the business model had to be constructed with great care.

7.3 Designing the business model

The research had earlier used the experience from four business cases to produce a general ecommerce model and to design a methodology for implementing that model in a community situation. The North Hokianga case was the first test of the methodology in an isolated community.

The population of North Hokianga consists of the very young and the old, with young adults typically migrating away to the cities. The general level of education is low, few people having completed secondary schooling, and with no tradition of educational attainment. There was, therefore, no base of technological knowledge to build on. This meant that the business model had to be very simple in terms of the technology used.

The local culture in North Hokianga is distinctive in many ways. One of the ways is that everything has to be done by consensus, and that traditional authority overrides everything else: one highly placed individual can have absolute veto over any proposal, no matter what. The business model therefore had to work within this traditional structure and to operate in a top-down fashion, despite the fact the authority figures in the society who had the most influence were those with the least appreciation of ICT and modern business practice. In addition, the initial interviews revealed that like small communities everywhere, this one had its share of traditional rivalries, even hostilities, often incomprehensible to an outsider but with the potential to derail any community-wide initiative. This meant that the business model would have to find a way to reconcile actively conflicting factions within the community as well as overcoming technical difficulties.

A third difficulty not encountered before was the difficulty in contacting people in the community. The population was scattered over a large area. In three of the previous cases the members of the community were easily contactable since they worked in the business in question. In the case of the Spa Association, the members were all on email. In Hokianga however, most of the members lived in isolated houses or in tiny hamlets.

It was therefore necessary to use the existing social structures to gather the community together and use group communication in informal settings.

7.3.1 Basic Strategy

A series of visits were made to the area to meet the community and establish the research credentials. On each visit contacts were made, relations established and data collected. The data was used to create a customised version of the general ecommerce model and the results were then taken back to the community and shown to them on the next visit. In response to that, more data was collected, concepts refined and new objections resolved and the action research went through another iteration before the next visit, when the cycle was repeated.

The basic strategy was to first contact prominent people in the community and to find out when community activities were to take place. This gave an opportunity to address a large number of community members at one time. At these community meetings the researcher outlined the purpose of the research and sought to get agreement and commitment from those assembled. This was done by showing that it was not a case of whether their region was to be featured on the Internet or not, but rather a question of whether they were going to take control of how the region was presented, or allow outsiders take it over. Once the concept had been presented, community leaders were targeted for individual presentations in order to secure their cooperation and support.

From this nucleus the methodology progressed as in the previous cases using rich pictures to identify issues of community concern and to identify relevant aspects of community life that could be featured on the first stage static website. The first stage would then be used to create a small business community portal and to build ecommerce functionality into the site. Part of the methodology aimed to ensure that the relevant skills were transferred to the community so that they could maintain the site themselves. Once the site was fully functional the community would become self-sustaining in technology and gradually build their tourism industry from there.

7.4 Building the community portal

Following the procedures used in the earlier cases, the Hokianga site was built in stages following a series of visits to the area. The visits varied in duration from one

day to three days. The stages of the process are detailed below showing how each stage could be mapped on to the stage headings detailed in section 6.4.

Obtaining Management Buy-in

The first visit was low key and was used to identify all persons of status in the community and to meet with them on a one to one basis to explain what was going on. These included local politicians, shop keepers, the tavern owner, sports personalities and community elders.

Involving non-management staff

The equivalent of the briefing process started with holding a public meeting in a community hall to which every stakeholder who could be identified was invited, paying particular attention to personally inviting every local dignitary. All the local business owners, people who had registered for a small business course at a local community college, and local notables were particularly targeted. The first community session was scheduled over two days in the local meeting hall to allow time for a full exploration of the issues.

Operating this way allowed the research to address several concerns at once. The main issue was to raise awareness of the research objectives. It was also hoped to be able to change attitudes within the community generally by showing that it was not a case of outsiders trying to impose a solution but genuinely trying to address their concerns. The group meeting also encouraged actual and potential operators to meet and consult informally, and to motivate them by showing the strength of public support. The public aspect of the meeting of course was to enable cooperation by bringing people together in a neutral setting to show that the area was regarded as a unit, and by implication that they should think of it that way too.

Ensuring Management Participation

The formal agenda was to get a public commitment to go forward with the project. Previous work had established that there was a desire for development in the area and that tourism was generally welcomed as a way of generating jobs and income. This phase of the methodology was aimed at getting joint agreement to a plan and to have locally respected persons affirm in public that they endorsed the plan.

Building Rapport

The first use of technology was to give a public demonstration of the Internet. This had been carefully set up in advance to show how their area was currently being featured on various websites. Many of these were amateur efforts, some were official tourism sites and some were add-ons from various hotels and guesthouses outside the area. The sites were of varying quality, mostly poor and inaccurate. As expected, the audience was appalled at how their region was being displayed and 'used' by 'unauthorised' sources. For more than half the audience this was the first time they had seen the Internet in action.

The Internet demonstration was followed by an open community discussion in which everyone was encouraged to state their views of what they had been shown. It was stressed to the audience that if they did not take action then the portrayal and 'ownership' of their community image would be taken over by some unauthorised outsider. The outcome was a general feeling that '*something should be done*' and a readiness to listen to the research proposal.

The next step was a follow up demonstration to show how a nearby region had set about promoting itself with professionalism and respect. The demonstration also showed them how you could buy souvenirs, book a room, enquire about activities and so on. This effectively demonstrated the possibilities and caught the interest of the group. In particular many of the small businesses began to see the possibilities of the Internet. There was much comment about the prices of the handicraft souvenirs on offer from similar regions, and open speculation about how much money could be made by selling to overseas customers unable to actually visit the area.

Community Building

The next step was to move the group towards some sort of action agenda, so that they could make a start on designing their ideal Internet site. This was started by facilitating a group meeting challenging them to define what was good about their region and what things would be of interest to a visitor. The audience was formed into small groups and invited to use whiteboards draw up rich pictures of their ideas. After an hour or so there was general agreement, to some people's surprise, that there actually was a great deal of potential for tourism, and that the opportunity

was there if only they chose to take it. The meeting was concluded for the day by bringing the various small groups together and expanding on the ideas that each had come up with. This worked to increase community feeling by showing that many people had valuable ideas to contribute and that there were differing but complementary views of what the region had to offer.

Portal Concept

The second day was aimed at forming the local business people into a cohesive community with a common theme for promoting their community. A second facilitation was done, on the theme of '*how could they handle a visitor who arrived unexpectedly at one of their member's operations and had no set plans*'. After some initial uncertainty the business owners began to see the possibilities and quite soon viable plans were devised for handing on the visitor from one operator to the next and how a notification system could be put in place to ensure all visitors were fully serviced. This process gradually caused a change in attitude of the operators as they realised that their own best interests would be best served by acting jointly and that no one operator could expect to do as well in isolation. Towards the end, this meeting was turned into an informal forum for the exchange of information and ideas about the use of internet technology in their businesses, with the researcher acting as a guide and consultant to the general area. In this way the business owners were able to get an insight into the technology and build rapport with the researcher.

Equity and equality

After the technology advice session, the business owners were called together and again the portable computer and projector was used to demonstrate examples of good uses of the Internet for tourism. Typical internet sites for tourism towns were shown and the general business model used in this methodology was analysed showing how it would be applied in their case. The hotel portal sites were demonstrated and the portal concept was explained to them. In this case none of the businesses had an existing website so the idea of getting a free website was greeted enthusiastically. Each business undertook to supply whatever marketing materials, brochures etc., that they had available for incorporating into the website. Those

who had none or were intending to start a small business promised to supply their details later.

Workloads

The general community members were invited to another demonstration on the second day. Some of the material was repeated since there were people who had heard of the previous day's demonstration and had decided to come after all. The whole group was shown how the Internet had been used to create a specialist site for the Katherine Mansfield Birthplace and how the basic concept could be applied to the North Hokianga community. There followed a general question and answer session in which the group was told how they could contribute and what was expected of them.

Keeping a single focus

The Hokianga community site was based on the general ecommerce site plan described in section one. The strategy was to set up a 'Welcome' page which would give visitors a single point of contact for tourism in the region.

The site would consist of two complementary parts. One part would be a cultural welcome designed to attract the independent traveller. It would emphasise the history, culture and uniqueness of the area and its people. There would be pages for topics relating to community life such as cooking, things to do, famous residents etc. The other part of the site would be a visitor oriented guide to what to do, where to stay, how to get there, etc. The portal section would list every tourist operation and act as a classified directory. Both parts would be complementary in that they would be able to give the Internet user access to tourism information, brochures and so on, and allow them to register their interest or book activities directly.

Content Creation

It was made clear to the community during the briefings that the success of their community website depended on them providing the text and pictures to go on the website pages, as that was the only way they could guarantee that the site would be an authentic reflection of their lifestyle. The lessons of the previous cases had shown that it was not feasible to expect individuals to create original content so a new strategy was used.

In the afternoon of the second day a group session was arranged for the community. A brainstorming session was convened in which the community challenged each other to come up with things that could be featured on the website. This session was very fruitful, with ideas never originally considered, such as listing famous people who came from the region, or secret locations only known to the locals, or special ways to cook local foodstuffs. The next stage was to form small groups again. Each group was allocated one area to concentrate on, so for example there was a group collecting ideas about food, one about travel and transport, and another about sports, and so on. Each group was asked to work together to write down on paper ideas, phrases, lists and words for their subject area. Each of the subject areas would become the theme of an individual community webpage and collectively the set of pages formed an overall site plan. The idea was to get the members to produce the material then and there, but in practice they took too long and while there was great enthusiasm and hilarity there was not a great deal of finished material. However, before the session ended each group gave an undertaking they would finish the material in their own time and appointed a coordinator who would take responsibility for making sure the material was gathered and forwarded to the researcher. By the end of the session there was a viable page plan for an Internet site which was unique to the region and would be written by the local people.
As an unexpected bonus, the deliberations of the local business owners had gone so well that they formed an official North Hokianga Tourism Association on the spot and voted in officers and a constitution: a remarkable event given the signal failure of all previous attempts at cooperation up to that point. The researcher left the meeting with high hopes and a plan for a website, and a promise that the web page material would be forwarded shortly. Overall, the first step of the community methodology proved to be a great success, almost certainly because of the catalytic effect of the internet technology.

7.5 Implementing the Hokianga community site

Over the next few weeks it became obvious that the content creation exercise had not worked. The progress after the first iteration of the project was disappointing. Although the community was enthusiastic and people promised to forward relevant information, in the end only a few hand written pages were produced, and that only after many reminders. In retrospect this might have been expected. As shown in the

previous cases, people with only a rudimentary education and unused to expressing themselves on paper cannot realistically be expected to produce high quality written material. In the event they produced almost no material at all despite the success of the group writing session. The only useable information came from a few of the small businesses, and that was mostly copies of their brochures or business plans. Given the failure of the content creation process it was therefore necessary to build the general model ecommerce website with the material to hand. This consisted of the few pages sent by the community plus scores of photographs taken during the research visit. There was enough material to create an Internet site based on the agreed plan, showing place holders without the content, but indicating what the site would look like when built. In addition a picture gallery was created from the fieldwork photographs.

A second visit was arranged with the community group to demonstrate the new community website. A general community meeting was held in the community hall and the laptops and projectors were set up to show what had been done on the Hokianga website. Although the site was light on factual material and generous on photographs, this turned out to be an advantage. People loved seeing places they recognised and this created a great deal of discussion and re-affirmed their commitment to the project.

Paradoxically, the written material caused problems almost immediately. The community had been asked to write about what made their place unique, and what would interest visitors. Among the material were suggestions that visitors could gather shellfish and cook it on the beach. Another group had added a bit of local colour about how local kids drove old cars up and down the beach on weekends as amusement. This led to protests from community members living near the beach. They were *'not going to allow tourists anywhere near our beach', ' no outsiders are going to take my food'*, and that the bit about the cars had to be removed from the site before *'the beach would become a racetrack'*. One page explained the origins of local Maori place names, and even this caused dissention, as no one could agree on what the origin was - everyone had their own favourite theory. Similar objections seemed to be raised about most material. It was obvious that the content generation problem had still not been solved.

7.5.1 Content Creation using Web Raising

To overcome the lack of unique original material the research developed a technique called 'web raising'. Web raising is the digital equivalent to a barn raising - a community working together to create a community asset. A web raising is a community event where neighbours share experience and skills to help empower one another in the creation of web documents. This idea was developed after reading a brief summary of work done by the Los Angeles Community Network (LACN 1999) who had developed websites for disadvantaged urban groups. With only very superficial reports to go by it was decided to adapt the general idea to the needs of the research project.

Portable computers, tape recorders and a digital scanner were taken to the Community Centre. Community members were invited to attend at the centre and were encouraged to bring their family photos, documents, genealogies, cultural artefacts and other icons of their lifestyle. The turnout was high, and hundreds of items were produced. As the people were waiting around they began to show their 'treasures' to each other and the whole thing took on the air of a village fair while people queued to be recorded. Objects and images were scanned, and people were interviewed, either by recording their stories on tape or typing the words directly into a laptop. This process opened up the concept of the Internet to many of the community who would otherwise never take any interest in the technology and allowed them to see a direct connection between their everyday life and how their community is represented to the world at large. By taking part in an event which is interesting and fun, and where they could see an immediate outcome, liaisons were formed with others and every participant felt comfortable with the technology and confident that they had contributed something to the community's website. In this way the technology was seen as a non-threatening, communally owned and natural extension of their everyday activities in conformance with best international practice (Turk and Trees 2000).

Using this method produced an immense amount of material in very short time. The result was a 'self image' of what the group thinks defines their collective identity, and how they want the rest of the world to see them. It is believed that this was the first time this innovative technique had been used as part of a community informatics methodology. An additional advantage of the technique was the

generation of a sense of well-being and community pride within the people, who had the opportunity to meet and reminisce with old friends and neighbours. The web raising produced an enthusiastic community and a large amount of information with which to build the first version of the Hokianga Community site.

The web-raised material was used by the researcher to create the official Hokianga Region website following the general model. On the next visit to the region the first version of the website, a static site without ecommerce capability but with many local features and photographs, was demonstrated to the community to general acclaim. It was judged that the site did accurately reflect the community's view of itself, it did support the tourism businesses in the region, it showcased the area's culture and attractions, and it gave a positive impression to internet visitors. It was generally reckoned to be a great success. A version of the website is available on http://www.scim.vuw.ac.nz/projects/hokianga/

After many visits to the Hokianga region the people and their needs were well understood. The constraints under which the research was operating also had become clear. The initial impulse to simply empower the local people to take over the website once it had been designed by them was now seen as impractical. The people were open, welcoming and interested in what being done. They were also living full and busy lives, and did not have the time or motivation to work on maintaining a website, and never would have. Nor did they have the necessary technical skills and showed little interest in acquiring them. Gurstein (2000) has shown that when technology is simply imposed on a community the skills leave along with the researchers. The problem then, was how to ensure that the site had adequate maintenance and would be kept up to date.

Reflecting on why the methodology was not enabling the support needed to make the ecommerce site self sustaining led to the realisation that the methodology contained a misleading assumption. Standard computer design methodologies have long been criticised because they regard the needs of the organisation as homogenous (Checkland 1979), as if one solution would suit all stakeholders. The assumption in the Hokianga case was that there was one community present and that there was therefore one set of community needs. The reality is of course, that the community is actually made up of multiple overlapping communities, and that while there may well be consensus on some things such as what makes an

acceptable internet site, there are differences to be taken into account as well. One major difference is that there is a business community with their particular needs, and a general community with other needs. There was a fundamental difference in the attitudes and motivation of these groups that had to be addressed.

