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A Multiple Case Study of Decision Making on
Pipfruit Orchards. ⁸⁸/₆₂₂₆

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Abstract

Traditional farm management texts view the farming firm as family oriented, owned and operated. In owner-operated settings owner's and manager's goals are assumed to be the same. However, corporate ownership structures, with ownership separated from management, make an important contribution to New Zealand agriculture. To further farm management research, teaching, and extension it is necessary to understand decision making within the specialised management structure of land-based corporates.

Decision making, as described in the business literature, takes place in activities (primary or support). Decisions are of three types; structured, semi-structured and unstructured and are linked to decision levels; operational, tactical and strategic. Decision types and levels can be compartmentalised by management level. The relationship between decision making activity and decision type and level is unclear. Further, the relationship between activity and management level is yet to be explained.

A multiple case study procedure, with an embedded design, was used to investigate decision making on corporate and owner-operated pipfruit orchards. Patterns were identified to describe actual decision making. These patterns were linked to the extant theory to identify the concepts and underlying propositions of managements' decision making.

Decisions were classified into primary and support activities, decision type (structured, semi-structured or unstructured), and decision level (operational, tactical or strategic). The case study owner-operator predominantly made semi-structured operational decisions in primary activities. The corporate orchardist attempted to compartmentalise decision making by management level. However, this compartmentalisation was incomplete. The corporate made a significant number of unstructured and semi-structured decisions at lower management levels.

Orchardists could improve decision making by making more decisions structured. In addition, the corporate has the ability to compartmentalise decision making which may lead to further improvements in decision making. A set of hypotheses are suggested that identify critical propositions between the three concepts of decision making and alternative management structures.

Introduction

"We are what we repeatedly do. Excellence, then, is not an act, but a habit."

ARISTOTLE

1.1. OWNERSHIP OF AGRICULTURAL FIRMS

Traditional farm management texts view the farming firm as family oriented, owned and operated. For example, all Kadlec's (1985) farm management problems were discussed in terms of a family owned and operated pig farm. Kadlec examined alternative structures in relation to the family pig farm. The notion of incorporated companies and their associated ownership structures was ignored. Other farm management texts such as Boehlje and Eidman (1984), Buckett (1988), Harsh, Connor, and Schwab (1981), Kay (1981) and Squire and Delahunty (1982) also provide little reference to alternative ownership structures.

Two notable exceptions are Castle, Becker, and Nelson (1987) and Johnson (1990). Castle, Becker, and Nelson reviewed farm business arrangements in the United States. They noted that although the majority of United States farm businesses are operated by one individual or family, joint venture arrangements were becoming more common. Suggested joint venture arrangements include partnerships, corporations, and simpler employee, lease and operating arrangements. Johnson (1990) examined business organisation in tropical farming. He recognised that the sole proprietorship is the oldest and simplest business arrangement. However, he suggested this type of business has several disadvantages that partnerships and company farming may avoid, for example, those of limited resources and unlimited liability.

Farm management research tends to have focused on "records and accounts, production and economic thinking, linear programming, decision theory and systems

simulation approaches" (Malcolm, 1990, p. 24). Issues of ownership, in particular its effects on decision making have been largely neglected to date.

Organisational structures adopted by agricultural enterprises include the sole-proprietorship, partnerships, trusts and companies (Lockhart, 1990). A sole-proprietorship is a business owned by one individual (Love, 1991). The owner legally owns the assets of the business, is taxed as an individual, and is personally liable for the business debts. Sole-proprietorship's are limited in their ability to raise capital (Castle, Becker, & Nelson, 1987). Owners gear their own resources to finance and raise capital for the operation and development of the business. Sole-proprietorship's, therefore, are the simplest ownership structure.

One claimed advantage of the sole-proprietorship is the sole responsibility for business decisions (Johnson, 1990). However, this may not strictly be correct. Owner-operated orchards often employ some level of debt capital. In such cases the lender may be involved with business decisions, particularly strategic decisions to protect their own capital. Sole-proprietorships have unlimited liability, therefore, the owner bears all losses if the business fails. The personal assets of the owner must, if necessary, be used to pay off business debts.

A partnership is a business owned by two or more people. Partnerships are governed by similar rules to sole-proprietors, additional regulation is outlined in the Partnership Act of 1908. Partnerships usually have specially prepared agreements which outline how the business is conducted. The provisions contained in the Partnership Act 1908 apply to the business if an agreement is not completed. The likelihood of disagreements increases and decision making is likely to be increasingly separated from ownership as the number of partners increases. For example, while all partners may be involved with strategic decision making, or determining the nature of the firm's business, they are unlikely to participate in day-to-day operations.

