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**Research and Development in Health Service Management: A study of
Innovation in New Zealand Acute Health Care Enterprises.**

A thesis presented in partial fulfilment
of the requirements for the degree of
Master of Business Studies
in Health Management
at Massey University.

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Abstract.

As of 1 July 1993, the New Zealand Government has extensively reformed its health care industry along the lines of managed competition. Amongst other objectives, the reforms were designed to encourage innovation in health service delivery. Innovation is preceded by research and experimental development (R&D). When considered in the context of a service industry such as health, innovation arises from health service management R&D. Health service management R&D encompasses all R&D that improves the efficiency and effectiveness of health service delivery. The purpose of this research was to establish the capability and extent of R&D in health service management within New Zealand acute health care enterprises during the fiscal year, 1 July 1992 to 30 June 1993, i.e. the year immediately prior to the reforms becoming operational. Case study research was then conducted to describe the parameters of health service management R&D in practice. This thesis focused on R&D as an indicator of innovativeness within the New Zealand health industry, innovation being a prerequisite for competitive advantage and business success/survival.

The research design was triangulation. A full population survey of 31 acute health care enterprises was conducted in the first instance, using a survey questionnaire based on the internationally accepted OECD framework for conducting such surveys. The response rate was 29 percent. Only one out of nine respondents conducted any health service management R&D, conducting five R&D projects in total and that organisation subsequently gave permission for the case study research to proceed, waiving its right to anonymity. The organisation was the Wellington Area Health Board and the R&D involved the development of a perinatal management information system- PIMS. The research for this innovation began in the early 1980's, taking a decade to bring into operation. The case study documents that history, illustrating the realities of innovating in an industry undergoing constant change due to environmental forces impacting on it. It also demonstrates the behaviour of an entrepreneurial knowledge worker, Professor Prof. John Hutton, of the Wellington School of Medicine, who joined forces with an entrepreneurial private company of software application developers, Terranova Pacific Services Ltd. Together they championed the idea to the point of successful innovation.

The survey questionnaire highlighted a paucity of health service management R&D being conducted plus identified perceived barriers to innovation and imitation. More importantly, it identified a serious shortage of employees among the responding organisations who had the expertise to conduct such R&D i.e., post-graduate qualifications in health service management. This input deficiency must affect R&D outputs and should be further researched.

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Introduction.

In the current climate of economic restraint, the need to innovate is becoming increasingly important in the New Zealand health industry as demand for health services is rapidly outstripping the Government's ability to meet supply. Innovation is preceded by research and experimental development (R&D). The overall purpose of this research was to establish the capability and extent of R&D in health service management within New Zealand acute health care enterprises during the fiscal year immediately prior to the current set of health reforms becoming operational and once identified, to then conduct case study research to describe the parameters of health service management R&D in practice. This thesis focused on R&D as an indicator of innovativeness within the New Zealand health industry, innovation being a prerequisite for competitive advantage and business success/survival.

This Chapter presents the aims and rationale for the study, outlines recent policy changes underpinning health sector reforms, establishes that these reforms are intended to foster innovativeness, and goes on to review the literature that argues the relationship between innovativeness and business services.

Aims of the Study.

The research aimed to answer the following three questions:

1. What was the capability and extent of R&D in health service management within New Zealand acute health care enterprises during the fiscal year 1 July 1992 to 1 July 1993?
2. How and why did R&D occur in acute health care enterprises during the fiscal year 1992/93?
3. What were the attitudes of health service managers towards R&D in health service management?

A survey was conducted of all New Zealand acute health care enterprises to answer the first and third questions and case study research was carried out to provide insights to the second question. Both methodologies were employed in order to examine the subject from the widest possible angle within the time frame permitted for the research.

Rationale for the study.

This research set out to document the level of R&D that occurred in the transition period immediately prior to the health reforms becoming fully operational. The argument for researching this period was based on the following assumptions. Clearly the external influences to respond to change were present. Logically, those influences should have generated some internal organisational response. The message from Government was explicit. Even though both the public and private sectors had two fiscal periods in which to prepare themselves for the new commercially competitive environment, by the time the announcement was made on 30 July 1991, public sector annual business plans for the fiscal year 1991/92 were formalised and both capital and service expenditure would have been committed. This factor would have affected the freedom of managers in public health care enterprises to be able to channel extra non-committed funds into new R&D projects during the 1991/92 fiscal year. They would have had to delay any such R&D plans until the following 1992/93 fiscal year. Astute health service managers, be they public or private sector, could reasonably be expected to have begun gearing up their organisations to function effectively within the approaching competitive environment. Clearly those smaller Area Health Boards, which could safely predict they would remain largely unchanged, had a competitive advantage over the larger Area Health Boards which would have recognised, quite correctly, that they were to be split up into smaller business units and would suffer more disruption. As for the health service managers in the private sector, who would probably have had more financial flexibility, one would expect that the astute amongst them would have concentrated more clearly on identifying what advantages the reformed health service might have to offer them and what changes they would need to make within their organisations in order to improve their competitive advantage. Such changes may well have generated the recognition for health service management R&D.

Health Sector Reform in New Zealand.

The public sector of the New Zealand health industry has been undergoing reform for at least the last decade. During that decade there have been a series of ministerial reviews and subsequent reports which have criticised the public sector as being inefficient, ineffective and uneconomic (Scott, Marwick & Fougere, 1986; Arthur Anderson & Co., 1987; Gibbs, Fraser & Scott, 1988; Audit Office, 1989).

In its first term of office, the National Government elected in 1990 immediately set up a ministerial Taskforce to firstly analyse all the above New Zealand reports plus review the research already done on health sector problems. Then, having taken into consideration current overseas solutions, its task was to advise the Government on a preferred New Zealand solution which would provide access to an acceptable level of health to all New Zealanders. The Taskforce reported directly to the Government and on 30 July 1991, budget night, the Government announced its plans to radically reform New Zealand's existing public health services. It proposed that from 1 July 1993 the health industry would be remodelled along lines of managed competition, arguing that New Zealand was well behind the rest of the world in providing innovative health care services such as the increased use of day surgery and outpatient/ community services. It saw these innovations as providing solutions which would reduce both our excessive length of inpatient stay and reduce our high numbers of hospital beds per population. Such changes, it argued, would help to correct New Zealand's excessively high levels of expenditure on hospital based services and in doing so, would provide a much desired, more flexible system, for users, providers and funders.

The stated aims of the reforms were to:

- improve access for all New Zealanders to a health care system that is effective, fair and affordable;
- encourage efficiency, flexibility and innovation in the delivery of health care to the community;
- reduce waiting times for hospital operations;
- widen the choice of hospitals and health services for consumers;

- enhance the working environment for health professionals;
- recognise the importance of the public health effort in preventing illness and injury and in promoting health;
- increase the sensitivity of the health care system to the changing needs of people in our society.

(Minister of Health, 1991, p.3).

Within weeks the Government appointed the National Interim Provider Board (NIPB) to "recommend, within that framework, structures for future public provision of health services" (NIPB, 1992, p.9). The NIPB reported in May 1992, publishing its recommendations in the document "*Providing Better Health Care for New Zealanders*".

The accepted view of the policy makers at the time, which was articulated by Sir Ronald Trotter, Chairman of the NIPB, was that competition was "the only way of ensuring, on a continuing basis, constant innovation and best value at optimum quality for every health dollar" (NIPB, 1992, p.8).

The NIPB recommended that public health care enterprises be remodelled on the profit-making business model as opposed to the non-profit model arguing that this model was "more likely to provide the incentives, initiative and innovation to overcome the inefficiencies entrenched in the present system" (NIPB, 1992, p.11). In doing so, they recommended the following eight key principles for the proposed Crown health enterprises (CHE's):

1. Clear commercial objectives;
2. High-quality directors who are replaced if they do not perform;
3. Performance objectives set by shareholding Ministers;
4. An arm's-length relationship between the Government and operational management;

5. Transparent subsidy where the Government wants to provide extra assistance to buy services which would not otherwise be commercial;
6. A competitively neutral environment in which public hospitals have neither advantage nor disadvantage over alternative providers, and win their contracts through efficient delivery of quality services;
7. Managers with the autonomy to make effective use of resources; and
8. Mechanisms to hold them strictly accountable for their performance in meeting Ministers' objectives.

(NIPB, 1992, p.11).

In future, providers, i.e. all health care enterprises, be they public or private organisations, would be subjected to the forces of competition, which in turn, would promote efficiency, effectiveness and ultimately value for money. Health service providers would compete for government funding which would be allocated by government owned regional health authorities (RHA's) who in turn would have capped budgets.

Although the Government was keen to imitate the private sector model, which it saw as preferable, it stopped short of relinquishing its position as the dominant funder of health services opting instead to follow the managed competition model (Minister of Health, 1991). By doing so, it retained its monopsony bargaining advantage which is now favoured by health care policy makers, planners and economists in the western world as being a significant factor in controlling escalating health care expenditure (Bowie, 1992; Evans, 1984).

The objectives for the new Crown health enterprises, as stated in the *Health and Disabilities Services Act 1993*, are as follows:

- (1) The principal objective of every Crown health enterprise shall be to -
 - (a) Provide health services or disability services, or both; and
 - (b) Assist in meeting the Crown's objectives under section 8 of this act by providing such services in accordance with its statement of intent and any purchase agreement entered into by it- while operating as a successful and efficient business.

- (2) Without limiting subsection (1) of this section, every Crown health enterprise shall have the following objectives:
- (a) to exhibit a sense of social responsibility by having regard to the interests of the community in which it operates:
 - (b) To uphold the ethical standards generally expected of providers of health services or disability services, or both, as the case may be:
 - (c) To be a good employer:
 - (d) To be as successful and efficient as comparable businesses that are not owned by the Crown.

These objectives are an almost exact duplicate of the objectives laid out in law for New Zealand State Owned Enterprises, with the exception being that the term "profitable" is used in the *State Owned Enterprises Act 1986* as opposed to the term "successful" in the *Health & Disability Services Act 1993*. In the case of the Crown health enterprises, the term "profitable" was initially proposed in the *Health and Disabilities Services Bill* but was eventually deleted as the term became politically contentious. It has not gone unnoticed however that a successful and efficient business must also, be by definition, a profitable business (Bowie, 1993).

While many New Zealand State-owned Enterprises have, since 1986, notched up considerable achievements in successfully operating as profitable and efficient businesses, some have also been criticised for their inability to exhibit a sense of social responsibility in the process (Mascarenhas, 1991). In fact, it has been questioned whether profit objectives are in fact truly compatible with social responsibility objectives (Boston, et. al., 1991). In practice, profit objectives have tended to dominate decision making. NZ Post, Housing NZ and Electricity Corporation of NZ (ECNZ) have all incurred the wrath of some New Zealanders for decisions where management have chosen to place profits before people.

There have also been problems of ministerial arms interfering in operational matters which have caused concern for some Chief Executives and others (Boston, et. al, 1991). Such situations, when they occur, simply create further support for the Treasury argument of privatisation following corporatisation. The NIPB have acknowledged the existence of this problem in their recommendations and time will tell as to whether their recommendations can be adhered to without forfeiting Crown ownership.

Crown health enterprises, rightly or wrongly, are now legally required to operate as successful and efficient as comparable businesses that are not owned by the Crown. The issue of comparability raises questions about comparable with what. If comparing by bed state, which for obvious reasons is not preferred, then the largest comparable non-Crown-owned health care enterprise in New Zealand is Mercy Hospital, Auckland, with approximately 168 beds followed by the next largest which is St George's Hospital, Christchurch, with approximately 91 beds. The largest CHE is Auckland Health Care with 1800 beds and the smallest Crown-owned health care enterprise is Wairarapa Health with 181 beds. They are not therefore comparable by size, nor are they comparable by demographics, inputs or outputs and neither are they comparable using international comparisons as the latter are widely acknowledged as being fraught with complicating factors.

Irrespective of whether health care enterprises are modelled on profit or non-profit lines, it is an indisputable fact that they still need to operate profitably. No business can be successful and survive in the long run, if it operates at a financial loss.

In summary, the Government believes that the managed competitive private sector model is more desirable than the pre-reform public sector model and has sought to reposition its public health care enterprises closer towards the free market end of the market continuum. Commercial success in the private sector is achieved by competitive advantage which results in the main from innovation derived from R&D. The health reforms have been designed with the view of promoting more innovation in the health industry. Innovation, when considered in the context of a service industry such as health, arises from health service management R&D, the term 'health service management R&D' being used in the widest sense of the word. Health service management R&D encompasses all R&D which improves the efficiency and effectiveness of health service delivery. In New Zealand, health service management R&D is classified by legislation as a sub-category of public health research, however it also encompasses aspects of biomedical research e.g. new techniques which shorten inpatient stay. Traditionally, biomedical research has taken priority over funding of health service management research. However if the Government is serious about increasing innovation in health service delivery then it must redress this imbalance. In doing so it must also develop some understanding of what influences the rate of innovation and then commit resources to ensure that such R&D occurs. All of the above arguments will be developed further in the following chapters.

Business Success and Innovation.

The New Zealand health industry, like its counterparts in the Western world, is undoubtedly in the midst of resource-lean times and therefore it is now vitally important that innovative solutions to the health industry's problems are found. Kanter (1983, p.21) has noted that in resource-lean times, "the domain for innovation simply shifts to managerial procedures and organizational practice" whereas in resource-rich environments, "emphasis is likely to be placed on potential breakthroughs in technology and extensive research and development activities because the company can afford them".

The product in the health care industry is service. Advances in knowledge and technology aid in the delivery of that service - they do not themselves provide that service. The provision of an efficient, effective health service is clearly linked to efficient, effective health service management and therefore health service management is a valid focus for R&D with the aim of improving health service delivery. Poor quality management in a service industry will result in poor quality outputs and outcomes, irrespective of the inputs that exist to facilitate that service.

The Government, acting on behalf of New Zealanders, requires best value for money and has clearly said it will strive to achieve this goal, in fact it has gone so far as to threaten that persistently poor-performing organisations may not secure further contracts for service. Health service managers will thus need to maintain their competitive advantage by imitating their innovative, successful private sector counterparts if they are to remain competitive. This need to imitate the competitive market model is the central thesis of this study.

Business survival in a competitive marketplace is dependent on maintaining competitive advantage (see Figure 1). According to Porter (1990) competitive advantage is necessary for economic and social well-being and is created through invention and innovation, both of which are derived in the main, from investment in R&D in science and technology. The process of competitive advantage begins when a creative person conceives an innovative idea which is then usually subjected to a formal process of research and experimental development which then results hopefully in an operational innovation. The operational innovation, if successful, then leads to competitive advantage, business success and survival.

In private industry the competitive model is based on the innovative process which is as follows;

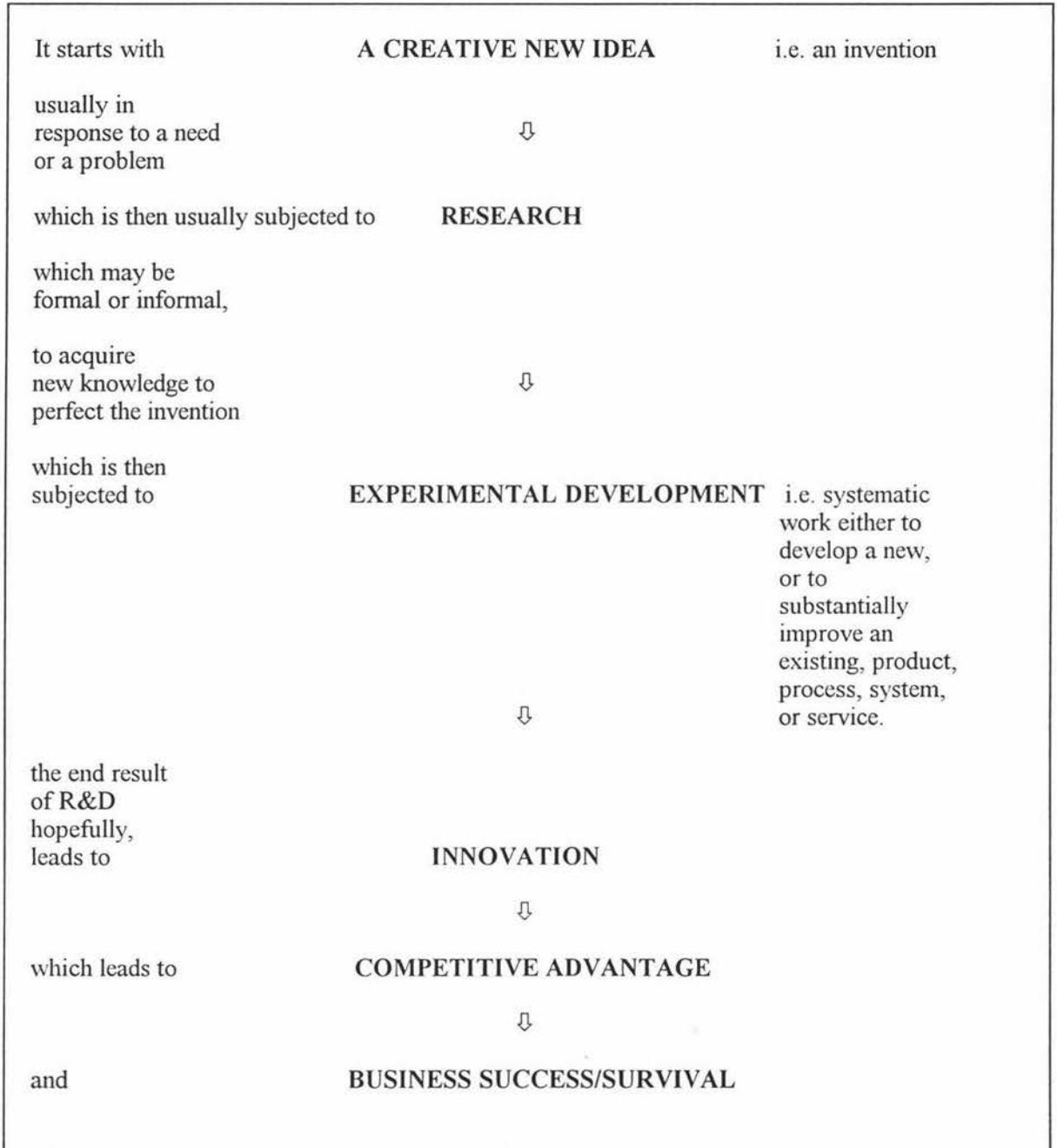


Figure 1. The Competitive Model.

The organisation may then commercialise the innovation and over time, there will therefore be diffusion of the innovation throughout the marketplace as competitors and other industries adopt or adapt the innovation to suit their needs. There may also be further refinement of the innovation or reinvention by either the originator of the idea, their competitors, or others. This process occurs through further R&D and so the cycle of invention leading to innovations, leading to competitive advantage and subsequent commercial/ economic progress, continues. Exploring the extent of R&D therefore is useful in that it provides an indicator of innovation.

Figure 1 incorporates the Organisation for Economic Co-operation and Development (OECD) framework as outlined in *The measurement of scientific and technological activities: Proposed standard practice for surveys of research and development "Frascati Manual" 1980*, which was published in 1981. This document formed the basis for the development and design of the questionnaire used in this research. New Zealand became a signatory to the OECD in 1973 and in doing so, adopted as its standard, the OECD definitions for R&D. In 1974 the OECD expanded their R&D definition to include both the Social Sciences and Humanities, building on their previous definition which only covered the Natural Sciences and Engineering (OECD, 1981). The following are the OECD definitions of research and development (R&D):

Research and experimental development (R&D) comprise creative work undertaken on a systematic basis to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications. R&D covers three activities: basic research, applied research and experimental development.

1. **Basic Research** is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use in view.
2. **Applied research** is also original investigation undertaken to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective.
3. **Experimental Development** is systematic work, drawing on existing knowledge gained from research and practical experience that is directed to producing new materials, products or devices, to installing new processes, systems and services, or to improving substantially those already produced or installed.

(OECD, 1981, p.25).

Structure of Thesis.

Research and development occurs in context. The above introductory section has outlined the recent health reforms in New Zealand and discussed the relationship of innovation to business success. It has argued that in the reformed climate, New Zealand health service managers now need to maintain their competitive advantage by imitating their successful private sector counterparts. Given that such competitive advantage is achieved in the main from successful R&D, and given that the health industry is clearly a service industry, then it follows that R&D needs to be focused on service delivery, and more specifically on health service management R&D as the outputs and outcomes of health service delivery are both driven and dependent on, the quality of health service management.

This argument will be developed further using the following sequence. Chapter 1 will set the scene providing a brief overview of the theoretical framework that includes both market and diffusion theories which together underpin this thesis. Thereafter the relationship of invention to innovation will be discussed and further definitions added, followed by an exploration of the role of creativity in innovation. A discussion of the environmental forces which effect organisations will then be followed by consideration of resistance to health service management innovations. The section concludes with a discussion of innovation in public service industries.

Chapter 2 discusses the approaches, perspectives and usage's of R&D. Health service management is defined and the difference between appropriable and non-appropriable research clarified. R&D in general as it occurs within New Zealand is then discussed followed by more specific discussion of health service management R&D and discussion of the legal perspective regarding intellectual property rights. Finally an outline of the extent and nature of health service management in the anglophile world is presented. Chapter 2 concludes with a summary section which draws together the issues as presented up to this point and sets the direction for which the rest of the thesis will follow.

Chapter 3 describes this study, the research design, the methodology and the approach used for the case study research. This chapter concludes with a discussion of the ethical issues and a description of the research process and problems experienced.

The results of the survey questionnaire are presented in Chapter 4. This is followed by reporting on the case study in Chapter 5 which illustrates health service management R&D in practice.

Finally, Chapter 6 presents the conclusions and recommendations for both the health industry and for further research.

CHAPTER 1: A Health System characterised by innovativeness? Setting the scene.

Theoretical underpinnings.

Economic theory, in particular market theory, offers the most useful insights towards understanding R&D. The other relevant body of knowledge is the work on the diffusion of innovations following successful R&D where innovations are imitated in the marketplace and diffusion occurs until the innovation is superseded by further successful R&D.

This chapter will present an overview of market theory and how it is thought to influence the rate of R&D. Thereafter diffusion theories will be discussed. It is worthwhile to note that the rate of R&D has not been the subject of extensive research within the discipline of economics and at this point in time there is no consensus view as to what force or indeed forces are responsible for generating R&D.

Market theory and the perfectly competitive health market.

Governments organise their economies in a variety of ways. These economies can be viewed along a continuum with one extreme being an economy where the government makes all the decisions and the other extreme whereby no decisions are made i.e. the market is considered to be free. In between lies the mixed economy in which both the government and the private sector interact with varying degrees of government control. Markets provide society with a way of deciding who produces what, how and for whom. They help allocate resources. As resources are scarce, supply and demand factors become relevant and must be taken into consideration. Supply factors relate to the behaviour of sellers and demand factors relate to the behaviour of buyers, the market being made up of both buyers and sellers. The terms "demand" and "supply", in economics, refer to the relationship between the two variables - price and quantity. The term does not refer to demand as in quantity demanded, neither does it refer to supply as in quantity alone. In a free market, both the quantity and price of both goods and services supplied or demanded are determined "freely" by the market. A perfectly competitive market, according to economists, is one in which there is product homogeneity, with many buyers and sellers, all with complete freedom to act independently of each other. Both buyers and sellers are free to enter or exit the market and all have access to perfect information. Buyers are freely able to choose which goods and services they will purchase, based on their access to perfect

information, and in doing so, these buyers create demand. Competitive markets, according to theory, constantly strive towards equilibrium, i.e. where quantity supplied equals quantity demanded and vice versa.

Suppliers strive continually to maximise their profits, not maximise their losses and marginal revenue must exceed marginal cost otherwise suppliers would simply not be in the market. In seeking to achieve this aim, suppliers strive ultimately to monopolise their market or at least increase their market share.

The reformed health market cannot logically be considered to be a free market, instead it is more correctly defined by the term "managed competitive market". The Government as dominant funder and hence dominant buyer, has monopsonist buying power. In this capacity, the Government is also able, and currently does, price set. The polar opposite of a monopsonist buyer is a monopoly seller where the seller dominates supply and is able to dictate price to some extent. Monopoly sellers also exist in the health care market. These monopoly sellers are not easily replaced by new entrants into the health market due to barriers such as cost and geographical location. There is also the additional problem of costs incurred by the Government if services are not brought from existing Crown-owned Enterprises. Free entry or exit into the market is also restricted by other factors such as legislation and regulation. Sellers are capable of colluding on prices and buyers, i.e. users of the health service, do not have access to perfect information. The situation of imperfect information exists because there is an imbalance of knowledge between patients and health professionals, the later group tending to have the advantage in most cases and therefore Agency theory criticisms can be applied. Product homogeneity also exists as different health care providers provide different services. There are also the problem of externalities and finally there is the problem of supplier-induced demand. Given the above imperfections, the health market cannot realistically be considered a perfectly competitive market in which both buyers and sellers believe they have no effect on price.

Schumpeter's view.

Joseph Schumpeter, an Austrian Economist, and Harvard academic, who is widely regarded today as having contributed significantly to a theory of innovation and entrepreneurship, takes the view that innovation is more likely to occur in a non-perfect market, which is fortuitous for the Government. His views, whilst related to innovation and entrepreneurship, have relevance to this study given that innovation is the end result of R&D and that the innovative researcher is often described by the term

"entrepreneur" or "intrapreneur", the later being the term used if the person concerned is an employee of an organisation.

The term "Entrepreneur" is not a recent one. It was known to be used as far back as 1800 by the French economist, J. B. Say (Drucker, 1986). Schumpeter favoured the term "entrepreneur" but had no objection as to whether this term was replaced with the term "innovator" or "business leader", arguing instead that "the essential thing is the recognition of the distinct agent ... not the word" (Schumpeter, 1949, p.69).

Schumpeter's thesis was that perfect competition is inconsistent with technological innovation (Schumpeter, 1987), arguing that a perfectly competitive market leaves no room for innovation to occur. Schumpeter believed that a capitalist society "incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one" (1987, p. 83). He described society as being a system in a "perennial gale of creative destruction" (1987, p. 84) with innovation being necessary to stimulate economic growth and prosperity. The innovator/entrepreneur, according to Schumpeter, disrupts the circular flow of equilibrium, creating disequilibrium out of equilibrium. His or her function "is to reform or revolutionize the pattern of production by exploiting an invention or, more generally, an untried technological possibility for producing a new commodity or producing an old one in a new way, by opening up a new source of supply of materials or a new outlet for products, by reorganizing an industry" (Schumpeter, 1987, p. 132).

According to Kirzner (1973, p.79), Schumpeterian entrepreneurship, consists of:

introducing new processes of production- of producing new products or producing old products in new ways. The innovator-entrepreneur disturbs the even flow of production and of the market by creating new ways of doing things and new things to do. In fulfilling this role he is at the same time creating profits for himself. By breaking away from routine activity the Schumpeterian entrepreneur is able to generate temporary gaps between the price of inputs and the price of outputs Until imitators once again force prices and costs into conformity, the innovator is able to reap pure profits ... The Schumpeterian innovator is the decision-maker whose alertness to unnoticed opportunities has enabled him to depart from the routine repetitive working of widely known opportunities.

The innovator is both maximising competitive advantage and profiting through innovation having fulfilled a market demand. This situation will only last until the a competitor catches up either by imitating or by overtaking the innovator with a superior innovation and thereby displacing the competitor who holds the market dominance.

Innovation/entrepreneurship, according to Schumpeter, cannot happen in a perfectly competitive market, as there would be no room for it to happen and therefore the perfectly competitive market is not desirable. He argued that innovation is more likely to occur in a monopoly situation as the monopoly position of the firm will generate more innovations in the first instance as it is not worried by market competition. He noted that

"there are superior methods available to the monopolist which either are not available at all to a crowd of competitors or are not available to them so readily: for there are advantages which, though not strictly unattainable on the competitive level of enterprise, are as a matter of fact secured only on the monopoly level, for instance, because monopolization may increase the sphere of influence of the better, and decrease the sphere of influence of the inferior, brains, or because the monopoly enjoys a disproportionately higher financial standing" (1987, p.101).

Economies of scale will advantage larger sized firms over their smaller competitors and in theory their resource advantage should mean that they are more able to participate in R&D should they choose to do so. Whilst there is evidence to support this view (NZ Manufacturers Federation, 1987), it is equally true that new businesses, the majority of whom start off small, also innovate. In fact this is the time honoured method by which new firms gain entry into new markets. However it is the innovation and not the size which creates the potential for market dominance. All things being equal, size simply gives the larger firm a financial advantage as it can do things for less cost. Unfortunately or fortunately, a size advantage does not necessarily mean it can innovate better.

In conclusion, Schumpeter believed that

"it is not sufficient to argue that because perfect competition is impossible under modern industrial conditions - or because it always has been impossible - the large-scale establishment or unit of control must be accepted as a necessary evil inseparable from the economic progress which it is prevented from sabotaging by the forces inherent in its productive apparatus. What we have got to accept is that it has come to be the most

powerful engine of that progress and in particular of the long-run expansion of total output ... In this respect, perfect competition is not only impossible but inferior, and has no title to being set up as a model of ideal efficiency" (1987, p. 106).

Market Demand or Market Supply?

The central question yet to be answered is whether market demand or market supply factors influence the generation of innovation or is it in fact a mixture of both? The Government needs to know the answer to this question if it wants to positively influence the rate of innovation within the health industry. This problem of market demand and supply is sometimes referred to in non-economic terms in the literature as "market pull"/ "market push" or "demand pull"/"technology push".

Mowerby and Rosenberg (1979) conducted a critical review of a number of empirical studies which had concluded that market demand was the dominant influence on the innovative process. The frequently-cited work of Myers and Marquis (1969) on successful industrial innovation was included in these studies. Mowerby and Rosenberg found that the "notion that market forces "govern" the innovation process is simply not demonstrated by the empirical analyses which have claimed to support that conclusion", making the point that to establish such as proposition, a shift in the demand curve must occur as opposed to simply movement along a demand curve (Mowerby and Rosenberg, 1979, 141). Demand for the innovation must increase to support the demand-pull hypothesis. Mowerby and Rosenberg believe that the role of demand in the generation of innovations has been "overextended and misrepresented, with serious consequences for our understanding of the innovative process and of appropriate government policy alternatives to foster innovation" (1979, p. 105). They contend that "a whole range of stimuli are important in the innovation process" and that "any careful study of the history of an innovation is likely to reveal a characteristically iterative process, in which both demand and supply forces are responded to" (1979, p.143). They make the point that one should differentiate the generation of innovation from the diffusion of innovation where market demand factors are clearly influential.

Diffusion Theories.

Much of the work on the diffusion of innovations has been collated by Rodgers, a Professor of Communications from Stanford University, who is recognised as the leading scholar in this field. In the 3rd edition of his work, "Diffusion of Innovations", published in 1983, Rodgers synthesised around 3000 publications on the topic and concluded that the diffusion of innovations is essentially a social process by which subjectively perceived information about a new phenomenon is communicated. Rodgers (1983) classified adopters of innovations by their degree of innovativeness, arguing that members of a social system could be conceptually classified into one of the following five categories: (1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards. He presented these categories as being distributed over a "normal curve" with the first three categories being to the left of the mean and the last two categories to the right of the mean. Innovators, according to Rodgers, have interpersonal networks which extend over wide areas and are able to cope with more uncertainty than the other four categories. As they are first to adopt an innovation, they rely on their own judgement rather than the opinions of others. Rodgers also noted that the rate of adoption of innovations differs and if plotted on an cumulative frequency basis over time, results in an s-shaped curve. The slope of the "s" varies in steepness depending on the speed of adoption i.e. rapid diffusion of an innovation would create a steep s-curve.

In conclusion, Rodgers work on the diffusion of innovations provides a useful platform to understand the process that follows after successful R&D. His conceptualisation of the five categories of adopters helps to explain why some members of society will choose to either innovate or imitate and yet others will choose to follow. Market theory provides a conceptual framework with which to view the generation of innovation. Schumpeter's view that a perfectly competitive market leaves no room for innovation, is consistent with the view that the health industry cannot be considered a perfectly competitive market. Market demand and market supply forces are both necessary factors in generating innovation although it is not yet clear just how these forces actually effect that change.

The relationship of invention & innovation to R&D.

The innovation literature abounds with slightly differing definitions of innovation (Zaltman, Duncan & Holbek, 1973). Some definitions also use the terms invention and innovation interchangeably which further adds to the confusion. This confusion is not lessened by the fact that the definition of

innovation can also differ between disciplines. This section will present the OECD definitions which have been adopted in this thesis and try to clear up some of the confusion by presenting an overview of the range of definitions used in the literature.

Invention.