7.5.2 Community management and balance

On the basis of these insights a more sophisticated approach was proposed which recognised and built on these differences. The only group in the community who were motivated long term to make the website a success were the local businesses owners. It was therefore necessary to enrol them as the core support group for the website, and to rely on them to produce factual, trade oriented material which they would keep up to date in the course of their normal business.

However, because of the focus on business users, there was a danger that over the longer term the site would develop to serve the business needs at the expense of the community part. In order to prevent this, a governance model was introduced which utilised the strengths of the community social structure and the respect which was accorded to traditional community leaders.

A meeting of the business community and the general community leaders was convened and an ecommerce management committee was proposed. After a long discussion a management structure was agreed upon. This would have two complementary parts. One part would be organised and run by the business community and develop the ecommerce site for the local businesses. The businesses had a vested interest in making the community part of the site attractive since that was what brought the web visitors to the site. The business community would therefore undertake to maintain the community part of the ecommerce portal. The community for its part would supply content as needed and would monitor the development of the website and have a veto over what could be shown in both the community section and the business part. The idea behind this was to give the businesses an incentive to drive the development of the site but to ensure that the cultural sensitivities of the general community were safeguarded.

The two part structure would ensure a dialogue between the business interests and the community interest in that businesses can develop their web presence so that they can make a living, but the community still feels in control of these pages.

There was, therefore, a built in feedback loop to make sure that there is enough traffic to the site and enough click-through to maintain business viability. In this way the site can change over time as social values change but the original cultural sensitivity stays in place. However, after some months it became apparent that the management structure was not being used. The businesses were happy with their pages on the website, and the general community had a pride in the fact that they were featured on the Internet, but no one was pushing the project forward.

7.5.3 Sustainability

The Hokianga website was undoubtedly a success in showing a realistic view of the community and its life and of showcasing its businesses. It was very successful in getting the community to become aware of the opportunity of ICT, of getting buy-in to the goals and objectives and of empowering individuals to design their own web presence. The methodology was successful in getting local entrepreneurs to meet each other and to start exploring possible joint ventures. However, the third phase, getting the community to take responsibility for the development of the site and of making ecommerce part of their daily lives, did not happen.

In fact, while several individual tourism operators used and still use the site in their advertising and publicity, the community generally never really adopted the site or used it. They were very happy to view the site, to contribute to the meetings, discuss their needs and aspirations and generally welcomed each initiative. But by this time a pattern could be recognised: everything the researcher proposed or delivered was greeted warmly by the community, was given full support while there, and was forgotten as soon as the researcher left. The community never got behind the ecommerce vision and lacked a focus, a reason to become enthused about it. One way that this could have been overcome was by having a local champion. As noted in chapter four a champion has to come from within the community, and is necessarily outside the scope of the methodology, so there is no practical way to ensure that a champion emerges.

The main problem seemed to be that in the absence of a committed leader, a local champion, the general community just did not have the resources to keep the momentum going. The level of ownership of home computers was very low and in fact some homes did not even have a telephone. Businesses were better placed, but

they too had problems with access to telecommunications and had few spare resources. In order to marshal more resources behind the project a final visit attempted to take advantage of the existing infrastructure by engaging the local school in the project. The aims were explained to the school principal, and the website demonstrated to the teaching staff. They were enthusiastic to be involved and talked of linking internet skills into the curriculum. One member of staff was nominated to liaise with the project but after a few email exchanges the person turned to other interests and the links to the school gradually faded.

As the project progressed and more became known about the history of development in the area it was learned that this project was just one of many that had been attempted, all with the same result - well meaning outsiders brought ideas and money to the area and left hoping the local population would somehow pick itself up from there, but didn't. It also became clear that the local community was well aware of the on-going issues and the history of failed development efforts. This manifested itself in many ways, not least of which was the refusal of the few successful local tourist businesses on the fringe of the area to have anything to do with community based development. Interviewing the owners of these revealed a general personal antipathy towards the traditional community way of operating, based on a legacy of failed promises. The model developed from the web raising sessions sought to give communities a genuine, locally designed introduction to ecommerce, to provide a unique sense of place, and to encourage the take up of ICT. To an extent, the research approach was naïve in that it was believed that the community would only have to be shown the benefits of ICT and given some access to the technology and they would take up the idea and change their lifestyle. As with many of the projects discussed in the literature review, this was really another instance of top-down community informatics, and suffered the same fate.

7.6 Enhancements from the Hokianga case

The application of the community methodology plus the addition of web raising did succeed in supplying the information for an accurate, authentic tourism focussed internet site, accepted and supported by the community in general. However, the web raising exercise showed that while full participation builds consensus and community, it does not necessarily lead to a well designed internet site.

7.6.1 Reassessing Participation

The Hokianga case uncovered a number of disadvantages associated with full participation. In practice, the goal of authentic representation of a community on a web-site proved to be difficult. The following key issues were revealed:

Authenticity

When web raising was begun and the content began to emerge, it became obvious that much of the material would not be useable. There was no problem with most of the material, even amateur photographs can make an attractive web page, but in asking people to bring out what was important in their lives, it was discovered that many people have personal interests that not everyone sympathises with. One contributor insisted on scanning in dozens of photographs of priests and tracts associated with a religious movement. Another proudly produced gory pictures of pig hunting and dismembered animals - not exactly what ecotourists would want to see from a community supposedly devoted to conservation. This raises the immediate issue of whose truth is to be represented?

Accuracy

Another aspect concerned the accuracy of the reminiscences and stories about the region's origins and history. It is truism of community based research that local people are the only valid source of knowledge about local places, local history and local resources. In fact, the opposite was found to be true. Local people are not historians, and no one seemed able to rule definitively to distinguish belief from fact. When their statements were checked against reliable sources, much of what was put forward as indigenous knowledge turned out to be the result of half remembered stories from other places, and misunderstandings of established history, combined with a wish to impress outsiders with traditional knowledge. For example the web page for the North Head Dunes could only say that '*the Dunes are spiritually significant to local Maori...and some parts are sacred sites that visitors are asked to respect*'. The page's text had to be non-specific because different people gave differing accounts about what was sacred and what was not. The same confusion and disagreement applied to the origin of place names and the early history of the region.

As a result of this the researcher supervised the writing of a full academic bibliography of every early source relating to the area so that it could definitively be established what is actually known and what was supposition (Turney 2000). This took many months of library research and was probably the first time the early literature of the area had ever been collected and summarised professionally. The finished the bibliography was incorporated into the website, along with the full text of many original early documents. When these were shown to the community in later visits they were delighted and astonished, and it became clear from their reaction just how little knowledge is passed on as collective memory in modern society. The people of Hokianga knew as much and as little about their own area as the average Aucklander knows about the early history of Auckland. In a project where authenticity is a fundamental requirement, this is clearly a problem.

Consensus

Getting true consensus such as agreement on a website 'look and feel' that pleases everyone may be impossible. There may not be any compromise that will suit every party. Getting agreement on the content in this case was an issue once people began to realise how incoming tourists might affect them personally and that they would have to make adjustments to the lifestyle or share 'private' resources with outsiders.

Content Validity

A traditional community is unlikely to be able to spontaneously generate usable content themselves. One of the members offered to write about the climate. What was provided was: '*The weather here in the north can be very extreme. Our winters are mild and can be exciting especially when walking on the beach or riding a horse. If you like solitude and plenty of space and don't mind a bit of wind then winter time is a good time to come. If you like meeting people, long hot days and plenty of recreation then summer is the time for you*'. The text is in fact contradictory - the climate is claimed to be both mild and extreme, and unless your recreation is limited to walking there is in fact very little to do. It is inevitable that the information from non-experts will be inaccurate. The temptation then will always be for the developers to supply what is missing in order to make progress, and thus put forward their own viewpoint, not the community's. On the other hand, where the methodology perseveres with eliciting information from the community,

someone is going to have to exercise editorial control of the material and thus influence the image presented. In exercising editorial choice some groups are inevitably going to feel slighted.

In the end the site was built from the web raised materials and the more idiosyncratic material was left out to be included 'later'. In fact there was more material than could be used immediately on the static site so there was no problem with not displaying everything collected. The wider issues of authenticity were not in the end resolved, and are probably irresolvable.

7.6.2 Commitment

The methodology gained the acceptance of technology into the community, but it did not succeed in getting either the business community or the general community to commit to ownership. The general community in particular was very proud of seeing themselves portrayed positively on the Internet, but the methodology did not generate any sense of responsibility or a desire to take over the management of the ecommerce functions.

The issues surrounding participation will impact every community informatics implementation and will mean that every successful implementation will necessarily be a compromise, but that is fundamental to the nature of community informatics and not something that any methodology can resolve. The issue of commitment, though, goes to the very heart of community informatics and the methodology therefore had to address this. According to best international practice, an ecommerce site needs to be ethically valid, culturally sensitive and highly participative (Turk and Trees 2000). The Hokianga site was all these things, but it still did not succeed in involving the community as interested partners and the businesses as main drivers of development. The next chapter shows how the methodology was revised to ensure commitment from the communities involved.

7.7 Summary

This chapter described the community situation of North Hokianga and how the methodology developed in the first part of research was applied. The general ecommerce model was successfully adapted to provide a business model for the general and business communities. The methodology succeeded in generating an enthusiastic response to the project and in getting support from the community

generally. The method of generating original content for the site proved inadequate and was replaced first by a group production method, and then by the highly successful web-raising technique. The web-raising outcome revealed many issues calling into question the use of full participation. Once the website had been built it was acclaimed by the community but did not of itself generate the economic activity it was designed to stimulate. Two attempts were made to change this: by setting up a management structure to encourage the business community to take the lead, and by trying to widen the support to include the local school as a focal point. Neither was successful, so the outcome was a well built professional ecommerce site, but without the planned transfer of technology into the community.

The next chapter describes how the methodology was applied in the Mahia region and how it was adapted to overcome the difficulties found in the Hokianga case.

Chapter 8:

Community Informatics in Mahia

8.1 Introduction

The outcome of the Hokianga case study suggested that a different approach to community informatics was needed. The basic ecommerce model worked well, but the implementation had failed to get the community commitment needed to develop and maintain it, so the methodology and its assumptions were reconsidered.

A revised methodology was designed and applied to a business community in the Mahia district. The objective in this case was to use the successful ecommerce model as the basis for the community business model, but to use a modified version of the community informatics development methodology. The Hokianaga case had shown that the methodology could successfully build the first stage of a fully participative and representative ecommerce website, but was failing to ensure the commitment of the community and therefore the project did not become self sustaining. An opportunity arose to refine a revised methodology when a group of businesses in the Mahia district asked for assistance in their ecommerce project.

8.2 The Mahia community

The Mahia district is an area extending inland from the Mahia peninsula, as far south as Wairoa and as far inland as Waikaremoana. This community is more developed than North Hokianga with a better infrastructure. The area is larger and is more densely populated (total approx 12,000) and therefore tends to have a less pronounced sense of community, but parts are still very isolated and the whole area

is still classified as economically depressed (NZGovt 2003). The district also has a significant Maori presence in some parts, but the majority of the population is non-Maori.

Attractions

The peninsula itself has outstanding beaches and scenery, and to the south there is a large Maori trust area around Lake Whakaki, which forms a wildfowl over-wintering site with world heritage environmental value. Further inland from Wairoa, there are large areas of virgin forest around Lake Waikaremoana under Department of Conservation control.

Economic resources

The area does have some significant differences from North Hokianga. It has a local newspaper which goes into virtually every home, and it has a better established network of schools. It also has a much higher density of personally owned computers. There are many more independently owned businesses and around the Mahia peninsula there is a well developed tourism area with many accommodation providers. Wairoa is the district service town (population 5,000), but has been economically declining for decades and has a reputation for social problems. The unemployment rate is amongst the highest in NZ (NZGovt 2003). The government at the time of the research had been trying to revitalise Wairoa and had recently established a new community telecentre.

Local attitudes

Interviews with the local business community and the public sector institutions showed that they were very keen to increase the region's economic activity level. The general response to the research proposals and objectives was positive and supportive. Interviews held in the predominantly Maori areas gave a less clear picture: some groups were enthusiastic while other groups feared the loss of their traditional amenities if they had to share them with tourists. In the town there is a high level of unemployment and social disadvantage, and the few brief interactions with this group gave the impression that they were entirely negative and pessimistic.

8.3 Designing the business model

The aim of the revised methodology was to engage a significant portion of the total population in the development process, and not to proceed until there was actual measurable commitment from the individuals within the community. The revised methodology called for working with communities that were willing and able to be self sustaining. Unlike the earlier projects, the revised methodology called for empowering people who already had some technology skills, rather than start with groups with no technology skills at all. The research role was to become that of a catalyst or facilitator mobilising locally based resources, not as external providers. The strategy was to facilitate existing groups with a vested interest in the success of the project, to enable them to create their own form of community informatics and to use that success to gradually draw in more and more of the general community. The Mahia Tourism Group (MTG), the business group who initiated the contact, were ideal since they were a loose association of local tourism businesses, mostly accommodation providers, who had decided to try to do something themselves and wanted some help.

Obtaining Management Buy-in

The point of departure from the previous case was that the initial contact in the area was the result of an initiative by local business people, not a government program. This meant that the people involved already had some stake in the success of the development and were not passive recipients. The first visit to the Mahia area was at the invitation of a spa owner in the area, who knew about the research from the Spanz project (see chapter 5.2). The visit began with a day long tour of the area, guided by a local politician. It included visiting potential tourist developments and the existing tourist facilities, and meeting the management of the largest school, the town council offices, and the newly formed telecentre, called the Wairoa Hub. Each stop was used as an opportunity to explain the project's aims and objectives and to seek support from prominent community members. The research objectives were well received and every person approached expressed an interest in being associated with the project. This part of the methodology was equivalent to the management buy-in used in the prototype cases except that the target group of interest was those people in the community who formed the business and regulatory environment for the Mahia Tourism Group.

Ensuring Management Participation

The evening of the first day was used to present the portal concept to the members and potential members of the Mahia Tourism Group. Notice of this initial meeting had been provided the previous week by an editorial announcement in the local newspaper. This was aimed at reaching as wide an audience as possible, informing not only the MTG but also keeping the broader community in the region informed of what was going on. Responsibility for setting up the meeting and the venue was passed to the MTG members and they organised a telephone tree to ensure good attendance. The presentation was held in the Nuhaka Marae meeting house just north of Wairoa and most of the Mahia and district motel and campsite owners attended. There were also a few associated industries represented: restaurant owners, fishing charter operators and water sport organisers. In all they formed a majority of the Mahia peninsula tourism operators.

The group were taken through phase one of the web-raising process, using laptop computers and a data projector, demonstrating the concept and potential rewards through the by-now standard presentations of how the Internet works, and how it could be used to support tourism in Mahia. It was then demonstrated how Mahia and district was being portrayed on the Internet. This produced the normal enthusiasm, but this time, in line with the developing ideas of the methodology, there was no offer to design and build a website for them.

Involving non-management staff

Instead, the meeting was asked to set up a committee of business people whose job would be to mobilise local support in order to secure funds to pay for the creation of a website. This transferred responsibility for the outcome to the group. In the ensuing discussion, it was pointed out that there were many possible avenues of funding from local and regional authorities and various trust boards and charities. It was explained that the MTG would be helped to make applications for funding, with the writing of submissions and with whatever technical help was required, but that they collectively would be the ones to approach potential funding bodies. The meeting to a certain extent had revolved around two or three of the largest operators to whom the smaller operators deferred but forcing the MTG to allocate roles and responsibilities for mundane tasks of identifying and contacting potential

sources of funds gave an opportunity for even the smallest operator to contribute to the project.