All the partners are responsible for the actions of other partners and, therefore, are personally liable for any and all the debts accrued by the partnership. Profits from the

partnership are distributed among the partners and each partner is taxed as an individual (Westpac Banking Corporation, 1990). Partnerships generally have access to greater capital resources than the sole-proprietor because partners are able to pool their resources.

Partnerships in pipfruit orchards in New Zealand are, commonly, husband-and-wife partnerships (Lockhart, 1990) formed to spread tax liability over two persons (to take advantage of New Zealand's progressive tax regime). In such cases one partner may have a greater influence on orchard decision making, similar to a sole-proprietor.

Special Partnerships are another form of partnership found in agriculture. These were particularly common in kiwifruit developments in the early 1980's (Eglinton, 1984). Regulations governing the operation of Special Partnerships are outlined in Part II of the Partnership Act of 1908. Special Partnerships consist of general partners and special partners. General partners are managing partners with unlimited liability, whereas special partners liability is limited to the amount of their capital contribution (Partnership Act, 1908).

Trusts may be established by any one person during their life (a settlor) or under the terms of their will (a testor). Essentially a trust obligates a person (trustee) to administer and manage a particular property for the benefit of beneficiaries (McRae, 1990). The manner in which the trustee may operate is set out in the trust deed established by the founder. A trust deed may allow the trustee wide discretionary powers or may dictate exactly how the capital is used and income distributed. Trusts in orcharding are less common than sole-proprietors and partnerships (Lockhart, 1990). However, they do offer an alternative ownership structure for orchardists to utilise.

The Companies Act 1993 is the principal legislation dealing with the formation and operation of New Zealand companies. This Act took effect on the 1st of July 1994, superseding the Companies Act of 1955. The legislation provides for *unlimited companies* (no limit to the liability of members) and *companies limited by guarantee*

(members' liability is limited to a predetermined amount). The majority of companies in New Zealand are *companies limited by share*, in which the owners (shareholders) are liable for company debts to the level of any unpaid share capital (Beck & Borrowdale, 1990).

The most significant difference between companies and sole proprietorships, or partnerships, is that a company is a legal entity in its own right. A company is distinct from those who own it; ownership often in the form of shares. In the sole proprietorship or partnership the owners and the firm are one and are personally responsible for the actions of the organisation. Whereas in a company, the owners and the company are separate legal entities and not liable for each other's obligations. The company is taxed as a separate entity. Tax-paid profits are then distributed to shareholders (dividends). Dividends are again taxable in the hands of the shareholders, although credits can be attached which recognise that tax has already been paid by the company (Westpac Banking Corporation, 1990).

Partnerships, trusts and companies are investment vehicles that can facilitate the separation of ownership and management. However, not all companies separate ownership from management thereby encouraging the use of specialised management. Companies vary from the small farming company with few, commonly family, shareholders to companies listed on the Stock Exchange with several thousand shareholders. The separation of ownership and management is more likely to occur in larger companies (corporates).

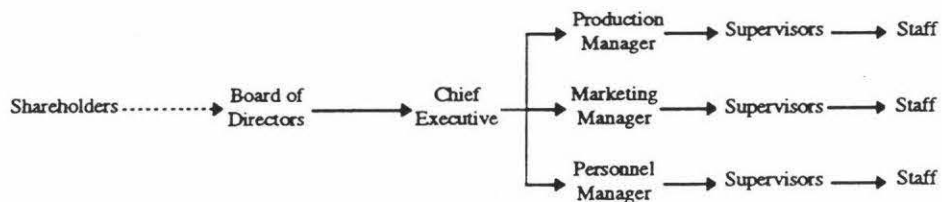
Company members elect directors who formulate policy and monitor the performance of the company on behalf of the shareholders. The directors appoint officers and management personnel that are responsible for operations. In turn, management may delegate specific decision making roles to lower management allowing greater specialisation when making decisions. Trotman (1994) suggests that...

the corporate form encourages management by specialists who need not be shareholders. Specialist management is critical in the efficient use of large

amounts of capital and fosters widespread investment in commercial activity. It frees the investor from the burdens of management. Specialists could also manage a partnership business but the partnership form does not encourage this because each partner is individually liable for the actions of management. (p. 6,203)

Corporate structures appear to have the critical mass necessary, in terms of capital and personnel, to employ specialist management 'in search of excellence' (Peters & Waterman, 1981). The employment of specialist management commonly results in a hierarchical structure (as displayed in Figure 1.1). However, horizontal structures also exist and are being postulated to further improve management's performance (Kaplan & Murdock, 1991; Ostroff & Smith, 1992). Figure 1.1 represents a typical specialist management structure, from shareholders to staff, where supervisors are employed to carry out production, marketing and personnel operations independently.