An invention can be defined as something new or novel which is brought into existence and which may or may not have utility. Invention is the end product of research, whereas the end product of experimental development is innovation. Not all inventions automatically become innovations. Some inventions may be invented before their time with no apparent obvious utility. Some may never be perceived as having utility. Utility is important as it has links with market demand.

Innovation.

The OECD definitions have been used in this research as these definitions are now accepted as the standard for New Zealand. The OECD refers to innovation by its more correct descriptor, i.e. "**scientific and technological innovation**" and defines the term as follows:

"the transformation of an idea into a new or improved saleable product or operational process in industry or commerce or into a new approach to a social service. It thus consists of all those scientific, technical, commercial and financial steps necessary for the successful development and marketing of new or improved manufactured products, the commercial use of new or improved processes and equipment or the introduction of a new approach to a social service. R & D is only one of these steps".

(OECD, 1981, p.15).

The OECD view innovation as a process (i.e. transformation) and a thing (i.e. something that can be identified and therefore counted). They admit that counting is difficult because of the problems associated with differentiating what is "new" or "improved" and make the point clearly that a simple count is of little meaning unless minor innovations can be differentiated from major innovations.

The OECD framework for measuring R&D, which has been adopted and incorporated into the questionnaire design for this research, measures inputs in terms of R&D expenditure, R&D personnel, and R&D facilities. Outputs are measured in terms of raw numbers with brief descriptions included.

Other Definitions.

Gronhaug & Kaufmann, (1988, p.4) believe that as yet "no unified 'theory of innovation' exists". Certainly different disciplines have different views and hence different definitions for defining innovation and there may well be a time factor involved in the changing viewpoints. However, despite the above, there is consensus in the literature that an innovation is something new or novel which has utility. Whilst utility has been widely accepted as an integral concept in the definition of an innovation, the term 'new' however has not. Several different interpretations of 'new' can be found in the literature.

The OECD's definition, as stated above, is that the innovation must either be new or a substantial improvement on someone else's innovation, with new being novel or substantially different. Other interpretations range as follows:

- new - used in the pure, strict sense of the word,
- new - being the first organisation to use,
- new - the first group of organisations to use the innovation,
- new - as in perceived to be new by the organisation,
- new - as perceived by those knowledgeable within the industry.

Yet another problem is the classic academic debate which surround the issue of when is "new", new. This later issue could form the underlying rationale for using the term "re-invention".

Zaltman, Duncan & Holbek (1973, p. 10) define an innovation as "any idea, practice, or material artefact perceived to be new by the relevant unit of adoption". Perception is the important issue in this definition.

Rodgers (1983, p.11) follows the above definition but expands the perception aspect. He defines an innovation as "an idea, practice or object that is perceived as new by an individual or other unit of adoption". Rodgers also adds "it matters little, so far as human behaviour is concerned, whether or not an idea is "objectively" new as measured by the lapse of time since its first use or discovery. The perceived newness of the idea for the individual determines his or her reaction to it. If the idea seems new to the individual, it is an innovation".

Becker & Whisler (cited in Zaltman et al., 1973, p. 11-12) agree with the concept of innovation as a process and define innovation as "the first or early use of an idea by one of a set of organizations with similar goals". According to Becker & Whisler, organisational innovation occurs when the organisation is amongst the first to adopt and incurs significant costs of search and risk. A firm adopting later, that is, after a significant number of other organisations have adopted and some time has elapsed, undergoes organisational change but not innovation, whereas the early adopting organisations undergo both innovation and change. Implicit in Becker and Whisler's position is the assumption that a given change involves an innovation process only when it occurs early in the diffusion process of the item.

Contrary to Rodgers' view, others argue that an innovative idea must also be widely accepted as innovative by persons knowledgeable in the industry, and widely implemented or adopted within the industry before it can truly be classed as an innovation. Amabile's operational definition of innovation follows this approach. Amabile (1988, p. 47) states "a product or process is innovative to the extent that appropriate observers independently agree it is innovative... Appropriate observers are those familiar with the domain in which the product of process was introduced".

Diffusion scholars have also been active in developing a body of knowledge around the term "re-invention" as opposed to the term "imitation" (Rodgers, 1983). Re-invention is defined by Rodgers (1983, pp. 16-17) as "the degree to which an innovation is changed or modified by a user in the process of its adoption and implementation". The OECD view is, that if the re-invention results in substantial change, then it is simply defined as an innovation and if not, it is merely an imitation and is referred to as such. The term imitation is used in law when defining intellectual property rights.

Innovations are also defined and ranked by size be they major or minor. Wilson (1966) argues we should only be concerned with major innovations as opposed to the trivial innovations. Wilson's (1966 p.196) definition of innovation is "a 'fundamental' change in a 'significant' number of tasks", with the terms 'fundamental' and 'significant' being defined by the organisations themselves.

Rodgers (1983) notes that not all innovations are the result of formal R&D. Innovations can arise through practice. Most people are familiar with the person who gets a bright idea and simply implements that idea without subjecting it to any formal R&D. Then, because one person does it or uses it, others simply follow, thereby adopting the innovation. Before long, the idea simply becomes diffused and accepted as custom and practice.

Innovation therefore can be defined objectively, subjectively and contextually. It can also be seen as a process as reflected in Nelson's definition (cited in Gronhaug & Kaufmann, 1988, p.2) of innovation as "the process by which new products and techniques are introduced into the economic system".

It is grammatically correct and widely practised to describe an organisation adjectivally as "innovative", although technically, in terms of the legal ownership of intellectual property, it may be in reality merely imitating some other person's or organisation's original innovation. Innovative activity by a firm may "be interpreted as being, in general, of two distinct types: innovation generation and innovation imitation (Kay, 1979, p.10). Nelson (cited in Kay, 1979, p. 10) points out, for a model (of firm behaviour) really capable of generating and responding to technological change, it seems essential to incorporate "some kind of an innovating or internal search mechanism for improvement, and some kind of an imitation mechanism whereby what one firm does can induce another firm to do likewise".

Drucker (1986, p.44) argues that "creative imitation is a perfectly respectable and often very successful entrepreneurial strategy". He cites the Japanese economy as an being a perfect example of an economy which has thrived by using imitation strategies. Drucker admits the term creative imitation, which was coined by Levitt of the Harvard Business School, is a contradiction in terms, given that creative equates with original, not imitation. Creative imitation, according to Drucker (1986) is an imitation strategy where an entrepreneur copies the work of the original innovator. The entrepreneur understands better than the originator, the potential of the innovation and applies it in such a way as to maximise its utility to the customer. The creative imitation then sets the standard and takes over the market. Drucker says that "the foremost practitioner of this strategy and the most brilliant one is IBM" (Drucker, 1986, p. 246).

Innovation is defined by Drucker (1986, p. 44) as "the act that endows resources with a new capacity to create wealth"... "Innovation, indeed, creates a resource". There is no such thing as a 'resource' until man finds a use for something in nature and thus endows it with economic value" (Drucker, 1986, p. 44). Because the resource is useful, i.e. it has utility, it is therefore endowed with economic and social value. According to Drucker, innovation is a discipline which can be learned and practised (1986, p. 34). He believes that 90 percent of effective innovations come from a mixture of purposeful, systematically organised analysis and sheer hard work. "Flashes of genius", according to Drucker, "are uncommonly rare" and he knows of no such flashes that have progressed from a brilliant idea stage to become an innovation (1986, p. 155). Drucker argues that "the extraordinary

performer in innovation, as in any other area, will be effective only if grounded in the discipline and master of it" (1986, p. 155-156).

"Systematic innovation", according to Drucker (1986, p. 49) consists of "the purposeful and organized search for changes, and in the systematic analysis of the opportunities such changes might offer for economic or social innovation". Drucker advocates monitoring seven sources for such innovative opportunity. They are:

1. the unexpected event
2. the incongruous event
3. process needs driving innovation
4. changes within either the industry structure or market structure
5. changes in demographics
6. changes in perception
7. new knowledge both scientific and non-scientific

The first four sources lie within the enterprise and the remaining three involve changes outside the enterprise or industry (Drucker, 1986, p. 50). Drucker believes that these seven sources for innovative opportunity occur "in descending order of reliability and predictability" and that "contrary to almost universal belief, new knowledge- and especially new scientific knowledge- is not the most reliable or most predictable source of successful innovations" (1986, p. 51).

According to Drucker "innovation is the specific tool of entrepreneurs, the means by which they exploit change as an opportunity for a different business or a different service. it is capable of being presented as a discipline, capable of being learned, capable of being practised" (1986, p. 33). An innovation can be introduced by either a person or an organisation. If introduced by a person, then that person is referred to as an entrepreneur.

An entrepreneur is someone who introduces an innovation which may or may not be their original idea. Entrepreneurs, according to Drucker (1986, p.34) "exploit change as an opportunity for a different business or service". Entrepreneurs seek change, respond to it and exploit it as an opportunity i.e. they innovate (1986, p. 42). "The overwhelming majority of successful innovations exploit change" (Drucker, 1986, p. 49). The term "intrapreneur" is used when referring to an employee who introduces an innovation from within an organisation.

The role of creativity in innovation.

"Innovations presuppose creativity" (Gronhaug & Kaufmann, 1988, p. 2). Creativity is defined by *Webster's Ninth New Collegiate Dictionary* as "the ability to create" and involves "problem finding as well as problem solving" (Gronhaug & Kaufmann, 1988, p.2). The literature abounds with lists of what is thought to constitute the creative and hence innovative, personality. This section will present a brief overview of that literature to demonstrate how it interacts in the innovative process.

The creative personality has been the subject of much research and many lists of personality traits exist as to what are thought to comprise the creative personality. As it is pointless to present the full range of these personality traits, Gronhaug's example has been selected to demonstrate what would generally speaking appear to be a fairly typical representation.

Gronhaug (1988) reports the creative personality as having the following characteristics/personality traits. Creative people, according to Gronhaug, are flexible, original, curious, complex, risk-takers, imaginative, intelligent, lateral thinkers, open to experiences, free from crippling restraints & impoverishing inhibitions, aesthetically sensitive, independent in thought & action, unquestioning about their commitment to creative endeavour, always unceasingly striving for solutions to the ever more difficult problems which they constantly set for themselves, accepting of conflict, capable of being puzzled, not afraid of the unknown nor ambiguous situations, self evaluators and have self discipline, good at concentrating, have a belief in own ability to succeed, uninhibited in the expression of their opinions, sometimes radical and spirited in disagreement, tenacious, unusually aware of their own impulses, more open to the irrational, emotionally sensitive, at times, non conforming, accepting of disorder, not interested in details, individualistic, not afraid of being different, and spontaneous. Other examples abound but generally speaking, Gronhaug's list, plus or minus a few traits, provides a fairly typical representation.

Not everyone agrees with the need for developing such lists, nor their content. Drucker argues that such lists are pointless, describing them as "half pop-psychology and half-Hollywood" (1986, p.161). Drucker argues that successful innovators are conservative people who are more likely to be found scrutinising cash-flow projections than dashing off looking for 'risks'. He believes they are not 'risk focused' but in fact 'opportunity focused'. He admits that they will be found operating in 'high risk'

environments but as Drucker points out, "all economic activity is by definition 'high-risk' (Drucker, 1986, p. 161). Successful innovators, according to Drucker, define risks and confine them (1986, p. 161). "They are successful to the extent to which they systematically analyze the sources of innovative opportunity, then pinpoint the opportunity and exploit it- whether opportunities of small and clearly definable risk, such as exploiting the unexpected or a process need, or opportunities of much greater but still definable risk, as in knowledge-based innovation" (1986, pp. 161-162).

The literature also refers frequently to the "product champion". This is the person who relentlessly champions their inventions against all odds and hopefully achieves a successful innovation as the outcome of their efforts. According to Peters (1989) these people are special. He describes them as the dreamers; the pragmatists saying they are likely to be energetic, egotistical, impatient, and disruptive, above all they are absolutely passionate about championing their products be they goods or services. They often irritate, alienate and will more than likely fail in their quests however despite all the above Peters maintains they are indispensable to any organisation wishing to maintain its competitive advantage. He recommends that organisations actively seek out, hire and nurture as many of these individuals as they can find as it is these people who are the innovators. Peters recommends that organisations mount numerous innovation projects as he works on the maxim that when it comes to producing successful innovations, more tries definitely equals more hits .

Kirton, a psychologist, (1988, p.72) has taken a slightly different stance on the creative personality. Kirton says an organisation will have both "adapters" and "innovators" on staff . He disagrees with Drucker's views on personality trait lists and cites the mounting evidence in the literature as support for his theory that "personality is implicated in the characteristic differences between adapters and innovators" (Kirton, 1988, p.71). Adapters, according to Kirton, can be found in large organisations that prefer bureaucratic structures which provide maximum safety and minimal risk. Adapters prefer well structured situations but will generate ideas for doing things better although these ideas are generally few in number and well chosen. The ideas also tend to follow the status quo. Whereas innovators however are in to doing things different. They generate a multitude of ideas, some of which are more useful than others and in doing so, they have the capacity to present solutions that break existing problems. This trait of wanting to do things differently can be very disruptive in an organisation. Nevertheless, according to Kirton (1988) in the face of imminent radical change, an organisation needs it's innovators to provide it with creative solutions on survival. Kirton (1988, p.74) says there is mounting evidence to suggest that "people who are most willing to cross boundaries of any sort are likely to be innovative" but stresses that there are situations where adapters can be of greater value than innovators and vice versa. If there are too many innovators in

the group then an adapter will be more likely to see the wood for the trees. Each group will be unique success will depend on the circumstances which prevail at the time and the actual mix of adapters and innovators within each group.

Amabile (1988), a psychologist, also draws attention to the broad similarities that exist between the process of organisational innovation and individual creativity. In conjunction with Gyskiewicz, Amabile conducted specific research in 1985 to discover what, if anything, were the specific stimulants and obstacles to creativity in the corporate environment, and in particular, within the R&D environment. In their research they interviewed 120 scientists and arrived at three general conclusions, which were as follows:

1. An individual's creativity within an organization is influenced by the same factors that influence creativity in other contexts,
2. An individual's creativity within an organization is also influenced by a number of factors that are specific to the organizational context and ,
3. The process of individual creativity is a crucial part of the entire process of innovation within and organization, but it is only one part.

(Amabile, 1988, p. 143-144).

They found that certain specific features of management style would appear to inhibit individual creativity. These features were related to performance evaluation and reward issues in a competitive environment which constrained the choice of work methods (Amabile, 1988, p. 143-144). They also found that the following factors can enhance an individual's creativity within an organisation: goal setting by management; poor internal communication; lack of availability of material resources and people resources; management attitudes towards innovation; presence or absence of interest & co-operation from different areas of the organisation, and the presence or absence of constructive feedback. Finally, they found that other elements are also essential both before and after an individual generates the creative idea. These elements include: a mechanism for hearing and disseminating new ideas; practical follow-up of ideas from various areas of the organisation; a broad rather than narrow corporate approach to achieving organisational goals; and an offensive rather than defensive strategy towards doing the business of the organisation. They concluded that an organisation needs (1) basic resources for all stages of the innovation process, (2) mechanisms for

appropriately managing the various stages of the innovative process and (3) higher levels of leadership to constantly communicate a genuine desire for innovation.

Amabile (1988) believes that individual creativity could be used as a beginning framework for developing a theory of organisational innovation, citing the following two reasons in support of his view. The first reason is the obvious one that the problem has enormous economic and social significance in that "organizations cannot continue to survive and thrive and have an impact in the modern world if they are incapable of successful innovation" and second reason is that he believes "there is abundant evidence that social factors can have a major influence on an individual's creativity" (Amabile, 1988, p. 162).

This brief overview has drawn together some of the extensive body of literature which argues the case for acknowledging that the role of creativity is both integral to and precedes innovation. Whilst recognising that disagreement exists as to what the exact characteristics of the creative personality are, in general, there is broad agreement that some individuals are simply more creative and hence innovative than others.

Forces which affect organisational innovations.

Organisations are influenced by both external and internal environmental forces. External influences include political, economic, social, cultural, and technological forces. Organisations are also influenced by customers, suppliers and competitors on local, national and international levels. Management and staff generate the internal forces. This section will discuss the external and internal forces which operate both on and within organisations.

Every organisation will constantly adapt to its external and internal environment. According to Gawthrop (1969, p.188), "except in the very short run, the organization cannot ignore the changing demands imposed on it either from the groups which constitute its external environment, or from those individuals and subunits which are included within its internal system". Some organisations will adapt by innovating whereas others will chose to consolidate their positions in response to their threats. Organisations will differ in their choice of response but over time, a dominant pattern will emerge and it is this pattern which, according to Gawthrop (1969), is a significant predictor of future organisational response. This behavioural pattern is embedded in its organisational culture.

Kanter (1983) found from her research of 100 American Corporations that companies could be classified as either having integrative or segmentalist cultures. The integrative companies embraced change, seeing problems as part of larger wholes. They challenged the established practices and operated at the edge of their competence. They focused more of their resources and attention on what they do not yet know (e.g., investment in R&D) than on controlling what they already know" (Kanter, 1983, p.27) whereas the segmentalist companies, were anti-change-orientated. The problem solving strategies in the later group of companies were orientated to compartmentalising and isolating problems. Kanter noted that such companies may even segment innovation, making it the responsibility of a separate R&D department "so that no-one else has to worry about it" (1983, p. 28).

Organisational flexibility is yet another critical factor in whether a company will respond outwardly to change or not. Whilst it has long been recognised that a relationship exists between organisational size and flexibility, with large organisations believed to be less flexible than small organisations, Peters (1989) argues that flexibility in an organisation arises from management empowering employees. Likewise Kanter also favours organisations which empower staff. Kanter found from her research, that "the degree to which the opportunity to use power effectively is granted to or withheld from individuals is one operative difference between those companies which stagnate and those which innovate" (1983, p.18). Kanter also found that "companies with reputations for progressive human-resource practices were significantly higher in long-term profitability and financial growth than their counterparts" (1983, p. 19).

Organisational culture is determined largely by organisational leadership which affects the way in which organisations respond to both their external and internal forces. The literature on leadership now differentiates leadership from management. Bennis (1989) argues that there are enormous and crucial differences between leaders and managers which he then proceeds to list, but most importantly, he stresses that leaders innovate whereas managers administer. This observation ties in with the literature on the creative personality.

Kotter (1990) argues that effective organisational leadership will produce useful change whilst good management will control for the complexity of the environment which is created by the change. Kotter, like Bennis, views leadership and management as "two distinctive and complementary systems of action" (1990, p. 103-104) and according to him, smart companies "try to develop leader-managers" as "more change always demands more leadership" and change is the one variable that is

always constant. There is a wealth of literature on the qualities of good leadership/management which is similar to and ties in closely with the literature on the creative personality. Interested readers are referred to that body of literature for more in-depth discussion of the subject.

To summarise, external and internal forces constantly influence organisations. Organisations adapt either by welcoming challenges or by taking a more inward stance in order to protect themselves. Organisations that respond positively to their challenges are believed to be more innovative than the other and obviously there will be yet another group of organisations that adopt a position somewhere in the middle. Over time organisations develop their own unique cultures in response to these forces which tend to influence future responses. That culture will be strongly influenced by the organisation's Chief Executive. Current wisdom believes that innovative organisations tend to be led as opposed to managed.

Resistance to health service management innovations.

Innovations bring change and usually some degree of resistance. This section includes a brief overview of general resistance factors and concludes with a discussion of the health sector- specific resistance factors.

General resistance factors.

General resistance to change is now a well acknowledged phenomenon within organisations. Resistance is directly affected by the organisation's culture. If the organisational culture welcomes change then naturally, resistance will be less than in those which prefer to deal with change by segmenting and isolating it.

As management innovations can occur at all levels of the organisation be it company wide, departmental or on an individual level, resistance can occur anywhere. Such resistance can be overt or covert; active or passive; major or minor. Further, it can occur at any time, be it prior to the beginning research process, during the research project itself, during the developmental phase of the innovation, or at any time thereafter.

The structure of the organisation can also affect resistance. The more hierarchical the structure, the more likely there are to be vested interests which may create pockets of possible resistance. Likewise any attempt to decentralise decision making by removing hierarchical structures within the management structure can also bring resistance as some staff may perceive a loss of their power.

Departmental rivalry within the organisation can also create resistance. This is especially likely to happen if the ongoing roles of staff within the department are threatened with closure by the proposed change brought about by the innovation.

On an individual level, individuals can feel very threatened by change, making them feel inadequate and raising the question of dispensability especially if the change involves the introduction of innovative technology. Technological changes can also bring resistance which can result in union-management tensions.

Employing external consultants can also be very threatening to the role and status of individuals and indeed whole departments. Organisations can also expect resistance from people who have vested interest in maintaining the status quo, be they managers or professionals.

Specific resistance factors.

The health industry is now well acknowledged in the management literature as being one of the more complex industries to manage (Shortell & Kaluzny, 1988). This complexity relates to the complexity of its product, with the term "product" being used in the generic sense, plus its mixture of managers and health professionals (scientists).

Burns (1975) argues that scientists and managers simply have different value systems which he feels may account for some of the difficulties that these two groups have in working together. He lists these differences as follows:

Scientist	Manager
uses measurable data	uses subjective data
focuses on detail	focuses on big picture
seeks critical evaluation from peers	views criticism as demeaning
orientated to profession	orientated to company
desires open communication with other professionals	secretive preferring to maintain competitive edge
scientific goals are uppermost in value system	economic goals are uppermost in value system

Scientists and other professionals are now referred to in the literature as "knowledge workers". Numerically knowledge workers predominate in the health industry. Knowledge workers are people who have high levels of education and intellectual skills and as such, these people enjoy greater discretion in their personal, professional and labour market choices (Rudman, 1990). They also have a high sense of self worth and are well aware that they are highly marketable. For many, their primary loyalty is to their profession. Sometimes they see themselves as being more accountable to their profession than to their employers. They tend not to regard themselves as employees *per se*. They identify with what the organisation seeks to achieve and when that purpose differs from theirs, they will exit. They place emphasis on the employment relationship which is more powerful to them than the employment contract (Rudman, 1990, p. 36). Knowledge workers are not passive instruments who will be told what to do and when, as some managers have discovered. They usually also want the freedom to do their own problem selection as opposed to problem assignment (Stein, 1988, p.312). They are usually less interested in monetary rewards than freedom and status, be it either professional or academic. These creative individuals have to be understood by managers. Management's challenge is to give these workers sufficient freedom, flexibility and due organisational status, yet ensure there is adequate accountability. All of which is no an easy task.

Put simply knowledge workers are a fact of life in the health sector. All health professionals, by virtue of their professional education are tertiary qualified whereas the same is not true for all health managers. No current research figures could be located on the educational preparation of managers in the health sector but Hooley and Franko (1990) randomly sampled 474 practising New Zealand managers from all sectors and backgrounds and found that of their respondents, only 9 percent of Directors and 5 percent of Managers were Master's qualified. In general New Zealand managers are

considered to be less educated than their counterparts in other Western countries. Campbell-Hunt, Harper & Hamilton (1993, p.99) note that although these educational levels are rising, "NZ still has a considerable distance to go to achieve international standards for managers"... "in addition, the typical background of CEO's is in finance or operations rather than in marketing" although CEO's now recognise that backgrounds in strategic planning and marketing are training priorities. This deficiency is of serious concern to the management profession in general and there is no evidence to suspect that the health sector differs from the norm. Cleverley (1991, p. 20) makes the suggestion that this discrepancy may well be one of the reasons why some New Zealand managers are less familiar with, or confident about, research into management related topics.

In addition to the above educational imbalance, there is also a power imbalance. Medical staff have historically enjoyed control within the health industry. They are both the recognised and legalised gatekeepers of health services in the primary health sector and the secondary sector is also organised around them. The new era of service management, where the system is organised around services as opposed to medical specialities, has only made a slight dent on this and that dent could well be said to be in the more marginal areas e.g., women's and child health. Malcolm's (1993) research on service management found that services continue to be organised around the traditional medical specialities e.g. surgical and medical services. The life span service model would seem to have been adopted for women, children and the elderly, but adult services are still organised according to traditional primary and secondary demarcations and the mind-body split paradigm continues with mental health services remaining, as always, quite separate, despite the rhetoric about seeing and treating people holistically.

Medical staff are also fully aware that their contribution is essential to the day to day delivery of a secondary health service and likewise nursing staff who were, in general, for a variety of reasons, much slower to realise also know that their services are equally if not more, essential. Managers are now finding that both professional groups are also not adverse to using this fact to leverage employment advantages.

The other problem is that health professionals operate on a international labour market. Currently there is a world wide skill shortage for health professionals which means that if current conditions are not too their liking, they can and do demand better employment conditions elsewhere. Some health professionals can also contract to multiple employers simply because of this shortage which in itself creates further complexities with conflicts of interest.

The medical profession also exhibits another unusual characteristic - one of selective innovation and selective resistance to change. Altenstetter (1981, p. 37) describes their resistance as being selectively "hostile to innovation in delivery arrangements" adding that the problems do "not involve resistance to change in general but to particular kinds of changes". There is no question that the medical profession is one of the most extremely innovative groups in society as is evidenced by the advances in biomedical research over the years and the incredible innovative leaps forward in the field of biomedical technology. However, paradoxically when it comes to accepting any cost containment innovations or service delivery innovations which they perceive to be a restraint on their professional autonomy, the medical profession become notoriously resistant to change.

Public policy literature also refers to added problem of professional accountability versus contractual accountability. Generally speaking health professionals tend to see themselves more accountable to their professions than their employers. Some professionals will place their employers interests second if they perceive they have to make a choice between the two parties which provides an increasing challenge for health service managers.

The above issues relate to power and control. Any one issue can provide fertile ground for resistance from staff. Add to this the fact that health is a people industry which must provide top quality service 24 hours a day, seven days a week, without fail in which faults can be life threatening and therefore unacceptable to any party, and one can see that the role of any health service manager is not simple.

Innovations in public service industries.

Currently most of the larger health provider institutions in New Zealand are owned and operated by the Crown so it is pertinent to examine innovation from a public service perspective.

According to Drucker (1986, p.201) "most innovations in public-service institutions are imposed upon them either by outsiders or by catastrophe". He lists the following reasons why public service industries have traditionally not been innovative:

- they are paid on budget not results
- they are dependent on multiple constituents
- they have to satisfy everyone
- they cannot withdraw a service without upsetting a constituent
- they exist to do good.
- they are out to maximise good rather than optimise.

Drucker states that goals of maximisation can never be attained, "indeed the closer one comes towards attaining one's objective, the more efforts are called for. For, once optimization has been reached (and the optimum in most efforts lies between 75 and 80 per cent of theoretical maximum), additional costs go up exponentially while additional results fall off exponentially" (1986, p.204). "The closer a public-service institution comes to attaining its objectives, therefore, the more frustrated it will be and the harder it will work on what it is already doing", which in turn, will cost more (Drucker, 1986, p. 204). The institution, according to Drucker, "will, however, behave exactly the same way the less it achieves ... and therefore "whether it succeeds or fails, the demand to innovate and to do something else will be resented as an attack on its basic commitment, on the very reason for its existence, and on its beliefs and values" ... which in turn, creates "serious obstacles to innovation", explaining "why, by and large, innovation in public services tends to come from new ventures rather than from existing institutions" (Drucker, 1986, p.205).

Peters argues that the excuse that public services operate in a glass fish bowl and therefore should not waste public money on R&D which may not be successful is simply not valid. He supports the fact that the public have every right to and should object to public sector organisations spending large amounts of public money on large scale/long term projects which have not been sufficiently subjected to initial small scale pilot testing. Peters hold the view that public service organisations are no different from private sector organisations and that the principles of success are the same for both.

According to Drucker and Peters, more entrepreneurial policies are needed in public service institutions to make them capable of innovation. Peters goes further and advocates that one should measure innovation because "what gets measured gets done", adding "while there are difficult issues of specification and definition, innovation can be measured" and that "even imperfect measures provide an accurate strategic indication of progress, or lack thereof" (1989, p.268).

Drucker also advocates that "wherever public-service activities can be converted into profit-making enterprises, they should be so converted", hospitals included (1986, p. 210). This view is shared by some New Zealanders e.g. Roger Douglas (1993). Drucker's rationale for his line of argument is that "we can ill afford to have activities conducted as 'non-profit', that is, as activities that devour capital rather than form it, if they can be organized as activities that form capital, as activities that make a profit" (1986, p.210). He notes that the great bulk of the activities that are being discharged in and by public-service institutions will remain public-service activities, and will neither disappear nor be transformed. Consequently, they have to be made producing and productive. Public-service institutions will have to learn to be innovators, to manage themselves entrepreneurially" (1986, p. 210) ... "to build entrepreneurial management into the existing public-service institution may thus be the foremost political task of this generation" (1986, p. 212).

Summary.

The focus of this chapter has been to set the scene for the research by reviewing relevant general literature on innovation and diffusion. As outlined above, the theoretical basis for this research stems primarily from economic theory. Diffusion theories are also relevant when considering imitations of R&D. Definitions of creativeness and innovativeness have been provided and discussed in their context. As the literature which relates to innovation is huge, and therefore not possible to cover completely, several key areas have been selected for discussion. These include the role of creativity in innovation; the internal and external forces which affect organisational innovation; and resistance to innovation. The chapter concludes with a section on innovations in public service industries given that the health sector is predominantly government owned.

Chapter 2: R&D - Approaches, perspectives, and usage's.

This chapter expands upon the OECD definition of R&D that was given in the introductory section and aims to provide a framework from which to proceed with discussing health service management R&D. Firstly it will define health service management R&D and then set out the New Zealand framework as per the legislation. The World Health Organisation (WHO) definitions and the OECD definitions are then discussed. Next the differences between appropriable research and non-appropriable research will be outlined. Thereafter R&D will be discussed in the general context for New Zealand and then more specifically, as it relates to the health care industry and then health service management. Given that any discussion about innovations also encompasses a legal perspective regarding ownership of intellectual property rights, a brief overview of the topic has been included. The chapter concludes with a summary of health service management R&D in the Anglophile world.

Health Service Management R&D.

Traditionally R&D within the health service has been focused primarily on clinical research. Any suggestion that such research may have a management component has, generally speaking, been met with a mixed response. The area of R&D that this study focuses on is health service management R&D with the term health service management being used in its widest sense. Health service management research is concerned with management problems, such as how to improve efficiency, quality, flexibility, availability and effectiveness. According to Blanpain and Delesie (1976) it is concerned with problems in the organisation, human resources, financing, utilisation and evaluation of health services. As discussed previously, this thesis adopts the view that management research is not simply a distant 'tack on' after thought as a research subject but is in fact the central focus of research if the aim is to provide an efficient and effective health delivery service. Any R&D which improves the quality of human health, shortens length of bed stay, finds innovative ways of providing improved health service, or discovers cost effective health care solutions etc., regardless of whether they come from advances in technology or clinical research, is ultimately health service management related. To narrowly define such research as being clinical or technical only is short-sighted.

New Zealand definitions of health research.

In New Zealand, health research is defined by law in the New Zealand *Health Research Council Act, 1990*, (s.2) as "research that has or may have relevance to human health; and includes biomedical research and public health research". In terms of the *Health Research Council Act, 1990* (s. 2), health service management research falls under the umbrella term of public health research.

Public health research is defined in the Act as "research into factors that influence the health of a population; and includes, (a) Research into health systems and health services; and (b) Research into the environmental, socio-economic, cultural, and behavioural factors that determine health status".

Biomedical research is defined in the Act as, (a) "Research into the biomedical science relevant to human health; and (b) Research into the causes consequences, diagnosis, and treatment of human illness".

WHO definitions of health services/ health systems research.

Research on the delivery of health services is defined by the World Health Organisation (WHO) as health service research (WHO, 1986, p.39). Health service management research is a sub-category definition of health service research.

The term "health services research" is often used interchangeably with the term "health systems research" (WHO, 1986, p.39). In general, health service research is applied research. Its primary purpose is "to help improve the health status of the people by improving the quality of the health service" (WHO, 1986, p.74). More specifically, it "aims to improve understanding of the structure and functioning of the health system and to achieve more rational policy and programme planning by providing decision-makers with evidence as to which health policies are likely to be more effective, efficient, economic and relevant to their needs" (WHO, 1986, p. 74). In order to achieve these aims, it depends on a variety of disciplines in the social sciences e.g. management, and economics ... in addition to biomedical and health sciences proper" (WHO, 1986, p.74). WHO points out that "health systems research is still at a relatively early stage of development" and that "most countries have not yet integrated such research into their managerial process for health development ... due to a lack of expert advice and skills" (WHO, 1986, p.78). WHO also stress that "for the full potential of health systems research to be realised, it is not sufficient to improve the quality and quantity of research, it

should also be responsive to the needs of those who manage services ... the latter, in turn, should be willing to use the results of research" (WHO, 1986, p. 78).

The OECD definitions of Health Service Management R&D.