Building rapport

The previous cases showed that introducing the management to the technology was useful in building rapport. The members of the MTG were invited the following day to a technology familiarity session to be held in the Wairoa telecentre. The telecentre had been set up as a regional government initiative, but after initial success and interest some months before, it had turned into little more than a retreat for the unoccupied and had lost its cutting edge image. The management of the telecentre were delighted to have their facilities used and made their classrooms available. These contained twelve personal computers with internet access and facilities for data projection.

The MTG members were not taught how to create their own home page since the necessary software was not available. Instead they were shown an expert's view of the Internet and were guided to various websites to learn how the Internet and ecommerce could be used to promote tourism in Mahia. To make it fun the members were allowed to explore whatever links they wanted to, so as to familiarise themselves with the Internet generally and then used the telecentre's facilities to send messages to each other within the room. The session lasted about an hour and a half and served to introduce the members to the technology, to the telecentre and to each other. It also allowed the researcher to build relations with the members and the staff of the telecentre.

Building a community

In order to help them build the MTG into an online community, an email forum was set up for the group, where they could post emails and exchange information and acted as a combined bulletin board and discussion forum for the members. The idea behind this was to give the group a place to discuss and monitor their progress towards funds acquisition, and to ensure that the focus of the effort was kept inside the group itself and not transferred the facilitator. A subsidiary research objective was to get the businesses accustomed to accessing the Internet as part of their daily routine.

Portal Concept

The portal concept was accepted by the group as a whole as the best way forward and formed the basis of the group business model. The larger motels and campsites already had a website, but most of the smaller operators did not. It was recognised that the use of a community tourism website, initially a static site, would be the best way to promote their joint interests. There was no dissention about relative size or importance and all owners agreed to provide materials for individual template pages.

Content generation

The Mahia project aimed to be as inclusive as possible and efforts were made to interest the local government agencies. All of those contacted were supportive of the scheme in principle but all had budget and time commitments and were not able to contribute directly at the time. The only organisation that became actively involved was the Wairoa Information Centre. The information centre agreed to host the website and made their facilities available for presenting the project to additional small businesses as the project progressed. The information office had over the years amassed a wide range of literature about the region. There was the usual rack of brochures, but in addition they had created a valuable resource of suggested drives, things to do, notes on scenic areas and specific interest activities such as history trails and farm stays. All of this was held on paper with typed details and hand drawn maps. The centre generously donated a copy of the material to the project and this formed the basis of the Mahia community site design.

Keeping a single focus

The ecommerce website was based on the standard model derived earlier. The core was a general guide to the area and its attractions based on the material supplied by the information centre. From this there were links to individual web pages for each business. By this stage the methodology was using a standardised template and each business was asked to supply the material for their own page. Many of the businesses felt uncomfortable with creating materials for the Internet so most of the several research visits to Mahia consisted of visiting business owners and potential business owners to help them create their web pages. In the process of explaining what was needed for their individual pages the opportunity was taken to get to know each person and to reiterate the benefits of the project. Demonstrating how to

put the material together was not difficult, and the personal interactions were valuable, but each call on a small business was taking an average of two hours, so progress was slow. However, by meeting the business owners either individually or in small groups the project was able to keep focussed and avoided diluting the MTG's efforts.

Involving the wider community

One of the ways that the project provided support for the business group was by involving the local newspaper. By keeping the editor supplied with stories about the activities of the local groups, about meetings and about the benefits of tourism to the wider community, this kept the project at the forefront of people's minds. Reading about the project in the newspaper also served to reinforce the project and to remind individuals in the group of their personal commitments and subtly applied pressure that others would be checking to see that it was done.

Sustainability

To ensure long term sustainability of a project it is necessary to have a core of IT enabled people within the community who can act as unofficial advisers. Small tourism operators cannot be expected to learn internet site maintenance skills on their own, nor can they afford to pay for expertise when needed. The solution evolved was to encourage the younger generation to link to the business community. The local school principals were approached with the proposal, first mooted in Hokianga, of having computer studies and internet business studies incorporated in the final year of schooling. Interviews with the principals revealed that although each school had been wired for internet access (paid for by the Ministry of Education), and ecommerce is on the curriculum, schools and teachers had little idea of how to apply their studies. What was proposed was that final year students be formed into groups, and each group be allocated responsibility for supporting one or more specific businesses, and as part of their studies to visit that business and get to understand its operations and problems. At the same time the business owner would get to know the students. This gives the school and students a focus for their studies and gives the owner a costless resource to call on for training, support, problem solving and application development. The constant interaction between the students and businesses would keep the curriculum up to date, and give students a thorough grounding in practical ecommerce principles.

This idea was taken up by the schools and the business owners began to invite senior students as computer advisers almost immediately.

Extending the reach

The inclusion of the information centre turned out to be a crucial factor in the development of the methodology. By agreeing to act as collection point for bookings and enquiries the information centre overcame many of the problems found in Hokianga. The information centre was staffed by full time trained employees who were knowledgeable about local businesses and attractions. It also had basic communication technology and it was open all year. This meant the information centre could act as an intermediary for those fledgling businesses which either did not have their own communications technology, or who only operated on a part time basis. The information centre was also seen as independent and had a good reputation for promoting the interests of the whole community and so was acceptable to all parties.

8.4 Implementing the Mahia business site

The revised strategy

The revised methodology applied in Mahia was much more successful at getting sustained commitment by the community, partly because there was a better infrastructure but mostly because it initially concentrated on local businesses. It still was a community based development, but the community aimed at was not the poorest section of society, it was the middle layer, independent small business owners who could see an immediate payback from the application of the technology. The ultimate aim was still to empower the least developed parts of the community, but it was to be done in a two step process: first benefit local businesses, and then let them employ and train the long term unemployed and so gradually bring more and more of the community into economic activity.

Transfer of responsibility

The concept of reflecting responsibility for action back into the group began to work almost immediately. The expectation was that by passing responsibility back to the group a local champion would emerge spontaneously. From the outset, the MTG proved to be a lively and active group. It went through several changes of president until it settled on one person willing to take control on a long term basis. Within the MTG, some individuals began to create a nucleus of special interest

groups around themselves. One went ahead with creating a crafts trail, where on a short walk visitors could see woodcarving, pottery, basket making and other crafts in action. This group actually raised its profile high enough to bring in artists and businesses not originally included in the MTG. Another group set up its own organisation based around Wairoa, and was successful in applying for funding on its own.

On the face of it this seemed likely to have overcome the problem of post-intervention apathy. A champion had emerged in the form of the president; and the business group method also seemed to have satisfied the requirement to create a site which reflects the actual aspirations of the community, and not the outsider's view of the community. The stage was reached fairly quickly where the various interest groups were ready to take off independently, had shown themselves not to need intervention or support from outsiders, and were definitely not dependent on them.

The tourism operators were now beginning to see themselves as a community that was aware of what a computer network could do for them and how to go about creating one. The challenge was then to get the rest of the community online.

8.4.1 Introducing new technology

There were a large number of potential tourism operators who wanted use the community portal to get started. The methodology relied on visiting each person to fill in the template for their business and to orient them to the project. However this was proving to be labour intensive and not satisfactory. Many of the 'potential business owners' had never used a computer and needed extensive help to even begin to appreciate how new technology could be used in business.

The first method tried was to encourage the potential business owners, who were mostly unemployed or partly employed persons, to utilise the facilities of the Hub, the telecentre in Wairoa. The literature suggests that telecentres are part of the answer to technology transfer in community informatics, but the experience in Mahia did not support this.

The work in Mahia and in Hokianga showed that for many people there are multiple barriers to computer access. For one thing, the unemployed are not idle, and they value their time as highly as any executive. In remote areas like Mahia, just getting to the Wairoa telecentre can involve journey times of an hour or more

each way. Even if people can reach the telecentre easily, they need a reason, what Loader, Hague and Eagle (2000) calls the 'hook' (see 2.3.1), to make it worthwhile to expend that much time and energy to get there. People in the marginal economy do not stand to make immediate gains in their lives from learning to use ICT.

Interviews with potential business owners in Mahia highlighted another problem with access: large step costs. To get to the Hub's computers involved a sizeable investment in time. To get their own computer involved an even larger investment in time and more importantly, money. From the point of view of someone not in the information economy, the cost of getting their first email is not a few cents; it is the cost of buying the personal computer. It is perfectly rational to resist paying for something which has no demonstrable benefit, takes hundreds of hours to learn to use, and may not have anyone wanting to communicate with you when you do get connected. Email can take quite a lot of time to administer. A further step cost was the cost of attending to the computer, waiting for prospective customers to contact you and replying to their enquiries. One backpacker owner, who actually had a very successful business, and had won tourism awards for the quality of their low cost accommodation, complained about the results from their website. '*I eventually took the email link off my website. I was getting messages all day from people in England and Germany and all over the place wanting to talk about some trip they were thinking of maybe doing. I haven't got time to listen to dreamers, I've got a business to run*'.

Even established business owners were not enthusiastic email users. Interviews with business computer owners had shown that they were reluctant to dial up their ISP to connect to the Internet because there were seldom email messages waiting for them. This had turned into a habit of only checking the Internet at weekends, and therefore negating any possibility of interactive internet bookings. The project reinforced the finding that without an established community of users the email bulletin board was not self sustaining. As in the SPANZ case the researcher had to take on the role of managing the board, by posting news items regularly so that there were always new items to read, and by emailing individuals regularly to get them to use the board. Despite its addictive qualities, email is quite a difficult habit to acquire without a constant flow of relevant messages.

Just giving people access to the technology was clearly not enough. They needed to be able to integrate it into their normal life patterns easily and naturally, and since

this was not happening, the idea of using the telecentre to give access to technology and of using email as a binding agent was dropped. Instead the focus moved to making the personal interactions with existing and potential business owners more efficient.

8.4.2 Extending the community

The existing business community around the Mahia peninsula had taken to the portal building concept with enthusiasm and was making progress unaided. The project therefore was able to revisit some of the groups who had been contacted in the early stages but who had not been part of the MTG. These were predominantly Maori communities.

The methodology used the education process to create rapport. As in the previous cases, the portal model was explained during a one to one interaction with the researcher. The person was invited to use the software to log on to the portal site and shown how to use the portal the way a prospective client would, and then shown how to enter their own details. In this phase of the research, the introductions were usually made through a community representative who sat in on the demonstration. After a few visits these representatives began to take the initiative in showing the new person how to log and use the software. This tendency to take an active role was then incorporated into the methodology. Instead of the researcher demonstrating the software to the new person, the representatives were trained to do this. The result was a more comfortable experience for the trainee, a source of pride for the trainer, and greatly enhanced productivity for the researcher.

8.5 Enhancements from the Mahia case

The revised methodology was successful in that it did avoid the 'culture of dependency' mentality and it was self sustaining but after the passage of some months it became clear that the business community had not succeeded in establishing the vibrant internet presence hoped for.

8.5.1 Factionalism

The Mahia Tourism Group originally saw the community informatics project as an ideal way to make the group more cohesive and more effective. In fact the opposite happened. The Mahia district is on the borders of two Regional Tourism Organisations and so there was a fundamental difference of opinion as to which

should be the main regional authority for the area. Some members wanted to tie their marketing efforts in with the Hawkes Bay region to the south, to take advantage of the burgeoning growth in wine tourism. Others saw their future as being part of the Gisborne and Eastland region to the north, sharing the region's publicity about beaches and sunshine. Both regional authorities were approached for funding and both were willing to work with the MTG, but they each naturally wanted to have exclusive listing of the activities on offer. This question immediately broke the MTG into factions, both of which had a good case.

The Wairoa group that had applied for funding to create their community website were granted it in principle, provided it was a full community website. This meant it had to include all the community outlets in the area, not just the businesses, for example to include the rose growers association, the crèche and other non-commercial activities. This led to internal dissention even within that group as to whether to accept these conditions or not. In the end the group could not come to agreement, the issue was never resolved and the grant lapsed unused. As time went on, there were also tensions between the more professional operators and the life-style tourism outlets. The larger operators were prepared to pay for a website to be built, the smaller operators were not and they could not agree to any kind of paid membership model. Operators who already had a website could not see why they should pay for others to get online. Many operators were reluctant to see competitors get online at all, and there was a suspicion that some members seemed to be working to prevent any progress on setting up web pages for the smaller operators. In the end the various sub-groups agreed to disagree, and one faction of the larger businesses went on to develop their own website in isolation.

8.5.2 Community Dynamics

Communities are made up of individuals with individual needs and agendas. The reality is that in community informatics the researcher has to take the situation as found, and must operate within the parameters acceptable to the community at large. The only approach that will work in the long term is negotiation and diplomacy: there is no way of forcing a solution on people. However, the long term may be outside the scope of any practical community informatics intervention. The situation in the Waikaremoana area demonstrated this clearly.

The Maori communities of eastern NZ are bound together by ties of kinship and by the land they live on and jointly own. No one can just sell their land and leave, since it is held in common. On the other hand no one can take too much of contrary position because they have to live within their neighbours' value system and no one can exploit any part of the land without the agreement of all.

The first community contacted was the people living around Lake Whakaki, located on the coast between Wairoa and Mahia. This is a totally undeveloped area of traditional tribal land, in secure possession. A meeting was arranged to tour the area and meet the owners of the lake to discuss possible tourism operations. The people living at the southern end of the lake were positive about change and had intelligent and well thought out ideas for opening up the lake and its world class wildlife to ecotourists and bird watchers. But as was the case in Hokianga, the land was held in common, so any changes had to be by consensus, and there was a small but vocal proportion of the community who could not agree with the proposals. Many of the people in the area live off the land and some of these regarded the lake as a personal asset, a source of food and recreation. Rather than bringing tourists to watch the birds, this group insisted on their rights to shoot the birds. Given this level of dissent there was no real prospect of getting any sort of development in the immediate future.

The other area of great potential was around Lake Waikaremoana and Lake Waikareiti. These are areas of outstanding natural beauty, sparsely populated and difficult to get to. The area played a crucial role in NZ history with several battles being fought during the Land Wars on and around the lakes. The lakes are in pristine condition and are a major source of hydroelectric power generation. The area already had two successful accommodation businesses run by non-Maori: these were already affiliated with the MTG. However, they both expressed doubt about whether a viable tourism infrastructure could be extended much further in the area.

A representative of the Maori landowners invited the researcher to make a presentation to their group. The presentation consisted of a computer aided demonstration of the websites built for North Hokianga and the current work being developed by the MTG. The presentation was well received and was followed by a discussion of how tourism could be encouraged in the area. There appeared to be real potential for history tours and to utilise the world wide interest in native

healing and indigenous medicinal plants. An itinerary was drawn up of leading people to see and potential tourism owner/operators. When visiting those who saw themselves as potential business owners the reception was cordial and no different from any other groups who had been shown the methodology. However, when visiting the community leaders there was a distinct coldness from some of them. After several visits and by discussing the issues with knowledgeable people, the reasons for this reluctance were uncovered. The reason why such a prime opportunity for tourism had been ignored appeared to be largely political. The first had to do with the history of the area. The tribes living around the lakes had been the biggest losers of the war, not merely defeated but decimated by their traditional enemies, the tribes allied on the British side, and having lost the battle then had much of their ancestral land confiscated as well. Even one hundred and fifty years on, for some older people, this was still a source of shame and embarrassment. The idea that visitors would be taken to the battle sites and told about the defeat was quite unacceptable. The other undercurrent was also historical. In the 1920's the electricity generation authority had forcibly taken large areas of Maori land for power generation use. This action had rankled for decades and over the years the people had protested and currently had a collective claim against the NZ government for compensation, with a good chance of a successful outcome. The result was that one section of the community was opposing all attempts to commercialise the area because that would bring outsiders to live there, whereas if they excluded them long enough the government settlement would eventually allow the tribes to keep their lands as exactly as they were, with financial independence. As discovered in the Hokianga case, there was not a single community, but several overlapping communities to deal with. The result was a stalemate, with some in the community wanting to start normal commercial ventures but being stymied by traditional authorities opposing it.