Figure 1.1. A generic example of a corporate structure.



Source: Adapted from Boxall & Green (1994).

In a publicly listed company ownership may not always be fully separated from management. Owners may be involved in strategic decision making and policy setting. Directors of publicly listed companies often own significant shareholding's in their companies. The level of director's ownership, for example, in three New Zealand corporations with land-based interests Apple Fields, Eastern Equities, and Grocorp in presented in Table 1.1.

Table 1.1. Annual levels of directors' ownership in Apple Fields, Grocorp, and Eastern Equities (publicly listed land-based corporations).

Year	Level of directors (and associated persons) ownership		
	Apple Fields	Eastern Equities	Grocorp ¹
1989	63.7%	56.5%	0.4%
1990	48.5%	52.4%	0.2%
1991	51.1%	54.9%	0.2%
1992	41.1%	41.0%	0.2%
1993	41.1%	26.1%	0.4%
1994	37.4%	21.0%	0.6%

Note: 1. Grocorp is largely owned by two companies who both have representatives on the board.
(The shareholding of these companies is discussed in Section 1.2).

1.2. INVESTMENT IN AGRICULTURAL FIRMS

During the mid-1980's the New Zealand sharemarket expanded at an extraordinary rate. Investment opportunities increased for several reasons, predominantly fuelled by the Labour Government's deregulation of financial markets. The Labour Government, elected in July 1984, discontinued prevailing interventionist policies with the desire to increase efficiency and competition in financial markets (Parker, 1987).

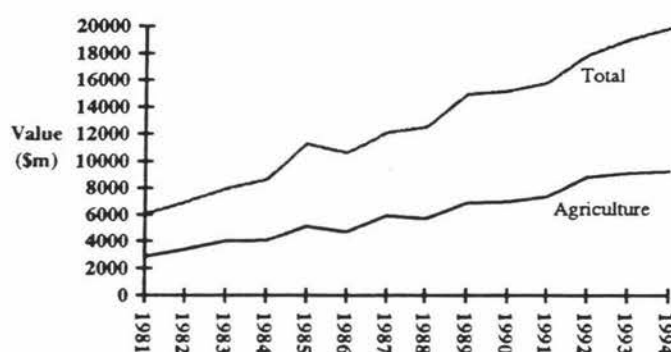
The performance of the New Zealand sharemarket is closely linked to the performance of several foreign share markets. In particular, movements in the NZSE 40¹ often correspond with fluctuations in the Dow Jones Industrial Index (New York), the FTSE-100 (London) and the Nikkei Average (Tokyo). In the mid-1980's various foreign governments were also in the process of privatising state enterprises (Cowley, 1990). Shares in privatised enterprises were issued to the public and subsequently floated on the share market, often at prices above subscription (Bose, 1988). This investment in foreign share markets further fuelled investment in the New Zealand share market.

¹ The NZSE 40 is an index based on the market capitalisation of the top 40 listed companies in New Zealand.

National reforms and privatisation led to an abundance of opportunities for both small and large investors. Banks and financiers were described as “throwing credit at their customers instead of dispensing it with lordy caution” (Parker, 1987, p.2). Several agricultural companies were among the investment opportunities offered to the public.

Agriculture (including horticulture) has an important place in the New Zealand economy due to its significant contribution to overseas trade (Johnson, 1992b). Exports of agricultural produce and total merchandise from New Zealand for the period 1986 to 1994 are shown in Figure 1.2.

Figure 1.2. Exports of agricultural produce and total merchandise from New Zealand for the period 1986 to 1994 (June year).



Source: Department of Statistics (1992, 1990, 1988, 1984); Statistics New Zealand (1994).

With the ease of securing capital, the public sought investment opportunities in New Zealand's land-based industries. Unfortunately, world prices for traditional agricultural commodities including sheepmeat, wool, and beef fell during the early 1980's (Manson & Mitchell, 1987). Falling world prices normally leads to reduced farm incomes. At the time, however, interventionist government policies subsidised farm income in New Zealand (Johnson, 1992a). These subsidies ensured farmers maintained a higher standard of living, albeit artificial, than if returns were dictated by market forces. Companies' production forecasts were often *over-enthusiastic* and expected prices appeared to embrace the continuance of subsidised returns. Therefore, investment was attracted to a sector that was not performing satisfactorily.