Health service management R&D, as per OECD (1981) guidelines includes the following:

- any research that is conducted specifically for the R&D project under consideration;
- feasibility studies on research projects;
- data collection attained primarily for research purposes.

Excluded are:

- biomedical and treatment R&D;
- education and training, including attendance at conferences;
- marketing research;
- customer satisfaction surveys conducted for general purposes as opposed to specific R&D purposes.
- policy related studies such as the ongoing analysis and assessment of existing programmes.
- operations research as a contribution to decision making.
- forecasting future changes in the pattern of demand for social services within a given area arising from an altered demographic structure.
- imitations of another organisation's innovations.

The above list is based on the OECD guidelines (1981) which state that certain activities should be excluded when conducting surveys of R&D. OECD's "basic criterion for distinguishing R&D from related activities is the presence in R&D of an appreciable element of novelty" (1981, p.28), novelty being defined in *Webster's Ninth New Collegiate Dictionary* as "something new or unusual". The 'rule of thumb' therefore is that the research must fit the criteria of being new or novel, or it must aim to substantially improve something as opposed to imitating it.

Appropriable and non-appropriable research.

Research can also be defined by the terms appropriable or non-appropriable research. These terms relate to the ownership of research. Appropriable research is private good research that can be appropriated by private individuals and companies, either by simply practising non-disclosure, or by adopting the more formalised approach and regulating its disclosure under intellectual property right laws as defined in the *Commerce Act 1986*. Non-appropriable research is public good research that is carried out with public funds, primarily because it is unlikely to be funded by management. Research funded by the Health Research Council, or the Public Good Science Fund is non-appropriable research.

R&D in New Zealand.

Funding of R&D has always been, to some extent, a function of the state in New Zealand, as is so in other countries. It can be argued that such funding of R&D is necessary for ongoing economic development, i.e. the public good, and that much R&D is simply not attractive to private enterprise who must ultimately generate a return on their R&D investment. In economic terms, the market is considered imperfect and therefore in need of government intervention.

New Zealand's R&D expenditure has fallen since 1981. In 1981 it spent about 1.4 per cent of its Gross Domestic Product (GDP) on R&D which was about average at the time amongst other OECD countries. In 1989, this figure fell to 0.91 per cent which was below the OECD average of around 1.70 per cent (Edwards, 1992, p. 2).

Business expenditure on R&D declined 34 per cent from 1981 to 1989 (Edwards, 1992, p. 2). New Zealand now spends only "one quarter of the proportion of GDP that businesses in the other OECD countries spend on research and development ... In addition, very little of this research money is spent in high technology industries in comparison with other OECD countries" (Edwards, 1992, p.2).

The Ministry of Research Science and Technology R&D statistics for all sectors for 1990/91 financial year estimated the following expenditure (see Table 1):

Table 1: Estimated Total R&D spending per sector.

SECTOR	\$ millions	Percentages
Business Enterprise	224	35
Government	334	52
Universities	90	14
TOTAL	648	101% *

(* = Rounded percentages).

The Ministry of Research Science and Technology (1993) confirmed that R&D expenditure in the business enterprise sector, during its survey of the 1991/92 fiscal year, was heavily concentrated in a small number of the larger sized firms. This finding is consistent with Schumpeter's view that larger firms have an R&D advantage should they choose to exercise it. The Ministry found that the 80/20 rule applied in this instance given that 82 percent of the total R&D for this sector was carried out by 26 percent of the firms surveyed. They noted that "information systems comprise a large area of business sector R&D with electronics, communications systems and software totalling \$43 Million", or approximately a fifth of all business sector R&D (Ministry of Research Science & Technology, 1993, p.2).

Nearly half of all R&D in the government sector was aimed at primary production namely "research into new and improved production and management systems related to New Zealand's traditional role as supplier of primary products in agriculture, horticulture, forestry and fisheries" (Ministry of Science, Research & Technology, 1993, p.27).

The Ministry stresses that New Zealand must concentrate on maintaining, improving and generating new areas of competitive advantage by matching "the innovative efforts of its competitors and the innovative demands of its customers" (Edwards, 1992, p.3). It cannot rely on past performance and good fortune to generate economic growth. Technological sophistication is now believed to be what will shape future world trade, not natural advantage.

R&D in the New Zealand health care industry.

The New Zealand health industry has a long and distinguished reputation in R&D. This section will provide an overview of that history and attempt to place R&D in its wider context incorporating a brief review of the political reforms which have affected both the science sector and the health sector.

In 1937 the Medical Research Council of New Zealand (MRC) was established as a committee of the Department of Health and in 1950 it became an autonomous statutory body with the passing of the *Medical Research Council Act*. The main function of the MRC was to support medical research.

Since 1984 the science sector, like the health sector, has been under review and a series government reviews and reports have also been produced. Some of these reviews have been more significant than others in relation to the health sector but all have in some way contributed to its development. In 1984 the then National Government set up an interdepartmental working party which was chaired by M. C. Probine to review the means by which Government obtained advice on science and technology problems (Probine, 1984). One of the recommendations of the Probine Report was to replace the National Research Advisory Council (NRAC) with a body which would give free policy advice as it would be set up to be independent from operational involvement.

Late 1984 the fourth Labour Government was elected to power. This Government with its fiscal crisis and its philosophy of "user-pays", soon focused its attention on to science and technology. In 1986 it commissioned a working party, chaired by Sir David Beattie, to review the place of science and technology in the economic and social development of New Zealand (Beattie, 1986). The Beattie report made some controversial recommendations regarding the funding of research. It also called for the establishment of a separate Ministry of Research to give policy advice to Government on strategic research priorities, as recommended in the Probine Report and recommended that a Science and Technology Advisory Council (STAC) be established. The recommendations to establish both the Ministry and STAC were accepted by Government. It then went on to establish and commission STAC to review the Government's investment in science and technology, giving it a three year mandate. This investigation included Government's investment in health research.

Whilst STAC was in the process of conducting this review, a national scandal erupted in July 1987 over health research which was being conducted at National Women's Hospital in Auckland. It began when Sandra Coney and Phillida Bunkle wrote their now famous article called "the Unfortunate Experiment", which was published in *Metro* magazine. This article, resulted in the appointment of a judicial inquiry by Judge Sylvia Cartwright. Whilst the inquiry was in progress, there were streams of revelations concerning the events that happened over a period of some two decades. Biomedical research, bioethics and patients rights became topics of wide debate amongst many New Zealanders. Judge Cartwright found that there was truth in the original allegations and went on to criticise research and ethical assessment procedures at National Women's Hospital (Committee of Inquiry into Allegations Concerning the Treatment of Cervical Cancer at National Women's Hospital and into other related matters, 1988). Her findings and subsequent recommendations, were to have far reaching consequences for health research in New Zealand and the New Zealand Medical Research Council (MRC) in particular, who had governed medical research in New Zealand since 1937.

Public trust with the medical profession deteriorated over these events and it became obvious to many within the industry, that there would need to be some changes to the way in which biomedical research was being conducted in this country.

As the MRC celebrated its 50th Jubilee in November 1987, the then Director General of Health, Dr George Salmond, publicly challenged it to review its priorities and emphases inherent in its distribution of research funds (MRC, 1988a). A Health Research Council was mooted by the Director General as being a much more suitable replacement for the existing MRC. He argued that such a council would have a broader focus which would be more in keeping with the health needs of a modern society. He also made it quite clear, that he expected there would be non-medical representation amongst the council of any such new body, and warned that there was going to be a ministerial review of the organisation and public funding of health research in the near future. In the beginning of 1988, the then Minister of Health, the Hon. David Caygill announced that there would be a Ministerial review of the organisation and public funding of medical and health research in New Zealand (MRC, 1988a).

STAC reported in 1988, recommending that all public good or non-appropriable research, should be allocated by one national science research agency. However the MRC (1988a) strongly opposed this suggestion on the grounds that a degree of overlap existed between biomedical and public health

research which made it difficult to compartmentalise such research into either public good i.e. non-appropriable research, or private good i.e. appropriable research.

The Government then commissioned Scott, McKay and Stewart (1989) to review the organisation and funding of health research in July 1988. In their report they chose not to support STAC's recommendation of separating off non-appropriable research funding to a separate national science body. They recommended instead, that there should be a continuation of an independent statutory body, such as the MRC, but that the existing MRC should be disbanded and replaced with a New Zealand Health Research Council (HRC), which would have a broader health research focus. The Committee also recommended that their newly proposed HRC should receive separate bulk funding for appropriable and non-appropriable research and that non-appropriable research funding should be contested against other government funded non-appropriable research. This new contestability provision would, in the longer term, "involve negotiations with the appropriate Cabinet committees and the proposed Ministry of Science, Research and Technology" (Scott, McKay & Stewart, 1989, p. 60). The Committee also recommended that the bulk funding allocations be kept separate, and not combined and reallocated in different proportions by the new Health Council. It recommended that the Council have two sub-committees, namely a Biomedical and a Public Health and Development Committee. All non-appropriable bulk funding, it said, should go to the Biomedical Research Committee of the HRC, and all appropriable bulk funding should be allocated to the Public health and Development Committee. In response to the Review Committee's report, the then Labour Government introduced the *Health Research Council Bill*. It was controversial and hotly debated in the House of Representatives before it was finally passed by a majority Government in August 1990, some three months before the General elections of 1990. Hansard reports describe intense medical opposition to the bill.

Public Health researchers seemed to be largely in favour of the intentions of the Act however many doctors feared that such changes could result in diminished money for biomedical research if biomedical and public health research funding was separated, without additional funding being allocated. There also appeared to be fears that lay people on Council would in some way contribute to this because they would, through no fault of their own, simply not understand the intricacies of biomedical research.

The Bill was passed into law in August 1990. The Health Research Council Act 1990 established a mixed membership Council and it established four committees within the Council - a Biomedical Research Committee, a Public Health Research Committee, a Maori Health Committee and an Ethics

Committee. Separate funding between the two areas of health research, as advocated by Scott, McKay, and Stewart (1989), did not proceed, but contestability provisions were strengthened. The scope of the Council was broadened to encompass more public health research plus a bicultural perspective. A national ethics Committee was established and lay people were appointed to Council.

The Act became an election issue in the forthcoming general elections. The National Government, then in opposition, promised to review the Act if it should be successful in the forthcoming elections. It became the Government in late 1990 and it hastily reviewed the newly created *Health Research Council Act 1990*. However after careful deliberation, it made only minor alterations to the Act, choosing not to make any major changes to either the composition of the Council, its committees, nor the funding arrangements. The Act survives today, remaining virtually unchanged. However, although the MRC has now been replaced with the HRC, the majority of funding is still allocated to Biomedical Research (MoRST, 1992).

R&D in Health Service Management in New Zealand.

It is not possible to give accurate figures on R&D expenditure in health service management because such R&D is only partially funded by Government, the Health Research Council, Universities, other organisations and individuals. Salaries and some other costs are subsidised heavily by employing organisations and it is not possible to separate those costs out at this point in time.

Searches of the literature revealed no specific surveys of health service management R&D in the New Zealand health industry. There were however, two related studies.

The first related study was conducted by the Medical Research Council of New Zealand (MRC) on the New Zealand Health Research Workforce (MRC, 1988b). This study examined the strength in the health research workforce by grades, categories and fields of practice. Questionnaires were mailed to 668 individuals or organisations who were thought to be engaged in health research which included full and part-time workers. The response rate was 85 percent. The study found, amongst other findings, that 3.15 percent of workers were active in the area of health services research during 1986- 87 and secondly, that no health research worker specified health service management as their major skill and scientific discipline, which they utilised as a basis for their current research.

The second relevant study was conducted in 1992 by the New Zealand Ministry of Research, Science and Technology (MoRST). The Ministry collated and published a benchmark analysis of all Crown-funded scientific and technological research conducted during the fiscal year 1991/92 (MoRST, 1992). This included research and development in the health industry as funded by the Health Research Council, departmental budgets, the universities, and the Public Good Science Fund (PGSF) which is funded by the Foundation for Research, Science and Technology. The analysis classified all Crown-funded research into 40 output classes "using OECD (Organisation for Economic Co-operation and Development) socio-economic classification of research to enable international comparisons to be made of New Zealand research efforts" (MoRST, 1992, p. 1.6). Health research is classified by the OECD as "Output 37: New and improved information bases, systems and products in health" (MoRST, 1992, p. 1.6). This definition is further expanded by MoRST for New Zealand purposes as being "new and improved information bases, processes, systems, services and products in health and well-being including biomedical, public health, Maori health and health support services" (MoRST, 1992, p. 1.6).

The Ministry, in conjunction with the Health Research Council, estimated that,

"\$40.2 million was spent on health research during 1991/92. Of this, approximately 33 percent was funded by non-Crown sources, 1 percent from the PGSF, 42 percent from departmental budgets, and 24 percent by the universities. The universities were the principal contractor for research funded from departmental budgets. The Crown invested 537 FTEs [full-time equivalents] research effort in this area, making this the largest of the 40 Output Classes" (MoRST, 1992, p. 4.300).

MoRST found that studies on the provision of health care services, funded by the Crown, accounted for 33 FTE out of 537 FTE i.e. (6.14 percent). Of the 215 current health research programmes and projects listed as being in progress during 1991/92, only one study, using one FTE, titled "*Effectiveness and efficiency of the provision of health services*", carried out by the Department of Health, could be seen as being predominantly health service management research. The majority of the remaining 214 research programmes were focused predominantly on biomedical research which is "research in the biological sciences relevant to human health, and into the causes, consequences, diagnosis, and treatment of human illness" (Scott, McKay & Stewart, 1989, p.5). A minor percentage were focused predominantly on public health research which is research that focuses on "factors which influence the health of a population" (Scott, McKay, & Stewart, 1989, p. 5).

To summarise, as can be seen by the above surveys, New Zealand investment in health service management R&D, which is regarded as a sub-classification of public health research (Scott, McKay & Stewart, 1989), ranks a dismal third in comparison to public health research and biomedical research despite the constant criticisms of health service management performance in the public sector over the last decade. Given the fact that the health service has been the subject of constant management restructuring for at least the last decade it is surprising that there has been so little health management research performed in this area especially given the size of Government spending on Vote: Health and its long term commitment to remain the dominant funder of health services.

R & D - The legal issues.

The legal issues which apply to R&D will be discussed before progressing further. The topic of intellectual property rights is a huge field in itself and the following is merely a brief sketch to illustrate its relevance to R&D.

Society promotes private investment in R&D by granting statutory intellectual property rights. Were it not to do so, R&D would become the sole prerogative of public investment only. Firms and individuals have to be able to reap the benefits from R&D investment, hence the term "appropriable" research, otherwise there would be no economic advantage in conducting such R&D and expenditure would ultimately be detrimental to economic and social growth.

Intellectual property rights confer on inventors and innovators short term protection from duplication by competitors in the market place. In New Zealand, intellectual property rights are defined in the *Commerce Act 1986, s.45(2)* to be "a right, privilege, or entitlement that is conferred, or acknowledged as valid, by or under -

- (a) The Patents Act 1953; or
- (b) The Designs Act 1953; or
- (c) The Trade Marks Act 1953; or
- (d) The Copyright Act 1962; or
- (e) The Plant Variety Rights Act 1987".

Society copes with the long term problem of preventing innovators/entrepreneurs from monopolising the market, by legislating against such uncompetitive practices. In New Zealand the above acts confer exclusive rights for differing time periods. Once a patent is granted, it lasts for 16 years. The

Copyright Act applies automatically on completion of any original literary or artistic work. There is no formal requirement to apply for copyright. The original owner merely asserts copyright by marking the work in question with the copyright symbol, their name and the year of first publication. Copyright extends for 50 years once the work is published or 50 to 75 years after the author's death depending on whether the work was published or not. Design copyright lasts for 5 years with designers able to apply for up to two 5 year extensions. Trade Marks can be registered for 7 years and are renewable thereafter on receipt of further payments. In addition, the *Fair Trading Act 1986* regulations also apply.

Intellectual property rights have long been viewed by many as the concern of commercial companies, whereas publicly funded R&D was traditionally viewed as non-appropriable scientific research. Such non-appropriable research was seen as scientific knowledge which should be freely available to anyone and as such, clearly belonged in the public domain. However the rules are now changing as the division between the public and private sectors becomes more blurred.

With the passing of the *Health & Disability Services Act 1993*, the majority of publicly owned New Zealand hospitals became Crown-owned companies as of 1 July 1993, and as such they came under the auspices of the *Companies Act 1955*. Intellectual property rights have now become of increasing interest primarily because they can confer commercial advantage onto these companies which are now required, by law, to be "as successful and efficient as comparable businesses not owned by the Crown". R&D offers an avenue to increase profits.

The issue is further complicated by the fact that the *Official Information Act 1982* also applies to these Crown-owned companies. The Official Information Act enshrines the principle of availability which requires that official "information shall be made available unless there is good reason for withholding it" (s.5). The protection of Official Information must be in the public interest. Official information is entitled to be withheld for a number of reasons, the most relevant to this discussion being that referred to by s.9 (b) which allows information to be withheld on the following grounds: that the making available of such information -

- (i) would disclose a trade secret,
- (ii) would be likely unreasonably to prejudice the commercial position of the person who supplied or who is the subject of such information.

A "person" is defined by the *Official Information Act 1982* as "a corporation sole, and also a body of persons, whether corporate or unincorporate". Section 2(5) also states that any information held by an independent contractor to the Crown is also deemed to be held by the Department or Minister of the Crown or organisation".

The question, which as yet remains to be fully answered by Government, is who owns the outputs of R&D funded exclusively by the public purse? Researchers became concerned and prompted the opposition spokesperson on Health, the Rt. Hon. Helen Clark to ask the following question in the House of Representatives on 1 December 1992:

“Does the Government intend to permit Crown health enterprises to prevent the release of the results of medical research and treatment innovations developed by their employees on the ground of commercial sensitivity?”

The Minister for Crown Health Enterprises, the Hon. Paul East, replied, that he regarded R&D that is conducted in Crown Health Enterprises, and which produces medical and treatment innovations, as non-appropriable research and that he would not favour "restricting the publication of anything that was in the interests of bettering the health of New Zealanders" (NZHR, 1992, p. 12680).

The impetus for this questioning arose from a growing unease amongst health professionals that some health service managers may try to claim intellectual property rights over biomedical and treatment innovations in their quest for competitive advantage. The Hon. Paul East has adopted the position that R&D leading to medical and treatment innovations will be regarded as non-appropriable research (New Zealand House of Representatives, 1992). By adopting this stance, which is in line with the overall intent of the *Official Information Act 1992 s. 9(1)*, companies in the health industry will be left with little option but to try and achieve competitive advantage through R&D in health service management.

Whilst the Government has made clear its intent regarding medical and treatment R&D, unfortunately it has not clarified its position on health service management R&D that is also conducted in publicly funded Crown health enterprises. Whether by intent or just simple omission, the Government has not addressed health service management R&D and by default health service management research is in essence the sole avenue left by which entrepreneurial Crown-owned health companies can seek to promote their competitive advantage.

In the absence of Government policy, the *Official Information Act 1982, s.9(1) and 9(2b)* have become open to personal interpretation by health service managers as to whether such health service management R&D is appropriable or non-appropriable research. There is growing evidence to date that health service management research is being considered appropriable. The latest piece of evidence can be found in a ruling given by the Ombudsman, Sir Brian Elwood, who in January 1994 has upheld a claim by two Crown Health Enterprises that their performance measurements "were too commercially sensitive to be issued to the news media" qualifying his decision by adding that "while the CHEs had to be held to account for the quality of their services, such considerations were outweighed by the enterprises' need to protect their commercial position" (cited by Ross, 1994, p.2).

R&D in Health Service Management in the Anglophile world.

In examining the international literature, it is clear that many countries do conduct health service management R&D. The results of such R&D however, tends to be reported on a project-by-project basis as opposed to any formal grouping of topics using survey format. The following is a brief overview of R&D in health service management conducted in English speaking countries.

Analysis of the American literature revealed that the Veterans Administration (VA), which is "the largest health care system in the United States" (Goldschmidt, 1986, p. 794) has a specific Health Services Research and Development programme that was established by Congress in 1976. Goldschmidt describes VA's early efforts to integrate health services research, as a tool for management, as "relatively unsuccessful" to the point where there were questions as to whether the programme would survive. However survive it did and in 1981 the programme was reoriented to re-emphasise health services research as an integral management tool (Goldschmidt, 1986, p. 798). The programme was based on the belief that R&D in health service management can (1) improve health care, (2) document tangible health benefits for veterans and (3) make substantial cost savings for the nation. VA use the term "management" to encompass the management of health care delivery systems and services plus the management of clinical practice. This programme continues to operate in the 1990's playing a "vital role in allowing VA to meet the challenge of providing top-quality health care to a fast increasing clientele within its straight-line budget" (Zamberlan, 1990, p. 169). VA accepts that it must become one of the most efficient service providers and it uses its health services R&D service as a major vehicle in supporting this objective. Zamberlan reports that health services R&D has increased operating efficiency at local, regional and national levels, ensured quality of care and has streamlined decision-making processes.

VA have addressed operating efficiency by R&D in resource allocation, developing a prototype budget procedure, based on casemix using diagnosis-related groups (DRG's). They have also increased efficiency by decreasing length of stay with a presurgical testing programme. VA have also conducted R&D into space utilisation to determine optimum numbers of operating suites and beds to meet patient demand most efficiently. R&D has also been used to support joint venture decisions between VA and external health providers and they have established Centres of Excellence between VA staff and researchers and local universities.

Whilst VA is concerned with increasing efficiency, they view maintaining top-quality patient care as their primary concern. They have focused their quality R&D on studies of morbidity and mortality and readmissions and other quality-related activities. VA also use their health services researchers to examine the efficacy of treatment modalities and the purchasing of high-tech equipment. VA are convinced that health service management R&D will assist their decision makers to "develop and implement efficient and cost-effective approaches without compromising quality of care" (Zamberlan, 1990, p. 175).

Numerically speaking, nurses are the largest professional group in the health industry which also makes nursing services the biggest budget consumer as nursing salaries are the major cost for inpatient care. The reason for this is that it is a person's requirement for nursing services that ultimately differentiates them from either being an inpatient or an outpatient. Most patients can and do receive health care as outpatients and as this is the least costly option as far as the state is concerned, the state naturally considers it the most desirable. For these reasons any nursing management research is important as nursing effects length of stay and hence resource consumption.

Given the above, nursing administrators in the United States of America conducted a survey in 1987 to up-date their information about the focus and funding of nursing administration research (Henry, O'Donnell, Pendergast, Moody and Hutchison, 1988). They surveyed 561 university hospitals and schools of nursing with graduate programmes and of these, approximately 39 percent (38.5%) were found to be conducting nursing administration research which the researchers defined as research concerned with "establishing costs of nursing care, with examining the relationships between nursing services and quality patient care, and with viewing problems of nursing service delivery within the broader context of policy analysis and delivery of health services" (Henry et. al, 1988, p. 28).

In 1986 two Canadian nurses also conducted a survey of 84 Canadian teaching hospitals to establish the structure, focus and outcomes of hospital nursing research because no previous study existed (Thurston, Tenove & Church, 1990). This study had a 57 percent response rate. Of the 170 research projects reported, 6 were focused on patient satisfaction, 10 related to quality assurance and 38 research projects were related specifically to nursing management. Therefore 32 percent were management related with the remainder primarily focused on patient care.

The United Kingdom, like New Zealand, has Research Councils that sponsor health research. Although no surveys could be located of specific numbers or topics of such government funded research, their Chief Scientist (1992) does refer to the problems of disseminating and implementing health services research into management practice and Williamson (1992) also stresses the need to link research on health management to the use of health services research. One can assume therefore that such R&D is occurring although no evidence could be located as to the extent.

A search of the Australian literature also revealed no specific surveys of health service management R&D. It did however reveal that the Australian Government has invested heavily in health service management R&D related specifically to the development of DRG's (Diagnosis Related Groups). In 1988, the Commonwealth Department of Community Services and Health launched a 5 year, \$5 million per year, inflation adjusted, programme for casemix research ("Commonwealth Money", 1989) which aimed to improve technical efficiency of services within the Australian health care system. The Australians have developed the American concept of DRG's that originated from Yale University to suit their specific needs with the intention of using it as a basis for funding public health care. The method provides an alternative to the specially weighted, population-based formula model of allocating funding which is the main model Australia uses to allocate funds to its public health care services. The casemix system was first implemented by the Victorian Government on 1 July 1993 who are since heralding it as "a genuine incentive to be more industrious and efficient" ("Casemix", 1993, p.1). Although the DRG movement is referenced frequently throughout the Australian health service management literature, the literature does show case by case evidence of other pockets of health service management R&D occurring, although the total extent of such R&D is unclear.

In summary, it would appear that all English speaking countries do, as expected, conduct health service management R&D although the true extent is not yet clear. What is clear, is that managers within the New Zealand health industry must rely heavily on R&D published in the international public domain. One can only assume, in the absence of a large New Zealand body of published health

service management R&D, that international R&D, if deemed applicable, is re-applied to health service management in the New Zealand context.

Whilst there is certainly some merit in adopting this type of approach, it is an approach that is now considered to be less than optimal. Current opinion is that imitation is not the strategy of choice as "there's no sustainable competitive advantage in doing things that some people can do better or other people can do cheaper ...You've got to do something different, which means you've got to be ahead of the market" (Young, 1994, p.17).

The other more obvious problem is that no two national health services can ever be considered equal. It is now both widely acknowledged and accepted, that each country's health service is unique, being shaped over time by its political, socio-economic and cultural beliefs. Given this fact, undoubtedly, funders, purchasers and providers will all have differing opinions depending on their country of origin. The other perhaps more academic problem with choosing to adopt this approach, is that sadly New Zealand, by its failure to conduct health service management R&D, is ultimately failing in its obligation to contribute its unique perspective towards enhancing the international body of knowledge that is health service management research.

Summary.

It was argued in the introduction to this thesis that demand for health services is rapidly outstripping the Government's ability to meet supply. The Government has chosen to remodel the health sector along managed competitive lines in an attempt to generate, amongst other objectives, increased innovation in the delivery of health care services. The public health industry has been restructured according to the profit-making business model. Profitability is dependent on maintaining competitive advantage. Competitive advantage is achieved, in the main, through investment in R&D which hopefully results in an innovation. In the health sector, competitive advantage comes from service delivery. R&D needs to focus specifically on health service management because ultimately health service management determines the efficiency and effectiveness of health service delivery. Poor management results in poor service delivery. Although there have been numerous reviews of the health sector in the last decade which have repeatedly stressed the critical need to improve health service management, in reality there is a paucity of specific health service management R&D being conducted in New Zealand. New Zealand health service managers are therefore reliant on imitating overseas research. Unfortunately true competitive advantage comes not from following others but

from market leadership. Following in the footsteps of others, whilst it has merit, simply does not result in new or substantially altered services.

This chapter has expanded on the OECD definition of R&D and placed it in the context of health service management. R&D has been discussed in the general context for New Zealand and then more specifically, as it relates to the health care industry. The chapter concluded with an overview of health service management R&D in the Anglophile world.

The research that is reported in the next chapter seeks to document the extent of R&D in health service management in the fiscal year 1992/93 immediately preceding the health reforms. Thereafter a case study is offered to illustrate health service management R&D in practice.

Chapter 3: The Research.

Research Design.

The design for this study combined both quantitative and qualitative methodologies. The study sought to establish quantitatively the extent of R&D in health service management by use of survey methodology. A qualitative case study, using Yin's (1989) approach, was then used to illustrate one example of health service management R&D in practice.

A variety of terms are being applied as descriptive labels for combining quantitative and qualitative research methodologies with the term "triangulation" perhaps gaining the widest following. Admitting to having drawn heavily from the works of Campbell (1963); Campbell and Fiske (1959); Webb, Campbell, Schwartz and Sechrest (1966); and Webb (1966), Denzin defines triangulation as "the combination of methodologies in the study of the same phenomena" (1970, p.297). Multiple methodologies, according to Denzin, include survey interviewing, document analysis, direct observation, observer participation, the life history and the experiment. Denzin argues that the advantage of triangulating data sources is that it seeks to overcome "the intrinsic bias that comes from single-method, single-observer, single-theory studies" (1970, p.313).

Jick (1979, p. 603-604) argues that triangulation

“can also capture a more complete, holistic, and contextual portrayal of the unit(s) under study. That is, beyond the analysis of overlapping variance which otherwise may have been neglected by single methods. It is here that qualitative methods, in particular, can play an especially prominent role by eliciting data and suggesting conclusions to which other methods would be blind. Elements of the context are illuminated. In this sense, triangulation may be used not only to examine the same phenomenon from multiple perspectives but also to enrich our understanding by allowing for new or deeper dimensions to emerge”.

As with all research designs, triangulation has its limitations. Those expressed in this study include increased time involved in conducting multiple methodologies and increased cost. Another shortcoming is replication, with Jick (1979, p.609) acknowledging that "replicating a mixed-methods package, including idiosyncratic techniques, is a nearly impossible task and not likely to become a popular exercise".

The methodologies employed in this study, of survey questionnaire and case study, are however considered to be replicable. Each methodology is now described separately and in detail.

The Survey.

Objectives.

The survey aimed to identify the capability and extent of research and development in health service management within New Zealand acute health care enterprises during the fiscal year 1 July 1992 to 30 June 1993. The OECD model framework for surveying R&D was used, as introduced briefly in the opening chapter of this thesis, as the basis for the questionnaire design with the model being expanded to incorporate attitudinal questioning of the respondents.

The OECD framework is an internationally accepted framework for identifying national levels of R&D. It aims to identify both inputs and outputs of R&D in a consistent manner to increase the accuracy of reporting by countries and thereby permitting more reliable international comparisons to be made. The theoretical basis for the model appear to stem from General System Theory (Bertalanffy, 1968). Originally the model sought to identify inputs in terms of personnel and resources utilised but it has since been refocussed to identify outputs. The OECD model accepts that R&D projects may have multiple sources of funding but concentrates on identifying R&D from a provider perspective in order to prevent duplication in counting. Although the OECD model has been designed to identify aggregated national data, for the purposes of this thesis, the model was adapted and applied more specifically to identify R&D in health service management.

The objectives of the survey were to:

1. identify the specific outputs of R&D in health service management during the fiscal year 1992/93; and how these were communicated;
2. identify what financial resources health service managers allocated towards R&D during the fiscal year 1992/93;

3. identify which personnel health service managers employed in health service management R&D during the fiscal year 1992/93
4. identify the educational levels of staff employed who had the potential to contribute towards R&D in health service management.
5. explore current attitudes of health service managers towards R&D in health service management and their views on appropriate and non-appropriate research.
6. identify what future issues health service managers believe should be addressed in health service management R&D.
7. collect baseline data on managers in control of these organisations and the number, size, and location of New Zealand acute health care enterprises, prior to 1 July 1993.

The study population.

The target population was all Chief Executive Officers (CEO's) or CEO designates or Directors or General Managers (depending on their title), of New Zealand hospitals, public and private, which admitted ill people, on an acute unbooked basis, twenty four hours a day, seven days a week, throughout the year 1 July 1992 to 30 June 1993. The study population included all hospitals which admitted people with medical, surgical, and psychiatric conditions. It was acknowledged that these acute hospitals may have more than one function but to be eligible for inclusion, they had to admit acutely ill people.

Excluded from the target population were all primary health care services, surgical day services, waiting-list surgical services, hospices, rehabilitation services, respite care services, and services which catered for long-term care. These groups were excluded for the following reasons. Firstly in order to narrow the scope of the study, by limiting it to the larger organisations and also to limit it to "like" organisations. Thirdly, given the climate of reform, it was believed that acute health care enterprises were the most likely group to remain operational whilst the study was in progress.

The sample frame was drawn up from lists obtained from the then Department of Health and the New Zealand Private Hospitals Association. As this study was a full census national survey and it was always envisaged that the final number of eligible hospitals was going to be quite small, the survey aimed to collect information from every hospital identified as eligible for inclusion.

The Survey Questionnaire.

The method of contacting each person in the target population was by mailing an introductory letter together with a consent form (see Appendix A). The method of data collection was by mailed questionnaire which was also included in the first mail out (see Appendix B). The questionnaire was to be completed by participants and returned in the postage-paid, addressed envelope which was also included.

The instrument for eliciting data in the first instance was this questionnaire which contained a mixture of closed and open-ended questions. Participants were advised in the introductory letter, that those who demonstrated a significant level of R&D would be re-approached to seek their consent to participate in an in-depth interview which would provide supplementary information to the questionnaire.

As noted above, this study involved a full population survey, as opposed to a sample survey, which precluded piloting of the questionnaire in this population. The questionnaire design and content, plus the actual survey process were pretested on General Managers of Hospices with the aim of eliminating as much information and response bias as possible from the questionnaire as well as to test the proposed process. The specific aims of the pretest were to check (1) if the questions yielded the right information, (2) if the directions were clear to the respondents, (3) if the respondents were able to answer the questions easily, (4) how much in-house research was required to answer the questions (5) how long it took to complete the questionnaire, and (6) whether they would comply with my request.