8.5.3 The final outcome

The use of the newspaper to inform the population generally, the wide consultation and public meetings and the contacts generated by the MTG resulted in the project attaining a high profile in the area. One unforeseen outcome of this was that the local authority, which had been initially benignly interested but chose not to get involved, decided to take up the idea of a regional portal. A regional controller was

appointed and plans made to integrate all the work into the official website. The decision was taken to take control of the various initiatives, to incorporate other internet based work not associated with the project, to formalise the links with schools and to take all development of the portal in-house. The management of the project therefore was taken out of the control of the researcher and this phase of the research was wound up. The project therefore succeeded in its objective of creating a sustainable community portal with assured funding.

The experience of the Mahia case allowed the methodology to be enhanced again to take into account the issues raised. By an extension of the education strategy the methodology could incorporate early adopters into a community version of the 'buddy system' where slightly more knowledgeable community members helped those just getting acquainted with the project. The issue of factionalism was addressed in the next case by a better choice of community, or rather by carefully delineating the community so that it included more people with similar expectations. The issue of community dynamics was finally solved by creating a software option where everyone was invited to join the online community but once enrolled, every member was given the ability to control who was linked to their personal webpage, and therefore effectively could create their own micro-communities. The implementation of these developments in the methodology is described in chapter nine, the East Cape case.

8.6 Summary

The Mahia methodology differed from the Hokianga methodology in two crucial factors. The project in Hokianga was aimed at empowering the lowest economic sector of the community, and it was seen from the beginning as an injection of technology by outsiders. The strategy in Mahia was to guide the business community to a position where they could produce their own ecommerce solution, then use this as a resource to enlist and assist new business entrants.

The methodology in this case worked, in that it did produce a website where there had not been one before, but it did not include the whole of the business community. What appears to have happened is that within the business community the various interest groups identified more with their own interests than with the wider community and so acted in pursuit of their own benefit. The outcome was a successful technical system, within a dysfunctional community system.

The next chapter describes how the revised methodology was applied in the East Cape region to create and sustain an ecommerce network of small businesses within an isolated community.

Chapter 9:

Community Informatics in East Cape

9.1 Introduction

This chapter introduces the East Cape case and explains the circumstances of the KiwiTrails community development initiative. It outlines the architecture used for the East Cape business model and the implementation section shows how the methodology was adapted to implement the business model. The implementation strategy introduced the final parts of the methodology which would enable the inclusion of the smallest potential tourism operators. The last section reports on the success of the methodology in enabling the community to achieve its aims and to produce a self sustaining community development.

9.2 The East Cape community

The East Cape region is broadly defined as the triangular area between the Bay of Plenty and Hawkes Bay. For the purposes of this case its northern boundary extends from Rotorua along the southern coast of the Bay of Plenty to East Cape itself, the southern boundary is the road between Rotorua and Wairoa, and the eastern side is the coast between Wairoa and East Cape. The region has huge areas without towns or any obvious visitor attractions, and none of the main roads are on the way to anywhere. Rotorua, Wairoa and Gisborne are sizeable towns, and there are small towns on the coast roads, but the interior is sparsely populated and parts are very isolated. The population is varied, some inland areas are predominantly

Maori, but the towns and coasts are mostly non-Maori. Rotorua is an established tourism centre, but apart from that only Gisborne has a tourism industry. There are many small independent tourism businesses scattered throughout the region, mostly accommodation providers but also including jet boating, horse trekking, fishing charters and other activity based outlets.

The Eastland regional tourism organisation is responsible for marketing East Cape tourism but its strategy was centred on promoting the Gisborne area. There was no coordinated promotion of the many small tourism outlets in other parts of the region. As a result the region had not developed a tourism mind set and there was a general feeling that there was no real opportunity for tourism growth other than along the coastal routes. In particular the inland areas were not optimistic about attracting visitors due to the difficulty in getting there and the perceived lack of attractions.

9.2.1 The KiwiTrails Concept

The economic isolation of the East Cape region had been a concern for development bodies for many years and there had been several attempts by local and regional agencies to boost tourism but these had been short term and of limited success. The community informatics work in Hokianga had attracted the attention of the Community Employment Group (CEG) a government agency charged with creating employment in rural areas. The CEG expressed an interest in applying the methodology in East Cape and after consultations agreed to use it to develop one of their employment initiatives, a community supported bus route called KiwiTrails. The idea of KiwiTrails had been created by an entrepreneur from Ruatahuna who wanted to start a tourism adventure bus route through the region. Ruatahuna is right in the centre of the region and very isolated, only reachable by travelling along sixty kilometres of unsealed road, so the concept of a bus route had particular appeal and the total support of everyone in the area.

The concept of KiwiTrails called for an integrated transport scheme to run small buses on a circular route from Rotorua along the coast via East Cape to Wairoa and then back to Rotorua by an inland route via Wiakaremoana and Ruatahuna several times per week. The scheme is designed for the backpacker segment of the market. It would pick up independent travellers from Rotorua and Taupo, the main central North Island tourism centres, and offer them a route through East Cape that they

could not otherwise reach by public transport. The scheme allows the backpackers to get off anywhere, stay as long as they want and to rejoin the route as many times as they want until they have completed the circuit. The idea behind it is to get tourists into the more remote areas and to provide a reliable supply of customers for new ventures. The rationale was that as more visitors come and spend, more tourism outlets will open to service those visitors. As new tourist attractions and activities open up, these will attract more tourists and so a cycle of self growth and development would be created. The concept of a continuous 'trail' had many advantages: it had a definite boundary, it could work even if there were only a few tourism services on the route itself, it gave a focus for other independent travellers as well as the bus passengers and it created a memorable product. The attraction strategy was therefore to encourage visitors who were already in nearby areas to sample the region by giving them a reason to visit.

After extensive discussions with both parties and after jointly exploring the issues using rich pictures, KiwiTrails Ltd was set up as a commercial business venture underwritten by CEG and other Maori support agencies. The CEG supported it because the scheme would employ drivers directly and had the promise of creating more opportunities in service industries for the Maori communities scattered along the route. However, to make it work meant that support and cooperation had to be created in other towns and communities. The community methodology was seen as ideal for enabling this type of project to proceed and the case was seen as ideal for testing out the amended methodology.

9.2.2 Designing the business model

To be successful the community informatics methodology was required to satisfy several conflicting criteria. It had to be cheap, simple to administer, acceptable to a wide variety of businesses, and easy enough for them to use unaided. It also had to be an attractive portal for overseas and domestic tourists and to allow them to make enquiries and bookings.

The basic strategy was to link all the independent businesses along the route and adjacent areas in to one ecommerce portal community. The outcome would be a simple but powerful web-based marketing and booking system that would allow existing and potential small businesses to feature on the website. Having pages on the website would give each business market exposure and ecommerce facilities.

There are many existing listing systems already available in New Zealand. For example Jason's, AA, the Motel Association and others provide a relatively simple way of getting listed online. However, this type of site has disadvantages for small tourism businesses: the listings cost money and they are usually restricted to one class of service, typically accommodation. They are also owned and controlled by the sponsoring organisation so the individual business has little or no say in their design.

These sites are designed using a simple tree metaphor and the site's architecture is designed to navigate to a single page. Typically the user finds the name of a tourism area they want to visit, and then drills down to identify a suitable hotel or motel within that area. Once on the accommodation page the user only has the option of making a booking or returning back up the tree, since the page owner has no interest in directing the enquirer to some other provider's website. The accommodation listing pages do not usually recommend places to eat or suggest activities for visitors unless the business owner has some financial interest in them. These sites are really index sites where each page is treated as independent, with no connection to any other page.

A community model uses a network metaphor to organise its pages. Each page is regarded as member of a collection of pages. These collections can reflect location, activity type or any other linkage.

The community business model starts from the principle that the unit of organization will be the community, not the individual business, and that the user should be able to navigate across any level of the data, as well as up and down. By using a network based design, every type of business can link to every other business, and the user can scan a whole community of businesses and create a complete experience by combining accommodation, meals, activities and transport. Once the visitor has reached an interesting page, they can access all the services of that community. The visitor can move freely along any part of the tree, and explore different types of service by following the links. Entry to site is normally to the home page from some external tourism organisation portal, but every individual page can be accessed directly, and from there all communities are linked to each other. No one person or community 'owns' the site and the site can survive the withdrawal of any business or group of businesses.

9.2.3 Architecture of the community website

Creating an ecommerce site for a community can be broken down into sub-problems:

a) Making the world aware that the community and the area exist.

b) Creating an authentic and distinctive website for each community

c) Providing small tourism businesses and potential businesses with an individual webpage.

d) Connecting marginal businesses to the website

The following section describes how these conditions were met by the East Cape business model.

The KiwiTrails site design consists of four levels.

Level One: Entry point

The website starts with a map showing the main tourist routes of East Cape region, with the KiwiTrails route prominently shown. The routes are bit mapped graphics so that clicking anywhere on the route allows the user to drill down into the next level. For each point on the map there is one associated community. The potential traveller can click on any point of interest and be taken directly to the appropriate community on the next level down. Other access pages include a geographic map with clickable hot-spots on towns and areas of attraction. Clicking on these opens up a page with accommodation listed by type and an alphabetical list of nearby places of interest. There are pages that list all the activities classified by type, showing the name and location of each provider. Potential visitors can therefore plan their trip by examining the attractions and activities offered in each of the locations and choose their stops accordingly.

The main map page can be accessed directly from www.kiwitrails.co.nz or can be reached via links from the webpages of the adjoining Regional Tourism Authorities and other tourism portals. This page is a way of organising and marketing multiple independent communities. This level corresponds to requirement (a) above, making the world aware that the community exists. The site benefits from being linked to bigger tourism sites as well as having each individual page tagged for search engines.

Level Two: The Communities

The community level pages detail the attractions, activities and services available in each community. In the initial webpages these follow a standard layout with a photograph, a block of descriptive text and links to the community's business members. It is intended that in future, as the community pages give more comprehensive cover, these pages will be expanded by the communities themselves to reflect the particular values and characteristics of each community. Each community page features a local group of businesses and can act independently or choose to link to one or more other communities. The community page is way of marketing the community and its immediate geographical region. The community level displays a classified guide to all the businesses in the community, listing places to stay, places to eat, things to do, where to shop and general attractions. Clicking on any one category of business will open a page listing all the individual businesses offering that service. This level corresponds to requirement (b) above, creating an authentic and attractive community designed website. The standard processes of web-raising and community building are used to create these community pages.

Level Three: Individual businesses

These pages give details of each business laid out in a standardised format. The business level pages are kept deliberately simple so that every business has exactly the same space and the same relative importance. The details are supplied and maintained by the business owner, and the photographs are normally supplied by the owner as well. Businesses which already have their own websites can add a link to their site. The webpages provide a marketing service for each business individually. Each business is ecommerce enabled and has an email link for communication and can take booking enquiries directly. This level corresponds to requirement (c) giving each business its own webpage. A detailed description of the process is given below in section (9.3.1). The business model for connecting marginal businesses (d) is described in section (9.3.3).

9.3 The implementation strategy

The objective was to get one hundred per cent of the existing businesses along the KiwiTrails route to be listed on the portal and to have an individual business webpage. The aim was achieve a density of attractions such that it would create a

critical mass capable of showing the visitor that there was something of interest for everyone, and to show the businesses, and particularly those thinking of starting a business, that there actually was a viable and thriving tourism industry in the area. This meant that the methodology had to be able to create webpages for possibly hundreds of tourism businesses. There were a number of issues to resolve: the time and programming effort to create the pages, businesses who already had websites, businesses who were already part of some other directory scheme, businesses who saw a web presence as a competitive advantage over competitors without a website, and businesses who did not want to be listed beside other businesses due to personal animosity. It also had to allow for tourism businesses who would be hostile to the idea of a community website, and those too apathetic to get on board. The problem of creating webpages for small and marginal businesses is further compounded by lack of resources. Most small businesses are familiar with the concept of internet business and want to have an internet site. However, they usually have no budget for development and little or no computer skills themselves. This means someone not only has to provide them with a website free, but also has to commit to keeping that website up to date indefinitely. This was impractical, so the software had to be simple enough for an ordinary person to be able to use it unaided, and having used it, to be comfortable enough to feel confident that they could keep it up to date themselves.

9.3.1 Using the business template

The design of the project started from the premise that the user had to be enabled to create and maintain a simple business webpage unaided. For a standard one page accommodation web all the elements can be defined in advance: a business name, an address, contact numbers, room tariffs etc. Because the elements are fixed, the design problem resolves itself into a simple matter of capturing the text for each element. For this an internet form template was created programmed in PHP (an internet programming language), and interfaced to a MySQL database. This software was written entirely using open source software and was available through any browser. As far as the user is concerned the process of using the software is entirely automatic: they enter their details, these are saved to the database, and the new information is immediately compiled into new HTML source code that overwrites the old page. There are two versions of the software: an administrator

only version accessed via a password which allows the business owner to change their details in the database; and a public access version open to anyone, which displays the latest pages and allows the user to contact the businesses by email. Using the internet form template required no special skills or training. Assuming the business owner can use a keyboard and mouse, all they had to do is to type in answers to questions as they appeared on screen. The questions were presented in one continuous scrollable screen, with instructions and examples around each question. Data entry was made as simple as possible, with the minimum of typing. Some questions inevitably require the business owner to type something in, such as 'what is the name of your operation or business', but wherever possible entries are chosen from a menu, for example 'select the classification that best describes your accommodation, e.g. Farm stay, Backpacker, B & B, Guesthouse'. More complex items are created from answering a series of linked questions, for example to determine how many rooms are available, of which type, and at what price. This section required several prototypes but eventually the software was able to handle any number of room types and almost any pricing plan.

By following this design the user requires no computer skills other than the ability to use a mouse and keyboard on a standard internet browser. In practice most users were coached through the process either by the researcher, or by a community member who had already used the package and had volunteered to help others. For most businesses the researcher took pictures of the owner, their staff and their premises with a digital camera and transferred these directly into the webpage. The program automatically resized the images to fit the webpage template. In other cases the business already had suitable images which were imported and became part of the webpage. In every case the business was encouraged to provide a photograph of the owner and their family, as well as a picture of the business.

The resulting webpage has the business name as banner across the top, a slogan, two columns for text describing the location and facilities on offer, and up to three photographs. Each business could also create their own photo gallery linked to their webpage. There is also the ability to display the logo of any trade associations the business is in, and to create a link to any personal or business website. The outcome was a professional looking webpage automatically generated from the owner's input. The owner could inspect the finished page and use the software to re-enter data until the page looked the way they intended. This process not only

familiarised the business owners with the software, it trained them in how to keep their pages up to date.

9.3.2 Community linkages

One of the principles underlying the methodology is to build-in community based solutions where possible. In order to build a sense of community among the businesses along the route a facility was provided by which one business could link to any other. This link is not automatic and any business can chose not to link to anyone. If a business does choose to link to others then there are several options available: the business can choose to link to everyone in the local area; or only to businesses which are not direct competitors; to selected businesses unilaterally; or to selected businesses, but only if they also link back. Businesses retain 'ownership' and determine which pages they wish to link to. There is no compulsion to link to any other businesses, but it is simple to link to say, a cousin with a boat to compliment a farm stay experience. Similarly, if you have an antagonistic relationship with some other tourism business, then you don't have to share guests. This way of linking the pages avoids any disputes there might be amongst a small community, but reinforces community linkages.