As subsidies were gradually reduced, beginning in 1984 and continuing through to 1989 (Sandrey & Reynolds, 1990), agricultural companies received returns substantially lower than those forecast in many company prospectuses. The failure to achieve expected returns was initially masked by the devaluation of the New Zealand dollar in 1984, which immediately increased export earnings. As a result of reduced returns, and the massive fall in share value that occurred with the global share market crash in October 1987, several agricultural companies were liquidated and their assets sold. A selected list of public companies with agricultural interests floated between 1984 and 1987, and their current status, is presented in Table 1.2 (listed in alphabetical order).

Table 1.2. Selected public companies with agricultural interests floated between 1984 and 1987, and their status in 1995.

Company	Year floated	Initial interests	Status in 1995
Agland	1987	Pastoral farming	still trading
Agricola	1986	Kiwifruit / Goats	delisted 1991
Apple Fields	1987	Apples	still trading
Cashmere Pacific	1986	Goats	delisted 1988
Eastern Equities	1985	Deer	still trading
Grocorp Pacific	1984	Horticulture	still trading
Producecorp	1987	Horticulture	delisted 1990

Public companies with interests in orcharding currently include Apple Fields Limited, Eastern Equities Corporation Limited and Grocorp Pacific Limited. The important attributes of each of these three companies, in alphabetical order, are now discussed.

1.2.1. Apple Fields Limited

Apple Fields Limited is a Canterbury based corporation with interests primarily in dairy farming and apple orcharding. The company was listed on the stock exchange in 1987, 130 hectares was then purchased to be developed into apple orchards. Apple Fields Limited has since diversified into dairy farming - becoming New Zealand's largest dairy farmer - and by 1995 increased their total orchard area to 524 hectares. In 1994 Apple

Fields Limited supplied 575,000 export tray carton equivalent² (tce) to become the largest single supplier of export apples to ENZA New Zealand (International) Ltd (Apple Fields Limited, 1994).

At their last balance date, 30th September 1994, Apple Fields Limited owned assets valued at \$134.8 million, up from \$109.5 million in 1993 (Apple Fields Limited, 1994). Shareholders' funds were \$70.2 million compared to \$56.6 million in 1993 and, as a percentage of total assets, increased from 51.7% to 52.1%. Asset backing per share is now \$2.40 compared to \$2.13 in 1993. Apple Fields Limited is owned by 1,298 shareholders of whom the majority are New Zealand residents.

The company reported an operating loss after tax of \$489,000 in 1994. This was reduced from a loss of \$3,792,000 in 1993 and operating profit (loss) could be expected to increase as their orchards reach full production. In addition, Apple Fields forecast an improvement in world apple prices leading to a profit in the apple division (Apple Fields Limited, 1993).

1.2.2. Eastern Equities Corporation Limited

Eastern Equities Corporation Limited is a diversified corporation based in Hawkes Bay. The company was floated in 1985 as Eastern Deer Corporation Limited. Established primarily as a premium deer breeding operation, the company diversified into pipfruit in 1987. After a trial planting in Central Hawkes Bay the company planted 125 hectares of apples in 1988. A further 22 hectares was purchased in 1991 with the option to purchase an adjacent warehouse to develop a packhouse. In 1992, a separate division of Eastern Equities Corporation Limited was created; Eastern Equities Corporation Horticulture Limited (EEC Hort). In the same year EEC Hort began development of their packhouse which was used for the first time in 1993. In October 1992 the horticultural division purchased Limnos Investments Limited, a subsidiary of Brierley Investments Limited. This acquisition consisted of a coolstore, and seven

² A tray carton equivalent (tce) is equal to one bushel, or approximately 20 kg of fruit.

orchards with total area of 221 hectares including 199 hectares planted in apples. EEC Hort now own twelve orchards with 351 hectares planted in apples, a packhouse and a coolstore complex.

At their last balance date, 31st August 1994, Eastern Equities Corporation Limited owned assets valued at \$58.5 million, up from \$55.4 million in 1993 (Eastern Equities Corporation Limited, 1994). Shareholders' funds were \$31.1 million compared to \$30.2 million in 1993 and as a percentage of total assets decreased from 54.2% to 53.2%. Asset backing per share is now \$0.92 compared to \$0.89 in 1993. Eastern Equities Corporation Limited is owned by 2,528 shareholders of whom the majority are New Zealand residents.

The company reported a pre-tax profit of \$5.379 million in 1994 up from \$3.612 million in 1993. The total apple crop decreased slightly with 966,135 bushels produced in 1993 compared to 971,000 in 1993. The export packout of 495,168 cartons represents 51.3% of total production and is 17% higher than that achieved in 1993.