Several problems were encountered in the pretesting process. The first was that the questions related to actual R&D, i.e. questions 12-23 inclusive (see Appendix B), were not pretested because none of the hospices who replied, actually did any R&D that year. The second problem was that some organisations didn't respond at all. Follow-up telephone calls to the non-responders revealed that they believed they were under resourced and too busy to comply with my request to participate in the pretest.

Despite the above problems, 4 questionnaires out of 6 that were sent out were returned, and the draft questionnaire was finalised following revision and pretesting. Some of the information gathered from the pretesting, such as the average time taken to complete the questionnaire, was then included in the information letter that was mailed out to participants.

The study aimed to achieve a response rate of at least 70 percent to ensure that a true and useful statement on R&D rates could be established for the fiscal year 1992/93 given that it was the year immediately preceding the operationalisation of the health reforms. It was recognised that the health reforms would create major turmoil within the industry and may create a response problem, but it was decided that the research should still proceed and attempt to document what was happening within the industry.

Given that a high response rate was feared to be difficult to achieve due to the reform process, plus the fact that questionnaires are renowned for such problems, the following methods were utilised to bolster the response rate. Firstly a comprehensive introductory letter with request for consent was sent which contained clear reference to ethical approval and governmental endorsement for the study (see Appendix A). Clear statements of time frames and deadlines were given and a reply-paid envelope was included. The questionnaire was designed with the intention of producing a clear, logically laid out, typed document, which minimised the need for in-house research. Non-responders were followed up by telephone and letter (see Appendix C). Certain characteristics of the non-responders were known from the sampling frame plus information gained from follow-up. This information was checked against respondents to see if there were any obvious characteristics that distinguished the two groups.

Method of Data Analysis.

Two approaches were adopted for data analysis. Firstly the closed questions with the predetermined response categories, were coded and then analysed. The open-ended questions were then analysed by content analysis using the Listing Method. Massey University Market Research Centre (1987, p.5) describes the Listing method as follows:

The coder usually eyeballs a random selection of 20 to 30 responses before beginning the coding proper, in order to get a feel for the range and type of response categories required. When coding, the first response is coded as 1, and written at the top of the list of coding categories. The second response is then compared with the first. If it is the same or very similar, it is given the same code (i.e., 1). If it has the same meaning as the first but is expressed differently (i.e., "excellent" c.f. "extremely good"), the new terms are added to the existing description, separated by a slash (/). If, however, the second response differs from the first, it is coded as 2, and becomes the second category on the list of coding statement. This process is repeated for all remaining responses.

The major design criticism of the Listing Method is that, because it seeks to analyse open-ended qualitative questions as opposed to predetermined responses, the method can involve interpretation bias which then brings into question both the validity and reliability of the findings. Nevertheless the method was used and the potential for bias noted.

Methodological details used for the case study.

Case study research was chosen as the methodological basis to illustrate health service management R&D in practice as it the preferred strategy when "how" and "why" research questions are being posed (Yin, 1989).

This case study was conducted to complement the broad picture generated by the survey methodology. The aims of applying the methodology as described by Yin (1989) were to:

1. describe one R&D project in health service management that was carried out in the Wellington Area Health Board during the fiscal year 1992/93.
2. explain how and why this innovation in health service management occurred,
3. explore the beliefs, attitudes and practices of the managers affected towards research and development in health service management.

Yin (1989, p.23) defines a case study as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used". According to Yin (1989,

p.29) the research design for a case study consists of five components which are: (1) a study's questions, (2) its propositions, if any, (3) its unit(s) of analysis, (4) the logic linking the data to the propositions, and (5) the criteria for interpreting the findings.

Case studies can be designed either as singular or multiple studies. In this research, a single study was conducted primarily because time constraints simply did not permit the multiple study design. It was however quite possible to conduct a multiple study as more than one instance of health service management R&D was located. Yin (1989) argues that the single case study, although not replicable and therefore lacking in external validity, still has merit, likening it to a single scientific experiment where although it may reveal new knowledge, generalisations cannot be made from the results.

Several rationales exist for the use of a single case study. These include the use of the single case study to critically test a significant theory, or to represent an extreme or unique case, or to reveal a phenomenon previously inaccessible to scientific investigation, or to explore the phenomenon as a pilot study before embarking on multiple-case studies in future. The single case study may also involve more than one unit of analysis embedded within each case. In this instance the single case study represented an unusual phenomena.

Wellington Area Health Board (WAHB) was selected as the research site for the following reasons:

- the fact that the innovation occurred during 1992/93 was made known to me,
- it was accessible,
- it was serviced by the WAHB Ethics Committee which had approved the survey research,
- the General Manager (GM) and Deputy GM and other key staff were still accessible,
- there was thought to be sufficient institutional memory and archival records available to facilitate the research.

Wellington Area Health Board was disestablished on the 30 June 1993 and has been reformed into three Crown health enterprises namely Capital Coast Health Ltd, Hutt Valley Health Ltd and Wairarapa Health Ltd.

Immediately prior to the 1992/93 fiscal year, Wellington Area Health Board was restructured internally and regionalised. An internal funder/provider split was instituted which saw services rearranged as follows: (1) the funding body, i.e. the corporate services was renamed WellHealth; (2)

Wellington, Hutt and the West Coast services were divided into two separate units called WellMed and CareWell and the Wairarapa Services remained as a separate unit. General Managers governed each of these services.

The research began with identifying what R&D happened in 1992/93 in the organisation. Initial discussions occurred with the General Manager, WellHealth. Ethical approval to extend the research project was then obtained. Following this process, other senior management staff within the Board were interviewed to establish where and what were the pockets of health service management R&D. In total five R&D projects were conducted during the fiscal year 1992/93. These projects occurred in WellMed and CareWell. Four out of the five projects related to computer software development and one of these projects was selected as the basis for the case study research in this thesis. The project was chosen because of its size and its use of external consultants.

Interviews were conducted in sequential order; firstly the project leaders, followed by other key staff involved in the project. The interviews were conducted during July, August and September and occurred in the main at the project leaders homes. Management were interviewed in their offices during working hours. Semi-structured questionnaires were used to begin the process of data generation (see Appendix D). All formal interviews were taped and verbatim transcripts developed. Informal interviews were also used to supplement the information plus documentation and archival records were reviewed. Data collation was supplemented by direct observation and physical artefacts were examined.

The sequential order of the interviews demonstrates how the research evidence was developed for this study. Multiple sources of evidence were utilised to cross check information e.g. interviews, archival reports, personal observation, minutes of meetings. The use of the sequential interviewing techniques, coupled with cross referencing by utilising information from multiple sources, helped enhance the construct validity of this case study.

The data was then analysed using the approach of Glasser and Strass's Grounded Theory as further developed by Turner (cited in Easterby-Smith, Thorpe & Lowe, 1991) to ensure the study meets Yin's (1989) internal validity criteria. Turner has developed a seven step sequence for analysing data which are briefly summarised as follows: (1) Familiarisation, which involves re-reading, exploring the data and thereafter beginning to frame ideas and questions; (2) Reflection, which involves evaluation and critique supplemented by the literature review findings plus returning to gather missed pieces of information; (3) Conceptualisation, which is the process of developing concepts from the

data; (4) Cataloguing of those concepts, which can either be done by using a card approach and documenting each concept/variable, or by intuitively letting them develop as was the case in this particular study; (5) Recoding, which involves revisiting the data and rechecking that the meanings and interpretations interviewers placed on the variables were consistent; (6) Linking, which involves linking the concepts/variables and identifying emerging patterns; and finally (7) Re-evaluation, which involves revisiting and filling in gaps in the information before beginning to document the first draft.

Thereafter the key informants and other interested parties were given the opportunity to review and comment on the accuracy of the draft report. This step is the final factor required by Yin (1989) in order to establish construct validity.

Ethical Issues.

This study sought and received prior ethical approval from the Human Ethics Committee, Massey University (see Appendix E). Thereafter ethical approval for the survey questionnaire was sought and obtained from the Wellington Area Health Board Ethics Committee who acted in an umbrella capacity for all other Area Health Boards throughout New Zealand, minimising what could well have been a lengthy process to gain individual ethical approval for each. Ethical approval was extended in June 1993 to include the case study research.

Confidentiality was the main area of ethical concern in the survey questionnaire which was addressed explicitly in the covering letter of introduction. 'Commercial sensitivity' was acknowledged in the information sheet and all participants in the survey questionnaire were assured that their names, plus those of their organisation, and the titles of their research and development, would not be identifiable in the final report and if they were through the case study research, then it would only be with their express permission. It was acknowledged that potential harm to participants could result from failure to protect 'commercially sensitive' information and therefore all participants were assured that commercial sensitivity would be protected and were given the option of seeing a draft report of the parts of the research findings which pertained specifically to their organisations for their prior approval before the report was finalised. Many took advantage of this opportunity.

There were no ethical problems regarding access to participants as the names and designations of Chief Executives of acute health care organisations were freely available in the public domain.

Ethical approval to proceed with the case study was granted on 18 June 1993 by WAHB Ethics Committee. In line with Yin's (1989) recommendation, approval was specifically sought to obtain full disclosure of participants names plus the name of the organisation. In adopting this approach, all interviewees were guaranteed that they would be given prior access to the final draft so that they could vet all comments directly attributable to them and thereafter these comments would then be adjusted and resubmitted for reapproval until such times as the process was completed to their satisfaction, before the final draft was given to the Chief Executive of the Organisation for its last approval. Interviewees were also assured that all tapes and transcripts would be destroyed by the researcher on completion of the research.

The research process and the problems experienced.

The first three months were spent developing the topic and getting the research to the stage where it had ethical approval to proceed. Initially it was proposed to gain Ministerial approval from the Hon. Simon Upton who at that time conveniently held both the portfolios of Minister of Health as well as Minister of Research, Science and Technology. However on 25 March 1993, there was a change of portfolios within cabinet and the Prime Minister replaced the Hon. Simon Upton with the Rt. Hon. Bill Birch as Minister of Health. In the changeover process, Maurice Williamson, the Associate Minister of Health, endorsed the research on 14 May. In the meantime, the survey was pretested on Hospice General Managers and the questionnaire finalised.

Two major issues started to become apparent quite early in the process. Firstly there was a problem with identifying which private sector hospitals were eligible for inclusion in the survey population. Initial investigations revealed that private sector hospitals were seemingly responding to increased market demand due to the opening up of the market. More private hospitals than expected were admitting acutely ill people. On top of this, private hospitals were licensed according to category of persons admitted and not severity, so it became necessary to conduct a preliminary survey of all private sector medical, surgical and psychiatric hospitals to establish their eligibility for inclusion in the survey population (see Appendix F).

The second major issue occurred in the public sector hospitals and was even more directly related to the reform process. Top management began moving their employment. Some managers took up other employment within New Zealand and others went overseas. This started around February 1993 and

picked up momentum as the changeover date of 1 July came closer. The vacancies their departures created were either not replaced or filled with temporary incumbents. The significance of this for the research was the loss of institutional memory and the loss of actual personnel at management level which increased pressure on those staff still working within these organisations.

Of the 14 Area Health Boards only 5 were broken up into smaller units, the remaining 9 staying roughly the same. Of the new 23 Crown health enterprises, 7 previous Chief Executives of the Area Health Boards became the new Chief Executives of their replacement organisations. Whilst some managers did change, the majority of staff in the public service simply had their appointments rolled over under the new legislation. The survey population was administered separately to public and private sectors and the public sector questionnaire was mailed out in advance on 14 May as to delay it until after 1 July, risked jeopardising the study due to loss of institutional memory. It was not possible to mail out the questionnaire to the private sector at the same time as it was still unclear who was eligible for inclusion. Irrespective of inclusion problems, there simply was not the same urgency in the private sector as employment patterns seemed to remain stable and the study was looking retrospectively at the financial period 1 July 1992 to 30 June 1993.

As feared, the public sector questionnaire got into response difficulties. Of the 14 Area Health Boards, two completed the questionnaire, three telephoned and requested extensions to the response deadline of 1 July 1993, five wrote and requested that the questionnaire be recirculated after 1 July either to the new incumbents or returned to them as they were staying on after 1 July when it would be more convenient for them to re-look at it then, and not surprisingly, four simply didn't respond at all. Of those who did respond, some discussed informally what health service management R&D they had done in the year in question.

While a loose picture began to develop of just where health service management R&D was occurring in the public sector, it was being supplemented by the preliminary questionnaire of the private sector which specifically asked who did health service management R&D during the year in question (see Appendix F). This question was specifically asked in the preliminary survey of the private sector as it was believed that a short questionnaire may encourage an increased response rate. This belief was based on the assumption that the private sector had less middle management resources available with which to respond to requests for research information. The assumption proved correct and the response rate to the preliminary questionnaire of the private sector was excellent.

In June 1993 the strategy for the case study research was developed in earnest and ethical approval was sought and granted to proceed with this section of the research. Access to conduct the research at one of the key organisations was initially denied but later granted..

July 1, 1993, i.e., the date on which the reformed health system was formally and officially implemented, came and went. The private sector questionnaire was mailed out. Data collection commenced on the case study research which indicated that the original scope of the case study needed to be narrowed to make it more focused and achievable. Another copy of the questionnaire was re-mailed to non-responders of the public sector and to those who had requested this extension. Details regarding response rates are presented in the next chapter.

Thus as anticipated, the timing of the survey proved problematic, and the result was a response rate that was much lower than hoped for. This was in spite of the enormous effort and cost described above that went into encouraging and enabling responses and fitting in with potential respondent's requests. One could suggest that the survey should have been done two or three years previously but as pointed out (ref. p.9), it is assumed that this would have yielded little information on R&D being done, as it simply was not taking place. On the other hand, one could argue that it would have been better to wait. The wisdom of conducting a survey in a year of transition and change when senior managers are under great pressure is questionable, but then are CEO's free of pressure in any year? In spite of the difficulties, the research was successfully brought to completion. The next two chapters go on to describe findings of the survey and the case study respectively.

**CHAPTER 4: Mapping Health Service Management R&D in the New Zealand
Health Sector - Findings from the survey.**

This chapter presents the findings from the national survey questionnaire of acute health care enterprises which sought to ascertain both the extent of health service management R&D and the capacity for doing such R&D. It begins by presenting the results of the public sector survey. Next the results of the private sector organisations are presented, beginning with the preliminary survey which was necessary in the first instance to establish which organisations met the eligibility criteria for inclusion in the main survey. Thereafter aggregated findings are presented under the following sub-headings: outputs; inputs; attitudes; plus current and future issues. Discussion of the findings follows and the chapter concludes with a summary section.

Survey of Public Acute Health Care Enterprises.

Questionnaires were mailed in May 1993 to all General Managers of the 14 Area Health Boards which was the organisational entity up to 30 June 1993. By a mixture of completed questionnaires, letters or telephone conversations, it was revealed formally and informally, that 7 of the 14 did no health service management R&D, and 1 did "pockets of health service management R&D". In spite of strenuous and repeated efforts by letter and telephone it was not possible to elicit any response at all from the remaining 6 prior to 30 June 1993.

As explained previously (ref. p. 71), several managers requested that they answer the questionnaire after 1 July 1993, on the basis that they would have more time to attend to the questionnaire and by which time, the Area Health Boards would be reorganised into 23 Crown Health Enterprises (CHE's). Their requests were met and another copy of the questionnaire therefore was mailed after 1 July. Two of these CHE's returned completed questionnaires.

These results that follow are reported in respect to the 14 Area Health Boards which were in place up until 30 June 1993 all of which met the eligibility criteria for inclusion in the survey. The information sought related to fiscal year 1992/93 when the public health sector was still organised as Area Health Boards, which was also when the questionnaire was first mailed out. Completed questionnaires were obtained from 4 of those Area Health Boards, and as noted above, from 2 CHE's. These results have been included in this report even though organisationally they do not coincide exactly with the former Area Health Boards.

Preliminary survey of Private Acute Health Care Enterprises.

As explained in the previous section (ref. p.70), a preliminary survey of thirty-seven private hospitals was conducted to establish (1) which organisations were eligible for inclusion in the main survey, (2) whether they did R&D and (3) if so, how many projects in total did they carry out during the fiscal year 1992/93. The thirty seven hospitals were identified from the lists supplied by the New Zealand Private Hospitals Association in which hospitals were identified by speciality e.g. medical, surgical.

Of the survey population of 37 hospitals, 86 percent returned completed preliminary questionnaires. While there were no refusals to participate, 5 hospitals did not respond. Of the 32 that did return questionnaires, 13 hospitals identified themselves as acute admitting hospitals and 19 identified themselves as non-acute. The status of the 5 non-responders was clarified by follow-up telephone call. This inquiry revealed that 2 of the 5 were in fact acute hospitals while 3 were excluded. The total number of private health care enterprises that described themselves as acute admitting hospitals was thus 17 and comprised the population to be surveyed.

Three of these 17 hospitals claimed in this preliminary survey that they did health service management research. One said they carried out 4 projects, a second said they carried out 3 projects and the third carried out 1 project. Specific details of the projects were not requested at this stage as it was envisaged that these details would be explored in the main survey. The three hospitals varied in size according to bed state. They included a large private hospital of over 100 beds, a mid-size hospital of between 30-50 beds and a very small hospital of less than 10 beds.

Questionnaire survey of the Private Sector.

The main survey questionnaire was mailed in July 1993 to the 17 private acute health care enterprises of which 3 claimed in the preliminary survey they did health service management R&D as per the definition sheet provided. The three organisations that indicated they did some R&D, were sent the full questionnaire of 53 questions to elicit more in-depth data. The remaining 14 which indicated they had done no R&D, were sent the abridged questionnaire of 39 questions, having deleted the questions that specifically related to actual health service management R&D projects, the reason being that this study sought to establish not only the extent and kind of R&D but also the capacity for R&D.

Of these 17 private acute health care enterprises, 16 responded, giving a response rate of 94 percent. None of the three organisations that were sent the covering letter and full questionnaire returned completed questionnaires: one said they didn't have the time to do the questionnaire; the second declined on the grounds of commercial sensitivity; and the third declined without giving a reason. Three others completed and returned the abridged questionnaires, thirteen refused for reasons which included "not relevant to us", "data not available", and "we don't do any R&D therefore this is not applicable to us". Others gave no explanation and one organisation did not respond. This gives a completion rate of 18 percent and although this provided useful data, it is not possible to generalise to the private health sector.

Aggregated findings.

Findings from both public and private acute health care enterprises are reported together. From a population total of 31 organisations, 6 public sector and 3 private sector organisations returned completed questionnaires. The response rate for the public sector was 43 percent and the private sector 18 percent, resulting in a response rate of 29 percent in total for the main questionnaire.

Characteristics of the responding organisations.

Responding organisations transversed New Zealand. All organisations, including private sector organisations, were organised on a not-for-profit basis during the fiscal year 1992/93. Total expenditure per organisation ranged from just under \$2 million to less than \$400 million. Bed numbers ranged from less than 30 beds to greater than 2000. Full-time Equivalent Staff numbers (FTE's) ranged from less than 30 to greater than 6500. No organisation had a defined R&D policy although one public sector organisation did have a procedure in place for applying for R&D funding, ethical and management approval. Only one public sector organisation referred explicitly to R&D in their strategic plan.

Characteristics of the Respondents.

All respondents were either CEO's or from Senior Management. There were five males and four females, aged between 30 to 60+ years. Qualifications included two MBA's, one DHA (Diploma in Health Administration), medical and nursing degrees plus other professional qualifications e.g. ACA. One respondent held a Certificate in Health Economics and one held a New Zealand Institute of Management qualification. One person with an MBA had completed multiple short courses in health service management within the last two years and one other had completed a short course on accountancy.

The range of years worked in the health industry, including international experience, ranged from 0.5 years to 40 years, the mean being 19 years and the median being 23 years. The range of years worked specifically in health service management ranged from 0.2 years to 23 years, the mean being 8 years and the median being 4 years. Overall years worked in management, including health management, ranged from 4 years to 26 years, the mean being 15 years and the median being 15 years.

Of the 9 respondents, six were members of the New Zealand Institute of Health Management. Other professional association memberships included the New Zealand Society of Accountants, the College of Community Medicine, the New Zealand Nurses Organisation and the National Council of Women.

Five of the nine respondents had research experience. Two of these five had experience in management research which they gained from postgraduate study and consultancy work.

Outputs

Outputs measured included actual health service management R&D conducted and imitations implemented during the fiscal year 1992/93.

- Actual R&D

As reported above, 3 private sector organisations indicated they carried out R&D but they declined to return completed questionnaires. Of the organisations that returned the full questionnaire, only one organisation conducted R&D projects in health service management during the 1992/93 year. In total, five projects were undertaken by that organisation.

Four of its projects were concerned with information systems development and the fifth was concerned with developing an innovative method of health service delivery. Although the projects did not start and finish conveniently during the fiscal year, most of the development was conducted during the fiscal year in question. Two of these projects started prior to July 1992. Three of these projects are still in the pilot stage of development. It was observed that there is an overlap in practice between research and development and therefore it was not possible to say precisely where research ends and development began.

Key people involved in the projects of this single organisation varied. Four of the five projects were joint projects involving people from the tertiary educational institutions, sometimes additionally involving the private business sector. In total, two universities, one polytechnic institute and two private companies were involved. Two projects involved staff from both the one university and the one private company. Only one project was fully staffed from within the organisation. Three principal researchers were identified as being educated to Master's level, one being employed by the public organisation, one the university and the other from the private sector.

Funding for the projects varied. One project was fully funded from within the organisation with the other four being only partially funded by the organisation. Other direct sources of funds were the then Department of Health. Indirect funding was obtained from the universities through subsidised staff salaries and overheads. Private companies also carried some of the development costs in relevant projects.

The private companies entered into a variety of contractual arrangements regarding payment and intellectual property rights for these innovations, the end result being that the organisation will be pursuing intellectual property rights for only two out of its five projects. One of these is the project it fully funded. Ownership rights were traded off by the private company involved in the second project in return for preferred marketing rights to the innovation. In the case of the third and fourth projects, one of which is the focus for the case study, costs were shared between the organisation and a private company with the latter retaining ownership of the intellectual property rights because of contractual arrangements. The fifth project is being considered as non-appropriable research. This latter situation arose also from funding arrangements as the project was funded jointly by the Department of Health, a University, a Polytechnic, plus the Organisation.

- Imitations

Using the OECD definition of innovation as the basis for defining an imitation (ref. pp. 16 & 45), three organisations implemented innovations that they neither invented nor carried out any substantial R&D to alter the innovation in any significant way. Two of these were public sector organisations and moreover two of the largest organisations in this sector. The third organisation was a private organisation with the smallest bed state of all respondents, i.e. less than 30 beds.

One of these public sector organisations was that described above which carried out its own R&D. This organisation listed over eight separate health service management projects under the category of imitation, one being a group of projects as opposed to a singular project. The broad subject areas included (1) implementing imitations which changed both employee working patterns and their methods of payment, (2) imitations which changed existing service delivery arrangements across multiple levels in the organisation, (3) imitations to improve the management of quality and (4) operations research to streamline existing service delivery arrangements.

The second public sector organisation implemented "multiple/partial" imitations of health service management R&D. This organisation was not able to list these imitations due to "the structure of their service" which allowed for "individual managers to implement R&D imitations at their pleasure". The respondent added that "many would be partial imitations or modifications to suit the New Zealand environment".

The private sector organisation described its imitations as coming under the following broad subject areas: Stock Management, Performance Appraisal, Employment Contracts, Professional Accountability, Team Development, Workload Indicators and Dependency Ratings.

When asked how the respondents learnt about innovations in health service management, unfortunately 2 respondents (1 publicly owned and 1 privately owned) chose not to answer the question. Of the remaining 7 respondents, the most popular strategy for learning about innovations was by networking on both a local and international level. This strategy was closely followed in popularity by attending conferences and seminars and utilising literature sources. One respondent cited commercial information as a source of knowledge about innovations whilst only one cited postgraduate study and lastly, one respondent mentioned staff recruitment as a strategy for learning about innovations.

Inputs.

The OECD model collects information on both financial and personnel variables in order to monitor the level of inputs to R&D. This framework was used in the questionnaire but supplemented by a question on library facilities. The findings are presented below.

- Financial Resources.

Only two of the nine organisations specifically allocated funding to R&D and a third did spend money on R&D but was unable to identify specifically nor speculate on what amounts were involved.

The organisation that both conducted original R&D and imitated other innovations, estimated it spent \$500,000 on R&D all of which was being spent on health service management R&D. They estimated that \$200,000 of this money would have been spent on contracting the services of external consultants to assist with these projects. In terms of this organisation's total expenditure for the 1992/93 year, this equates to less than 0.2 percent specifically spent on R&D. No allowance has been made in this figure for the cost of salaries and overheads.

The private sector organisation which imitated others innovations, allocated \$1,000 in total to R&D which also excludes the costs of salaries and overheads. It spent \$800 of the \$1,000 on health service management R&D which equated to less than 0.05 percent of their total annual expenditure being spent on health service management R&D.

The second public sector organisation that carried out "multiple/partial" imitations said that "R&D was incorporated in other management projects especially to do with the reforms", adding that "much of it was consultant's time which was often paid for by central government". As discussed above, this organisation could not provide any financial information.

In addition to these three, one other public sector organisation added that their Board Designate contracted two external consultants to do research at a cost of \$16,000 which was paid for by the Crown Health Enterprise Establishment Unit". However, no other details as to the nature of this research were offered.

The remaining two private and three public organisations that responded neither allocated nor spent money on R&D.

- *Personnel in Health Service Management R&D*

The OECD requires that information on personnel involved in R&D be expressed in terms of FTE's (Full-time equivalents) which they define as follows:

A FTE may be thought of as one person-year. Thus a person who spends 30 percent of their time on R&D and the rest on other activities should be considered as 0.3 FTE. Similarly if a full-time R&D worker was employed at an R&D unit for only 6 months, this results in a FTE of 0.5.

(OECD, 1981, p. 66).

The organisation that did R&D estimated that it employed a total of 1.52 FTE's on health service management R&D during the year 1992/93. This figure is very much an estimate as it proved extremely difficult to establish direct time involved. The figure applies to only three of the five projects as two of the five projects did not use employees directly. One employee was seconded to a project on a full-time basis and the remainder were employed part-time on three of the five projects only. Personnel for the other two projects were provided either by a university and or private companies.

The OECD model also seeks to classify personnel engaged in R&D according to occupation and formal level of qualification. They recommend four classes of qualification which are:

- (1) holders of University level degrees
- (2) holders of other post-secondary diplomas
- (3) holders of Diplomas of secondary education
- (4) other qualifications.

Of the 12 staff (which comprise the figure of 1.52 FTE's referred to above) who were employed by the organisation which carried out health service management R&D, three held university level degrees, one a Master's degree (not in management) and two held undergraduate level degrees. The remaining six staff held post-secondary diplomas.

- Educational levels within the organisations.

This survey also attempted to identify which organisations employed staff with post-graduate degrees at masters level and above in management and the total numbers of those staff. No attempt was made to further differentiate which of these employees had a formal education in research. No private sector health organisations employed anyone with Master's degrees in management. Of the public sector organisations, four employed staff with Master's degrees in management. In total, there were 14 person's identified among the 4 organisations as having Master's degrees in management related disciplines. One of the fourteen staff had a double Master's in two management disciplines and hence the total number of Master's degrees was 15 (see Figure 2).

Not surprisingly, none of the staff were educated to PhD level in management. No private sector organisation employed anyone with Master's degrees in management.

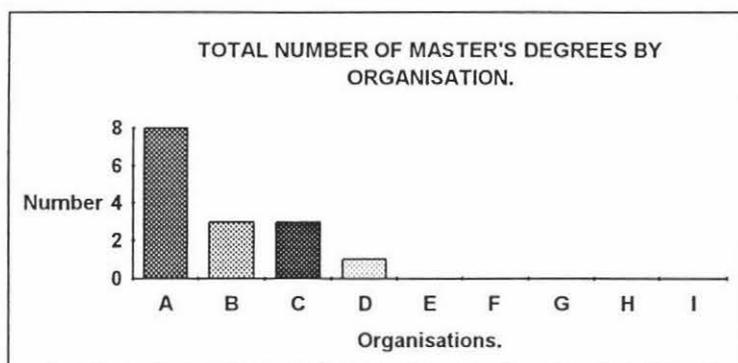


Figure 2: Total number of Master's Degrees by Organisation.

Of those organisation's that employed master's-level educated staff, one organisation employed three staff with MBA's (one of whom had an overseas Master's degree in management), one staff with an MBS (Master's of Business Studies) and three staff with an MPP (Master's of Public Policy) and this was the organisation that did some health service management R&D. A second employed three staff with MBA's (Master's of Business and Administration) degrees and this was one of the organisations that followed a policy of imitating innovations. A third employed three staff, one with an MCM (Master of Commerce & Management), one with an MCom (Master of Commerce) and one with a non-New Zealand Master's degree in a management related discipline. The fourth employed one employee with an MBA. The remaining five organisations had no staff educated to master's level.

The four organisations that employed master's level educated staff were all public sector organisations.

The most commonly held Master's degree therefore was an MBA followed by an MPP (see Figure 3). Generally speaking, MBA degrees do not include a high component of formal research in their programmes.

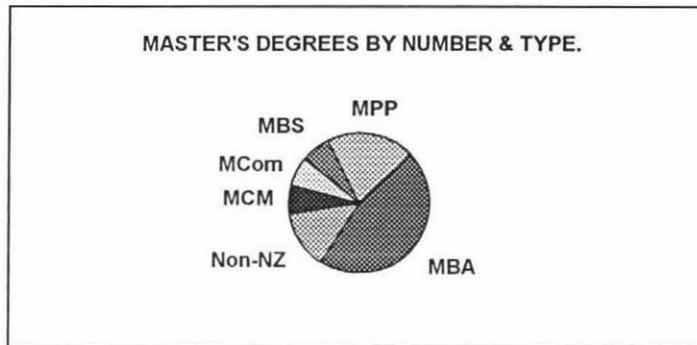


Figure 3: Total Master's Degrees by Number and Type.

- Other Resources

The survey also inquired about library facilities as these constitute a valuable source of information regarding innovations in health service management. Of the nine organisations which responded, all but one private sector organisation had library facilities. All six public sector organisations employed librarians and all except two private sector organisations subscribed to professional journals on health service management.

Attitudes.

Respondents were asked to indicate their attitude to the allocation of scarce resources and whether R&D should be funded by the government or not. They were also questioned on whether R&D should be considered appropriate or non-appropriate. These questions were designed using a five-point scale to indicate responses. The results are presented separately for this section to improve clarity.

- Private sector

Responses from the private sector in the attitude section revealed that one respondent adopted a neutral position on all questions. The remaining two respondents had a positive attitude to health service management R&D and described their organisation's attitude to R&D as neutral to positive. Both thought that health service management R&D was important to their organisation's ability to gain and sustain competitive advantage, and both were strongly in favour of all innovations funded by Vote:Health or the Health Research Council as being considered non-appropriable. Both also thought that research conducted in public sector organisations should be non-appropriable but were divided as to whether privately funded research should be considered non-appropriable. Both respondents thought that in-house research should be non-appropriable and both thought that research carried out by external consultants for their organisation should be non-appropriable.

- Public sector

While four out of the six respondents described their attitude towards health service management R&D as positive with the fifth being very positive, the sixth described it as negative. This latter respondent also believed their organisation had a negative attitude towards R&D and that health service management R&D was not important in assisting the organisation to gain and sustain competitive advantage.

Three out of the remaining five respondents thought their organisation had a neutral attitude towards health service management R&D with the fourth and fifth being positive. Only one respondent out of these five thought that health service management R&D was very important to their organisation's ability to gain and sustain a competitive advantage and this respondent was one of two respondents who held MBA qualifications. Three others thought it was important and one was neutral.

The answers to the remaining questions in the attitude section as to whether research funded by Vote:Health, the Health Research Council, private enterprises, or Crown-owned enterprises should be considered non-appropriable, revealed nothing conclusive. Respondents were also divided as to whether in-house research or research conducted by contracted external consultants should be considered non-appropriable.

Current and Future Issues

Respondents were asked to list the top three factors which they believed were the most important in enabling their organisations to do health service management (HSM) R&D. The top choice clearly was staff motivation, followed very closely by funding support (see Figure 4). Thereafter there was a sizeable gap in importance to the next most common choice which placed equal importance on computerisation and skilled staff. Of lesser but equal importance were service developments and management support.