The community ethos of the software design also eliminates issues of factionalism. The ecommerce site has no owner and no controlling body or committee - every page and entry is exactly the same size and layout and members can opt to have a webpage now, or wait until later, or decide not to have one at all. This allowed the more committed members to get on with listing while still leaving the option for the more reluctant members to join in later if they wished. It also allowed those with an existing website to continue with it or to use both.

9.3.3 Supporting microbusinesses

Research in mainstream electronic commerce has shown that online purchasing systems usually fail, unless the purchaser is given the ability to talk to a real person when problems arise (Keen and Macdonald 2000). One of the strengths of a community-based system is the abundant human resources available. A community-based system needs to include even the most marginal business. It is easy to design ecommerce solutions for those with full access to the technology: the challenge is to include those with none. The solution devised was to connect the

visitor to each service provider either through the Web interface directly, or indirectly via a human intermediary.

One problem with tourism businesses is that they demand a high level of commitment and service to maintain, even if patronage is low. Many individuals on the East Cape route were interested in starting a tourism operation but needed the assurance that there would be sufficient demand. This class of business also tended to be undercapitalised, and have little or no formal business training and no IT skills. Many potential entrants, especially in the Maori communities, do not have access to the Internet or are not able to devote themselves full time to their new business.

The community software design caters to this group of emerging entrepreneurs by allowing the business owner to nominate a proxy, a person or business to act on their behalf that does have internet access and can respond to enquiries from potential tourists. This means the new business can enter the market without the overhead of a computer and internet service but still get the benefits of being listed as a full member of the business community, and participate in the booking and payment system. The proxy business agrees to take all incoming enquiries and either answer them or pass them on to the intended business. How this is done is left to the two businesses. This cements the personal relationship between the businesses and automatically provides a mentor for the newcomer. In the case where a new business does not know or does not want to nominate another business, non-competitors such as the public Information Centre can act as the proxy. The Information Centre can also act as a central information hub, taking general questions from the website about the area which do not involve individual businesses.

Financial transactions.

Small businesses may not generate enough turnover to maintain a merchant account with a credit card company. Where bookings are handled through the system, a nominated credit card proxy can help small businesses to sell their product by allowing them to use their credit card facilities.

The proxy support for the very smallest businesses was implemented as described and worked well. Supporting the smallest businesses this way overcomes not only the lack of technological infrastructure, but also the problem of low usage. Some

accommodation businesses for example only operate in high season, or participate only in particular events. Most have no Internet access and never intend to get any. Bookings/enquiries for these marginal businesses will be routed through the local tourist information office or a school in the area. This ensures that the point of contact gets enough traffic to warrant frequent attention to the system. Since using a proxy is not compulsory, businesses can decide who, if anyone, they trust with handling bookings on their behalf.

9.4 Implementing the East Cape community site

The project started with a pilot study aiming to capture all the accommodation businesses along the proposed route. The Community Employment Group's regional coordinator travelled along the route several times contacting existing businesses and small communities and describing the project to them. All those who expressed an interest were kept up to date on the progress of the project and in due course everyone of them was visited personally.

9.4.1 Community building

In a process similar to the initial buy-in meetings of earlier cases, business owners were briefed on the objectives of the project either individually or in groups of three or four. During the briefing the owners were asked to nominate other businesses who might be interested and these in turn were visited, briefed and asked to nominate others that they knew about. In this way the project used the community networks to grow organically and at an acceptable rate. In this case the businesses were all very small and there were few staff members to include, but wherever possible staff and family were included in the briefings.

The concept of the bus route was very successful at getting the individual owners to realise that they could become part of an integrated industry in the East Cape region and that by working together as a community of mutually dependent businesses they could achieve more than they could alone. As the project progressed word of what was going on began to spread along the business network and more and more businesses owners asked to be included in the briefing process. This allowed the briefings to be more productive in that they were made to clusters of businesses rather than individually. As the clusters got bigger the web-raising effect become apparent again as people began to interact and encourage each other.

9.4.2 Introducing the technology

Whenever a briefing was conducted the owners were shown the prototype website running on a laptop computer. This ran an onboard version of an internet browser which simulated the website without actually needing to be connected to the Internet so that the owners could see how it would look to an overseas visitor. The website had the home page with a map of the region and a menu on the left hand side. The owners were invited to click on any of the locations shown on the map and the software would open up a listing of businesses in that location. To begin with, these were specimen pages with sample information on them, but at each briefing the owner was shown how to enter their own details and then generate their own webpage on the spot. This never failed to intrigue and impress, and the same built the same kind of rapport which had been a feature of the earlier technology education interactions. One procedure that proved particularly effective was to get the owners to come up with the slogan for their business. This was reminiscent of the successful procedure used in the early web-raising stages of getting the community to come up with an original and catchy Internet address for the site. The owners were encouraged to explore the website and experiment with linking to other businesses and shown how to set up mutually complementary links. The software was seen to be acceptable and easy to use and getting owners to use the templates proved remarkably easy. In many cases the businesses were able to follow the onscreen prompts and enter their data without assistance. In other cases the researcher typed in the data where the business owner was uncomfortable with using a computer. The only problems experienced were the time taken to type in the data by some of the more nervous owners, and difficulties with interfacing the laptop to some digital cameras. On the whole the use of the laptop to display the site and to collect the data directly was a success.

The revised version of the software was successfully used to capture the details of many types of tourism businesses including backpacker's hostels, motels, large hotels, fishing charters, guided walks, restaurants, rural manufacturers, orchardists and many other businesses proving that the model could handle most of the tourism operations found in the East Cape area. (See www.kiwitrails.co.nz)

9.4.3 Extending the community

At the end of each day the business details entered by the owners were downloaded to the central database, and the owners were invited to access KiwiTrails independently through their own browser, where they could see their own webpage, and try out the links. This was used as a way to reinforce the 'reality' of the project and gain commitment from the owners to support the bus route. Once they had accessed the public site by themselves they could make changes to their details and could also enrol other businesses and add them to the database. In this way the project began to be self-sustaining and grew organically. There was only one minor problem; it was found that many of the businesses were so pleased with their site that they immediately emailed the web address to all their friends causing some business from far outside the region to ask to join, but they had to be turned down.

9.4.4 Sustainability

The concept behind the scheme was welcomed and accepted by the businesses along the bus route, and in fact many of the businesses insisted on the researcher staying longer so that they could bring in other people from nearby to be enrolled on the system. The portal concept also proved to be attractive to the various Maori groups included in the bus route area. There have historically been deep differences and rivalries between the different groups and a reluctance to work together in case one group should be seen to be giving control to another. The ethos of this community informatics project with its emphasis on multilateral access and lack of an overall 'owner' made the project much more acceptable to Maori interests.

The interactions with business owners showed that the business level pages could be created automatically by the businesses themselves. The advantage of this business model is that once the software is in place it needs almost no further support. The project had not had enough time to show whether the businesses will in fact update and maintain their pages but there is no reason to think that they will not, and the existence of the bus route is a powerful incentive for them to ensure that they do.

The other levels of the website require minimal ongoing maintenance. The home page will not change since all the communities are already listed or can be accessed by clicking the map. The community pages consist of a brief description of the

community's attractions which will not change. The classified listing of places to stay, places to eat and so on, are generated from the details entered by the business owner so are also maintained automatically. All other pages on the website are templates and do not need maintenance. The result therefore is that the technology aspects of the community informatics require the minimum of effort and simple self-administered on-going maintenance.

9.5 Summary

The responsibility for the project was handed over to the Community Employment Group in May 2003 when the KiwiTrails site was launched and the bus service started running.

This software has created an integrated community website for large numbers of individual businesses. It has proven to be easy to use, has captured the imagination of the communities involved and its success can be judged from the fact that it has led to requests to be included from communities outside the research area. The software and the process of introducing it to the business community has acted as a catalyst and ensured the success of the bus route.

This case has shown that community informatics can succeed when an appropriate methodology is used, and the introduction of information technology can be used as the means of supporting regional and community development. The next chapter draws together the lessons learned from the cases in which community informatics was introduced.

Chapter 10:

Critical Factors in Community Informatics

10.1 Introduction

The previous chapters described how the Community Informatics methodology developed in this thesis was applied and developed in various community situations. This chapter brings together the results of the case studies and examines the contribution that this research has made to the knowledge of Community Informatics.

The first section covers the evolution of the methodology and shows how the issues arising from the experience of applying the methodology were incorporated into the subsequent versions. The second part answers the research questions posed in chapter two: can a participative methodology be created to successfully implement a community informatics project, and what are the critical factors in community informatics? The required outcomes for a community informatics methodology are evaluated and the methodology is assessed on how well it has satisfied those requirements. It is shown that the methodology has in fact produced all the outcomes specified. The critical factors found in the literature are restated and then each case is reviewed to identify which factors were significant in each case. The role of each factor is critically evaluated and the case for including new factors is presented.

10.2 Development of the methodology

The application of community informatics to the communities in this research brought out many issues which affected the methodology. The circumstances of each community are unique to each case, but recurring issues could be identified and the methodology was modified to allow for these. Many of the issues were interrelated which meant that the methodology had to be able to address multiple issues simultaneously. Some of the issues identified related to the generic model only, some related to the implementation methodology and some impacted on both.

Changes to the generic model

The generic ecommerce model was described in section 4.2.3. Section 10.2.1 below lists the issues which were found to affect the generic model, with brief details of how each issue was satisfied. The references in brackets are the section numbers where the issue is described in detail. The changes affecting the generic model are discussed within the framework of the stage development model outlined in section 4.3.

Changes to the community methodology

The experience of the community cases in chapters six to nine brought out several issues relating to the methodology itself, and to the interaction between the methodology and the model. The methodology was described in section 6.4: section 10.2.4 discusses the additional issues that affected the methodology. The references in brackets denote the section where the issues were first described.

10.2.1 Issues affecting the generic model

The overall architecture of the generic model consists of a core set of web pages which together showcase the community, provide the marketing and display information needed by visitors. This set of pages defines the community in its own terms and can be simple or extensive. The purpose of the core pages is to attract visitors to learn about the community and to build the desire to visit the community. These core pages act as a portal, a hub around which ecommerce functions are arrayed. Each business within the community is given a webpage on which they can describe their services. Each business page has ecommerce facilities such as a link to email so that the visitor can contact the business and buy their services. The basic ecommerce functions were considerably extended for the East

Cape implementation (9.3.3). Each business page also links back to the core pages and to other businesses with the community. The linking function was also extended in the East Cape implementation (9.3.2). The overall design of the community core is derived by using the community design methodology utilising techniques such as rich pictures and web-raising. Individual pages on the site, both the community pages and the business pages, are derived from templates that allow the web page to be generated and maintained by individuals in the community.
The model is implemented in two parts: a static part and an interactive part. Most of the issues that arose affect the static part: these are covered in section 10.2.2. The interactive part is covered in section 10.2.3.

10.2.2 The static site requirements

Part one of the model, the static site, consists of two stages: static information provision and basic ecommerce. Even though the community websites can be quite sophisticated, creating a static site using this methodology requires very little programming and can be constructed using off-the-shelf software, with only the content needing to be provided by the community.

Stage One: The static website

In the community section of the website the following requirements were noted.

Central design and planning function (5.4.5a): The static information provision section of the website follows a standard page plan ensuring that the need for a central planning function is addressed from the start.

Site navigation needs to be simple and consistent (5.4.5a). A 'Home' page shows a brief description of the objectives and displays links to the other parts of the site. Every page has a link to the site map page, a page that allows the user to reach any other page in not more than two clicks.

The website must allow for personalisation (4.2.3). The community section content is created by web-raising (7.5.1), and depending on the community, this section will feature aspects of locality, personalities, attractions, history, etc., as determined by the community members. The community section also features a photograph gallery (6.4.1h) illustrating aspects of community life and work. The programming of this section reuses standard pages, so it is simple to implement and can be expanded indefinitely.

A business portal section is a requirement (6.4.1j) and acts as a showcase for all the individual businesses in that community. Each business has a standard page created from a template, showing details of the business - its location, services, prices and contact numbers. These pages are completed using information supplied by the business owner through an on-screen form, and any number of businesses can easily be added.

Stage Two: Ecommerce requirements

The site must incorporate ecommerce from the start (5.4.5d).The second stage uses an integral ecommerce model based on direct email contact between any user and any business. (The ecommerce implementation is described in 9.3).

The site must use page templates (4.4.1d). For businesses and individuals who want to sell physical goods over the Internet a standard set of pages is provided. A page linked to the supplier page lists the goods on offer from a given supplier, and clicking on any product in that list displays a page describing that product in detail, with a photograph, price and delivery details. The product pages are based on a template so that the programming required is minimised.

For businesses selling services such as accommodation or tourist activities there is a standard template for each category of services. Completing the template is done by the business owner through an on-screen form. (Details of the accommodation forms are given in 9.3.1).

10.2.3 The interactive site requirements

In part two, the interactive part of the implementation, most of the stages were automated or incorporated as part of the website building process. One of the principles underlying the methodology is that the community website can only be developed and implemented at a rate that matches the development of the community itself (4.4.1e). This meant that for the communities in this research several stages of part two were either not applicable or would only become relevant once the sites had become established and stable for some time. The emphasis in part two was the creation and maintenance of relationships.

Stage Three: Active information management

The websites of the communities in this research grew so quickly that there was little need to create any website facilities specifically for this stage. In the course of

applying the methodology this stage grows out of the activities in stage one and arises naturally from the process of community web-raising. As the community activities pages evolve and consolidate they offer a continually changing view of the community and so visitor interest can be maintained automatically. In addition the community members have the ability to add new photographs to the gallery themselves (6.4.1h), and to add new features to the site as the page content is captured. None of the sites had reached the state of maturity where the site had finished evolving. When that stage is reached the provision of active information can be supplied by a further round of community web-raising (7.5.1).

Stage Four: Relationship Management

Relationship management must be integral to the design (4.2.3). Two aspects of relationship management are built into the model, relationships with customers and relationships between businesses. The emphasis in the model is on a partnering strategy (4.2.3). The strength of the model is in the way that it links the community to businesses and links the network of businesses to each other. In the community situation the businesses are all small and do not have extended logistics chains, but rather depend on each other. The extensive linkages between businesses ensure that they are able to cooperate to the maximum extent. The structure of the ecommerce site also ensures that the communities are linked to the major tourism marketing organisations and the major transport organisation websites. The community site has an online visitor's book that lets people leave messages and allows the community to build up a contact file of past community members and other supporters.

Stage Five: Interactive enquiry support

Given the nature of the community websites dealt with in this research, only a basic level of support was required. The small businesses in the communities did not have extensive databases so any enquiry could be dealt with by contacting the business owner directly. This was facilitated by the direct email contact available from the ecommerce functions. The intimate nature of relationships between the businesses and their suppliers such as transport organisations means that more formal arrangements were not needed.

Stage Six: Environment management

The requirements of this stage are incorporated directly into the methodology. There are direct Internet links between each community website and its regional tourism authority and the links between the businesses in each community act as a natural web ring. As the sites matured it would be expected that the communities would take over the management of the site within its environment.

Stage Seven: Site monitoring

There must be a clear cost/benefit balance (5.4.5e). None of the community sites had reached the stage where formal monitoring was necessary, but since the site was essentially at no cost to the communities, the business cost benefit ratio would be positive. The need for monitoring user perceptions of the site was likely to be less of an issue in the first instance due to the community's participation in the design.