1.2.3. Grocorp Pacific Limited

Grocorp Pacific Limited was floated as a public company in 1984. Established in Hawkes Bay as a large scale stonefruit producer, Grocorp Pacific Limited has since diversified into apple production. Thornton Station, purchased in 1984, was the first orchard development with 58 hectares of apples planted in 1986. Expansion continued in 1987 with the purchase of Tikokino and Te Papa orchards which were both planted in apples. More recent acquisitions include Kinross and Ngapuka orchards. The area planted in apples is currently 272 hectares.

At their last balance date, 30th September 1994, Grocorp Pacific Limited owned assets valued at \$28.8 million, down from \$29.8 million in 1993 (Grocorp Pacific Limited, 1994). Shareholders' funds were \$17.5 million compared to \$16.6 million in 1993 and as a percentage of total assets increased from 55.7% to 60.8%. Asset backing per share is now \$0.33 compared to \$0.31 in 1993. Grocorp Pacific Limited is owned by

1,265 share holders with 87% of the shares owned by overseas residents. Grocorp Pacific Limited has two major shareholders, one owning 49.99%, and one owning 36.66%. Both major shareholders are companies which have representatives on the Board of Directors.

The company posted a profit of \$1.747 million after tax and minority interests in 1994, compared with a \$1.595 million loss the previous year. The reversal was partly the result of higher returns from apple operations due to increased prices overseas and a better apple growing season. Grocorp Pacific Limited reports a commitment to diversifying income streams to invest in crops and product lines over which the company has greater marketing control (Grocorp Pacific Limited, 1993). Significant statistics for each of Apple Fields, Grocorp, Eastern Equities and the MAF Model Orchard³ are presented in Table 1.3.

Table 1.3. Significant statistics for each of Apple Fields, Eastern Equities, Grocorp and the MAF Model Orchard.

1994	Apple Fields	Eastern Equities	Grocorp	MAF Model
Directors' ownership	37.4%	21.0%	0.6%	100%
Total Assets	\$134,768,000	\$58,539,000	\$28,765,000	\$498,200 ¹
Capital invested in pipfruit	51.4%	41.9%	-	100%
Area	524 ha	351 ha	272 ha	10.6 ha
Total production	1,400,000 tce	966,135 tce	386,200 tce	24,500 tce
Segment Profit/(loss) ²	(\$0.388 m)	\$0.763 m	-	\$93,000

Source: Apple Fields Limited (1994); David Buys (personal communication, January 27th, 1995); Eastern Equities Corporation Limited (1994); Grocorp Pacific Limited (1994); Carmen Hoy (personal communication, January 25th, 1995); Ministry of Agriculture and Fisheries (1994a).

- Notes: 1. This is an estimated orchard value based on \$47,000 ha.
 2. This is an operating surplus/(deficit) before tax, interest, depreciation, drawings and development.

³ The MAF model orchard is 10.6 ha, based on data weighted from orchards in Hawkes Bay (54%), Nelson (34%), and Canterbury (12%). The model is indicative of a *typical* owner-operated orchard.

1.3. COMPARISON OF CORPORATE AND OWNER-OPERATED ORCHARDS

Management is responsible for strategic, tactical and operational decision making (Boehlje & Eidman, 1984). On an owner-operated orchard, all levels of decision making are undertaken by the owner. Decision makers, however, are limited by the amount of information that they can process at any one time (Simon, 1978). Consequently, as orchard size increases it becomes increasingly difficult to operate the business in the mode of an owner-operator. Therefore, a specialised management structure may be required to overcome these limitations.

As firm size increases, further hierarchical levels of management are required (Hodge & Anthony, 1991). Strategic decision making is then separated from operational decision making. Williamson (1967) suggested that "the larger and more authoritarian the organisation, the better the chance that top decision makers will be operating in purely imaginary worlds" (p. 123). He implied that managerial inefficiency may partly be related to the size or complexity of the organisational structure. The likelihood of operating in Williamson's *imaginary worlds* will be reduced through streamlining the management hierarchy and efficient communication of decisions between hierarchical levels.

Export pipfruit has traditionally been grown by owner-operated orchardists in New Zealand. From a survey of Hawkes Bay orchardists Lockhart (1990) reported that 59% were operated as partnerships, mostly between married couples, and 18% were sole traders. Therefore, nearly four-fifths of the survey orchards were owned and operated in the traditional manner.

Owner-operator orchards are significantly smaller than corporate orchards. The average New Zealand orchard is 8.7 hectares (Statistics New Zealand, 1993). An orchard of this size is most likely to be managed as an owner-operator orchard where the owner is responsible for all decision making. Corporate pipfruit orchards are significantly larger, the average size of the three corporates' (Apple Fields Limited,

Grocorp Pacific Limited and Eastern Equities Corporation Limited) orchard holdings is 382 hectares.