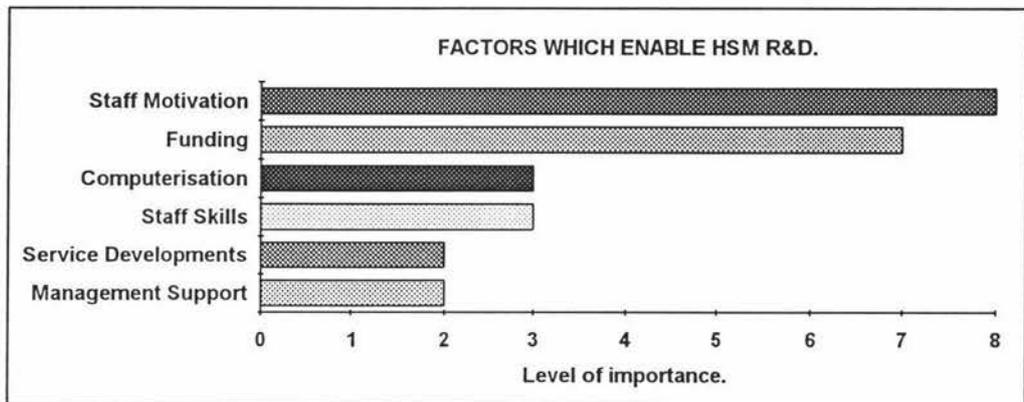


Figure 4: Factors which enable health service management R&D.

Respondents were also asked to list the top three factors which enabled them to imitate other innovations (see Figure 5). The most enabling factor was seen as having good access to up to date literature. The next most commonly mentioned factors were computerisation, smart people and the organisational climate. Finally, the third most important factors were listed as funding, staff availability, management support and staff motivation.

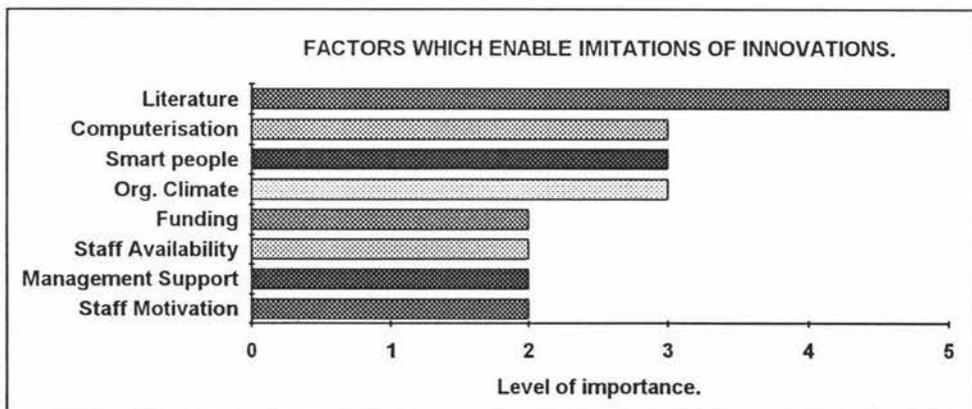


Figure 5: Factors which enable imitations of health service management innovations.

The barriers to R&D, as listed in descending order in Figure 6, were given as lack of: funding; time; conviction that R&D is something that needs to be done; qualified staff; opportunity; resources; the right environment (prior to the health reforms); access to computerised systems; stability; and size of the organisation.

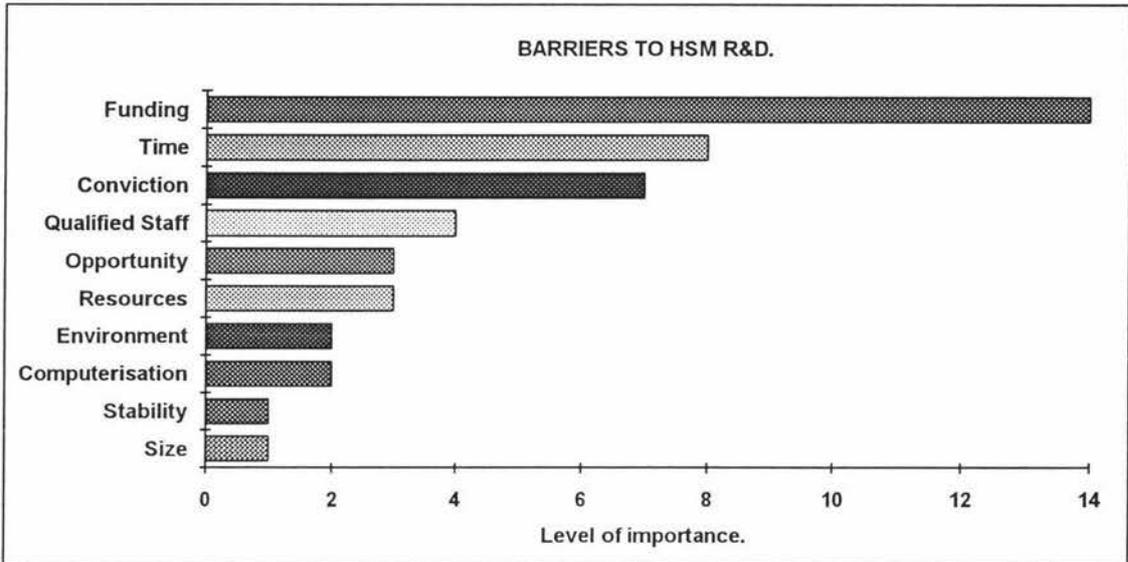


Figure 6: Barriers to health service management R&D.

Barriers to R&D differed from barriers to imitating innovations as the former, generally speaking, involves a greater commitment of resources than the latter. The barriers to imitation were listed in descending order (see Figure 7) as lack of: funding & staff; time; change management skills; journal abstracts; and computerised systems. These were followed by a sense of time wasting, instability of the environment and lack of desire to achieve a unique status.

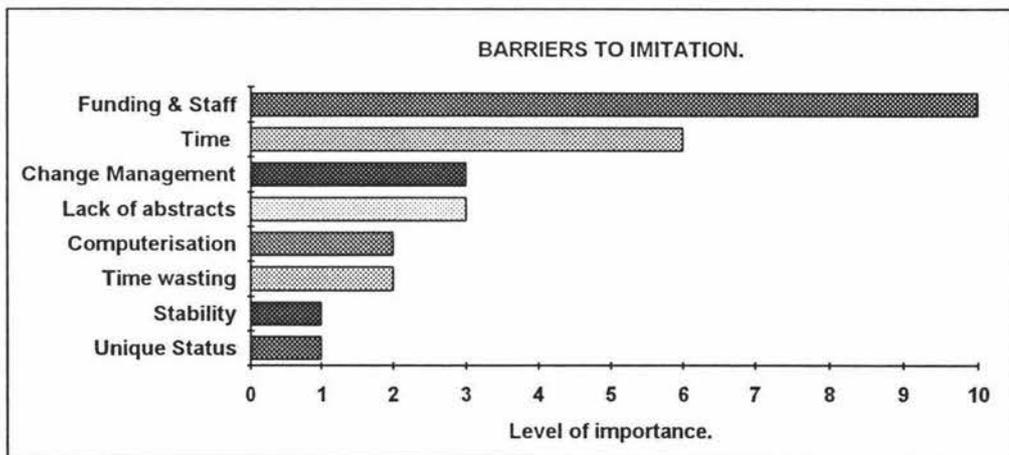


Figure 7: Barriers to imitation of health service management innovations.

Respondents were questioned as to what types of assistance would help encourage their organisations to do more health service management R&D. All except the respondent who was negative about R&D completed this section. The negative respondent said "quite frankly, they were too busy getting on with the job".

Table 2 lists the other 8 respondents total responses in ranked order of preference. Respondents were able to indicate as many avenues as they liked and therefore these totals in Table 2, represent the number of choices selected and not the number of respondents in the survey. The total public and private sector responses have also been included for information and comparison .

Table 2: Preferred avenues of assistance for increasing health service management R&D.

Number	Type of assistance	Total	<i>Total Public</i>	<i>Total Private</i>
1	More sources of private funding	7	5	2
2	Access to HSM database	6	4	2
3	Access to HSM R&D literature	5	3	2
4	Joint appointments with universities	5	5	0
5	More funding from the HRC	5	4	1
6	More short-term involvement by university management staff	5	3	2
7	Ability to negotiate prices with RHA's which recognise importance of need for HSM R&D	4	3	1
8	More staff with Masters qualifications	4	3	1
9	Negotiated concessions on profit margins by RHA's for demonstrated action in HSM R&D	4	4	0
10	More contestable graduate scholarships for researched based university study in HSM	3	3	0
11	More short-term involvement by management consultants	3	2	1
12	Government income tax incentives for all R&D	0	0	0
13	Other ideas	0	0	0

Following on from the above question, respondents were then asked to select which three areas would give them the greatest encouragement to do more health service management R&D.

Their top five choices were as follows (see Table 3).

Table 3 : Preferred encouragement's for increasing health service management R&D.

Importance	Public Sector Respondents	Private Sector Respondents
1st	Ability to negotiate prices with RHA's which recognise the importance of the need for HSM R&D	Access to HSM R&D literature
2nd	More funding assistance from the HRC	Access to HSM R&D database
3rd	More staff with Master's and Doctorate qualifications in HSM	More sources of private funding
4th	Negotiated concessions on profit margins by RHA's for action in HSM R&D	More staff with Master's and Doctorate qualifications in HSM
5th	Government income tax concessions for all R&D	More management consultants

- Other issues of concern.

The following are direct quotes from respondents who provided additional comments. They have been reproduced verbatim as they provide additional valuable insights.

There is a view that in New Zealand R&D is not well developed:

"We are so far behind in this area...relying heavily on individuals to perform"

\$ always a problem but perhaps new structures will assist".

Quality is not always up to scratch i.e. depth of academic preparation".

Low R&D activity was also seen as relatively low in priority:

“I don't believe it is an attitude issue in regard to R&D in our organisation. Rather other issues are so pressing in terms of managing the changes into a health reform environment that it becomes submerged ... each management team member has a range of roles leaving little space for additional activities”.

The following insightful comment raises questions about the health reforms actually stifling innovation as opposed to enhancing R&D as was the original intention.

“In the current environment of strong centralized monitoring performance measurement and instruction regarding process, the opportunities for R&D are limited and the incentives nil as unique solutions are not encouraged in practice yet”.

Others opinions focus on resources and infrastructure:

“We need people skilled and with time to carry out research. We need stability of the health system and structures to see R&D to completion”.

And there are those who consider that R&D is already happening, albeit by another name:

“A lot of the problem is in the terminology and attitude. This organisation has been innovative and imaginative for years. We have changed our management arrangements several times during the last few years, in response to our perception of our own needs, not as a result of anything which could fairly be called R&D. That has not been a disadvantage. We have been led by people of vision, ... all of whom have now left... What we have done has worked very well. I would hate to see some future injection of academic "R&D" written up in a future report as being an improvement- it would not necessarily be true. I would hate any implication that AHB's have been a sort of intellectual desert. Here, and in many other places, there has been a very high awareness of trends in health service management and politics, and a willingness to lead or modify those trends. ... We have already had heaps of innovations and efficiency gains in "the old system", but these don't relate directly to the use or non-use of formal R&D”.

Discussion.

The findings represent information from just over a quarter of all acute health care enterprises in New Zealand during the fiscal year 1992/93. Whilst it is not possible to generalise from this response rate of 29 percent, which this survey questionnaire achieved, it is possible to comment on the above findings. The following discussion will firstly address the health service management R&D output findings followed by the input findings. Thereafter the attitude findings plus current and future issues will be discussed. Next the characteristics of the respondents will be discussed followed by discussion of the findings from the preliminary survey of private acute health care enterprises. The section concludes with a section discussing the limitations of the survey.

The research aimed to identify the specific outputs of R&D in health service management during the fiscal year 1992/93. As discussed in Chapter 1, the health reforms have sought to increase the rate of innovation within the health industry by introducing a climate of managed competition with clear commercial incentives. The central thesis of this research has been that, given this shift in emphasis, government health sector organisations will now need to imitate the private sector if they are to gain and sustain competitive advantage. Competitive advantage is achieved in the main through invention, which is subjected to R&D, which then hopefully leads to successful innovation and thereafter business success and survival. The health industry is a service industry and as such, the quality of its service is dependent on the quality of its management and therefore the primary focus of its R&D must be on health service management. This belief formed the rationale from which the following research question was generated i.e., what was the extent of health service management R&D in New Zealand during the fiscal year 1992/93?

Outputs.

The findings reveal a paucity of R&D during the fiscal year 1992/93. Only one public sector organisation out of the six who formally responded, conducted any health service management R&D despite an explicit signal from the Government on budget night, 30 July 1991 to innovate. Three public sector organisations said they did R&D in the preliminary survey, although as they did not return completed questionnaires in the main survey, no further details are available on these projects. Even allowing for the fact that the budgets for public sector organisations were largely set in place for the 1991/92 fiscal year, one could realistically have expected to see some signs of R&D activity in the fiscal year 1992/93 from both the public and private sectors. Not only was the evidence scarce in practice but it also appeared that the signal had been ignored insofar as only one public sector

organisation of the 9 public and private sector respondents actually referred specifically to R&D in its strategic plan and only 1 did any actual R&D. The public sector organisation that referred to R&D in its strategic plan then proceeded to pursue a strategy of imitation.

Only one out of nine respondents did any formal R&D in health service management. Four out of the five health service management R&D projects, that were conducted by this particular organisation, focused on information systems R&D. The rationale for these projects was improve information outputs so as to improve the quality, efficiency and effectiveness of service provision.

It is public knowledge that information systems in New Zealand's public health services are woefully inadequate and do not meet the current needs of funders, providers or users and therefore it is not surprising to find an organisation developing its own tailor-made information system solutions (Melhuish, 1993). This situation is a sad indictment on both the Government and the New Zealand information technology (IT) industry. Firstly, considering the size of public health sector organisations and the resources they consume, it is shameful to acknowledge what little is actually known about the services they produce. Area Health Boards are often the largest employers, consuming huge resources funded by the public purse and from the Government's perspective, this consumption represents a sizeable proportion of total government expenditure.

To date, IT vendors in New Zealand have, generally speaking, been uninterested in the health industry for the simple reason that it tends not to invest in IT and therefore there is no commercial incentive for IT vendors to get involved. The IT industry is also very much aware that those vendors who have done so in the past, have not made good returns on their investments and put bluntly, one cannot expect large multinational corporations to put their businesses at risk for an industry that is known not to be a profitable investment when there are simply more attractive commercial areas available elsewhere. Interestingly, the above comments on the extent of IT do not hold true for health industries in countries where the government is not the dominant funder of health services. In these countries, IT occurs because it is seen as a natural business resource that is required to achieve competitive advantage and commercial success and is therefore both invested in and purchased accordingly.

Given that information is one of the most fundamental prerequisites for competing in a competitive marketplace, it is not surprising therefore to find that these four R&D projects were focused on information systems.

The fifth R&D project differed from the other four, in that it focused on altering the delivery of health services. The impetus for this project came from government sponsorship via the Health Reforms Directorate. In June 1992, the Government announced that it would spend \$1 million on ten pilot projects (Ross, 1992). This project was one of those successful in attracting grant money and thereafter, having secured the funding, the project leaders then approached the organisation concerned to act as a joint partner to provide them with the venue and management services.

This organisation had a mixed strategy to R&D. It also imitated other innovations thereby demonstrating that it did not attempt to reinvent the wheel unless it thought it necessary which was probably a wise strategy for a cash strapped Area Health Board. One other Area Health Board also chose to imitate innovations although it could give no specific details of the innovations.

The literature draws a connection between organisational size and R&D output although confusingly there appears to be no consensus as to whether larger organisations do more R&D than smaller organisations or vice versa. In terms of size, the two Area Health Boards in question were two of the largest and the private sector organisation one of the smallest with less than 30 beds. In terms of disruption caused by the environmental forces, namely the political, economic and social forces brought about directly because of the health reforms, the two Area Health Boards in question both knew in advance that they were in for a very disruptive year, as it was obvious from political comments that they would be reconfigured into smaller organisational entities as of 1 July 1993. One could argue that although this Board, because it knew it would be split up, had the least incentive to innovate, they were one of the few which did. The question has to be why? Certainly this evidence of innovativeness runs against predictions expressed personally to the researcher by peers, i.e., that in a transitional year, which would be more disruptive than previous years, one was not likely to find innovation occurring nor get a true picture of the state of innovativeness within the health sector. One could also argue that even with all the negatives, it is most creditable to find that despite all the difficulties that occurred during this year, one out of nine respondents did actually do some R&D, three out of nine were imitating others innovations; and three private sector acute health care enterprises also claimed they did some R&D but did not participate in the main survey.

Except for two respondents who chose not to answer the question, the other seven respondents all demonstrated both awareness of and a process for, learning about innovations. All but one private sector organisation had library facilities and all 6 public sector organisation employed librarians who could both search for and retrieve health service management R&D literature on request if it was not held by the library. All except two private organisations subscribed to professional journals on health

service management, so one can assume a reasonable level of access to information for all of the public sector organisations.

Inputs.

The survey aimed to identify what financial resources Health Service Managers allocated to R&D during the fiscal year 1992/93. A major finding was that it proved impossible to accurately track and identify actual financial inputs to R&D. The evidence supplied showed that the percentage of organisational resources, which included financial and human, that were allocated to R&D was minuscule. Not surprisingly, outputs followed accordingly.

The organisation that did the most, spent the most and allocated the most staff to R&D, spent less than 0.2 percent of its total annual expenditure (excluding the costs of salaries and overheads for those 1.52 FTE's). In contrast, Interlock Industries, a privately owned company that is widely acknowledged to be a leading-edge, innovative New Zealand manufacturing company, has a company policy of spending 10 percent of sales on R&D, of which 50 percent is tagged to short-term projects and the remaining 50 percent is allocated to R&D projects with a greater than three years completion date (NZ Business, 1994). Interlock Industries argues that successful R&D comes from producing patentable innovations, i.e. innovations that are new or substantially different, as opposed to the small incremental improvements. Although it subscribes to a policy of continuous improvement (Kaisen), it prefers to make giant innovative leaps in its R&D so that it can, and does, subsequently patent. Interlock Industries currently holds about 300 patents which the CEO, Stuart Young, states both protects the company's rights and enables it to remain ahead of its competitors. According to Young, the only position a company should be in is one that is both different and in front i.e., leading the market. Current wisdom holds that those who follow by imitating are using yesterday's rules which are simply not sufficient to ensure survival in tomorrow's competitive marketplace (Young, 1994). The discrepancies between innovation in the health sector and a manufacturing company such as Interlock are glaring.

The other interesting insight gained from the survey in relation to inputs, concerns the educational levels of the staff employed in the responding organisations. The OECD model has been developed on the assumption that in order to do research, one must have been through a formal educational process and have qualified to PhD level, indicating that one is then acknowledged as being capable of conducting independent research. Holders of those Master's degrees, which contain significant research components, have only completed a course of supervised research and are not considered

capable of independent research until they have completed their PhD's. Some Masters degrees are by course work, and do not have a major research component. This view is not subscribed to by everyone and others would argue that anyone can do research however the essential issue is that the academic quality of the research is maintained to the highest level.

Whilst one might not expect to find staff educated to PhD level in a management discipline employed in either public or private acute health care enterprises, because they are few in number and have a multitude of employment opportunities, the low number of Master's degrees in management related disciplines, i.e. 14 persons spread between 4 public sector organisations, is very revealing. The other point which should be noted is that the management degrees surveyed in the questionnaire were not specifically health management degrees but degrees with some management components to them. MBA's were the most common qualification. The survey did not cover whether those people with MBA's had completed undergraduate degrees nor did it survey what, if indeed any, was the research component of each Master's degree held and neither did it ask what each master's-educated person's job title was within the organisation. All of these questions would be worthwhile avenues for further research.

Of note, although it should be interpreted with caution, is the fact that the organisation with the most employees educated to Master's level, was the organisation that did the R&D, although only one of the key researchers involved in the projects was educated to Master's level. The other two Master's educated researchers in the projects came from outside the organisation, one of whom came from a University and the other being a Director of one of the private companies.

In summary this low level of education is consistent with the literature findings (Campbell-Hunt, et al., 1993). Obviously one cannot expect high outputs of health service management R&D when the inputs capable of producing such research are woefully inadequate. One cannot also expect a high degree of excellence in health service management practice with a workforce that is not educated in the discipline of health service management either, unless of course one subscribes to the belief that practice makes perfect.

Attitudes.

The survey sought to explore current attitudes of health service management towards R&D in health service management and their views on appropriate and non-appropriate research. In general, respondents demonstrated a positive attitude towards health service management R&D which was to

be expected as the respondents were all senior health service managers. It was not possible to tell clearly from the findings just what the respondents thought about appropriable or non-appropriable research except to say that respondents in the public sector were divided. The private sector responses also demonstrated unclear thinking on the subject e.g. they thought they shouldn't own their own in-house research which begs the question, who should? They also believed that research carried out for their organisation by external consultants should be non-appropriable. It is not possible to determine whether indeed respondents are unclear on the principles of intellectual property, as the questionnaire did not enquire specifically as to whether the organisation had purchased the intellectual property rights. Perhaps they just expected the external consultants to retain ownership rights to their intellectual property in return for price concessions? One can only speculate from these findings. In reality, it is impossible to say what the respondents believed about whether research should be appropriable or not. Maybe they simply did not refer to the definition sheet which was included with the questionnaire.

Current and future issues.

This section sought to identify what the current and future issues were for health service managers as regards R&D in health service management. Staff motivation was seen by respondents as the key enabling factor to conducting health service management R&D, ranking higher than funding, staff skills and four times more important than management support. However, one should note that without management support there would be no funding and without the staff skills, one has to question the quality of the outputs irrespective of the degree of motivation present. This is not to say that motivation is not important, merely that it takes more than motivation to bring about successful R&D.

Respondents identified good access to up to date literature as the major factor which would enable them to implement imitations. This finding raises some concern because seven organisations said they subscribed to professional journals on health service management. One has to assume that they actually are receiving up to date literature and given that six of these organisations also employed librarians who are skilled in accessing health service management databases for information as requested by management, the finding is most confusing.

The barriers to R&D were very interesting, although not surprising. Lack of funding was the seen to be the biggest barrier, followed by lack of time and lack of conviction that R&D is something which needs to be done. Regarding lack of funds, certainly it is true that Vote:Health has been falling over

the last decade as both public expectations and costs have risen. The public sector organisations have actually experienced genuine funding pressures so there is some truth in this argument. Equally so, there is also no doubt that resources have been reallocated to improve technical efficiency although some politicians, and others, may well argue that there is room for further allocation and that some of that funding could be reallocated to R&D. Nevertheless despite these truisms, one has to question what benefit extra funding would have if respondents believe that there is a lack of time and a lack of conviction towards doing health service management R&D, especially when it is also suspected that there is a lack of skilled personnel anyway.

The other factor of note in the section on barriers was that instability within the health sector was not seen as being a major barrier to conducting health service management R&D. Interestingly, the organisation that thought stability was an important facilitating factor was the same organisation that did the R&D. This begs the question as to have other respondents simply got used to working in an industry that is constantly undergoing change or is stability not really the issue some would believe it to be?

On a more positive note, respondents were asked what type of assistance would help encourage their organisation to do more health service management R&D. A list of 12 suggestions was provided with room for further ideas if the choices did not suit (ref. Appendix, Question 46). The intent of including this list was to get respondents thinking broadly on the subject by providing a wide range of choices. The next question followed from this, expecting them to refine their thinking by choosing their top three choices from that list. The results are confusing. From the list provided, the most favoured avenues of assistance for increasing health service management R&D for the public sector were more sources of private funding, followed by joint appointments with universities. Yet when asked to narrow down their choice to what would give them the greatest encouragement to do more health service management R&D, their top two choices were an ability to negotiate prices with an RHA which recognised the importance of and the need for R&D in health service management and secondly more funding assistance from the Health Research Council. Public sector respondents also saw tax concessions as an encouragement yet not one respondent actually selected this choice from the list of 12 suggestions provided. The answers from the private sector for both questions were less confused but also suspicious, given that the respondents selected the top three choices as their top three selections, albeit with a slightly different ordering. Given the inconsistent public sector responses, conclusions cannot be drawn from these results.

The open ended comments (ref. pp. 87-88) speak for themselves and provide interesting insights. They acknowledge that health service management R&D is not well developed in New Zealand and suggest that it is because it is given a low priority ranking. One respondent acknowledges the lack of skilled personnel and the time constraints.

Characteristics of the Respondents.

This survey aimed to achieve baseline data on managers in control of acute health care enterprises and the number, size, and location of New Zealand acute health care enterprises, prior to 1 July 1993. This objective was seen as important given that this fiscal year was both the end of the Area Health Board era and the year immediately preceding the reformed health environment. This objective was not met firstly because of the poor response rate and secondly because public sector managers started moving employers from about February 1993 onwards. By the time the question was asked, the opportunity to retrieve the data was lost.

Preliminary survey of the private sector.

This survey produced some unexpected results. Firstly its return rate of 86 percent was a pleasant surprise which may be expressed by the brevity of the questionnaire design (see Appendix F) and the fact that the survey included a stamped addressed envelope for the respondents answers. The real surprise was that 17 hospitals described themselves as acute admitting hospitals which was much higher than expected to be the case for the private health care sector. This finding started to reveal itself when telephone enquires were made to elicit the pretest group for the survey questionnaire. These enquires revealed that the main reason cited for this movement was a change in public demand by private health insured patients for increased availability to private hospital services. Even more surprising was that three of the 17 acute health care enterprises surveyed, said they did health service management R&D as per the definition sheet provided.

Limitations and Benefits of the Survey.

As mentioned the main survey questionnaire lacked external validity because its findings were not generalisable due to the low response rate of 29 percent. However given that this was a full population survey, the findings still relate to more than a quarter of all acute health care enterprises operational in New Zealand during the fiscal year 1992/93, a significant cross-sectional sample.

The survey aimed to reveal the state-of-the art of health service management R&D throughout New Zealand during the fiscal year 1992/93. Whilst it did not succeed in revealing the broad picture, it did identify one pocket of health service management R&D in the public sector, and indicated three areas of activity in the private sector. Given that no similar national survey had been conducted previously, it was important to firstly conduct this survey despite reservations because of the turmoil within the industry. Furthermore, this survey was necessary in order to identify a suitable organisation in which to carry out the case study. In this respect, the survey was successful.

Chapter 5: Health Service Management R&D in Practice: Findings from the Case Study.

Introduction

The following case study complements the survey questionnaire in that it illustrates health service management R&D in practice. It is one of the 5 R&D projects carried out by the only organisation that identified itself in the survey questionnaire as having conducted any health service management R&D during the fiscal year 1992/93. The study illustrates the realities of innovating in an industry undergoing constant change due to environmental forces impacting on it. It also demonstrates the behaviour of a an intreprenurial knowledge worker who joined forces with an entrepreneurial privately owned small business to champion an idea to the point of successful innovation.

This chapter begins with an overview of PIMS- the Perinatal Information Management System that was developed in Wellington Women's Health Service, Wellington Area Health Board following almost a decade of research. The second section of this chapter chronicles the R&D and includes a postscript to update events to the present. The third section discusses the issues that arose from the R&D. This project was chosen as the case study because although the original research for this innovation spanned more than a decade, the development of the innovation to operational level occurred mainly in the fiscal year 1992/93. Throughout this chapter various people and organisations are identified by name. Either their prior consent has been obtained or knowledge of the persons and/or the event, is already in the public domain.

The pivotal person in this R&D project is Prof. John Hutton, who is at the time of writing still currently employed by Otago University as Professor of Obstetrics and Gynaecology, Wellington School of Medicine. As well as his teaching commitments, he is also involved in providing a clinical service for Wellington Area Health Board. Throughout the project the R&D conducted by Prof. John Hutton was undertaken in addition to clinical responsibilities to the hospital where he was employed for 0.5 WTE (Whole Time Equivalent's) and the University where he was employed to teach for 0.4 WTE and the remaining 0.1 WTE where he was employed to do Administration. The developers were Terranova Pacific Services Ltd., which is a privately owned Wellington based company formed in November 1991. The remaining persons were all employees of Wellington Area Health Board.

Much of the information used in the following sections came from suitcases full of minutes of meetings, memos, correspondence and unpublished papers which Prof. John Hutton had the foresight to keep and subsequently made available for this research. This material was supplemented by personal and telephone interviews with Prof. John Hutton; the Manager, Wellington Women's Health Service; the General Manager, WellMed; the Chief Executive, WellHealth, Wellington Area Health Board; the Manager, Medical Records, WellHealth; Information Services Staff; and John Stroh, Director, Terranova Pacific Services Ltd.

PIMS: An Overview of the Product.

The rationale for the development and subsequent support for PIMS, i.e. the "why", begins from the premise that to improve health care delivery one must focus on the quality aspect of service provision. Quality encompasses every aspect of health care management and managers must strive to maximise customer satisfaction through providing the highest possible quality of service given their available resources. In order to maximise customer satisfaction, managers need to know precisely what services they are providing before they are then able to assess actual performance against set standards of practice and make further service improvements.

The best method, in the 1990's, for achieving this objective, is to utilise a comprehensive computerised information system to provide the quantitative data required and as an added bonus, such a system will also provide some qualitative data. Information technology has advanced exponentially over the last decade and the days are now past when managers can function effectively without access to quantitative data. Quantitative data in itself does not represent the total picture but it does give one part of the picture which must be taken into consideration. Most managers need comprehensive, up-to-the-minute, accurate information and most would now recognise that it is both inefficient, wasteful, and some would even argue unethical, to use staff to 'number crunch' manually when the work can be done faster, cheaper and more accurately if collected and collated electronically.

PIMS provides an integrated system for recording information on mothers and babies which captures clinical information from the confirmation of pregnancy to the early postnatal period. The Source Code for PIMS, which is a set of copyright protected software programs written by Terranova, has been written in Borland C++. The Borland C++ compiler, Borland's Application Frameworks and the native capabilities of Borland's Paradox Engine, are used for the development of the Source Code.

In a Local Area Network (LAN) environment, PIMS uses Paradox Engine to access the PIMS Database on Paradox tables that are centrally stored on a Server System. The Server is a PC-System which is dedicated to the management of the network and the data. An optional Microsoft ODBC Interface allows data to be shared with other systems. The number of Personal Computers (PC's) that may access the server is limited to the licence restrictions of the LAN software. The application platform for the normal operation of PIMS is provided by Microsoft Windows. PIMS has been designed so that its application interface, i.e. the way it looks to the person using the application, looks like a series of forms. Each form contains a variety of objects. Some objects, like fields and check boxes, hold values. Other objects, like text, graphic lines and rectangles, clarify the purpose of the form or add visual interest. Button objects let the user make something happen e.g. open a form, store a record, launch an application, simply by pointing and clicking a "Mouse". Terranova has purposely incorporated the popular advances in technology such as the use of a "Mouse" plus graphical icons on the screen, to provide an innovative user-friendly interface for clinicians who are still largely a non-computer literate group of users. The Microsoft Windows Sound Recorder for voice recording of patients notes is optionally available.

Advantages.

PIMS offers the following advantages which enable the product to contribute towards increasing the overall effectiveness of service provision.

- **Quality Management Tool.**

PIMS systematically records who does what to whom, when, where, and why. In doing so, the system provides a comprehensive quantitative picture of service provision which forms the basis for the management of quality. PIMS also records qualitative information in its 'notepad' facility although currently the extent of qualitative data collected varies according to individual organisational preferences and the availability of PC's.

The database can be used by a variety of users provided they have authorised access. Access to the system is password protected and restricted between user groups. Individual practitioners can use it for self-auditing purposes for their clinical practice and consumers entered into the database have access to a personal hard copy print out of all information stored on them. The database can be used by management. Other groups such as policy analysts, politicians and others can use aggregated data

from the system at either a local, regional, national or international level. Other interested groups can apply for access to aggregated data although such access to the system is rigorously controlled.

- **Accuracy.**

The system is designed for direct user entry by clinicians. It maximises legibility and also provides choice lists which help to prevent clinical oversights. PIMS has been designed to minimise data entry errors by standardising choices which facilitates quality control and research. The software has been designed so that it navigates data entry to some extent and in doing so, acts as a guide to users. Naturally the accuracy of the system is dependent on accurate data entry however the same rule applies irrespective as to whether the data collection system is manual or electronic.

- **Efficiency**

Prof. John Hutton, in an application to the Ethics Committee, Wellington Area Health Board, estimated that at least 32, and up to 78 different records and reports, are associated with the birth of one woman's baby in which there was often excessive reduplication of vital data, some of which was done inaccurately. PIMS minimises repetitious report preparation and in doing so, saves on labour and supply/paper costs. It can generate the following hard copy reports for each woman and infant(s):

- Maternity record
- Maternal Antenatal record
- Pregnancy and delivery Record
- Caesarean Section Record
- Maternal Postnatal Discharge Record
- Maternal Postnatal Re-admission Record
- Infant Discharge Summary
- Infant Re-admission Record
- Notepad notes
- Patient Sticky Labels for both mother and infant(s) .