10.2.4 Issues affecting the methodology

The initial version of the community development methodology was described in section 6.4. The experience of the cases showed that there were several issues which had not been addressed in the original formulation of the methodology, but that on the whole the methodology was able to deliver everything required for a community informatics intervention. The headings below have been used to group related issues together, since these were often interconnected. The numbers in brackets refer to the section where the issue was first raised.

Multiple Objectives (5.4.5b)

Early in the development of the methodology it was recognised that a community informatics methodology needs to be able to reflect multiple objectives, and be able to absorb poorly articulated objectives. The methodology ensures this by obtaining management buy-in as the first step in the implementation (4.4.1f; 6.4.1a). This ensures that the key members of the community are consulted and that the project does not proceed unless it accords with their objectives. By aligning the project with the needs of the key members any conflicting objectives raised by other members will be seen to be contrary to the aims of the project, and pressure will be applied by those key members to prevent other objectives from deflecting the project.

Conflicting objectives are also avoided by ensuring management participation (6.4.1b). The methodology proceeds top down from the two or three key members to include all of the next layer of influential people. The project objectives are outlined to this group and any objections are dealt with at the time. In keeping with the action research philosophy, any substantive objections are discussed with the key members and if necessary the project aims are amended and the process continues with revised aims. At this stage rich pictures are used to bring as many people as possible into the discussions, and act as both an educational tool and a conduit for dissenting ideas to surface.

Once the rich pictures had been developed the principles of soft systems methodology were used to define the primary relevant system. This resulted in the project keeping a single focus (6.4.1c). This single focus was emphasised throughout the project and all work was directed to achieving that single focus. From time to time other relevant systems were suggested by the community, but the methodology always focussed on the primary relevant system only. The process of involving as many key people as possible also avoided the related problem of conflicting agendas (6.2.4c) which had occurred in one case and factionalism which arose in another (8.5.1).

Building Rapport (6.4.1d)

The success of the methodology very largely depends on establishing rapport between the researcher and the community. The methodology builds rapport by using the technology as a way of involving the community and business owners. After many variations it was found that introducing people to quite elementary computer based activities was an ideal way of overcoming reluctance and creating an acceptance of the project. This was normally done one to one by the researcher with key community members or senior management because it provided an ideal environment in which to get to know each other and to allow either party to ask questions in a comfortable conversational manner. In a similar way technology was used as a vector for involving non-management staff in larger organisations.

Lack of technology knowledge (5.4.5c)

The methodology was designed to recognise and allow for the lack of technology expertise within the community. Using technology education as a rapport building

technique also worked well with the general community. These members did not need to learn the technology, but demonstrating even very simple data entry and encouraging them to personally interact with the Internet pages was a very powerful way of engaging their attention and securing their support for the project.

Time Availability (6.2.4e)

Rapport was also enhanced by using the technology itself to demonstrate that there would not be excessive workloads. Seeing for themselves exactly how the process worked allowed senior people to judge how much time their workforce or community would have to commit to the project and underlined the fact that all contributions were voluntary. The methodology learned from the early cases that it was unrealistic to expect busy people to give up their time for the good of the community and the process of creating and maintaining the website would need to be almost entirely automatic.

Each step in the methodology is heavily participative and emphasises the interaction with the community (2.5.1). Most of the content for the static parts of the websites was collected from existing publicity material such as brochures, but some had to be created for the community web pages. The material for the community pages was gathered by the process of web-raising and the material was then collated and mounted into standardised pages. Everywhere it was used the web-raising was very popular and never failed to produce large amounts of high quality material.

Templates were used for recording personal pages and business details (4.4.1d). These only required the user to answer questions on screen and then the software generated the page automatically. Users found this process very simple to use, it saved them time and they found that they could change their page details themselves.

Community Building (6.2.4a)

One of the ways that the project provided support for the community was by involving the local newspaper (8.3) where there was one. This opened up the project to all interested persons and paved the way for personal contact. Due to the very large numbers of people in involved in a participative methodology it became impractical for the researcher to deal with each person personally.

When dealing at the individual level it became standard practice to encourage senior community members to take on the role of adviser to other members of the community. These advisers could be trained in simple form filling operations quickly and easily and by passing these skills on to others they increased their own commitment to the project, as well as introducing new users. By ensuring that the more senior members of each community were the ones trained first their status in the project was reinforced and using their network connections to introduce new users to the project simultaneously created bonds of community based on personal interaction that the researcher could never have achieved. By using the community networks in this way the community could be extended indefinitely (8.4.2).

Another result was that the community building process was transferring ICT skills to new users (8.4.1). Many of the community members had never used a computer and even this limited introduction enabled them to appreciate how new technology could be used in business and to aid the community.

The portal concept (6.4.1j) proved to be essential in community building. By visualising the ecommerce website as a portal, all members of the community could orient themselves within the concept of the community and see exactly where they, their family, workgroup, or personal enterprise fitted in. It also validated the use of templates. These made community building easier by ensuring equity and equality (6.4.1i). It became apparent in some of the interactions with community members that issues of status were important. By using templates every business and every personal page was of the same size and this ensured that issues of perceived status did not become a problem.

Commitment (4.4.1a)

In the Hokianga case the methodology succeeded in building a comprehensive ecommerce website, but it failed to get the community to commit to ownership of the site. This highlighted the need to ensure commitment. The methodology therefore changed its focus from offering to introduce technology and donating an ecommerce website, to offering to help communities organise better and focussing on helping them to implement the technology themselves. The difference was an insistence that the community takes responsibility for its own success (8.4). The change in focus meant that the community had to commit to the project and in so

doing reinforced their own community bonds. The emphasis on community building also counteracts the possibility of control being removed from the community as happened in the Mahia case (8.5.3).

Sustainability (2.5.3)

To ensure long term sustainability of a project it is necessary to have a core of IT enabled people within the community. The methodology used several means of getting IT skills into the community. The rapport building process depended on exposing the community directly to the IT and using community members to teach the skills to each other. The methodology also ensured that the skills required were as simple as possible so the community could take over the task of adding and revising the web pages.

Another important element in achieving sustainability in community informatics is the ability to extend the project to include permanent community resources. In the Mahia case the Information Centre turned out to be a key resource (8.3). In other cases the local schools were brought into the project (7.5.3).

Applying Action Research (6.4.1m)

Throughout the development of the methodology the principles of action research were followed. In all of the cases the action research cycle guided the detailed activity and the action research concepts of planning, implementation, evaluation and reflection were consistently applied to the situation.

At the same time the principle of matching and pacing was applied (4.4.1e). Each iteration consisted of making changes and checking back with the senior community members for comment on the outcome of those changes, and then making more changes in the light of those comments. When building the static parts of the websites, because the same basic model was being re-used, some of the repeat visits and consultations with senior figures were not strictly necessary but the extra visits were made because they did allow the researcher to introduce the website in stages to ensure that the speed of development did not outpace the speed at which the organisation could absorb the changes.

Community Participation (2.5.1; 5.4.5f)

The principle of community participation had to be reassessed in the light of the results from the community web-raising (7.5.1). The stages of action research

includes reflection on experience and reassessment of even the most fundamental of the principles of the methodology. There were issues of authenticity, accuracy and consensus which led to the methodology adopting a more pragmatic approach to total participation in order to avoid issues that were deemed to be irresolvable in the context of community informatics.

A related issue arose in the Mahia case. Community dynamics meant that for some situations it was impossible to reconcile differing viewpoints (8.5.2). The methodology was able to deal with this by allowing each member of the community to decide for themselves whether they wanted to be part of the community website or not in such a way that they did not come into conflict with opposing factions, and so that no faction was able to prevent the website being successful. The details of how this was done were given in 9.3.2.

Overall, the lesson learned from the case studies meant that the updated generic ecommerce model and the revised implementation methodology were able to create a sophisticated solution to the problems of Community Informatics.

10.3 Identifying the critical factors

For a community informatics methodology to be considered successful it must produce a usable ecommerce site, respect the community's values and lead to self-sustaining economic activity. The cases described in chapters four to nine all aimed at this outcome, but did not always achieve it.

The following section looks at each of the cases in turn and identifies the factors which affected the outcome.

10.3.1 Review of the theoretical factors

The factors proposed as being relevant to the success or failure of community projects were detailed in section 2.5.3.

Romm and Taylor (2000) and Romm, Plishking and Clark (1997) listed ten factors which were found to be associated with the success of community projects. These were:

Technology	degree of user friendliness and ease of use.
Motivation	degree to which individuals are motivated to participate.
Task	degree to which the outcomes of the project bring

	personal benefit.
Environment	degree of positive changes to the social and economic environment.
Politics	degree to which harmonious relationships exist in the community.
Culture	degree of compatibility between the culture and the goals of the project.
Autonomy	degree to which the community has ownership of the project.
Harmony	degree to which the local community is conflict free.
Finance	adequacy of funding.
Government Policies	degree to which the project accords with government policies.

Gurstein (1999) found two factors:

Development	Links to economic activity.
Leadership	Strong leadership.

Rosenbaum and Gregson (1998) found five:

Integration	degree to which the project is integrated into the life of the community.
Infrastructure links	degree to which there are active links to community services.
Ownership	degree of ownership by the community.
Sustainability	degree to which procedures for long term sustainability are in place.
Sense of place	degree to which there is creation of local content.

Four of the factors overlap and can be consolidated into two: Harmony and Politics; Autonomy and Ownership. Two other factors, Finance and Government Policy, were not relevant in this research: there was no external funding involved in any of the cases and the same government policies applied to every case. They are therefore not discussed further. The remaining thirteen potential factors can be classified under five headings:

Technology

Technology: degree of user friendliness and ease of use.

Development: Links to economic activity.

Sustainability: degree to which procedures for long term sustainability are in place.

Motivation

Motivation: degree to which individuals are motivated to participate.

Task: degree to which the outcomes of the project bring personal benefit.

Environment: degree of positive changes to the social and economic environment.

Ownership

Ownership: degree of ownership by the community.

Sense of place: the degree to which there is creation of local content.

Integration: degree to which the project is integrated into the life of the community.

Community Relationships

Politics: degree to which the community has harmonious relationships between its members.

Culture: degree of compatibility between the culture and the goals of the project.

Infrastructure links: degree to which there are active links to community services.

Leadership

Leadership: Effective leadership from within the community.

10.3.2 Analysing the cases

This section briefly reviews the outcomes and salient features of each case. The relevance of each of the potential critical factors is assessed and where any other factors were found to be crucial to the outcome these are described.

The Katherine Mansfield Birthplace

The outcome of the KMB case was a working ecommerce site that was never put online. That the staff rejected the final product was not unique to this case. The standard information systems design process often goes wrong (Oliver and

Langford 1984). In the standard systems life cycle approach, clients appear to hold all the power in the design process: they are the ones who hire and pay the analysts, and they are the final arbiters on what does or does not go into the finished system. In practice however, the users cannot specify what they want because they do not have enough knowledge. The analyst tries to explain, but fails to communicate adequately, and the users get out of their depth. To improve the communications the analyst adopts a formal documentation process which requires the users to read and approve the design as it develops. But this then becomes just one more thing the user doesn't understand. Each user has to read the specification and agree to sign off on a design that they will be held responsible for. The user feels powerless. So they use the only area of power they have left, the power to delay or veto the proposals, often citing reasons which appear illogical to the analyst. This was very similar to what happened in the Katherine Mansfield case.

The project started out being highly participative, but failed to engage the community. At the beginning the curator took a great interest in the design process but soon withdrew from day to day involvement. The relationship with the staff was also more in the nature of a consultative process than true participation. Only one employee was directly involved, the others commented and gave suggestions but were not really committed to the project. As the deadline for the project approached, the staff became more reluctant to participate and the researcher had to take over most of the functions to made sure the project got finished on time. This behaviour is precisely what a CI methodology should seek to avoid. The site was a technical success in that it did carry out all the tasks needed but the methodology used did not really involve all the community and so the implementation ultimately failed.

In terms of the critical factors:

Technology: The technology was appropriate to the community level of expertise and was accepted by all staff. There were mechanisms for sustainability in place. The ecommerce functions were in place and working.

Motivation: The initial motivation for the organisation was not clearly articulated, and there was no appreciable personal benefit to any individuals involved. Even if the project had worked perfectly there was little scope to make positive changes to the social or economic environment.

Ownership: The staff never really took ownership of the project and in fact tended to try to distance themselves from it towards the end. There was no integration between the project and the community of users but on the other hand the degree of local content was very high.

Relationships: The internal relationships within the staff were entirely harmonious, but deteriorated between the staff and the researcher. There was a good fit between the community culture and the goals of the project. Infrastructure links were planned (building relations between the museum and schools and between the museum and coach companies) but not implemented.

Leadership: This factor was entirely missing within the community. The curator chose not to become a champion of the project and no other member of staff stepped forward to take the role. The researcher ultimately took over the role and pushed the project to completion.

Other factors identified: Lack of leadership; Lack of commitment.

The Spa Association

The outcome of the Spa Association case was a good technical design that failed to generate any community response. The community in this case had shown that they were ready for an Internet site, welcomed it and in fact many members already had their own websites. The methodology relied on email contact to generate member enthusiasm which never eventuated. The problem in this case was trying to use technology as a substitute for face to face interaction. Much of the time spent by systems analysts in interviews and meetings with users and clients is not actually aimed at gathering information so much as selling and reinforcing the vision, the motivation for the user to participate. Without this contact and reinforcement the community could not gain a critical mass and become self-sustaining. The relationship on offer was distant and impersonal, and not worth the investment without some other motivator to persuade them. The original impetus for this project had come from the chairman of the association. He had proposed setting up the joint industry website and had agreed to act as a one man ginger group. In the event, this did not happen. He was overseas on business for much of the early period and just too busy afterwards. With no one in the association constantly cajoling, visiting and maintaining their relationship with the members that task fell

to the researcher. Efforts were made to work up enthusiasm through the email forum but it was not the right approach. Part of the problem was that within the spa industry there were strong personalities who had their own ideas of how things should develop, and who were not going to allow anyone else to create an outcome not to their liking. Without an internal champion to work out compromises the project could not attain consensus. Without the prospect of consensus the project gradually faded from people's minds and was quietly shelved.

Technology: The technology was inappropriate for the task in this case, and failed. The links to economic activity were not immediately available, and the procedures for sustainability were lacking.

Motivation: The community motivation was there to start with, but the degree of personal benefit was perceived as remote. In the longer term there were prospects for increased social and economic change, but there was no immediate prospect.

Ownership: The perception of ownership failed entirely; this prevented any sense of place or community integration from developing.

Relationships: The relationships between members were harmonious on the surface, but deep divisions were later revealed. The goals of the project were compatible with the community aspirations. Infrastructure links were planned but never implemented.

Leadership: There was a leader initially in this case but he subsequently withdrew. No leader arose to replace him, and following the lessons of the previous case, the researcher did not take the role.

Other factors identified: Lack of leadership; Lack of consensus; Lack of commitment.

The Hotel Portals

The Hotel Portal project deliberately set out to avoid the methodology problems of the previous cases by building-in specific interaction with the staff of the hotels. In order to ensure the vision was inculcated, senior staff were given demonstrations of good and bad hotel websites from around the world showing what features were possible, what worked, and what didn't. In addition, senior staff were given hands on training in how to create simple web pages. The result was an enthusiastic and

committed group who willingly agreed to steer the project. In each hotel the senior staff could see immediate and realisable benefits for the hotel, so were highly motivated to get the website built. In addition the hotel manager in each case was very keen to make progress and was constantly talking to their staff about it and sending demands to the researcher, sometimes several times a day. The end result was high quality website ideally suited to the hotels' needs. The site showed the rooms, the facilities, menus, a photo gallery, the gift shop and was ready for online sales and bookings. What the site did not do was to form any sort of community portal. As described in 6.4.4, the managers would not agree to including the staff in one case, and the associated businesses in the other. The researcher tried to move the project on but to no avail. In this case the effort/reward bargain was entirely satisfactory, and there was a good relationship between the hotel managements and the researcher. The critical factor which derailed things was that the project had transgressed the organisational boundaries. In each case, and for different reasons, each manager felt uncomfortable with the community aspects. They were very happy with the websites that were built for them and if the projects had stopped there they would have been declared complete successes. The concept of a community had seemed an attractive idea at the beginning, but as with the Katherine Mansfield site, as the project moved into the final phase the reality of what was being proposed did not accord with the managers' worldview.