The corporate orchardist may compartmentalise levels of decision making. For example, in a corporate, the board of directors may be involved with policy setting and strategic decisions, whereas operational managers will make day-to-day decisions (Hodge & Anthony, 1991). Successful compartmentalisation *may* lead to efficient decision making as each person within the firm's structure performs fewer tasks, supposedly at a higher level of proficiency.

The three public companies, introduced in Section 1.2; Apple Fields Limited, Grocorp Pacific Limited and Eastern Equities Corporation Limited endured the same difficult economic and physical conditions experienced by other public companies with agricultural interests in New Zealand. However, they have all subsequently posted profits and continue to operate in an encouraging economic climate. The success of these companies may, in part, be due to successful management structures and decision making.

To date, farm management research has prescribed a normative model of decision making, largely for owner-operated enterprises (Boehlje & Eidman, 1984). However, it is unclear whether the model described for the owner-operator is appropriate for the corporate structure, where decision making is compartmentalised. Further, the extent to which normative models describe actual decision making in farm management remains largely unknown. Mintzberg (1988) suggests that there is often a difference between behavioural (descriptive) models of decision making, based on actual decision making and normative models, based on how decision making ought to be. Farm management research has largely ignored behavioural models of decision making. To further farm management research, teaching, and extension it is necessary to understand decision making within the specialised management structure of land-based corporates.

1.4. RESEARCH OBJECTIVES

This study is part of a larger research programme initiated by a group at Massey University (Gray, Lockhart and Todd) investigating decision making in agricultural enterprises. These researchers have recently published results of an investigation into drying-off decisions on seasonal supply dairy farms (see Todd, Gray, Lockhart, and Parker, 1993).

This study of orchardists' decision making was conducted in conjunction with another Masters student in the Department of Agricultural and Horticultural Systems Management at Massey University. That study, investigating information used in orchardists' decision making (Hall, 1995), was also part of the same research programme investigating decision making. The data collection for this study (discussed in Section 4.3) was conducted alongside Hall's study.

The aim of the research is to identify and describe decisions made by orchard management and discuss how decision making changes among the hierarchy of a corporate's management structure. The research compares a corporate's decision-making with that of an owner-operator. Managements' decision-making is then compared, and contrasted to the theoretical views expressed in the farm management, strategic management, and decision making literature.

The specific research objectives are:

1. To examine the relationship between the principles of decision making in farm management, and business management.
2. To identify and describe decision making within corporate, and owner-operated farm businesses.
3. To compare and contrast decision making within corporate, and owner-operated farm businesses.

4. To compare and contrast corporate, and owner-operator decision making with the literature.

1.5. OUTLINE OF THE STUDY

This chapter has provided an overview of the ownership structures commonly used in agriculture in New Zealand. The justifications for the study and the research objectives were then outlined. Chapter Two provides a brief overview of the philosophy of science and the methodology adopted in this study. A framework for describing the research method is then discussed. A review of farm management and decision making is presented in Chapter Three. Recent farm and business management literature is discussed with particular reference to management activities, decision types, decision levels and the decision making process. A description of the case study research procedure adopted for this study is introduced and discussed in Chapter Four. The case study descriptions for each case study are then presented in Chapter Five. Results are presented and discussed in Chapter Six. The chapter includes comparisons between the two case studies and the extant literature. The study's conclusions are then presented in Chapter Seven.

Chapter Two

Normal Science and Farm Management

"Men love to wonder, and that is the seed of science"

RALPH WALDO EMERSON

2.1. INTRODUCTION

The philosophy of science is the ubiquitous approach to epistemology and ontology to which humans consciously (or subconsciously) subscribe. This approach, variously referred to as the scientific or research method, provides a framework in which methodology, method and data collection can be examined. Oldroyd (1986), like many authors, narrates the history of the Philosophy of Science from the period of the Ancient Greeks. This chapter provides an outline of the philosophy of science, normal science, farm management research and the methodology employed in this study.