Copies of these reports can be stored on patient files, given to the woman, sent to other health professionals or other hospitals. Information can also be exported electronically to off-site users as PIMS has automated telephone dial and fax transmission capability. Currently the electronic information flow is outwards to practitioners but PIMS is capable of importing electronic information

which will provide a seamless interface internally within the hospital and externally to all PIMS users.

PIMS also automatically assigns ICD9CM Codes to diagnoses. (ICD9 Codes are the International Classification of Disease codes, currently required by the Ministry of Health for statistical purposes). PIMS has been designed to produce a range of standard statutory forms for external agencies such as the RG9 (Notification of Birth) which is required by the Department of Justice, and the H661 (Medical Notification of Birth or Stillbirth under Obstetric Regulations 1975) which the Ministry of Health still currently requires to be filled out, although that requirement is about to be reviewed.

The system also generates aggregated management reports on either a daily, weekly, monthly or annual basis, depending on requirements. Reports can also be automatically triggered at specified times of the day. Queries can be either standard or ad hoc and can vary in sophistication depending on individual user requirements. Information can also be further categorised into inputs, outputs and outcomes, which can then be costed by a separate system enabling the organisation to meet the accountability requirements as laid down in the Public Finance Act 1988.

- **Acceptability**

PIMS is acceptable to both users and consumers. The data elements used as the framework for PIMS were agreed nationally over a period of some ten years by a variety of interested health professionals working within the field. Their committee work was also supplemented by consumer input to ensure consumer acceptability. Such wide consultation, over a lengthy time frame, naturally enhanced the acceptability of PIMS although one could never say there was, is, or ever will be, unanimous agreement over the data elements included. To ensure that PIMS remains acceptable, ongoing review and development will always be necessary, not only to meet those changing needs, but to incorporate advances in information technology.

From an ethical perspective, PIMS received approval from the Ethic's Committee, Wellington Area Health Board. It also meets the requirements of the Privacy Act 1993 and the temporary requirements put out for the health sector by the Privacy Commissioner. As outlined above, the developers have built extensive sophisticated security measures into their programme. These measures have been designed to preserve the integrity and confidentiality of patient records by providing controlled authorised-only access for different categories of users. Non-authorised users can only get access to aggregated data held by the system for specific purposes e.g. research,

provided they have first gained the approval of the Wellington Women's Health Service Manager, the Obstetric Standards Review Committee and thereafter the Ethics Committee, Wellington Area Health Board.

PIMS is also acceptable to users because of the simple, logical design of the software application. The system is intuitive and easy to learn. Health professionals use a "Mouse" to "point and click" options within "windows" technology. The Mouse allows simple selection of predefined choices which minimises the time required to enter data thereby promoting consistency of data recording and reducing data entry errors. The system has been especially designed to be simple, quick and easy to use which increases its acceptability to busy health professionals. Use of the keyboard is minimised but "notepads" are also provided for recording qualitative data to supplement the predefined choices.

- **Accessibility.**

In large obstetric units, the customary design is that women and babies move from area to area as they progress through their antenatal, labour, delivery and postnatal/neonatal stages, so having a network of PC's servicing all areas, means that the system has logistical advantages as it provides multiple user access for data entry and data retrieval. Electronic access also provides access to patient information removing total reliance on the physical presence of the hard copy of the patient's notes which can be a source of great frustration and time wastage in busy units which operate with many staff, all needing access to the one set of notes. In time, the incorporation of hand-held technology will provide portability which will further increase accessibility.

- **Flexibility**

The programme can be adapted to suit individual organisational requirements. It is proposed that the next version of PIMS will be expanded to integrate the needs of primary providers who are not employees of hospitals e.g. Midwives, General Practitioners and Specialists. Terranova is a NZ based company that specialises in providing quality Healthware™ management solutions for the New Zealand health industry and other international markets. Their use of state-of-the-art C ++ object-oriented technology provides a sound basis to ensure that their products can both integrate and add value to existing or future software applications.

The critical success factors for PIMS are as follows:

- **The appointment of a Co-ordinator.**

This person should be accountable to the Service Manager and responsible for the overall management of the system, ensuring that the day-to-day running needs of the system are met so that it functions correctly thereby ensuring maximum return on investment. Ideally the Co-ordinator is a women's health professional, with a postgraduate background in health research, who is proficient at working within a windows environment so that they can produce, interpret, and action reports from the database. This person should also be responsible for the security of the system, for managing the operational budget, for periodically auditing the system to ensure accuracy, and for ensuring the system is updated as the needs of organisation change, which in turn, requires an ongoing relationship with the copyright holders of the software.

- **Formal education process.**

The Co-ordinator should ensure that all users are familiar with how to operate the system correctly. Most users need some initial training on how to input data. Terranova provides for education as part of its implementation services for Systems Administrators, Trainers and key users. This process is based on a "teach-the-teachers" concept.

- **Budget.**

Fixed assets usually require ongoing servicing and computer systems are no exception, often representing a substantial financial investment within an organisation. These systems require a budget to fund the initial capital investment as well as ongoing operational expenses. Capital expenses include the cost of hardware, the network, systems software and application software. The cost of the initial implementation (installation of equipment and software, education and project management) is generally included in the initial capital expense. Ongoing expenses include the cost of internal and/or external support staff, software maintenance costs and supplies such as paper and printer cartridges. Replacement and or upgrading of hardware and other equipment become an integral part of capital expenditure planning in subsequent years. A rule of thumb indicates that budgets should be equally divided between capital costs and ongoing service and maintenance costs over a three year period.

- **Integration with existing information systems.**

The system also needs to be interfaced with existing systems so that the organisation's information technology is integrated. Over time, a non-integrated system simply becomes a chaotic mess of multiple vendors with incompatible products. The problem becomes magnified in terms of both size and cost unless rectified by the development of an information systems architecture i.e. a blueprint which says how the technology will fit together. To this end Terranova Healthware™ provides an interface which conforms to Microsoft standards.

PIMS: From Conception to Inception.

1980- 1986

In the early 1980's, both national and international literature strongly advocated the need for better perinatal information facilitated by computerised technology (Malcolm, 1983; Mutch & Elbourne, 1983). The NZ problems, which were identified at the time, were (1) the unnecessary replication of information collected, (2) the inaccessibility of that data (3) no agreed minimum data set and (4) poorly designed information collection forms.

On the 1st of March 1983, Prof. John Hutton attended the Obstetrics Standards Review Committee (OSRC) meeting, on what was his first day of work as Professor of O&G, Wellington School of Medicine. At that meeting, the Obstetric Standards Review Committee discussed the need to develop standards. Prof. John Hutton argued, successfully, that the Committee could not hope to measure standards if they did not have a computerised information system and a sub-committee was set up to look into the issue.

November 1984 saw a General election and a subsequent change of Government. The fourth Labour Government came to power. This government was to radically reform the public service with its policies of decentralisation, devolution, commercialisation and privatisation. Enabling legislation focused on outputs and outcomes. The effects of these changes on this specific R&D project will become apparent below.

Two years passed after the first meeting of the OSRC before a formal application was submitted on the Wellington Women's Hospital capital estimates. This happened in March 1985 and the sum of \$93,000 was requested to implement a perinatal information system. The application however was unsuccessful because the Women's Hospital, in their priority ratings, rated their request for Ultrasound equipment as being more urgent than their request for a perinatal information system.

In November 1985, the Department of Health brought Dr Colin Walker out from Aberdeen to New Zealand. Dr Walker had been involved in the United Kingdom with implementing a computerised database. He advised that "the success of the United Kingdom system had depended crucially on the involvement of a wide range of organisations, and broad community support" (National Working Party, 1988, p.26). A meeting was convened by Prof. John Hutton within the Women's Hospital, that also involved the Health Department, to implement the programme for a perinatal information system using the experience of the Scottish maternity information system as implemented and managed by Dr Colin Walker.

A year later, in November of 1986, the Department of Health, National Health Statistics Centre, convened a one day workshop at National Women's Hospital, Auckland. The objectives of that meeting were to elicit support for a national scheme, as well as discussing a minimum national dataset and access to the database, ethics and confidentiality. As a result of that meeting, a National working party was convened by the Department of Health to identify a minimum dataset. The Chairman of the National Working Party was Professor Ross Howie, Auckland, with Prof. John Hutton, Wellington, Deputy Chair. At the meeting, Dr Colin Walker, Chairman of the U.K. Child Health Computing Committee, who was back in New Zealand, discussed the U.K. experience, stressing the need for wide consultation in the planning stage.

The current system in place at the time was viewed to be poorly co-ordinated and fragmented, with professionals unable to agree on a minimum data set. The collection system was not standardised and full of duplication, all of which, coupled with difficult access, added up to what was seen quite correctly as creating a situation of lost opportunities for New Zealand to improve the health status of it's women and children.

It was proposed to include the perinatal system within a child health system. In terms of process, a perinatal system was seen as being the first step towards developing a child health system which would include all children up to school age. The object of the Child Health Information System was to potentiate the maintenance and improvement of perinatal and child health in New Zealand by the

establishment of a national database for perinatal and child health services. It was envisaged that by co-ordinating information, there would be spin-offs in increased efficiency and effectiveness. It was planned that such a database would be best managed by the Government owned Health Computing Services (HCS) as the HCS were seen to have both the resources and the expertise to run the database nationally for the benefit of all. The Working Party identified 55 user groups who were likely to require access to a child health information system from the time a child was conceived until it was five years of age. User groups included the family, General Practitioners, Plunket, other district health services, public hospital/health services, the Health Department and other Government Departments e.g. Justice, Education and Social Welfare Department, and researchers. Such a system would interface well with the National Master Patient Index (NMPI) (which was a national index where each child/person had a unique identification linked to the ADT-Admission, Discharge, Transfer system within hospitals). A national system was seen at the time as the ideal. It was argued that such a system would advance child health in New Zealand and in the process would overcome any self interests or jealousies.

These were powerful arguments given the state-of-the-art of computerised information systems in the 1980's, especially when coupled with the fact that internationally, many other countries had all been moving in this direction, some being more advanced than others. Countries with such systems included America, Canada, England, France, Australia and the Scandinavian countries. The National Working Party reaffirmed the choice of the Scottish approach as the model to follow.

1987.

Around May of 1987, the Department of Health commissioned the Strategic Information Systems study to examine national information needs. This study was conducted by Azimuth Systems Ltd and was reported in January 1988. It recommended that the most urgent project was the Health Management Information Requirements Study (HMIRS) which was commenced in October 1987 and the resulting report produced in January of 1988. This HMIR study and the changing status of the Health Computing Service, resulted in the need to review and restructure the National Working Party.

In response to moves made by Prof. Ross Howie and Prof. John Hutton, the then Director General of Health, Dr George Salmond, asked all hospitals in May of 1987 not to develop their own data bases in this field for the next two years. The reason for this request was to create time for the National

Working Party to develop and run a national pilot study whilst preventing any possible duplication of effort and resources.

On the 10 July 1987, Prof. Ross Howie convened an expanded national working party. Because of the magnitude and relevance of this project and what was seen by Prof. Ross Howie as the obvious marketing advantages given that the ADT system was now available to hospitals nationally, the Health Computing Services was agreed to be the obvious organisation to co-ordinate the project.

Three pilot sites were proposed initially, these being Auckland, Wellington and Dunedin. Wellington and Dunedin formed local working parties, both of which developed different problems related to who was involved at a local level. However these problems were largely resolved over time and the data elements were eventually agreed nationally. It is not known what happened in Auckland.

In December of 1987, the National Working Party heard that Health Computing Services was to become a State-Owned Enterprise as of 1 April 1988. This meant that piloting would only be possible in one centre because of resource constraints on the HSC. Dunedin was chosen as the preferred site and it was expected that development would take 9 months.

1988.

The Azimuth Systems report was received and accepted in principle by the Corporate Management Group of the Department of Health in January of 1988. The report proposed a model for an integrated health management data base and according to Prof. John Hutton, "basically approved the work which had been done to date by the National Working Party".

In April of 1988 a formal proposal was put to the Department of Health from the National Working Party entitled "*A National Perinatal Information System: A basis for improving child health*". Subsequently this report became attached to a report which had been commissioned by the Department of Health from Azimuth Systems titled "*Perinatal System Conceptual data model*". This report looked at defining the structure of the minimum perinatal information which would be needed to be collected by an HMI data base in order to maintain the integrity of the HMIS. It was envisaged that the perinatal data model would be a subset of the HMI data model. Azimuth also proposed a paper based system in front of the computerised system in which data entry clerks would enter information. The trial forms were developed and piloted in Dunedin Hospital plus throughout

the Otago Hospital Board. Thereafter the National Working Party received feedback and a report was sent to the Department of Health in February.

1989.

In April 1989 Prof. John Hutton had come to the realisation that there was no possibility of having a national computerised perinatal information system in the foreseeable future. This realisation had grown as the Government moved towards total implementation of the Area Health Board structure as per the *Area Health Boards Act 1983*. The changeover of Hospital Boards to fourteen Area Health Board's happened gradually between 1983 and 1989 bringing increased regionalisation. This, coupled with the devolution of centralised decision making, meant that national projects were now much less favoured by Government and correspondingly also by the Department of Health. Up until then a national approach would have been the preferred option, especially if the proposed project was perceived to be of significant national benefit, however the move to Area Health Boards basically spelled the end of the national perinatal database and thereafter the focus changed to locally based initiatives.

On 1 June 1989 the Wellington Hospital Board became the Wellington Area Health Board and shortly afterwards Information Builders Australia (IBA), which is an Australian based computer company, entered the scene. In July 1989 IBA proposed the implementation in Wellington Women's Hospital of their software module but as this module incorporated few of the data elements which Prof. John Hutton and the Working Party had wanted for the perinatal system, it was seen as unsatisfactory. Therefore in November 1989 Prof. John Hutton resubmitted his proposal through the Manager of Information Systems, Wellington Area Health Board, for funds to develop a local perinatal information system as proposed by the National Working Party.

Unbeknown to Prof. John Hutton, an Obstetrician at National Women's Hospital, Auckland was developing an initiative independently of the National Working Party. By June 1991, Dr Neil Pattison, Senior Lecturer O&G, had completed the development of a Maternity Service Patient Information Computer System to the stage where it was up and running in National Women's Hospital. Throughout this time, Prof. John Hutton and Prof. Ross Howie had been continuing to meet with the Department of Health to follow through on the recommendations of the April 1988 Report.

1990.

In July of 1990 Prof. John Hutton and Prof. Ross Howie had a further meeting with the Director General of Health in which they put the case for special project status for the perinatal information system. Despite their realisation that their timing was probably too late, they were still nevertheless trying to get approval for the project to be run on a national basis.

Meanwhile at the local level, Prof. John Hutton submitted yet another proposal in August 1990 to the Wellington Area Health Board for \$150,000 for a perinatal information system on the IS Department budget, not the Women's Health budget. This proposal envisaged a Board-wide perinatal system which would encompass maternity services at Wellington, Hutt and the West Coast District, but excluded the Wairarapa which was not then included as part of the Wellington Area Health Board. After submission, the proposal underwent further scrutiny within the offices of the Board at Boulcott Street, and was included in the 1991 Capital Estimates programme.

At this stage Prof. John Hutton went on a year's sabbatical to Bristol, leaving December 1990. While he was away, Dr Peter Stone, Senior Lecturer O&G, Wellington School of Medicine, took over the stewardship of the perinatal information system project, Dr Stone having been actively involved with the Perinatal Information System project since his appointment in 1987.

1991.

During 1991, Dr Stone, in conjunction with the Obstetric Standards Review Committee, went on to develop the document "*Standards and Guidelines for Midwifery and Obstetric Practice*". This document provided an explicit quality framework which was designed to underpin the perinatal database. These standards were subsequently accepted, approved and adopted by Wellington practitioners and published as approved policy by the Wellington Area Health Board.

On the night of July 30th 1991 the Budget was presented in which the Government made public its plans for reform of the public health sector. Immediately it replaced all elected members of its Area Health Boards with Government appointed Commissioners, whose role was to govern in the interim period until 1 July 1993 when the health reforms were to become fully operational .

Finally in July 1991, some 6 years since the funding had been first applied for, \$150,000 was approved on the Wellington Area Health Board's Capital Estimates by the Department of Health.

Unfortunately the newly appointed Commissioner froze the funds for the project because the Board was overspent and the money was subsequently diverted to pay for hospital transport.

The following month, in November 1991, Dr Pattison demonstrated his system at the O&G Society Annual Conference and in December of 1991, Prof. John Hutton returned from his year's sabbatical. On his return, Prof. John Hutton met with Dr Stone, and having discussed developments and progress to date, they decided that the plan of action from that point would be to support Prof. John Hutton in implementing the system and drive the project using Hutt West Research money. (Hutt West Research is a private partnership of the three O&G Specialists who are employed at the Wellington School of Medicine by Otago University. The partnership acts as a repository for payments from their private practice work which they are involved in from time to time).

On the 20 December 1991 Prof. John Hutton wrote formally to the Manager of the Wellington Women's Health Service, expressing his surprise that in his absence, there had been no development at all of computerisation of information within Wellington Women's Hospital. In this letter he asked her if she would give consideration to viewing the National Women's information system while she was up in Auckland on her holiday, with a view to considering whether Wellington Women's should move towards using the same software.

It was at this stage that Prof. John Hutton, whilst attending the rounds of Christmas functions, came, by chance, to learn of the existence of Terranova Pacific Services. Prof. John Hutton met with John Stroh, one of the three Directors of Terranova, and discussed his requirements for a perinatal information management system. Prof. John Hutton was clear on what was needed and also clear that he and Wellington lacked access to the resources to do it.

1992.

After some discussion of the various options, on Friday the 10 January, Prof. John Hutton, using Hutt West Research funds, flew the three Terranova Directors - John Stroh, Tim Boyer and Phil Thompson, plus two of Wellington Women's Charge Midwives and himself up to Auckland to view Dr Neil Pattison's programme. All six spent the day in Auckland and came away with the belief that the system was a good example of a user system written with a commercially available generalised package, but could be improved.

Prof. John Hutton then weighed up the pro's and con's of which option to pursue. There were various clinical and commercial reasons involved in reaching his decision. Firstly the Auckland system did not meet all the Wellington requirements. Wellington was faced therefore with either accepting the Auckland system on that basis, or alternatively, it could have adapted the Auckland system by paying for the work to be done provided Auckland would permit such adaptations. For the Auckland programme to be adapted, it required additional work to be done either by Auckland or another software developer. Such work could only be done provided Auckland supplied either their run-time code or their source code, both of which would incur further costs. Other factors also came into the final decision which included issues such as timing, control, quality, and the current and future interface requirements for a Wellington system.

Prof. John Hutton decided that he would contract Terranova, through Hutt West Research, to develop an application, under Wellington control, that would be based on a Paradox database in object-oriented code which would enable Wellington to capitalise on object-oriented technology. Such technology would (1) enable faster application development and maintenance compared with the technology level used in the Auckland system, (2) enable fast replication, adaptation and migration to new user environments (e.g. other hospitals or similar applications in other hospital wards), and (3) incorporate state-of-the art user technology (e.g. Mouse, Fax, Voice Recording). A custom designed application would also meet all the Wellington specifications in terms of the database requirements, plus provide a graphical solution as opposed to a character based solution, allowing clinicians to use a 'mouse' to enable them to simply 'point and click' various options.

On his return from Auckland, Prof. John Hutton realised that the cost of implementing the proposal was greater than Hutt West resources could sustain and he sought and obtained further support from the other part-time Obstetricians who practised at Wellington Women's Hospital. He then spoke with the Chief Executive of the Wellington Area Health Board and, according to Prof. John Hutton, the CEO was mildly supportive, indicating that the project would get approval.

Two weeks later, at the end of January 1992, Hutt West Research formally contracted Terranova to develop a database which would enable quality review and health care trend evaluation. It was envisaged that this database would improve efficiency and therefore effectiveness, the need being created because existing information systems were not delivering adequate solutions.

From Terranova's perspective, the situation presented an opportunity to develop a relatively small clinical database application that was leading-edge. As time progressed in developing the prototype,

both the scope of the specifications and the commercial opportunity, changed. The application, originally intended for sole use by Wellington Women's Hospital clinical staff, grew from a simple data repository of Labour and Delivery details to a full Women's Hospital patient record transaction system incorporating antenatal clinic, admissions, discharge and transfer, postnatal readmission, caesarean section operating notes, general patient notes and letters plus a host of additional functions not originally envisaged. With this new product, Terranova felt confident that there was a market outside Wellington.

It became obvious to Prof. John Hutton that the costs of developing the software were going to be greater than Hutt West Research could sustain. To overcome this problem Prof. John Hutton enlisted the full support of the other Obstetricians who practised at Wellington Women's. They all agreed to put up a set amount of money to fund the project.

On the 23 January 1992 Prof. John Hutton met with the Chief Executive where he told the CEO that the O&G Department would be happy to use their Hutt West Research funds to get the project up and running if, in return, the Board could reimburse Hutt West Research later in the year, when the money became available. However, later that day an incident occurred where the transfer of a pregnant woman from Nelson was refused due to "staff shortages" (Hollings, 1992). According to Prof. Hutton this contentious clinical affair resulted in the Obstetricians, who were not employed by the Wellington School of Medicine, immediately withdrawing their financial support from the project.

In the meantime, Terranova began development of the software programme. They worked from a variety of sources of documentation as opposed to a fixed set of specifications and used the National Perinatal Dataset work as a framework. The first prototype of WPIS, which was the original acronym used to refer to the Wellington Perinatal Information System, went up on screen in March. Terranova did the initial technical development on their own equipment, teleworking from their homes. Once the development had reached the initial prototype stage, the O&G Department made a project room available in their department within Wellington Women's Hospital for Terranova to facilitate regular prototype reviews with clinicians on site. The technical development work took place as part of a normal iterative process of prototyping with user feedback and incremental enhancement and was carried out from March to August.

On the 12 March Prof. John Hutton and the Manager of the Women's Health Service were asked to resubmit the plan for the project to the Chief Executive so that the CEO could forward it to the

Department of Health, even though the project had been previously submitted and approved as part of the 1992/93 Business Plan. The Terranova specifications were included in this resubmission.

In the meantime the CEO came to visit the project and was perceived by Prof. John Hutton to be supportive. Although others of the senior management team did not visit the project, they were aware that it was in progress. Prof. John Hutton then thought that the General Manager WellMed and the General Manager Finance & Support were both supportive. Prof. John Hutton also discovered during this time that the General Manager of the Information Systems Department was absolutely "aghast" when he finally found out what was happening because the development did not fit with the organisation's wider strategic plan for information systems. Throughout this time Prof. John Hutton was still expecting the funding to come through around July or August.

The project applied for and was granted, ethical approval to proceed in May of 1992. The Ethics Committee of the Wellington Area Health Board had by that time developed some expertise with health databases having just previously been involved with the granting of ethical approval for the Department of Health's National Cervical Screening Project which incorporated a computerised register of women.

On 14 May 92 there was a meeting between Prof. John Hutton, general management and staff from the IS Department staff, the Manager Medical Records and IS Corporate Staff to discuss the practicalities of the ADT interface and the feasibility of running Terranova, and IBA/ADT in parallel. They also discussed the requirement to support the IBA/ADT system because it integrated with other hospital modules e.g. laboratories, medical records, theatres and the dietary department. The meeting resolved to check that the Women's Health Service still wanted the system; to check that Terranova met the users specifications; to specify the interface required between IBA and Terranova and to cost that interface; to confirm hardware requirements and to confirm that the system could meet the regional requirements. IBA estimated in 1991 that it would cost \$75,000 for an interface. At that stage Detante, another computer company, were still estimating \$60,000.

In June, Prof. John Hutton and the Manager of the Women's Health Service resubmitted a revised contract proposal to the Chief Executive in which they made further comments about various aspects of the system in light of their further discussions with various people and requested approval and funding for the implementation of the system. They listed additional specifications that they believed were now required of the system; sought to change the sponsorship from the University Department to the Manager of the Regional Women's Health Service; and clarified that they believed a license

from Terranova Pacific Services Ltd for the system was more appropriate than the systems integration development contract which had been originally contemplated. They also submitted revised costings of \$12,000 to cope with a more sophisticated patient-tracking system as they now thought a terminal would be required within the main hospital. They also advised the Chief Executive that they had reviewed the clerical roles within Wellington Women's and had re-deployed a clerk to Delivery Suite to cope with the new system.

The fiscal year: July 1992 to June 1993.

The Manager, Women's Health Service restated her commitment to Senior Management in July that she would continue to act as sponsor for the perinatal information system and another meeting was convened at the Corporate Office by the Board's Systems Development Manager over the perinatal system. This meeting was held in response to earlier meetings and in response to the Manager of the Women's Health Service and Prof. John Hutton's letter to the Chief Executive. It sought to examine the requests from the revised contract and review the current status of the project. The meeting minuted the Manager of the Women's Health Service's sponsorship, noted the regional implications and noted that the specifications for the Terranova system had not been formally reviewed by a representative group of users, as was required by Board policy. The meeting reviewed the current status of Terranova's, IBA's, and Detante's option.

In August Prof. John Hutton convened the first meeting of the WPIS Committee. This was a project team brought together to co-ordinate the implementation of WPIS. Membership of the Committee included the Senior Midwife of Women's (who reported to the Manager of the Women's Health Service), IS Department staff, the Manager of Medical Records, a General Practitioner and a Consumer Representative. At the initial meeting Prof. John Hutton warned the group that he suffered from "over-enthusiasm with associated communication difficulties". This Committee agreed with the Senior Midwife of Wellington Women's, that the Booking Clerk be relocated to Delivery Suite to help with clerical duties and that the Delivery Suite Clerk also help with user training once she was trained in the use of PIMS by Terranova staff. This support from within the Women's Hospital greatly assisted the satisfactory implementation at this stage and also later in January and February 1994, when the delivery and postnatal modules were added.

On the 27th August, the booking system went live in Delivery Suite. Prof. John Hutton had hoped to go live with the whole system by August but these plans were postponed because despite being told

regularly that the money was coming, it had still not materialised and so Hutt West Research continued to fund the capital costs of the hardware and the setting up costs.

On the 16 October the Chief Executive visited to view WPIS and during that visit re-discussed with Prof. John Hutton the capital expenditure for the information system. Four days later Prof. John Hutton offered the Chief Executive access to Hutt West Research funds to install the equipment on the proviso that she could guarantee the reimbursement of Hutt West Research capital expenses on WPIS in early 1993 once the IS capital budget was approved. The Chief Executive replied formally the next day, stressing the point that although she recognised the need to make progress, she personally could not approve anything in advance of government approval of IS expenditure and that Government approval was expected to come through in a week, provided timelines were kept. However the expected approval still did not come.

IS staff announced to the WPIS Committee in November that they had a brief to ascertain what would be the requirements to interface WPIS with the existing IBA system. Prof. John Hutton once again checked out the status of the funding speaking with the General Manager who conveyed his optimism to Prof. John Hutton regarding the funding for the system.

On 1 December 1992 Prof. John Hutton advised the WPIS Committee that the system would no longer be known as WPIS. In future it would be called PIMS- the Perinatal Information Management System, as Nelson-Marlborough Area Health Board had now bought the software and at least four other main centre Boards were in contract negotiations with Terranova to purchase licenses for the programme.

Hutt West once again went on record stating their preparedness to the Chief Executive to finance the next stage of the development with Delivery Suite. They did this without guarantee of reimbursement from the Board as they believed that staff resources did not lend themselves to investigating alternative sources of funding.

Prof. John Hutton advised the Chief Executive on 8 December 1992 that Hutt West had invested another \$10,000 installing hardware and software. Two days later, on the 10 December, the \$150000 funding finally came through from the Department of Health and the Chief Executive advised Prof. John Hutton accordingly.

On the 21 December 1992 Terranova commenced the initial training programme for users and two days later they submitted, to the General Manager, a proposed license agreement for the supply of 10 PIMS licences in return for payment of 6 licenses. The proposed contract received no response.

PIMS went live in Delivery Suite on the 11 January 1993. Shortly afterwards a PIMS Co-ordinator was appointed.

The convenors of the PIMS Committee wrote formally to the Manager of the IS Department on 5 February 1993. In this letter they pointed out that they would like a representative from the department to attend the PIMS Committee and stressed that they were "very mindful of IS's mission statement, particularly regarding integration".

Information Systems staff from RUS, the Board's Resource Utilisation System which uses computerised data collected throughout the Board to develop costs, tested the PIMS file in the beginning of February and notified the PIMS Committee that everything appeared to be in order. From their perspective, they felt that once they were satisfied with the accuracy of the data then all that was required was to decide on the most effective way of transporting data across to their department.

In the middle of February, Prof. John Hutton had what he termed "a crunch meeting" with the General Manager and his Manager of Finance and Support Services, over what he saw as their stalling of the contract negotiations which effectively denied access to the much sought after funding. In this meeting Prof. John Hutton finally secured an agreement to proceed with implementing the system over late afternoon drinks. He wasted no time the next day in implementing PIMS on Wards 11, 14, 16 and in the Administration area.

Finally on the 22 Feb. PIMS went live in the Wards making the whole system operational. PC Power, a local computer company, supplied the hardware and network equipment and two days later contract negotiations recommenced.

Communication between the PIMS Committee and IS Department weakened in February due to the IS nominee on the Committee leaving and it became "unclear what support could be expected from IS at this stage". The PIMS committee was also revamped and condensed at the request of the Manager of the Women's Health Service, as the system was now operational. By March the PIMS Committee was still questioning whether the PIMS/IBA interface should even be pursued, however despite their

reservations, they wrote to the Manager of the IS Department, expressing their concern over finding the most cost-effective method for arranging that interface, suggesting four different scenarios for integration. The Committee went on record saying that they doubted the value to management of a complete interface, which they believed to be probably the most expensive option. This expense, they said, was their main reason for not seeking this degree of integration to date. The PIMS Committee felt that the depth of PIMS data was not essential for IBA/ADT system.

On 12 March Prof. John Hutton was stunned to learn that a decision had been made by Senior Management of WellMed that the \$150,000 Capital Estimates for the PC Perinatal System which had been submitted on the Woman's Health Budget was to be divided up into \$70,000 for the hardware and software and \$80,000 for the interface with the IBA patient management system (the hospital mainframe system). This was a major change in principle and not at all what those in the Women's Health Service had believed to date. The Women's Health Service had estimated they needed all the \$150,000 for hardware and software if they were to complete the implementation of PIMS at Wellington, Kenepuru & Hutt maternity units. They believed that the cost of the interface was an IS capital item and not a Women's Health Service capital item.

As of the 16 March 1993, despite repeated requests to continue negotiations, and having conceded to WellMed's requests within 48 hours on the 26 February, Terranova were still unable to conclude their contract with WellHealth which effectively meant that the funding was still inaccessible to Hutt West Research, Terranova and other suppliers. Given the seriousness with which Hutt West Research and Terranova perceived the situation, they decided to suspend all further installation of PIMS until such time as the contract was signed.

Although the existing system continued to collect clinical data within the Women's Health Service, the system was not expanded to include the production of management or clinical reports nor the collection of further antenatal data. Plans to connect the electronic interface with Medical Records were also suspended and only manual data, as opposed to taped data was sent for costing.

The IS department staff rejoined the PIMS committee on 17 March and the PIMS Committee went into abeyance pending the signing of the contract. The Consumer Representative was then paid for her services by Hutt West Research and her position on the Committee was closed.

On the 5 May 1993, 16 months after the project had been commenced, despite the contract still being unsigned, Hutt West Research submitted its invoice to the Board for the reimbursement of their costs.

Hutt West Research had funded the installation of some hardware, the software consultancy and some implementation fees for the installation of the PIMS system in Delivery Suite and the "training" computer system which was also installed in Delivery Suite. Prof. John Hutton decided at this point that it would be inappropriate for the University O&G Department to operate a software license and that their future access to the system would be via the same channels as other users. By this stage, the only remaining capital item required was a workstation for the Manager of the Women's Health Service which was to be ordered and invoiced directly for management reports and research.

An internal memo on the 17 May noted that the contract between the Board and Terranova was still unsigned and that the Board was still negotiating with IBA over the interface. The contract was eventually signed on the 25 May and Terranova was paid in June. Thereafter Terranova continued with the implementation process as specified in the contract.

On the 24 June Prof. John Hutton expressed his concern to the Manager of the Women's Health Service that if the money allocated for PIMS in 1992/93 financial year was not all spent it may well become "lost" again. He recommended that she purchase her workstation which would be needed for the management reports which after all was the actual purpose to the whole project.

On 30 June Wellington Area Health Board ceased to exist as an entity. At that time, payments in full had been made to P.C. Power, who supplied the hardware plus set up the network, and Terranova. However Hutt West Research had not been reimbursed.