Technology: The technology used in these cases worked well and was accepted by the communities. There were strong economic linkages and well defined processes for long term sustainability in place.

Motivation: Due to the use of the methodology a strong motivation was developed in the senior staff and in the business communities. The benefits to the senior managers, although not personal, were clear. The benefits to the staff in getting featured on the website were clear, and the suppliers also had an obvious and immediate benefit. The degree of positive social and economic change was high.

Ownership: The feeling of ownership in the senior staff was high, but the other communities never got a chance to experience ownership since they were excluded. The methodology deliberately aimed to develop a sense of place through personalised content so that was in place. The degree of integration was

never tested since the community section was not implemented, but it had been planned.

Relationships: The relationships were harmonious, but there was an unequal power balance in the communities between management and the staff and suppliers. There was a high degree of compatibility between the project and the culture of the organisation in theory, but when it came to implementation it transpired that there was a cultural divide between management style and community principles.

Leadership: The managers of both hotels displayed strong leadership roles.

Other factors identified: Lack of consensus.

The Hokianga Project

The Hokianga project did produce a viable internet ecommerce site. The website was extensive, innovative and authentic. It was welcomed and valued by the community and praised by outsiders. It was the first case where a full community methodology was demonstrated in use. However, it did not succeed as an ecommerce site and it did not generate ongoing economic activity. To a certain extent this was because there was very little activity to promote the site, but it was mainly due to a lack of community initiative and follow-up. There was no immediate personal identifiable gain, therefore there was no incentive for action, and not enough motivation to invest in learning how to use ecommerce. There was no clear tourism product which would immediately benefit the majority and therefore no issue to rally around with community support. Everyone thought it was a good idea, but no one wanted to initiate anything. The other critical factor was the lack of a local champion to drive the process. Despite much lobbying and persuasion, no local advocate came forward. Many traditional societies are strongly hierarchical and any change must be sanctioned by those towards the top of the hierarchy. This tends to discourage initiative from the lower levels and means that successful projects must be supported by the more senior people, who are usually older and less familiar with technology. They are less likely therefore to be found leading an ecommerce project. Certainly there was no issue with the methodology or the acceptance and enthusiasm of the community, and the website was better

than anything else extant at the time, so it must be concluded that a good methodology, appropriate technology and community support are not enough.

Technology: The technology was accepted by the community and easy to use. There were ecommerce links to create economic activity and the processes for sustainability were in place.

Motivation: The community was highly motivated to participate and did participate in contributing materials and feedback. However personal benefits were absent: there were community benefits, but not personal benefits. There were prospects of changes for the community in general but few immediate social or economic gains.

Ownership: This community resolutely did not accept ownership of the project and the project did not become integrated into the life of the community. The local content proportion was high.

Relationships: There were some differences but in general there was a high degree of harmony in the community. The goals of the project were accepted by the community and links were established to the local school.

Leadership: There was no local leadership in this project. Several people were approached to take charge of it but no one was willing to take charge locally.

Other factors identified: Lack of leadership; Lack of commitment

The Mahia Project

The Mahia project did eventually produce a website but it was little more than a list of businesses and did not really capture the essence of the region for visitors. The methodology, if driven by the researcher as it had been in Hokianga, would have produced a similar community generated site. In order to get the community to lead the project it was insisted that they take responsibility for running it. The community motivation was high, all the members of the committee were in business and took a businesslike attitude to the project. They wanted to get going with it to increase the numbers of visitors and so make more income. There was also a local champion. One of the business owners was located on the fringes of the region and could see clearly that his business would benefit by increasing the number of visitors even if they stayed and shopped at other places in the region. He worked actively to keep up the momentum and constantly talked up the project to

anyone who would listen. The critical factor in this case proved to be the fragmentation of the community. The region appeared to be one continuous geographical unit and the business owners appeared to be one homogenous group with common interests but was not how the community members saw themselves or their region. The business owners in the east broke up into competitive factions and could not agree on what the website should accomplish or how it should operate. The people in the west had decidedly different interests at heart and very different goals. Added to this it was discovered that there were long running antagonisms between various businesses competing in the same sector. These would not agree to rival businesses being included in any community scheme. The Mahia work almost succeeded. The technology worked, the community was engaged and motivated, and there was an active local champion. The lack of community consensus ruled out a community solution.

Technology: The technology worked, there were procedures for sustaining the sites and there were direct links to economic activity.

Motivation: The individuals were very motivated and could see immediate personal benefit, and therefore changes to their economic and social environment.

Ownership: The community took ownership of the project. The methodology ensured that local content was generated and that the project was integrated into the community.

Relationships: There were deep divisions between different sections of the community. The community culture was compatible with the methodology. The aims of the project and procedures were in place. There were links with local services such as schools and local government.

Leadership: A local leader was found in the community who was effective.

Other factors identified: Lack of consensus.

The East Cape project

The final case, the East Cape bus route, saw all the elements of a community informatics project come together. There was a proven methodology allied to a proven technology, the motivation was engendered by involving communities of businesses with a direct stake in the success of the project, the objectives of the project were simple, clear cut and accepted by everyone, and there was a local

champion who tirelessly liaised with the businesses, the sponsors and the researcher to keep the project running. The idea of the bus route was something that everyone could easily grasp, and it was something that the whole region had wanted for many years. Everyone could see a benefit for themselves, but no one business had to oversee the project and no one business could capture the benefits. Any business could opt into the scheme, any business could opt out, and there were no critical businesses which could veto the project. The technology had been tested and refined so that it was acceptable to everyone, and anyone could enrol themselves or others. The community in this case was a community of businesses but in the areas served all the business owners knew each other and have to work together in order to overcome the difficulties caused by remoteness and lack of infrastructure, so the community is really the collection of individuals who own or work in these businesses. The local champion was an agent of the Community Employment Group and had credibility with them as sponsors and with many of the business owners through relationships built up over many years. The champion was himself motivated to keep up the momentum because he stood to make a personal profit from business ventures once the bus route was operational.

Technology: Fully accepted, easy to use, flexible with extensive links internally and externally to economic resources. Self-sustaining procedures were in place.

Motivation: High degree of motivation driven by economic potential. Each business in the community stood to benefit personally and immediately. Positive changes were expected for both the individuals and the region.

Ownership: The community designed their websites and felt immediate ownership.

Relationships: Even though the individual businesses were geographically isolated they were able to envisage the community concept. The businesses culture fitted very well with the business model and the community implementation. There were strong links to local and central government agencies.

Leadership: There was effective leadership from the inception.

10.4 Mapping the critical factors

This section analyses the factors which affected the outcomes of the cases. It first analyses the cases to establish which of the potential critical factors reviewed in

10.3.1 actually had a significant effect and then identifies additional factors which were found in the cases.

10.4.1 Evaluating the critical factors

Section 10.3.1 identified the factors which previous research suggested might have an impact on the success of community informatics projects. The only case in which the critical factors were not seen was the SPANZ case, and this was because although most of the factors were envisaged in the project, due to the failure of uptake of the technology they never came into play. However, all of the critical factors were found in one or more of the other cases, showing that the factors identified in previous research were relevant to community projects generally. These are summarised in table 10.4.1 below. Each dot represents an instance where the factor was found, a star represents an instance where the factor was found but moderated in some way. For example, in the Hotels cases the management took ownership of the project, but they did not allow ownership to transfer to the employees or suppliers communities.

Case/Critical Factors	KMB	SPANZ	Hotel Portals	Hokianga	Mahia	East Cape
Technology	•		•	•	•	•
Development	•		•	•	•	•
Sustainability	•		•	•	•	•
Motivation	•		•	•	•	•
Task			•		•	•
Environment			•	•	•	•
Ownership			*		•	•
Sense of place	•		•	•	•	•
Integration			*		•	•
Politics	•		*	•		•
Culture	•	•	•	•	•	•
Infrastructure	•	•	•	•	•	•
Leadership			•		•	•

Table 10.4.1: Incidence of critical factors in the cases
*• = present, - = absent, * = partial*

Table 10.4.1a shows the same factors mapped against cases, but with the SPANZ case omitted, and with the factors organised under the categories suggested in 10.3.1. Inspecting the table shows that many of the factors are homogenous within their categories, that is, the factor applies equally to each case. For example, in the Technology category, in every case the factors of Technology (Ease of use), Development (Links to economic activity) and Sustainability (Procedures in place) were present.

Case/Critical Factors	KMB	Hotel Portals	Hokianga	Mahia	East Cape
Technology					
Technology	•	•	•	•	•
Development	•	•	•	•	•
Sustainability	•	•	•	•	•
Motivation					
Motivation	•	•	•	•	•
Task		•		•	•
Environment		•	•	•	•
Relationships					
Politics	•	*	•		•
Culture	•	•	•	•	•
Infrastructure	•	•	•	•	•
Ownership					
Ownership		*		•	•
Sense of place	•	•	•	•	•
Integration		*		•	•
Leadership					
Leadership		•		•	•

Table 10.4.1a: The critical factors categorised
*• = present, - = absent, * = partial*

Since the outcomes of the cases were not all the same (some cases succeeded in creating a community based development while others didn't), this suggests that it cannot be inferred that there is a correlation between the presence of the factor and

the success of the project. It may well be that not having Easy to Use technology may prevent a project from succeeding, that it is 'necessary but not sufficient' for success. Similarly, the Motivation category factors apply equally to most cases. The same argument applies as for the previous category, that these factors may be necessary but not sufficient for success: their absence might mean the project fails, but their presence does not guarantee success. The Community Relationships category has two factors which apply in all cases: Culture and Infrastructure; and Sense of Place.

It appears that the reason that these factors appear in all or nearly all cases has more to do with the aims of the methodology than with the requirements of the projects. In other words, these are not independent factors. For example, the Ease of Use of the technology is directly attributable to the design adopted for the project, which in turn is predicated by the requirement that the technology be compatible with the needs of communities with little or no experience of ICT. Similarly, Development (links to economic activity), is not an independent variable: the links are there because they were designed to be there as part of the methodology. The Culture factor, the degree of compatibility between the community culture and the goals of the project has also been designed in: it is a requirement of the methodology that the goals are in fact compatible.

It would therefore appear that these factors can all be 'designed out' as problems by using the right methodology. It can therefore be argued that these are not independent factors but indicators that in the projects where they arose, they were the result of using an inappropriate methodology. Effectively, using an appropriate methodology avoids problems with these factors and ensures that they will be present as positive elements in the implementation of the project.

After eliminating the factors controlled by the methodology, four factors remain: Politics, Ownership, Integration and Leadership.

Identifying additional factors

In the review of the cases in section 10.3.2 factors specific to each case were identified. These were:

KMB	Lack of leadership.
	Lack of commitment

SPANZ	Lack of leadership
	Lack of consensus
	Lack of commitment
Hotel Portals	Lack of consensus.
Hokianga	Lack of leadership
	Lack of commitment.
Mahia	Lack of consensus

This gives two additional factors, Lack of commitment and Lack of consensus.

Lack of commitment

This was seen in three of the five unsuccessful cases. Lack of commitment is associated with Motivation, but motivation in previous studies was defined as motivation to participate. In fact the methodology had no difficulty in getting community members to participate, it was getting them to commit to the project that was the critical factor. This was seen clearly in the Hokianga case, where the community was always ready to participate but would not take the next step and assume responsibility for the project. Lack of commitment manifested itself when the communities would not or could not take over responsibility for their projects. Ownership and Integration cannot take place unless there is commitment from the members of the community.

Lack of consensus

This factor is closely related to the Politics factor, the degree of harmonious relations within the community, but is more than simply lack of conflict. Consensus as used here refers to solidarity, a positive desire to achieve some end. The real challenge in all the cases was to get community consensus. Even in the Hokianga case, which had a very strong sense of community, the consensus was one of passive acceptance rather than unanimous enthusiasm.

Lack of leadership

In three of the five unsuccessful case the lack of leadership was identified as a factor. In the Katherine Mansfield case the researcher took the leadership role, pressing forward despite reluctance in the user community, but the lack of consensus between them ultimately proved insurmountable. In the Spa association

the poor methodology and the lack of a leader outweighed the community motivation. In the Hokianga case, another high quality site was produced, but languished due to lack of community motivation: no leader arose to carry the project forward. The Mahia case had several leaders, but of different factions. Only in the East Cape case was there effective, continuous leadership from within the community.

Analysis of the six cases and their outcomes reveals that there are four critical factors.
The methodology has to be right: flexible, inclusive and robust. The community commitment has to be there - an imperative reason for each individual to want to invest their time and energy into the project. Mere generalised benefit for the community is not enough. There has to be genuine consensus, the community has to have a common goal, to be willing to act together for the common good, to actually recognise that there is a community and that they personally will benefit more by contributing to that community than by acting independently. And finally, there has to be a leader, a champion, someone committed, enthusiastic and persistent who will constantly keep the overall vision in front of all the parties as the project progresses.

Case/Critical Factor	Methodology	Commitment	Consensus	Leadership
KMB	-	-	-	-
SPANZ	-	•	-	*
Hotels Portal	•	•	-	•
Hokianga	•	-	•	-
Mahia	•	•	-	•
East Cape	•	•	•	•

Table 10.4.1b: The critical factors
• = present, - = absent

The interaction between the critical factors in the six cases is shown in table 10.4.1b. This shows that all four factors were present in the successful community informatics project, but one or more were absent in the unsuccessful projects.
The limiting factor most often is community consensus. In all the cases the technology was easy to match to the requirements. In the KMB and the SPANZ

cases the methodology was immature and precluded a successful outcome. The Hotel portals project had three of the critical factors in place, and did produce a high quality site, but not a community site, because the community consensus was missing. In the Hokianga case three of the factors were present: there was full consensus from the community, but no commitment. In the Mahia case, again three of the factors were present, the methodology was revised to ensure commitment and the communities took responsibility, but the divisions among the communities caused the project to fail. Only in the East Cape case did all the factors come together and produced a successful sustainable community project.

Identifying and recruiting a leader, a local champion, is outside the scope of the methodology but the other three factors can be controlled and managed. What this research has revealed is that a community informatics methodology can 'design out' most of the problems identified in previous research, and following the methodology can help to ensure that consensus and commitment are found.

10.4.2 Evaluating the methodology

The requirements of the methodology were detailed in section 2.5.1 where they were stated as a series of required outcomes. The requirements can be categorised under three headings: participative design, community outcomes and economic outcomes.

Participative design

The design process must involve the whole community.

The community outcomes

Social capital: builds social capital.

Empowerment: empowers individuals.

Sense of community: builds a sense of community.

Uniqueness: capable of creating community specific content.

Integration: integrates into the community.

Ownership: perceived as owned by the community.

Respect: reflects the community's unique values and aspirations.

Linkages: achieves active linkages with schools and local government agencies.

The economic outcomes

Economic Benefit: bring direct economic benefit to the community.

Ecommerce: supports ecommerce, facilitate direct bookings.

Self-sustaining: capable of being sustained long term without external intervention.

Self-maintaining: capable of being maintained by community members.

Alliances: allow partnerships between the community and outside agencies.