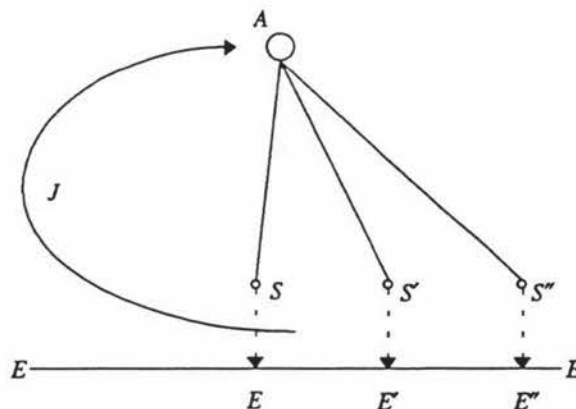
Research method is the autonomous scientific procedure encompassing both inductive and deductive methodologies (Kaufmann, 1958). The adopted methodology is dictated by the maturity of the research discipline, the research question and the researcher's beliefs, and attitudes towards each methodology (Sarantakos, 1993). Method or procedure is the research strategy (Yin, 1989) used to collate the data, for example, laboratory experiment, survey or case study. Whereas, data collection is the technique by which specific data is gathered, for example mail survey, personal interview or high performance liquid chromatography (HPLC). The research data is collated using the research procedure appropriate to answer the research questions. The method and techniques for data collection used for this research are described in detail in Chapter Four.

2.2. PHILOSOPHY OF SCIENCE (SCIENTIFIC METHOD)

Epistemology, the theory of knowledge and ontology, the nature of being, form the basis of the philosophy of science. The goal of science is to contribute to knowledge using prediction and control or explanation and understanding (Gale, 1979). The scientific method is the theoretical foundation by which humans generate and test theory to aid explanation, understanding, prediction and control. It is often reported that theory generation is inductive in nature and testing or refinement of theory is deductive (Wallace, 1971). Research may begin with either the collection of facts that leads to an explanation (hypothesis) or an explanation (hypothesis) that is tested (Beveridge, 1950). Hypothesis formulating research is known as inductive research and hypothesis testing research is referred to as deductive research. These two strategies are, however, inextricably intertwined (Hunt, 1983; Wallace, 1969) as integral and related parts of the scientific method.

Scientific method has been discussed by many authors, including Dessauer (Holton, 1965), Einstein (Holton, 1979), Oldroyd (1986), and Wallace (1971). Albert Einstein recognised the mutuality of the scientific method and depicted it in his *EJASE* model of the scientific process. Einstein explained his interpretation of the scientific process in his correspondence with Solovine (Holton, 1952/1979). Einstein's model of the scientific process is presented in Figure 2.1.

Figure 2.1. Einstein's model for constructing scientific theories.



Source: Holton (1979, p. 112).

The sum of worldly experiences, E , represents concrete facts that researchers are attempting to understand through the development of theory. The arc, J , is a “speculative leap or a constructive groping to A ” (Holton, 1979, p. 114), where A , axiom, is an explanation of E . Through the statement of hypotheses these A can be tested using deduction, or prediction, of S ’s. The ability of S to explain E determines the accuracy of a theory. The development of theory involves a series of $EJASE$ iterations until all of the experiences are explained by the theory, which then becomes part of a paradigm.

Normal science is “research firmly based on one or more past scientific achievements, achievements that some particular scientific community acknowledges for a time as supplying the foundation for further practice” (Kuhn, 1970, p. 10). Therefore, normal science tends to focus on the downward movement (ASE) of Einstein’s model. However, this approach may only be appropriate where the research discipline is sufficiently mature that it may be guided by a governing paradigm.

Kuhn (1970), after several revisions, defined a paradigm as the adopted law, theory, application and instrumentation by which a scientific community distinguishes itself. A paradigm not only defines the boundaries of a scientific community, it may identify key problems and offer possible solutions. When a scientific community is governed by a strong paradigm it is logical that the majority of research will use a deductive methodology until sufficient evidence suggests the paradigm should be altered. The strength of a paradigm will, in turn, be related to the maturity of the discipline. Kuhn (1970), Gale (1979) and Oldroyd (1986) all recognised that modern science, as we know it, began in the Seventeenth Century. Consequently, hypothesis testing research is more common in the *mature* physical and biological sciences than in the social sciences.

In contrast to the maturity of physical and biological sciences, farm management as an academic discipline evolved late in the 19th century (Currie, 1955). Under the Land Grant College Act of 1862 rights to government land were given to designated colleges in each state (Robinson, 1989). In return these colleges were required to offer tuition

in agriculture and the mechanic arts. The first investigations into the economics of farming were conducted in response to declining prices during the thirty year period following the end of the American Civil War.

Until the 1940's farm management research was primarily concerned with the collection of data through farm surveys, cost studies and the analysis of financial accounts, and the development of farm budgeting techniques (Currie, 1955). Jensen (1977), and Parker, Gray, Lockhart, and Townsley (1994, p. 9) reported that Heady (1948) introduced the neo-classical theory of the firm, statistics, and mathematical economics which dominated farm management research and education in the post-World War II period. It was not until the plenary work of Johnson, Halter, Jensen, and Thomas (1961) that modern farm management research evolved to include decision making. However, none of the authors who have reviewed farm management research (Currie, 1955; Malcolm, 1990; & Parker, Gray, Lockhart, & Townsley, 1994) claimed that one particular paradigm has prevailed. It appears farm management research is still in the *immature*, pre-paradigm stage. Consequently, this research will use an inductive research methodology to investigate decision making on corporate and owner-operator pipfruit orchards.