PIMS: Postscript.

Hutt West Research was finally reimbursed for their invoiced amount on 16 August 1993 by the unit responsible for disestablishing the Wellington Area Health Board. The financial reimbursement for both Hutt West Research and the developers, did not accurately nor totally reflect the true costs of this project. Much unrecognised and unpaid effort went into seeing this project to fruition.

Prof. John Hutton resigned from Otago University and all of his appointments at Capital Coast Health, Wellington in mid October and is currently working out his resignation. His reasons for resigning were multiple. He agrees that the events that occurred throughout the lifetime of this project, which after all have gone on since the first day of his appointment will have contributed to this decision.

Two weeks later, on 27 October, Terranova won the 1993 Microsoft Open Awards for Best Commercial Application for their neonatal product, NIMS. This prestigious award, which has given the company international recognition for their talents as software developers, was given by Microsoft in recognition of Terranova's ability to design innovative world class state-of-the-art software. In fact Microsoft were so impressed with Terranova's software that they awarded Terranova additional prize money to assist them in the international marketing of their products.

In early December, the new IS Manager, took the initiative to provide appropriate technical resources to support the hardware and software platform on which the PIMS product is implemented. Until this time, Terranova had provided, of its own volition, 24 hour technical support coverage at no charge.

A critical incident chart of the above events is provided in Figure 8.

Figure 8: Critical Incident Chart.

Conception of the idea	Prof. Hutton forms OSRC Subcommittee	1st application for funding \$93,000.	Dept. of Health convenes 1 day workshop	Dept. of Health commissions study of national information.	National Working Party formed
⇄	⇄	⇄	⇄	⇄	⇄
1980's	Mar 1983	Mar 1985	Nov 1986	May 1987	July 1987
Change to AHB's. Shift to regionalisation.	Application on WAHB capital estimates for \$150,000	\$150,000 approved	Funding frozen	Prof. Hutton contracts Terranova	1st Prototype on screen.
⇄	⇄	⇄	⇄	⇄	⇄
1989	Aug 1990	July 1991	Aug 1991	Jan 1992	Mar 1992
Antenatal Booking system live	Labour & Birth system goes live	Funding through	System operational	Contract signed	Terranova paid
⇄	⇄	⇄	⇄	⇄	⇄
July 1992	Aug 1992	Dec 1992	Feb 1993	May 1993	June 1993
WAHB ceased to operate	Hutt West Research paid.				
⇄	⇄	⇄			
30 June 1993	Aug 1993				

PIMS: The Issues

The contentious issues in this R&D did not revolve around "why" this R&D occurred but "how" it occurred and the context within which it occurred. People had no difficulty accepting the use of a computerised database to facilitate quality control. There was no significant resistance to change from consumers or the 180 users which included all Obstetricians, General Practitioners, Registrars, House Surgeons, Midwives, Nurses, office staff and Management.

Wellington Women's Health Service was at the time, located over six floors of a multi-storey building. The six floors comprised Delivery Suite, Outpatients, Administration, a mixed Antenatal and Postnatal Ward, a Postnatal Ward and a Gynaecological unit which also admitted Obstetric patients periodically. Practitioners in Wellington Women's Delivery Suite developed and adopted their own "in-house rule", that the person who did the actual delivery, did the data entry. This rule was necessary for both practical and logistical reasons as women and their babies are admitted, transferred and discharged from different units within this six-floor area. Additionally, babies are admitted to the neonatal intensive care unit which is housed on a separate floor within the same building. It is simply not practical in Wellington Women's Hospital for data to be transcribed onto PIMS by clerical staff from each women's notes. This would require increased clerical cover and would result in an increased risk of data entry errors plus a paper mountain of patient's notes as throughput is approximately 3200 deliveries a year. The resultant backlog of notes would also deny clinicians access to those notes until such times as the data was recorded. Such a system would be chaotic which is one of the reasons why PIMS was developed for direct clinician input.

Implementation of PIMS went smoothly. Initial training and familiarisation with the new technology was provided by the Developers. The Manager of the Women's Health Service attributes its smooth implementation to the fact that the concept of PIMS had been around for so long in the industry that it was simply a case of "oh it's arrived".

The real issue of contention was more specifically related to lack of consistent management support. This was exacerbated by the duration and timing of the R&D which occurred throughout more than a decade of almost constant public health sector reform in what was and still is, a climate of constant economic restraint.

Changes in Governments over the years brought changes in the way in which the public sector of the health industry was both organised and operated which in turn, affected this project. The project

started in the Hospital Board era, prior to 1988, progressed throughout the Area Health Board structure from 1988, and was finally developed during the two year caretaker period which existed from 1991 prior to the Board becoming a CHE in 1993. Predictably these changes in structure, organisational entity plus culture, brought changes in management. In the beginning of the research, i.e. the early 1980's, a consensus management style existed within the Hospital Boards and decision-making powers were shared equally between the triumvirate of the administration, medical and nurse managers. However this consensus decision making model, having fallen into disfavour, was replaced in the late 1980's by the Service Management model.

Throughout the life span of the R&D, the Wellington Hospital Board and later the Wellington Area Health Board also had, and continues to have, a School of Medicine attached to it, which is owned and operated by Otago University. The triumvirate management model extended its consensus decision making to include the views of the Clinical School Professors given that they were committed to clinical services of a high standard, as well as medical training of both undergraduate and postgraduate medical staff. The service (*vis-à-vis* teaching) management model, which replaced it, did away with the consensus approach and was modelled on a hierarchical chain of management accountable to their CEO, who in turn were accountable via the Department of Health, to the Minister of Health and thereafter the Government. This model was in keeping with the prevailing theoretical views of the time which in turn influenced the legislative reforms of the same period e.g. the State-Owned Enterprises Act, 1986, the State Services Act, 1987, and the Public Finance Act, 1988.

During that time, the Department of Health, on behalf of its Minister, continued to maintain a watchdog role over the expenditure of Vote:Health. Since the AHB Act 1983, Boards have submitted annual business plans which outlined service provision and budgeted expenditure. These plans were then scrutinised, approved and monitored centrally by the Department of Health, such control being part of the overall strategy of reform in which successive governments have struggled and continue to struggle with containing the threatened expenditure explosion within Vote:Health. The dominant policy throughout the history of the research was one of tight monetary control with Hospital Boards/Area Health Boards being subjected to allocation cuts in their total budgets on an annual basis. The end result was that Chief Executives applied downward internal pressure within their management layers to keep expenditure within budget.

Service Management was introduced in 1990 into the Wellington Area Health Board and the Manager of the Women's Health Service took over as Manager Wellington Women's Health Service

having previously been Principal Midwife of the Women's Health Service since 1989. At that stage the Board divided Women's Health into four separate services - Wellington, Hutt, West Coast (Kenepuru) and the Wairarapa, each having its own service manager. The specific management control of the R&D was not taken on by the Manager of the Women's Health Service at this stage because the project was Board-wide, not service specific. Prof. John Hutton was left therefore to continue pushing his vision, which by this stage, was still only an idea, having never having made it past the paper stage.

In 1992, the Chief Executive reorganised and regionalised the management structure of Wellington Area Health Board. The CEO created an internal purchaser provider split which saw WellHealth as the purchasing body, and WellMed, CareWell and the Wairarapa as the three provider groups. These titles were just made up names given to identify the separate groupings of services. Each of the three provider groups had their own General Managers and Senior Management team. In theory each General Manager was accountable for running their separate services with the Chief Executive managing the Board which functioned as the purchasing body. Women's Health Services were regionalised under WellMed which incorporated Wellington, Hutt and the West Coast Women's Health Services with the Wairarapa left separate. The three Women's Health Service Managers were combined under one regional service manager and the Manager of the Women's Health Service was the successful incumbent for the job. However it is also worthy to consider that at the time of these redundancies and appointments, it was widely anticipated within the industry that this new structure in Wellington whilst it was the face of things to come, would probably cease to operate on 1 July 1993. In reality, these new appointments were at best, only short-term positions in what was for Wellington Area Health Board essentially a caretaker environment until the reforms became operational on 1 July 1993.

Throughout these year-in, year-out reforms, which created varying degrees of turmoil within management, Prof. John Hutton simply continued on championing his case for a perinatal information system. As Professor of O&G he had multiple management roles, accountabilities and responsibilities and was both Advisor to the Board on O&G as well as having a relationship to the Manager of the Women's Health Service whose role changed from Senior Midwife, Wellington Women's Hospital, Wellington Area Health Board, through to Service Manager, Wellington Women's Health Service, Wellington Area Health Board, and finally to Regional Service Manager, WellMed, Wellington Area Health Board.

Confusion also developed over the ownership of the R&D basically because the R&D was driven by Otago University staff, over more than a decade, and largely developed in the University's O&G Department office space. Not surprisingly, the project was perceived by management as being "owned" by Otago University and not the Board. Prof. John Hutton, was also clearly seen as the project manager having been one of the original prime movers and Deputy Chair of the National Working Party.

Aside from the above issues, unfortunately not all Wellington Area Health Board managers were actually aware of what the true benefits of a Perinatal Information System really meant and because of that fact, there was neither mutual agreement nor unanimous support for the system amongst management. Now one could argue that the advocates simply did not market their idea well enough but this was very difficult at the time as people in management kept changing and furthermore, the rules for implementing proposals also kept changing. It may also be that their arguments fall on deaf ears. Whatever, interviews revealed that some management perceived the Perinatal Information System as merely a clinical based information tool which would gather clinical statistics that would be of value to clinicians and the Department of Health. In adopting this position they totally overlooked its value as a management information system. Unfortunately such a narrow perspective is not uncommon in the health industry and probably has its roots in the fact that, generally speaking, managers and clinicians have traditionally seen their roles as quite separate whereas in fact the reverse is true. This peculiarity may well be health sector specific and may also relate to the fact that health is a service industry and service industries have traditionally been slow to perceive service as a product. Most manufacturers, on the other hand, have always been quite clear that they need both quantitative and qualitative data on their products and that efficient and effective product management is in fact the essence of good business management. It was and is therefore, quite short-sighted for health sector managers to argue that quantitative and qualitative clinical data is only relevant to clinicians and as such has either minimal or no relevance for them. In fact those who continue to advocate this approach discredit themselves by demonstrating a poor understanding of health service management.

Another factor of note was the slowness by management to value the commercial potential of the product. Once Prof. John Hutton had accepted that a national perinatal database was not going to happen, and that Wellington would probably have to go it alone, his vision changed to the Wellington Area Health Board developing its own software and in the process, owning the intellectual property rights to that software. Such a move would have enabled the Board to market the end-product for their commercial gain if they so desired and given the prevailing ethic of the health reforms which

since July 1991 repeatedly called for more innovation and commercial business practice, such a vision was not out of step with the current thinking. It was also no secret that such a perinatal database would have commercial potential. The marketing opportunities had been openly acknowledged during the research and the fact made available in the public domain since 1988. The software product was even named WPIS in recognition and anticipation of, Wellington's role in its development and future ownership.

One other factor which added fuel to the fire, was the sheer speed with which the project progressed from initial specifications to prototype stage and further development. Basically after years of procrastination and delays, the project progressed from the paper/talking stage to being up and running in just under three months, catching some managers unaware that it was even happening. This happened basically because Prof. John Hutton had access to and used the goodwill of Terranova and an external source of funding to develop the project. The private developers also shared the same passion about the project and went to work immediately. Both the confusion about ownership and the communication problem were compounded by Wellington Women's actual physical separateness from the main hospital plus the sheer day-to-day busyness of senior staff.

Prof. John Hutton recalled that the problems started over the contract and its funding from about April/May 1992 onwards and gathered momentum from there. In hindsight Prof. John Hutton cannot be certain what the true reasons for Management's change of heart were actually related to. He has since speculated that the problems which arose with the Senior Management of WellMed, may well have been related to either the fact that Management simply decided against wanting to own it, or that they simply couldn't afford to own it, or that they didn't want to work with Hutt West Research or with Terranova. He believes that Senior Management really did want to own the software but that they didn't want to invest any money in its development, preferring instead that Hutt West Research and Terranova continue to do all the R&D and carry all the risks and that basically, because the project had gone so far down the development track that both Hutt West Research and Terranova would have no option but to allow WellMed to buy the system off them and in the process Terranova would relinquish all proprietary rights to the software. Any relinquishing of the ownership of such assets comes at a price and this price was beyond Hutt West's ability to purchase. The other factor which may have influenced Management's attitude towards Hutt West Research and Terranova was the fact that Hutt West Research used their private funds to contract Terranova until the second allocation of funding came through. This may well have been seen negatively by some management who may have believed, rightly or wrongly, that they were being manipulated into purchasing the

system and that their decision making powers regarding their rights to allocate financial resources were being usurped.

With hindsight one has to say that management did in fact set the precedent for this problem back in July 1991 when they rightly or wrongly diverted the R&D's original \$150,000 funding allocation. There is also a question mark as to whether it was permissible to simply redirect these funds which had been approved under capital estimate funding. Hutt West Research could also be considered as either being most generous or most foolish in risking their funds in the face of no reimbursement guarantees. It is not likely that the real truth will ever be revealed or acknowledged publicly. In fairness what can be said is that not everyone saw the need for a perinatal information management system in the same light and with the same priority, for a variety of good reasons, all of which had some validity. All the affected parties believed they had and were acting in good faith, and all had different perspectives on the matter depending on the angle from which they were coming to it.

Unfortunately the failure to resolve the contractual issues and the continual funding problems, did nothing to promote a harmonious relationship between the key parties. Whilst this non-resolution was going on, the Developers were carrying all the risk and costs, but more important, they still held ownership control of the product. The situation became even more complex when news of the project spread amongst other Area Health Boards. Several of them began courting the Developers to purchase licenses to operate the product. Finally, 11 months after the development had begun, on 1 December 1992, the minutes of the WPIS Committee recorded Prof. John Hutton as saying that it had been decided that the Developers would retain ownership of their product. The product's name was then changed to PIMS and licenses to operate the software were sold commercially to other Area Health Boards.

Wellington's chance to own its intellectual property was officially forfeited. Nine days later the funding was approved by the Department of Health and WellHealth asked Terranova to submit it's contract for leasing the software. There was a further six month delay in resolving the contents of this contract between the Management of WellHealth and Terranova and it was not finalised until five weeks before the Board ceased to operate. The actual costs of the R&D are now commercially sensitive but Wellington Women's did receive a number of free software licenses from Terranova in recognition of the contributions of Prof. John Hutton and other Wellington Area Health Board staff to the development of PIMS although private clinicians and other advisors were also involved in its development. Terranova's software and implementation services were priced at approximately 50 percent of the prices on offer to other hospitals.

Finally the last factor which should not go unmentioned is the personal costs to the product champion, Prof. John Hutton. These were enormously high and he is now able to acknowledge this fact. The Manager of the Women's Health Service, openly acknowledges that no-one attached to the project would have hit more brick walls than Prof. John Hutton did in trying to bring the perinatal database to life. This high personal cost is likely to have been a contributing factor in his resignation.

With the benefit of hindsight, one can speculate as to whether PIMS would be operational today if the project had been managed differently and everyone had waited for funding to be released. In that case, would Prof. John Hutton still be pushing for the introduction of the system? Sceptics within the health industry would probably argue the later scenario as more realistic. One can also speculate on whether such an initiative would have floundered on dispute and compromise. The Manager of the Women's Health Service believes, in retrospect, that the project basically had to go through the process that it did and that she personally still can not see how it could have been achieved differently, given the circumstances which were happening at the time.

What had started more than a decade ago as a national initiative for a national perinatal database which would be funded once by a national agency, used nationally by all providers of women's health services and linked later to child health services, was now, ironically, developed privately and owned privately. Over the ten years which it took to bring a perinatal information management system into being, paradoxically access decreased as the end price increased. It is impossible to be certain whether the end monetary costs are now proportionately less from having waited some 10 odd years. Questions are raised at what cost this delay has had on the overall status of women's and children's health in New Zealand. Information technology has certainly improved exponentially over the last decade so there has been some benefit in delaying the development. There may well also be some advantages in developing a local product, which can then be marketed, as opposed to buying an existing product developed either in New Zealand, or off shore. There is also the question as to whether it was in fact better to have the product developed by external consultants, who were specialist software developers, rather than developed "in-house". Given that the product must always be continually reviewed and redeveloped if it is to maintain its leading edge within the market, the issue is an important one as to whether this would not be done more efficiently and effectively by software developers given that this is their core business. It is questionable whether a health service should actually be in the peripheral business of developing, owning, refining and marketing health software applications.

What also emerged throughout this research was that this project was not the only one of its kind actually happening within the Wellington Area Health Board during the fiscal year in question. Other pockets of software development were also occurring simultaneously throughout the Board in other areas. Terranova also developed their Neonatal system - NIMS at Wellington during the same fiscal year within the Child Health Service but this project was totally funded by external agencies and the use of the software licenses, the hardware and the costs of the maintenance, donated to the Neonatal Unit. It is worthwhile noting that the original impetus for this R&D had always encompassed a view that a women's and child health database was required and the development of NIMS was in effect merely a natural progression towards this end goal. It was suggested by a member of the IS staff, that in their opinion, this mushrooming of software development was merely occurring in response to unmet demand which has been compounded by the Board's continual cash-strapped position over at least the last few years.

Diffusion of this innovation is now occurring both nationally and internationally. Not surprisingly, both PIMS and NIMS have application to other CHE's. Ultimately the diffusion of these products will, over time, create the beginnings of a national database in women's and child health.

Fortunately for Wellington this innovation is most timely. Government, as funders of health care, now need to know outcomes of Vote:Health spending. This in turn, forces downwards pressure on RHA's as the Government's purchasing agents to account for how funds are spent. They in turn now contractually require service providers, including CHE's to provide them with a range of information on quality, volume and cost of service provision. PIMS documents clinical service provision at the point of provision by the clinicians, and in detail. It has the ability therefore to generate accurate up-to-the-minute management reports on quality and volume. It also provides a tracking system for identifying providers which comes at a time when the numbers of private sector contractors with contractual admission rights is increasing greatly. Currently Wellington's information systems are providing service managers with retrospective summaries which can be up to six months out of date by the time that summary is produced and are therefore of questionable value. PIMS has been designed using open system technology which enables it to be integrated with existing systems for costings to be done. Accurate clinical costings simply cannot be achieved without firstly recording comprehensively all relevant clinical events and who better to do this than the actual clinicians involved in delivering the care?

At the time of writing, management control of PIMS is being refined and it still lacks its own operational budget. The system is not yet fully integrated with the IBA/ADT system however IBA's

NZ representatives, Terranova and the IS Department staff, Capital Coast Health are all committed to implementing the interface. Irrespective of what has happened in the past, all stakeholders have a vested interest in getting PIMS operating to its fullest capacity as soon as possible so that everyone can benefit.

The Findings in Relation to the Literature.

Returning to Yin's (1989) definition of a case study (ref. p. 66), this single case study investigated health service management R&D within its real-life context. It was conducted at the only acute health care enterprise that acknowledged it conducted any health service management R&D during the fiscal year 1992/93. From the researcher's perspective therefore, the case study demonstrated a unique occurrence, which is not to say that other health service management did not happen elsewhere during the year in question, merely that if it did, it was not known to the researcher.

As anticipated, the case study revealed more detail than the survey questionnaire. It showed clearly the multiple organisational and environmental forces that impacted on the project during the decade it took to get the idea from conception to inception. The case study also revealed the history of the project and the experiences of a group of people who turned an idea in to an innovation. It documented their struggles and frustrations as they attempted to innovate in a health care industry that was undergoing constant change as a result of political and economic forces.

The role of the product champion, as defined in the literature by Peters (ref. p. 32), clearly fits the behaviour of Prof. John Hutton. This man relentlessly pushed for ten odd years against immense obstacles to turn his dream into a reality. It demonstrated the extraordinary lengths such people will go to. It also demonstrated the negative effects such consuming effort can have on the individuals concerned which may well in turn affect both their family and friends.

The case study also demonstrates a fit with the literature findings on creative personalities. Drucker's beliefs on innovators, i.e. that they are opportunity focused, define and confine risk and are often found scrutinising cash-flow projections, is very much a true description of Terranova. Their risk taking behaviour, whilst a huge gamble in a high-risk environment, was a well calculated response to what they believed was a real market opportunity.

Prof. John Hutton displayed true intrapreneurial behaviour whilst Terranova displayed entrepreneurial behaviour. Whilst there is truth in the adage that like will always attract like, the case study also demonstrated the power of this combination in practice. Both Prof. John Hutton and Terranova proved to be unstoppable against a management team that was constantly changing and variously contradicting and undermining the innovation.

The case study also exhibits knowledge workers in action as is evidenced by Prof. John Hutton and Dr Peter Stone. When the original \$150,000 was diverted, Hutt West Research used their personal money to fund the venture with no guarantees of reimbursement from the Area Health Board. In doing so, they demonstrated that they were driven by different incentives, confirming Burns (1975) and Rudman's (1990) comments (ref. p. 37-38). For these reasons, they must be managed carefully.

From an economic perspective, the Wellington Area Health Board's behaviour supports Schumpeter's theory that larger firms who hold monopolistic power, will be more inclined to innovate. Conversely Terranova's behaviour as a small, innovative, start-up company also demonstrates the theory that innovation is indeed generated from small businesses. As to whether market supply or market demand influenced the generation of innovation in this case, it is not obvious. Supply factors were present and the product could be developed because both the technology and the technicians existed. The developers agreed to do it for a price that was affordable to both them as supplier, and Hutt West Research as the original purchaser. Demand factors were also present and had been for a long time. That demand did not dissipate either whilst Prof. John Hutton spent the next ten years trying to secure the capital to fund the project. The current diffusion of the project throughout the global marketplace is further evidence of demand. It would appear from observation of the events in the case study that Mowerby and Rosenberg (1979) may be correct in their belief that the generation of innovation probably occurs through a mixture of both supply and demand factors. It would appear from looking at the way events unfolded in the case study, that both chance and luck also contributed to bringing PIMS to life although there is little discussion of these variables in the literature.

One of the overwhelming advantages noted from using the case study approach, as opposed to the survey questionnaire, was the sheer richness of data which comes from using multiple data sources. People's ability to remember events spanning a decade was a genuine research problem. This problem was offset partly by both the data collection approach and the fact that each participant validated the findings until they were satisfied that the results were a true reflection of events and beliefs. Not all facts were known or remembered by all participants but it became obvious over time that by following through with the validation process, a more comprehensive end result was achieved.

Participants remembered more detail each time they went through the validation process and as total information grew, memories were jogged. Archival notes also added immensely in enhancing the framework by supplying dates, times and other facts thereby creating an end result that was truly greater than the sum of its parts. This consensus style would appear to have an advantage over using a sole respondent who may well exhibit recall bias. The validation process, although time consuming, does keep the data truthful or more correctly, as truthful as it is ever going to be, given the reality of conducting research in a commercially sensitive world. Such an environment results in some facts never actually reaching the stage of being formally committed to paper and published in the public domain, although it should be noted that the researcher may well be privy to such information, as happened in this case study. Whilst this behaviour is detrimental to the development of knowledge within the discipline, the researcher does benefit personally. It is also true to say that the same situation may well exist with survey questionnaires as it is simply human nature for people to censure information they do not wish known by others. No methodology will ever succeed in overcoming the humanness of people.

In summary, the case study for all its merits, does have its limitations. It documents a single event, over one period in time, and with one group of people. It cannot be replicated, nor are its findings generalisable either and therefore it lacks external validity. However as noted previously (ref. p. 75), the same was also true for the questionnaire.

Chapter 6: Conclusions & Recommendations.

The purpose of the survey was to identify the capability and extent of research and development in health service management within New Zealand acute health care enterprises during the fiscal year 1 July 1992 to 30 June 1993 using the OECD model as a framework to guide the construction of the questionnaire (OECD, 1981). One aim of the survey was to locate an organisation that was conducting health service management R&D, and having successfully done so, to illustrate health service management R&D in practice by utilising case study research.

As discussed in Chapter 4, overall the disappointing response rate of the survey questionnaire means that mapping of health service management R&D could not be done. In total, the response rate for all acute health care enterprises was 9 from a total survey population of 31, i.e. a response rate of 29 percent. The results of the 9 completed questionnaires have been presented as a record of the responses. Even so, these nine respondents represented just over a quarter of all acute health care enterprises in New Zealand during the fiscal year 1992/93, which is a sufficiently large sample to allow some generalisations to be made. Only 1 public sector organisation, the Wellington Area Health Board, acknowledged that it did "pockets of R&D in health service management" and the case study is from this Board. In contrast three private sector acute health care enterprises claimed in the preliminary survey of acute health care enterprises to have carried out 8 R&D projects in total although no further information was forthcoming on these projects.

In terms of inputs, financial resources allocated towards R&D were minuscule as were the total number of personnel employed specifically in health service management R&D during the fiscal year 1992/93. Staff employed who had the potential to contribute towards R&D in health service management, i.e. those with postgraduate university qualifications in a management related discipline were also rare.

Attitudes were positive towards health service management R&D although respondents were ambivalent on appropriable and non-appropriable research. They believed that staff motivation was the most important factor in enabling organisations to do health service management R&D and that good up to date literature was the most important factor in enabling organisations to imitate other innovations. They believed that lack of funding was the greatest barrier to conducting any R&D and that both lack of funding and lack of skilled staff created a barrier to imitating other innovations.

Baseline data on managers in control of these organisations and the number, size, and location of New Zealand acute health care enterprises, prior to 1 July 1993 was not achieved. The respondents were all either senior managers or CEO's.

In summary, amongst other objectives, the health reforms aimed to encourage efficiency, flexibility and innovation in the delivery of health care. As of 1 July 1993, the Government has remodelled the public health sector along lines of managed competition. Now all health care providers, both public and private, compete for contracts to provide health care services. This has emphasised the importance of gaining and sustaining competitive advantage which is achieved in the main through a process of invention, followed by R&D which hopefully leads to innovation and thereafter competitive advantage and business success. Given that the health industry is a service industry, and that the outputs of its service delivery are dependent on the effectiveness of its management, the term 'management' being used in its widest sense (ref. p. 43), then it follows that a logical focus of R&D is that aimed at improving health service management.

Innovation however is not new in the New Zealand health industry. Innovative ideas have always existed. They were also promoted during the transition period as health reforms were being implemented, as evidenced by the 10 Government funded pilot projects trialing innovative ways of delivering primary health care which were conducted during 1992/93 (Dominion, 4.6.92, p.1) and no doubt they will continue to be generated. Certainly the initial survey of the private hospitals found evidence of R&D occurring throughout the fiscal year preceding the reforms although further detail was sadly not forthcoming. The fact that R&D in the private sector was spread across large, medium and small sized hospitals was also interesting. The other surprise finding in the private sector was that there are now 17 private hospitals which will admit acutely ill people 24 hours a day 7 days a week.

Low response rates for the full survey questionnaire meant that a comprehensive mapping of R&D in New Zealand could not be carried out. The poor response could well have been related to the pressure of organisations trying to cope with extra pressures brought about by the reforms, but it could also have been related to the topic and length of the questionnaire. However information relating to over one quarter of all acute health care enterprises in New Zealand, both public and private, provides a clear indication that on the whole, there has been very little R&D to date, and furthermore the capacity for doing so, is severely limited by a number of factors. These include a serious shortage of staff with post-graduate education qualifications in health service management, and a lack of funding allocated to health service management R&D, both of which are input

problems. Other problems which are attitudinal include a perception that there is neither the time or opportunity to do any R&D, nor is there evidence that managers are convinced that R&D is something that needs to be done.

However despite these limiting factors, one public sector organisation did conduct 5 health service management R&D projects during the fiscal year 1992/93 and one of these projects became the subject of the case study. The impetus for the R&D project described in the case study, had its beginnings over a decade ago and it was pure coincidence that it was implemented in the fiscal year preceding the reforms. Nevertheless the end result is still timely for Wellington Women's Health Service which now has an information system that will benefit them in the reformed environment. It must be acknowledged though, that this particular instance of R&D was not connected with the management of the Women's Health Service seeking to gain and maintain a competitive advantage; in fact quite the reverse is true. Prof. John Hutton and the other members of the National Perinatal Working Party always wanted a national perinatal database to improve the health status of all New Zealand women and children. Luckily because of the diffusion of PIMS and its related product NIMS (the neonatal information management system), the same end result may still be achieved despite decentralised control.

Whilst the case study has centered on the development of an information system, it is important to recognise that it is not the information systems itself which will in some way magically lead any organisation to achieve its competitive advantage. That situation will always be dependent on the way in which management use their systems to exploit their commercial advantage within the reformed environment. Women's Health still is and probably will continue to be funded by the Government for the foreseeable future. However by being able to measure, monitor and demonstrate quality, as well as establishing actual costs of delivering that service, Wellington Women's management, and now Capital Coast Health (the CHE), will be in a better position than previously to exploit their competitive advantage in the new contractual environment. They will have more sophisticated access to information which will enable them to better meet their ever increasing external reporting requirements that are now being demanded by RHA's.

From a personal perspective, the triangulation methodology used in this research was most worthwhile in that it enabled a greater level of immersion in the topic. The questionnaire survey set the scene surveying the total population. It tried to cover a broad area and succeeded in establishing both that a paucity of R&D has been carried out, and in locating the whereabouts of a pocket of health service management R&D. Whilst it did not deliver answers to all objectives, it did point the

way forward for the case study research. Obviously a multiple case study design could have been conducted in the Wellington Area Health Board as the Board carried out five R&D projects in total during the 1992/93 fiscal year. This option however was discarded as it became obvious that the triangulation methodology was absorbing vast amounts of time and a multiple case study design was not possible in the time permitted, nor indeed could be expected to generate different conclusions than those from the single case study. The questionnaire survey was complicated by the turmoil created by the health reforms and the process of improving response rate administration increased that complexity. Furthermore, the case study which involved collecting data from multiple sources and from persons who were all working in this same turbulent industry, proved equally as complex. A limitation with the triangulation method is that as it takes more time, it becomes more expensive. It also results in a doubling up of data which in turn doubles the collation and writing up process. Nevertheless this extra effort is well worth it as the researcher gets to examine the topic from the widest possible angle which adds immensely to personal understanding of both the topic and the research process. In hindsight, adopting a single methodology seems somewhat limited as it effectively denies the researcher both more information and the different perspectives afforded by each method.

In closing, although the research topic was timely, the outputs and outcomes of this research were without doubt affected by the turmoil which existed in the health industry. One could argue 1992/93 was a bad year to choose but, on reflection, most years over the last decade at least in the health sector have been years of change and restructuring. Unfortunately to conduct any health management research requires interaction with health service managers at some point, all of whom are busy people. Certainly aiming to conduct the survey was optimistic in the year in which reforms were effected, but as it hadn't been done before, it was necessary to establish the whereabouts of health service management R&D and the survey achieved this aim. The OECD model, on which the questionnaire was designed, and which is also used by the Ministry of Research Science and Technology, will be seen more regularly in future in the health sector. In time, more health service managers will undoubtedly acquire post-graduate education. This coupled with research backgrounds will mean they will become more familiar with the process and the terminology and hopefully more interested in fostering R&D in their enterprises and even more innovative in their practice.

Recommendations for Practice.

Health service managers should, if they have not already done so, give serious consideration to improving their post-graduate qualifications in health service management. In doing so, they should be conscious of the fact that they need to include research in their personal programme of study. In the meantime they should be taking active steps to increasing these skills amongst their employees.

Within every organisation there will be a number of innovative employees struggling to find support for their ideas who need nurturing. These people should be actively sought out and listened to as without doubt some of their ideas may be well worth piloting in the first instance. One never knows what end result may appear from such encouragement.

New Zealand funders/purchasers and providers of health services should also communicate with one another on the issue of how to increase innovation in service delivery. It is impossible to believe that such persons do not have either the inclination or capacity to work out innovative ways to increase the levels of health service management R&D. It has been suggested that some form of monetary incentive could be worked out which suits all parties and public sector respondents have indicated that such a move would be welcomed.

Recommendations for Research.

Obviously there is a need for monitoring the state-of-the-art of health service management R&D within the New Zealand health service. Based on the belief that what gets measured gets done, bodies such as the Ministry of Health, Ministry of Research Science and Technology, and the Regional Health Authorities should monitor the outputs of health service management R&D and the amounts of funding spent in this area.

On a more serious note, it is vitally important that more research is conducted to establish what the true level of expertise is in health service management within New Zealand that is capable of promoting and conducting such R&D. It is pointless to criticise a service for poor management if it simply does not have the expertise available within its ranks to improve through imitation and innovation. Once the true dimensions of the problem are known, then politicians, policy makers, academics and practitioners are enabled to accept responsibility for, and can do something about, improving this situation.