Throughout each of the cases the methodology followed the socio-technical principles articulated in 2.5.1 and so always included full consultation with the community members. The process has been described in detail in chapters four to nine and was essentially the same for each case and so the outcome requirement of participative design will not be specifically referred to in the analysis.

The table below shows how the methodology performed for each case in terms of the requirements for community and economic outcomes (Table 10.4.2).

Outcome/Case	KMB	SPANZ	Hotel Portals	Hokianga	Mahia	East Cape
Social Capital			*	*	•	•
Empowerment			*		•	•
Sense of Community			*	•	•	•
Uniqueness	•	•	•	•	•	•
Integration			*		*	•
Ownership			•	•	*	•
Respect	•	•	*	•	•	•
Linkages	•	•	•	•	•	•
Economic Benefit	*		•		•	•
Ecommerce	•		•	•	*	•
Self sustaining	•		•		•	•
Self Maintaining			•		•	•
Alliances			•	•	•	•

Table 10.4.2: Outcomes of the methodology

*• = present, - = absent, * = partial*

The methodology had no problem in any of the cases with creating a sense of place, respecting the culture of the community or setting up links to community infrastructure. However, creating social capital, individual empowerment and creating a sense of community all depended on the community's cohesiveness, rather than on anything the methodology could do. Where the community already had a concept of its own existence it was possible to create these outcomes, but where the community had no common vision or joint interests they did not eventuate. Similarly integration into the community and a sense of ownership also depended on the existence of an established community.

10.4.3 Summarising the case outcomes

Table 10.4.3 summarises the outcome categories. As shown in the table, the technology part was mastered very early. Getting the technology to generate economic activity was not especially difficult either. In every case except for the Spa Association the methodology could have been imposed on the community to produce a site which would support ecommerce. In the cases where there were no economic outcomes the failure was not in the technology, but in the attitude of the community towards the aims of the projects.

Case/Outcomes	Effective Technology	Community Outcomes	Economic Outcomes
Katherine Mansfield	●		
Spa Association			
Hotel Portals	●	*	*
Hokianga	●	●	
Mahia	●		*
East Cape	●	●	●

Table 10.4.3 Summarised outcomes of the cases
*● = present, - = absent, * = partial*

The real issue was getting the communities to cooperate in creating a site with genuine community values. The table shows that community outcomes were successful in only two cases and partly successful in one. In the KMB case the community showed little interest in committing to the project. In the Mahia case and the hotel portals the communities were internally divisive and while some parts

of the community achieved the outcomes they wanted, this was at the expense of other parts. The reasons for this are discussed in the previous section, but it needs to be noted just how difficult the process is, how long it takes and how much effort is required to get agreement on what the community values actually are.

The results improved steadily as lessons were learned in one case and applied in the next. Overall, the methodology was successful in delivering all of the required outcomes by the time it had evolved into the version used in the East Cape case.

10.5 Summary

This work has shown that using the right methodology can create a sustainable community development for underdeveloped isolated communities. This chapter described the evolution of the methodology and how it changed in response to the experience of each case. It reviewed the critical factors identified in previous research and showed that most of these factors are in fact under the control of the methodology, and that while their absence can prevent a community project from succeeding, they are necessary, but not sufficient to ensure a successful outcome. The chapter showed that these factors could be eliminated by using the right methodology. The remaining factors were reassessed along with additional factors found in the cases, and a new contribution was made to community informatics by identifying four factors that explained the success and failure of the cases. The final part of the chapter showed that the methodology had succeeded not only in producing a successful case for the East Cape community, but had also satisfied all the outcomes required for a Community Informatics methodology.

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Appendices

Appendix 5A: Assessing Technical competency

Seven criteria, summarizing several sub criteria, determined the overall technical competency of each site.

Navigation	Has links back to home page Has a site index Has links to other relevant sites Has an internal search engine
Design	Good presentation/use of… • colours • textures • sound • video • animation • plug-ins • fonts Good formatting Clear and defined Resolution compatible Browser compatible Good use of symbols
Location	Appropriate URL
Speed	Server speed good Fast initial loading time Image sizes reasonable Plug-in requirements reasonable
Content	Relevant Brevity Balance (text:images) Depth

	Currency
User-friendly	Introduction Help page or section Clear instructions Proactive leads to other information
Extras	Downloadables Humour Maps Trivia Virtual goods

Appendix 5B: Assessing Site Functionality

Location	Does the site give information about the physical location of the museum or gallery?
opening times	Are the opening times of the museum listed clearly?
directions	Are directions provided which clearly instruct users how to reach the museum/gallery from major tourism landmarks?
maps of external environment	Is there a graphical representation of the museum's/ gallery's physical location in relation to major landmarks/streets?
maps of museum (plans)	Does the site show floor plans of some sort to aid in planning a visit?
contact details	Are there details on postal address, phone numbers, email addresses and contact people available on the site sufficiently that web-users can successfully contact the museum?
Resources	
staff and volunteers	Does the site carry information including photographs and bios of staff and/or volunteers working at the museum?
history of the museum	Is there information regarding the history of the museum?
current projects	Is there information regarding current projects undertaken at the museum?
facilities	Are physical facilities at the museum listed on the site (i.e. café, parents' room, parking, etc.)?
disabled museum access	Does the site convey information about access for disabled people, including location of ramps, special parking, etc.?
museum resources (disabled)	Is there information available concerning facilities for disabled people at the museum/gallery (i.e. wheelchairs,

	special lifts, access for guide dogs, etc.)?

Relationships and Links	
Does the site use questionnaires?	Does the site actively seek to gain marketing or other information through the use of online questionnaires?
Can you vote for the site/museum?	Is it possible for web-users to communicate their thoughts on how good the site or museum is, through an online voting system, to either the museum or other web users?
Is there a guest book?	Does the site host a 'guest book', which allows web-users to browse through comments left by previous visitors to either the site or the museum?
Is there a FAQ?	Does the site have a 'Frequently Asked Questions' page which lists common questions (about either the site or the museum/gallery) and answers?
Information for 'friends'	Is there information online specifically for Friends of the Museum/Gallery?
Employment opportunities/information	Is there information online showing job opportunities or vacancies? This should include clear instructions on how to apply for the position(s).
Volunteer information	Does the site encourage volunteer involvement by listing information on how to volunteer and current opportunities?
Mailing list	Can a web-user sign up to receive regular mail-outs (or emails) from the museum?
Links to relevant sites	Does the site have links to other museums, galleries, or heritage-tourism sites?
Aims and Goals	Does the site convey the following…
the organisation's aims/goals	Does the site satisfactorily lay out the reasons and philosophies for the museum's existence?
education	Does the site mention education as a core purpose?
conservation	Does the site mention conservation as a core purpose?
research	Does the site mention research as a core purpose?
advocacy	Does the site advocate a particular point of view?

Market segmentation	
Are there language options?	Does the site have options for different languages clearly available?
Does the site accom-modate...	
overseas visitors	Is the site written with non-New Zealand residents/ethnicities in mind?
children	Does the site have a focus on children, their needs, and does it provide information which can be interpreted by younger web-users?
young adults	Does the site recognise younger adults as a market and does it actively attempt to capture this market's attention?
senior citizens	Does the site recognise older adults as a market and does it actively attempt to capture this market's attention?
Are there...	
resources for teachers	Are there online resources for teachers such as information on special deals available to schools, curricula information, Learning Outside of Classroom, etc.?
school tour information	Does the site provide information on tours for school children including times, dates, venues, experiences, costs, contacts, etc.?
online activities for children	Are there fun activities for children on the website (i.e.quizes, games, etc.)?
Is there information on what's new?	Does the site inform the web-user what is new at the museum/gallery, and is this up-to-date?
The site actively markets the museum	Does the site promote the museum in a way which entices web-users to visit the physical premises?
Ecommerce	
Online shopping	Does the site allow web-users to purchase goods or services online in a secure environment, or does the site provide satisfactory information on merchandise available for purchase that a web-user could then organise a transaction using email?
Journals/publications	Does the site allow web-users to purchase journals or publications

	online in a secure environment?
Membership subscription	Is membership information available and does the site actively encourage web-users to become financial members of a 'Friends of' society either by online secure transaction or through email?
Donations	Can an individual make a donation through a secure online transaction?
Bookings	Does the site allow web-users to make bookings for tours or other services (aside from educational services – see above) online in a secure environment, or does the site provide satisfactory information on bookings that a web user could then organise a transaction using email?
Other commercial services	Are other commercial services available through the museum listed on the site
Attractions, Exhibits	
Planning a visit	Does the site provide information on the museum's exhibits in a format which imparts knowledge about the individual item and creates interest, and gives an indication of where the exhibit is, spatially, with regards to other exhibits?
Archive information	Is there a comprehensive, online list of the museum's item collection?
Library information	Is there a comprehensive, online list of the museum's publication collection?

Appendix 5C: Museum Website Rating Matrix

	Museum No.:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Total	% poss	Avg
	Type (1=museum, 2=gallery)	1	1	1	2	2	1	2	1	1	1	2	1	2	1	2	2	1	1	1	1	2	2	2	1	1	1	1	1	1	2	1	1			
Technical competency	Navigation	1	1		1	1	1	1		1	1			1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1		1	26	0.81	
	Design	1	1	1	1	1	1	1			1			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	28	0.88	
	Location	1		1	1	1		1				1	1	1		1		1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	24	0.75	
	Speed	1	1	1	1	1	1		1	1	1	1	1		1	1	1	1	1	1	1		1	1	1		1	1	1	1	1	1	1	28	0.88	
	Content	1	1	1		1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30	0.94	
	User-friendly	1	1			1	1	1			1	1		1	1	1		1		1	1	1			1	1		1	1				1	19	0.59	
	Extras	1					1	1	1		1	1	1	1	1				1	1	1	1						1	1	1	1			18	0.56	
	CAT TOTAL	7	5	4	4	6	6	6	3	3	6	4	4	6	6	7	4	6	6	7	7	6	5	5	6	5	3	7	7	6	6	4	6	173		0.77
Visitor information	Location		1	1	1	1	1	1	1	1	1			1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	27	0.84	
	Open times		1	1	1	1	1		1	1	1		1	1		1	1	1	1	1	1	1		1	1	1	1	1	1	1		1	1	26	0.81	
	Directions		1	1			1		1		1			1		1		1	1		1					1		1	1	1				14	0.44	
	Maps			1			1	1		1			1	1		1			1		1	1						1		1				12	0.38	
	Plans																		1			1									1			3	0.09	
	Contact details	1	1	1	1	1		1		1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	29	0.91	
	Staff				1	1		1								1			1	1		1						1		1		1	10	0.31	
	History				1				1	1	1	1	1	1	1			1	1	1	1	1		1	1	1	1	1			1		1	20	0.63	
	Projects				1			1			1	1		1					1	1		1		1	1	1					1		1	13	0.41	
	Facilities		1	1		1	1	1	1			1			1		1	1	1	1	1	1		1	1	1	1	1	1					20	0.63	
	Physical access					1											1		1							1		1						5	0.16	
	Museum resources					1									1		1											1						4	0.13	
	CAT TOTAL	1	5	6	6	7	5	6	5	5	6	4	3	7	4	6	6	6	11	7	7	9	2	6	6	8	5	7	8	5	6	2	6	183		0.48
Relationships & Links	Questionnaires																																	0	0.00	
	Vote																																	0	0.00	
	Guest book															1				1		1				1								4	0.13	
	FAQ																	1															1	2	0.06	
	Friends	1				1		1		1		1		1	1	1			1				1		1									11	0.34	
	Employment																				1													1	0.03	
	Volunteer													1																				1	0.03	
	Mailing list							1		1						1																		3	0.09	
	Links to relevant sites	1	1			1	1												1	1	1								1	1	1		1	11	0.34	
	CAT TOTAL	2	1	0	0	2	1	2	0	2	0	1	0	2	1	3	0	2	2	2	1	1	1	0	1	1	0	0	1	1	1	0	2	33		0.11
Market segmentation	Language																																	0	0.00	
	O/seas visitors																	1											1					2	0.06	
	Children					1	1								1										1	1			1	1				7	0.22	
	Young adults														1										1									2	0.06	
	Snr. citizens																																	0	0.00	
	Resources						1						1	1	1	1		1		1					1	1								9	0.28	
	Tours					1	1		1			1	1	1	1	1		1	1	1				1	1	1	1		1	1		1		18	0.56	
	Online activities														1											1								2	0.06	
	What's new				1	1		1								1	1	1	1	1	1	1	1	1	1				1		1		1	16	0.50	
	Marketing	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		31	0.97	
	CAT TOTAL	1	1	1	2	4	4	2	2	1	1	2	3	3	6	4	2	5	3	4	2	2	2	3	6	5	2	1	5	3	2	2	1	87		0.27
Mission Function	Aims & goals				1		1	1		1			1		1			1	1	1	1		1	1	1	1	1	1			1	1	1	19	0.59	
	Education						1	1	1	1		1	1	1	1	1	1	1	1	1	1			1	1	1	1		1		1	1			21	0.66	
	Conservation	1		1			1		1	1	1		1		1			1	1	1	1			1			1	1					1	16	0.50	
	Research									1			1					1	1	1	1												1	7	0.22	
	Advocacy							1			1								1		1		1		1					1	1			8	0.25	
	CAT TOTAL	1	0	1	1	0	3	3	2	4	2	1	4	1	3	1	1	4	5	4	5	0	2	3	3	2	3	2	1	1	3	2	3	71		0.44
Income generation	Shopping	1						1												1		1							1	1			1	7	0.22	
	Journals	1														1				1										1	1		1	6	0.19	
	Membership				1														1				1		1						1			5	0.16	
	Donations																																	0	0.00	
	Bookings													1		1		1	1		1	1						1	1	1				9	0.28	
	Other services				1	1	1					1				1	1	1	1	1	1	1	1	1	1	1		1	1	1	1		1	20	0.63	
	CAT TOTAL	2	0	0	2	1	1	1	0	0	0	1	0	1	0	3	1	2	3	3	2	3	2	1	2	1	0	2	3	4	3	0	3	47		0.24
Attractions Exhibits	Planning a visit																	1	1										1				1	4	0.13	
	Archive information									1			1	1					1	1	1				1						1		1	9	0.28	
	Library information									1				1						1	1												1	5	0.16	
	CAT TOTAL	0	0	0	0	0	0	0	0	2	0	0	1	2	0	0	0	1	2	2	2	0	0	0	1	0	0	0	1	0	1	0	3	18		0.19
																																		0		
	TOTAL	14	12	12	16	20	20	20	12	17	16	13	16	22	20	24	14	26	32	29	26	21	14	18	26	22	13	19	26	20	22	10	24	612		0.37

Appendix 5D: Museum Site Owner interview plan

Thinking of the Internet and your museum specifically:

1. How long have you had a website?

2. When building your Internet site, were you doing this as part of a formal business plan?
   - What audience were you trying to reach with your site?
   - What was the main purpose of having the Internet site?
   - How you measure the effectiveness of your Internet site?

3. Do you intend expanding into ecommerce?
   - do you have an ongoing budget specifically for future development of your Internet site?

4. What process did you use to plan and develop the site?
   did you use a formal methodology?

5. Overall, do you think that your Internet project has been worthwhile for the museum/gallery?
   - has your site generated any income for you?
   - have there been any unexpected benefits or drawbacks with having the site?

6. What are your future plans for the website?
   - what do you see as the most valuable and relevant use of the Internet today?
   - do you think this will be different in five year's time?

7. If you were to start the Internet project again, what would you do differently next time?
   - what lessons have you learned,
   - what insights have you received from your experience
   - have the results of having the site been what you expected?