Additional case study research into successful and failed R&D will validate the findings of this case study, and further clarify the enabling and destructive human and organisational factors related to innovation. Findings of such research will be of wide interest but vitally useful to managers.

Finally after a reasonable length of time to allow for the effects of the reforms to be evident, the total population survey should be repeated to establish whether the reforms have increased innovation in health service delivery.

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64a Churton Drive,
Churton Park,
Wellington 4.

Appendix A.

MASSEY
UNIVERSITY

Private Bag 11222
Palmerston North
New Zealand
Telephone 0-6-350 5194
Facsimile 0-6-350 5661

FACULTY OF
BUSINESS STUDIES

DEPARTMENT OF
MANAGEMENT
SYSTEMS

(04) 478 4387

DATE.

THE CEO

.....
.....
.....
.....

Dear Sir/Madam,

Information sheet for a research survey.

1. Introduction.

I would like to request your co-operation in a national survey which will involve all GM's (or equivalents of New Zealand acute health care enterprises.

I am a full-time Massey University student currently completing a Master of Business Studies, majoring in Health Management. As part of the requirements for this degree, I am in the process this year of carrying out research towards a thesis. The title of my thesis is Research and Development in Health Service Management: a survey of New Zealand Acute Health Care Enterprises, 1992/93.

2. Aims of the study.

The survey aims to discover what, if any, were the outputs and the actual and potential inputs of research and development in health service management during the fiscal year 1 July 1992 to 30 June 1993. It will also seek to explore numbers of staff who had the capacity to conduct research and development in health service management, management attitudes to wards research and development, and identify what future issues should be addressed in health service management research and development.

By capturing the state-of-the art of research and development, at such a significant moment in time, this study will provide an historic snapshot of the New Zealand health industry. It will provide valuable information for future research on the topic.

3. Ministerial Endorsement and Ethical Approval.

This research has been endorsed by the Rt. Hon. W. F. Birch, Minister of Health. Ethical approval to proceed has been granted by Massey University Human Ethics Committee and thereafter by the Wellington Area Health Board Ethics Committee acting in an umbrella capacity for all other Area Health Board Ethics Committees throughout New Zealand.

4. Action required.

Due to the changes brought about by the reforms it has now become urgent that I get the responses of all current GM's of AHB's before 1 July 1993. Therefore I will be telephoning you on Wednesday 26 May to confirm:

- (a) whether any research and development in health service management is currently happening in your organisation, and
- (b) to arrange how best to complete this questionnaire before 1 July 1993.

Possible options are that either I arrange a personal interview with you to record your responses or alternatively that you complete the questionnaire and return it by mail.

Sections 4-6 need to be answered by you personally whereas sections 1-3 may be answered either by yourself or delegated to your personnel manager or senior researcher as appropriate.

Unfortunately it is not possible to estimate the time which will be involved for people in completing the questionnaire although feedback from the pretest estimated this time to be about 40 minutes for those who have not conducted any research and development.

5. Your rights as participant.

If you agree to take part in this study, you have the right to:

- refuse to answer any particular question;
- withdraw from the study at any time;
- ask any further questions about the study that occur to you during your participation;
- provide information on the understanding that it is completely confidential to the researcher. Personal and organisational confidentiality is guaranteed by the researcher. Your answers will be destroyed on completion of this study;
- be given the opportunity of seeing a draft report of the parts of the research findings, which pertain specifically to your organisation, for your prior approval, before a final copy of the report is completed;
- be given access to a summary of the findings from the study when it is concluded; and
- be advised on how to access a full copy of the thesis.

There will be no direct cost to you or your organisation. I acknowledge there are indirect costs by asking for your participation. I recognise that your time is pressured over the next 6 weeks and apologise for adding to your stress but I and others believe this data should be captured now before it becomes irretrievable.

If you have any enquires about the questionnaire, please don't hesitate to contact me on the telephone or contact me by mail. I am more than happy to answer any questions you may have.

Yours sincerely,

Elizabeth Wall.

Research and Development in Health Service Management: A survey of New Zealand Acute Health Care Enterprises, 1992/93.

CONSENT FORM.

I have read the Information Sheet for this study which has answered my questions to my satisfaction. I understand that I may ask further questions at any time. I also understand that I am free to withdraw from the study at any time, or to decline to answer any particular questions in the study. I agree to provide information to the researcher on the understanding that it is completely confidential.

I am willing to participate in this study under the conditions set out on the Information Sheet.

Signed:

Name:

Organization:

Address:

Date:

I request a draft report of the research findings pertaining to this organization before the research report is finalised. (Please tick preference).

YES	<input type="checkbox"/>
NO	<input type="checkbox"/>

Research and Development in Health Service Management: A
survey of New Zealand Acute Health Care Enterprises, 1992/93.

CONSENT FORM.

(PLEASE RETAIN THIS COPY FOR YOUR RECORD)

I have read the Information Sheet for this study which has answered my questions to my satisfaction. I understand that I may ask further questions at any time. I also understand that I am free to withdraw from the study at any time, or to decline to answer any particular questions in the study. I agree to provide information to the researcher on the understanding that it is completely confidential.

I am willing to participate in this study under the conditions set out on the Information Sheet.

Signed:

Name:

Organization:

Address:

Date:

I request a draft report of the research findings pertaining to this organization before the research report is finalised. (Please tick preference).

YES	<input type="checkbox"/>
NO	<input type="checkbox"/>

Appendix B.

RESEARCH & DEVELOPMENT (R & D) IN HEALTH SERVICE MANAGEMENT SURVEY.

Please complete and return this questionnaire with the consent form as soon as possible. A reply-paid envelope is attached for your convenience, otherwise please return to:

Elizabeth Wall, 64a Churton Drive, Churton Park, WELLINGTON 4.

Telephone enquiries can be directed to the researcher on (04) 478-4387 anytime.

This survey aims to explore the outputs plus actual and potential inputs of R & D in health service management, within New Zealand acute health care enterprises during the fiscal year 1992/93. It will also explore managers attitudes towards health service management R & D, identify possible issues of concern health service managers have in health service management R & D, and document the characteristics of the managers of these organizations.

EXPLANATIONS AND DEFINITIONS OF TERMS AND CONCEPTS.

The following terms are used fairly frequently throughout this questionnaire. If you would prefer to detach these definitions whilst completing this questionnaire, then do so.

New Zealand adheres to the OECD definitions of R & D as outlined in "The measurement of scientific and technological activities: Frascati Manual 1980" which was published in 1981.

The area of R & D that this study is focusing on is health service management research and development.

Health Service Management Research is a subcategory of health services or health systems research, which focuses on management problems, such as how to improve, efficiency, quality, flexibility, availability and effectiveness. It is concerned with problems in the organization, human resources, financing, utilization and evaluation of health services.

Health Service Management R & D, as per OECD (1981) guidelines, includes:

- any research conducted specifically for the R & D project,
- feasibility studies on research projects
- data collection attained primarily for research purposes.

It does not include,

- medical and treatment R & D;
- education and training including attendances at conferences;
- marketing research;
- customer satisfaction surveys conducted for general purposes as opposed to specific R & D purposes.
- policy related studies such as the ongoing analysis and assessment of existing programmes.
- operations research as a contribution to decision making.
- forecasting future changes in the pattern of demand for social services within a given area arising from an altered demographical structure.
- imitations of another organisation's innovations.

The rule of thumb is that the research must fit the criteria of being a new or novel idea or it must aim to substantially improve something.

Research and experimental development (R & D) is the process which links invention to innovation. It is creative work undertaken on a systematic basis to increase the stock of knowledge and to use this stock of knowledge to devise new applications.

An invention is only counted as an innovation once the R & D is completed and the innovation is operational. An innovation can only be counted once. If copied by another organization, it becomes an imitation not an innovation.

R & D covers three activities:

1. *Basic Research* which is experimental or theoretical work undertaken primarily to acquire new knowledge... without any particular application or use in view.
2. *Applied research* which is also undertaken to acquire new knowledge but is directed towards a specific practical aim or objective.
3. *Experimental Development* which is systematic work, drawing on knowledge gained from research and/or practical experience, that is directed towards installing new processes, systems or services, or to improving substantially those already produced or installed.

Research can also be defined as either appropriable or non-appropriable research. These terms relate to ownership of research.

Appropriable research is private good research and can be appropriated by private individuals and companies, either by simply practising non-disclosure, or by adopting the more formalised approach and regulating it's disclosure under intellectual property right laws as defined in the Commerce Act 1986.

Non-appropriable research is public good research which is carried out with public funds, primarily because it is unlikely to be funded by management. Research funded by the Health Research Council, or the Public Good Science Fund is non-appropriable research. The Minister for CHE's has also said that results of research funded by RHA's and performed in CHE's, which leads to medical and treatment innovations, should be made available in the public domain (NZHR, 1 Dec 1992, p. 12680).

SECTION 1: INFORMATION ON THE ORGANIZATION.

Q. 1. In which Regional Health Authority (RHA) area is your organization located? (Please tick correct response).

Northern RHA	<input type="checkbox"/>
Midland RHA	<input type="checkbox"/>

Central RHA	<input type="checkbox"/>
Southern RHA	<input type="checkbox"/>

Q. 2. Which of the following responses most accurately describes your type of organization? (Please tick correct response).

For-profit CHE	<input type="checkbox"/>
For-profit Non-CHE	<input type="checkbox"/>
Not-for-profit Non-CHE	<input type="checkbox"/>

Q. 3. Approximately how many full-time equivalent (FTE) staff does your organization currently employ?

FTE's

Q. 4. How many commissioned beds (i.e. acute plus others) are there currently in your organization?

beds

Q. 5. What was your organization's total expenditure for the fiscal year 1992/93? (include current and capital figures, but exclude depreciation).

\$

Q. 6. Did your organization have a defined R & D policy in 1992/93? (Please tick correct response).

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
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Q. 7. Was R & D referred to in your organization's strategic plan during 1992/93? (Please tick correct response).

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
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Q. 10. If one of your organization's strategies is to imitate health service management innovations which have been developed in other organizations, how do you learn of these innovations?

Q. 11. Did your organization carry out any R & D projects in health service management during the fiscal year 1992/93, i.e. research in progress?

Yes		No	
-----	--	----	--

(If no, please omit the following questions and proceed to Q.24 to continue with the questionnaire).

Q. 12. In total, how many health services management innovations did your organization implement during the fiscal year 1992/93? (An innovation is that which is invented by the organization, or is the result of substantially altering another organization's R & D).

--

Q. 13. Please complete all the columns below on all of your health service management R & D projects, which your organization worked on during the fiscal year 1992/93.

NB: The words listed in the second column, headed *key words for describing the subject area* will be used in the final report to identify the outputs of R & D. The actual titles will remain fully confidential.

RESEARCH TITLE	KEY WORDS DESCRIBING SUBJECT AREA	HIGHEST QUALIFICATIONS OF PRINCIPAL RESEARCHERS	CARRIED OUT BY ORG. EMPLOYEES OR EXT. RESEARCHERS	START DATE & FINISH DATE OF R & D PROJECT
1.				
2.				
3.				

(Q. 13 continued),

RESEARCH TITLE	KEY WORDS DESCRIBING SUBJECT AREA	HIGHEST QUALIF- ICATIONS OF PRINCIPAL RESEARCHERS	CARRIED OUT BY ORG. EMPLOYEES OR EXT. RESEARCH- ERS	START DATE & FINISH DATE OF R & D PROJECT
4.				
5.				
6.				
7.				

IF YOU HAVE MORE THAN SEVEN R & D PROJECTS TO LIST, PLEASE ATTACH A SEPARATE PAGE, USING THE SAME CATEGORIES AND FORMAT.

Q. 16. Of the R & D projects which you intend to treat as appropriable research, please indicate which ones do you intend to pursue intellectual property rights for, practise non-disclosure on, or you are still undecided on? (Please use the numbering system in Q. 13 to identify projects and answer by ticking appropriate columns).

PROJECT NUMBER	INTELLECTUAL P.R.	NON-DISCLOSURE	UNDECIDED

Q. 17. Using the categories described below in the key, list which category of funding applies to each R & D Project?

R & D Project Number (as per Q.13)	Category of funding (see Key for identifying choices below).

Key to funding categories for Q. 17.

- A = ORG
- B = ORG + HEALTH RESEARCH COUNCIL
- C = ORG + PUBLIC GOOD SCIENCE FUND
- D = ORG + UNIVERSITY (Please state which university)
- E = ORG + OTHER EDUCATIONAL INSTITUTE (Please state which other)
- F = ORG + HEALTH DEPARTMENT/MINISTRY OF HEALTH
- G = ORG + OTHER GOVT DEPARTMENT (Please state department)
- H = ORG + PRIVATE FUNDER.
- I = ORG + LOTTERY GRANTS BOARD

SECTION 3: ACTUAL AND POTENTIAL INPUTS FOR R & D IN HEALTH SERVICES MANAGEMENT.

3.1 ACTUAL CATEGORIES OF PERSONNEL ENGAGED IN HEALTH SERVICE MANAGEMENT R & D.

Personnel, according to the OECD, should be expressed in estimated FTE's. A FTE may be thought of as one person-year. Thus a person who spends 30 percent of their time on R & D and the rest on other activities should be considered as 0.3 FTE. Similarly if a full-time R & D worker was employed at an R & D unit for only six months, this results in an FTE of 0.5. (OECD, 1981, p. 66).

Q. 18. Using the above OECD definition as a guide, how many FTE personnel would you estimate your organization employed on Health Service Management R & D during the fiscal year 1992/93?

FTE's

The OECD use two systems to classify people engaged in R & D. They can either be classed by occupation or by formal level of qualification. This survey will use the qualification criteria. OECD uses the International Standard Classification of Education (ISCED) as the basis for classifying R & D personnel by formal qualification. Four classes are recommended. They are:

1. Holders of University Level Degrees (ISCED level 6 & 7)
2. Holders of other Post-Secondary Diplomas (ISCED level 5).
3. Holders of Diplomas of Secondary Education (ISCED level 3)
4. Other qualifications.

Q. 19. Using the above criteria as a framework, how many of your personnel engaged in health service management R & D during 1992/93 had the following qualifications? (Please use actual numbers).

Doctorates	
Masters degrees (+/- Hons)	
Bachelors degrees(+/-Hons)	

Q. 20. Of those personnel listed in the previous question (Q. 19) with Doctorates or Masters degrees, how many had the following management related qualifications? (Please use actual numbers)

PhD (in management related subject)		MCM	
MBA		MCom	
MBS		MMS	
MCA		MPP	
Other (Non-NZ) Masters in Management		MSocSc	

Q. 21. How many staff engaged in R & D on health service management other than the above held a post secondary qualification?

(These would include all holders of diplomas and certificates not equivalent to a university degree. Included in this category are personnel whose education has been "more practical than that of universities", e.g Non-degree holding registered nurses, occupational therapists; technicians, tradespersons; and others.

(actual numbers).

Q. 22. How many staff engaged in R & D on health service management other than the above held Diplomas of secondary education? e.g School Certificates or University Entrance.

(actual numbers).

Q. 23. How many staff engaged in R & D on health service management other than the above held other qualifications? *This includes those with less than a Diploma in secondary education, or incomplete secondary education, or education not falling under the other three classes.*

(actual numbers).

3.2 POTENTIAL INPUTS TO R & D IN HEALTH SERVICE MANAGEMENT.

3.2.1. POTENTIAL LEADERS OF R & D HEALTH SERVICE MANAGEMENT PROJECTS.

Q. 24. How many of your employees not currently engaged in R & D in Health Service Management would hold postgraduate degrees in management studies in the following. (Please use actual numbers if at all possible).

PhD (in management related subject),		MCM	
MBA		MCom	
MBS		MMS	
MCA		MPP	
Other (Non-NZ) Masters in Management		MSocSc	

3.2.2. R & D SUPPORT SERVICES.

Q. 25. Do you have library facilities in your organization? (Please tick correct response).

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

Q. 26. Does your organization employ librarians? (Please tick correct response).

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

Q. 27. Does your organization subscribe to professional journals on Health Service Management? (please tick correct response).

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

3.3 ACTUAL R & D EXPENDITURE.

According to the OECD Frascati Manual (1981), R & D expenditure is taken to be both current and capital expenditure. Depreciation payments are excluded.

Q. 28. During the fiscal year 1992/93, what figure did your organization budget for R & D in total?

\$

Q. 29. Of the above figure, what amount would have been allocated specifically to Health Services Management R & D? (give either actual or estimate amount or mark N/A if not applicable)

\$

Q. 30. Did your organization have a separate R & D department in 1992/93? (Please tick correct response).

Yes		No	
-----	--	----	--

Q. 31. If you answered yes to Q. 30, what was the size of your R & D department's budget?

\$

Q. 32. If you contracted external consultants to conduct R & D identified above, what was the size of the budget allocated?

\$

(This section to be completed by CEO/GM/ or equivalent if possible).

SECTION 4: ATTITUDES TO R & D.

Indicate the balance of your opinion by ticking one of the gaps in the 5 point scale adjacent to each question or statement.

Q. 33. How would you describe your attitude towards Health Service Management R & D?

Very positive Very negative.
1 2 3 4 5

Q. 34. How would you describe your organization's overall attitude towards Health Service Management R & D?

Very positive Very negative.
1 2 3 4 5

Q. 35. How important do you believe Health Service Management R & D is to your organization's ability to gain and sustain competitive advantage.

Very important Very unimportant
1 2 3 4 5

Q. 36. Should the results of all innovations funded by Vote: health be considered non-appropriable?

Strongly agree Strongly disagree.
1 2 3 4 5

Q. 37. Should the results of innovations funded by the Health Research Council be considered non-appropriable?

Strongly agree Strongly disagree.
1 2 3 4 5

Q. 38. Should the results of innovations carried out in private enterprises be considered non-appropriable?

Strongly agree Strongly disagree.
1 2 3 4 5

Q. 39. Should the results of innovations carried out in CHE's be considered non-appropriable?

Strongly agree Strongly disagree.
1 2 3 4 5

Q. 40. Should the results of innovations carried out by in-house researchers be considered non-appropriable?

Strongly agree Strongly disagree.
1 2 3 4 5

Q. 41. Should the results of research carried out by consultants be considered non-appropriable?

Strongly agree Strongly disagree.
1 2 3 4 5

(This section to be completed by CEO/GM/ or equivalent if possible).

SECTION 5: CURRENT & FUTURE ISSUES.

Q. 42. List the top three factors which enable your organization to do its own R & D?

1.
2.
3.

Q. 43. List the top three factors which enable your organization to imitate other organization's health service management R & D?

1.
2.
3.

Q. 44. List the top three barriers which prevent your organization from conducting health service management R & D?

1.
2.
3.

Q. 45. List the top three barriers which prevent your organization from imitating other health service management R & D?

1.
2.
3.

Q. 46. Which of the following types of assistance would help encourage your organization to do more health service management R & D? (Please indicate by ticking items which appeal).

More staff with Master's and Doctorate qualifications in health service management.	
More short-term involvement by university management department staff.	
More short-term involvement by management consultants.	
More joint appointments with Universities.	
More funding assistance from the Health Research Council.	
More sources of private funding.	
Ability to negotiate prices with RHA's which recognise importance of need for health service management R & D.	
More contestable graduate scholarships for research based university study in health service management.	
Access to health service management R & D literature.	
Access to a health service management R & D database.	
Negotiated concessions on profit margin by RHA's for demonstrated action in health service management R & D.	
Government income tax incentives for all R & D.	
Other idea(s), (please specify)	

(This section to be completed by CEO/GM/ or equivalent if possible).

SECTION 6: CHARACTERISTICS OF RESPONDENTS.

Q. 49. As respondent, what is the title of your position within the organization?

--

Q. 50. Which category applies to you? (Please tick box).

MALE	<input type="checkbox"/>	FEMALE	<input type="checkbox"/>
------	--------------------------	--------	--------------------------

Q. 51. Which age bracket do you belong to? (Please tick closest age band).

20 to 29 years	<input type="checkbox"/>
30 to 39 years	<input type="checkbox"/>
40 to 49 years	<input type="checkbox"/>
50 to 59 years	<input type="checkbox"/>
60+	<input type="checkbox"/>

Q. 52. Which of the following academic qualifications do you hold? (Please state qualifications and university where obtained in spaces provided. Use letters for NZ qualifications but explain O'seas qualifications in more detail please).

Q. 52.1. UNIVERSITY QUALIFICATIONS

QUALIFICATION(S)	FROM
Doctorates	
Masters	
Bachelors degree with Hons.	
Post graduate diplomas	
Undergraduate degrees	
Undergraduate diplomas	

Q. 52.2. OTHER PROFESSIONAL QUALIFICATIONS

(e.g. those completed at Polytechnics or awarded through other educational institutions, organizations, or licensing bodies e.g. ACA, NZIM, RCpN).

QUALIFICATION(S)	FROM

Q. 52.3. SHORT COURSES COMPLETED IN HEALTH SERVICE MANAGEMENT WITHIN THE LAST TWO YEARS.

NAME OF COURSE(S)	RUN BY

Q. 52.4 EXPERIENTIAL LEARNING.

Q. 52.4.1. How many years have you worked in the health industry? (include overseas experience)

In NZ	years
Overseas	years

Q. 52.4.2. How many years have you worked specifically in health service management?

years

Q. 52.4.3. How many years have you worked overall in management? (including health management)

years

Q. 52.5 MEMBERSHIP OF PROFESSIONAL ASSOCIATIONS/ORGANIZATIONS.

Q. 52.5.1 What professional associations/organizations do you currently belong to?

RESEARCH EXPERIENCE.

Q. 53. Have you conducted any research projects?

YES,	<input type="checkbox"/>	NO	<input type="checkbox"/>
------	--------------------------	----	--------------------------

If yes, please list projects below and give details.

I guarantee that no individual, organization, nor specific titles of any R & D will be identifiable in the final report.

THANK-YOU VERY MUCH FOR YOUR TIME AND EFFORT IN ANSWERING THIS QUESTIONNAIRE. I HOPE I HAVE NOT INCONVENIENCED YOU TOO MUCH AND THAT YOU CONSIDER THE COPY OF THE FINAL REPORT AS WORTHWHILE PAYMENT FOR YOUR EFFORTS.

PLEASE RETAIN YOUR COPY OF THE CONSENT FORM AND RETURN THE REST OF THE PACKAGE TO ME IN THE REPLY-PAID ENVELOPE.



MASSEY UNIVERSITY

Private Bag 11222
Palmerston North
New Zealand
Telephone 0-6-350 5
Facsimile 0-6-350 5

FACULTY OF BUSINESS STUDIES

DEPARTMENT OF MANAGEMENT SYSTEMS

Appendix C.

64a Churton Drive,
Churton Park,
Wellington 4.

☎ (04) 478 4387

DATE.

THE CEO

.....
.....
.....
.....

Dear Sir/Madam,

Re: Survey Questionnaire on R&D in Health Service Management.

Recently I sent you a questionnaire on the above topic. To date, I have not received your completed questionnaire in the mail. It is very important for my research that questionnaires are returned so that statistically valid conclusions can be drawn from the data collected. I would very much like your organization to contribute to this national survey as I believe that the results of this study will be of interest to you and may well benefit your organisation in future.

If you have already mailed your completed questionnaire, or it is still in progress, please disregard this reminder and accept my sincere apologies. However, as your questionnaire may well have gone astray, either in the mail, or for some other reason, I have taken the liberty of including a duplicate questionnaire, together with copies of the information sheet and the consent forms. I would appreciate your earnest consideration of my request to participate in this study. Please be assured your answers will remain confidential to myself as researcher. I will follow-up this letter with a telephone call if I haven't heard from you in two weeks.

Thank you for your co-operation.

Yours sincerely,

Elizabeth Wall.

Appendix D.

Semi structured interview guide sheet for the case study research.

1. When did the project begin.
2. Who commissioned it?
3. Why?
4. Who were the key researchers involved?
 - Name
 - Employment status - Internal/External
 - Tertiary qualifications ** particularly post-graduate
6. Were there contractors involved? If so, who?
 - Was the project planned with formal objectives?
 - If so, is that documented anywhere?
 - If so, can I have access to it as well as any other documentation?
5. What was the process for getting the project up and running?
 - Was the R&D piloted?
7. What resources were allocated to the project and where did they come from?
 - Staff?
 - Equipment?
 - Space?
 - Money?
8. What was the budgeted cost & final costs for the project?
9. What was your role in the project?
10. What was new or innovative about this project?
11. Was there any resistance encountered? If so, where, who from, & why?
12. What are the short & long term advantages to management from this innovation?
What are the short & long term disadvantages to management from this innovation?
13. What insights have you gained from this process?
14. Would you do anything different in future if you had to repeat this process?
15. Do you have any other general comments to make about any aspects of the project which you feel that I haven't explored.

Participants Rights - Case Study

You have the right to:

1. refuse to answer any questions;
2. withdraw from the study at any time;
3. ask any further questions about the study that occur to you during your participation.
4. know that you will be identifiable in the final report;
5. be the first to see and edit the final copy of all comments in the report which are personally attributed to you.
6. know that after you have edited your comments, the final copy will be seen by the CEO of Capital Coast Health for final editing and approval before it is made public. Commercial sensitivity will be respected.

Interviews will be taped and transcribed for analysis. The tapes and transcriptions will remain confidential to;

- myself.
- My research supervisor - Ms Nicola North,
Senior Lecturer,
Management Systems
Massey University.
- My research advisor - Prof. Tony Vitalis.
Head of Department,
Management Systems
Massey University,

Tapes and transcripts will be destroyed on completion of the thesis.

There will be no direct costs to any persons involved in this study.

A complimentary copy of the thesis will be resented to the CEO on completion of the study.



MASSEY
UNIVERSITY

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New Zealand
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FACULTY OF
BUSINESS STUDIES

DEPARTMENT OF
MANAGEMENT
SYSTEMS

Research and Development in Health Service Management:
A case study of a New Zealand Health Care Enterprise.

CONSENT FORM.

I have had the intent of this case study explained to me which has answered my questions to my satisfaction. I have also read the attached rights sheet. I understand that I may ask further questions at any time. I also understand that I am free to withdraw from this study at any time, or to decline to answer any particular questions in the study. I agree to provide information to the researcher firstly, on the understanding that any research projects carried out by this health care enterprise, which may become appropriable research in future, will not be identifiable in the final report and secondly, that I will have the opportunity to comment and approve a draft copy of the final report before the research is completed.

I am willing to participate in this study under the above conditions.

Signed: _____

Name _____

Title: _____

Organisation: _____

Address: _____

Date: _____

Facsimile

Appendix E.



MASSEY
UNIVERSITY

Private Bag
Palmerston North
New Zealand
Telephone 0-6-356 900

31 March 1993

Ms E Wall
MANAGEMENT SYSTEMS

Dear Ms Wall

re: Application "Research & Development in Health Service
Management: A survey of New Zealand Acute Health
Care Enterprises, 1992/93" (HEC 93/23)

Thank you for your above application which was discussed at the Human Ethics committee meeting on Friday 26 March 1993.

The following points are made:

- (i) There should be no apparent pressure on people to participate. Appendix 4: Non-Consent Form is not necessary and should be deleted.
- (ii) We note that the opinion of the committee was sought on two issues of commercial confidentiality, (a) whether it is permissible to follow a certain line of questioning and (b) thereafter report and discuss such findings.

As a committee, we feel we are not competent to answer but strongly suggest you seek legal advice.

- (iii) We would like you to take particular care with the storage of the data and to ensure that it is kept under secure conditions.

Your application is approved.

Yours sincerely

IVAN SNOOK
Chairperson
Human Ethics Committee

c.c. Ms N North

ETHICS COMMITTEE

Chairperson:
The Rev Owen S Robinson
Room 48, Ground Floor
Seddon Block
Wellington Hospital

Phone: 3855-999 x 5185
Fax: 3855-840

All correspondence to:
Secretary
Room 48, Ground Floor
Seddon Block
Wellington Hospital
Private Bag 7902
Wellington South

30 April 1993

Ms Elizabeth J Wall
64 A Churton Drive
Churton Park
WELLINGTON 4

Dear Ms Wall

Re 93/40 - Research and development in health service management:
A survey of NZ-acute health care enterprises.

The Ethics Committee has looked carefully at this proposal. It approves it, but the Committee has a number of reservations which I shall list.

1. The committee agrees with the Massey Ethics Committee that the non consent form should be deleted from the project.
2. The issues raised on page 7 are important and should be faced in the writing up of the report. We believe the questions of A. whether it is permissible to follow this line of questioning and B. thereafter report and discuss such findings, are proper questions to be asked. It is right that you see these as ethical matters and it is important that in the conduct of the study and especially in the writing of the report that great care be taken to preserve the confidentiality and the intellectual property rights of those who have been interviewed. However, in our view the questions are proper and indeed ought to be asked.
3. We do not think it wise to insist that people give reasons for non participation in the study. This could be seen as undue pressure and could prejudice the responses that you may get.
4. Members of the committee are concerned that the study is too large to be achieved within the timeframe. This is a matter for your judgement but we wish to put our concern on record.

Wellington Area Health Board
Te Waiora a Tara

Wellington District

- 2 -

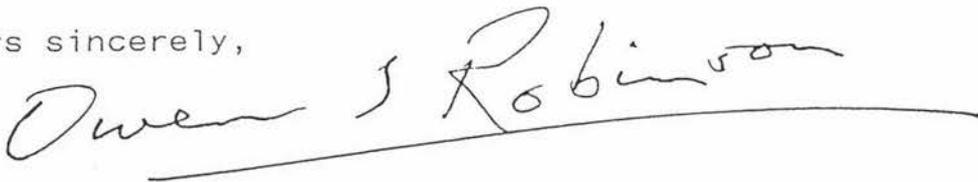
5. Since 1993 is going to be a roll-over year we wonder whether the choice of 1992/93 as the year for investigation is the wisest choice. Again this is a matter for your judgement but we flag our concern. If you do continue with the 92/93 year we wonder whether it might be wise to include some anticipatory type of question that asks how people see expenditure and programmes for the future.
6. One member of the Committee felt that the project was somewhat of a "blunderbuss" approach in that for most boards a single question asking whether any management research had been done or was contemplated might get as much information as the very detailed questionnaire that you have devised. It was felt by some members of the committee that at the present juncture, with considerable changes taking place in the health system, management would not feel able or willing to give time to answering such a detailed analysis of work with which they may not be very familiar. Again, however, this is a matter of judgement for you as a researcher but we felt we ought to sound this note of caution.

We do not intend to be negative in relation to this piece of research. It is the kind of work that ought to be done but we are concerned that you may spend a considerable amount of effort in vain because the circumstances which are beyond your control will prevent you from receiving sufficient data. As I have discussed with you before it might be better to get permission from Massey to reconstruct the project and make it a case study of selected boards whom you know will provide the information.

It is a condition of Ethics Committee approval that we receive a brief progress report on the study no later than April 1994.

Every good wish for your work.

Yours sincerely,

A handwritten signature in black ink that reads "Owen S. Robinson". The signature is written in a cursive style and is positioned above a solid horizontal line that spans the width of the signature.

Owen S. Robinson
CHAIRPERSON

ETHICS COMMITTEE

Chairperson:
The Rev Owen S Robinson
Room 48, Ground Floor
Seddon Block
Wellington Hospital

Phone: 3855-999 x 5185
Fax: 3855-840

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Room 48, Ground Floor
Seddon Block
Wellington Hospital
Private Bag 7902
Wellington South

18 June 1993

Ms Elizabeth J Wall
64 A Churton Drive
Churton Park
WELLINGTON 4

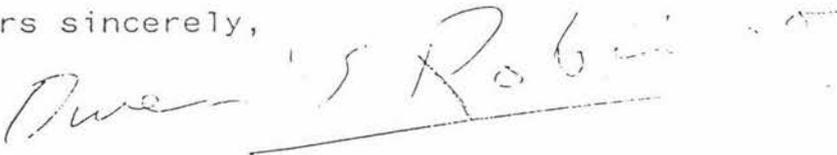
Dear Ms Wall

Re 93/40 - Research and development in health service management:
A survey of NZ acute health care enterprises.

Thank you for sending in the additional revisions to your protocol. This is a most useful extension of your study and very relevant to the current situation. You have Ethics Committee approval for this extension.

Every good wish for all your work.

Yours sincerely,



Owen S. Robinson
CHAIRPERSON

Wellington Area Health Board
Te Waiora a Tara

Wellington District

Private Bag 7902, Wellington South

Appendix F.

Research and Development in Health Service Management: Private sector survey questionnaire.

1. Has your organisation carried out any R&D in health service management during the fiscal year 1992/93?

YES NO

2. If yes, how many projects in total were carried out in your organisation?

.....

3. Does your organisation admit acutely ill people for either medical, surgical or psychiatric health care, 24 hours a day, 7 days a week?

YES NO

(This questionnaire was accompanied by the letter of introduction, consent forms and the definition sheet from the survey questionnaire (ref. Appendix A & B).