2.3. INDUCTIVE METHODOLOGY

Normal science often begins with a hypothesis statement. The researcher then attempts to accept the hypothesis, in order to verify a theory, or reject a hypothesis to disprove a theory. Farm management research appears more inductive in nature, often the statement of hypotheses being the result of research (see for example Lockhart 1990; Peterson 1993).

An inductive research methodology has been adopted for this research that will use qualitative data to identify components of orchardist's decision making in both corporate and owner-operated enterprises. Inductive research is represented by *E*, *J* and *A* in Einstein's model. The researcher collects actual data from its natural setting

(*E*) and follows a series of steps (*J*), themata (Holton, 1979), to develop concepts, propositions, explanations and ultimately axioms (*A*). Concepts in this study will endeavour to describe the orchardists' decision making. Initially concepts will be of a low level of abstraction with close links to the observed data. Concepts increase in their level of abstraction as the researcher develops theory. Once a high level of abstraction has been achieved the researcher links concepts using propositions to suggest an explanation of the observations (Turner & Beeghley, 1981). This explanation is the first stage of a new theory. The theory can then be refined further using a deductive methodology such as hypothesis testing.

The level of abstraction of these concepts will determine the ability to generalise to other decision making situations. This form of generalisation differs from normal science, where it is suggested that a large sample size is necessary for generalisation. Generalisation is possible in the case study situation where the level of abstraction is sufficiently linked to theory such that all possibilities (*E*) are explained (Eisenhardt, 1989). The higher the level of abstraction, and the greater the links to theory, the greater the opportunities for generalisation. Generalising from case studies is discussed further in Section 4.2.1.

This study draws from two sources of data; extant theory, and the empirical results of the case study research. It is recognised that there is significant literature describing farm management and decision making. However, it is unclear how this literature relates to decision making on corporate and owner-operator orchards.

2.4. SUMMARY

The philosophy of science, based on Einstein's *EJASE* model for constructing scientific theories, was briefly described. The inductive research methodology used in this study is depicted as the upward movement (*EJA*) of Einstein's model. The scope of the experiences (*E*) examined in this study from the literature are discussed in Chapter Three. The procedure for collecting empirical results from case study research, further contributing to *E* is described in Chapter Four. The case study results, *E*, are

summarised in Chapter Five and the concepts and propositions, *A*, developed through the process, *J*, are presented in Chapters Six and Seven. Chapter Three reviews existing management and decision making literature, drawing from both farm and business management.

Management and Decision Making

"The man who insists upon seeing with perfect clearness before he decides, never decides"

FREDERIC AMIEL

3.1. INTRODUCTION

Nix (1979) dates the subject of farm management, like that of the Philosophy of Science, from the era of the Ancient Greeks. The longevity of farm management reflects mankind's long association with permanent agriculture; the cornerstone of civilisation (Bronowski, 1973). Nix endorses his comment with a quote from Epictetus, AD 55-135.

Do I say man is not made for an active life? Far from it. But there is a great difference between other men's occupations and ours. A glance at theirs will make it clear to you. All day long they do nothing but calculate, contrive, consult how to wring profit out of food stuffs, farms and the like. But I entreat you to understand what the administration and nature of the world is, and what place a being endowed with reason holds in it; to consider what you are as a person, and in what your good and evil consists.

EPICETUS (AD 55-135), cited in Nix (1979, p. 277).

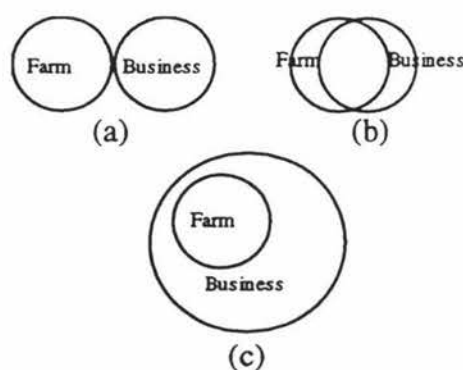
However, Nix accepts that farm management, as an academic discipline, was developed only late last century in the United States of America. The first farm management textbook is generally attributed to be *Farm Management* written by Warren in 1913 (Nix, 1979). Since then there have been many texts on farm

management along with numerous papers describing its theory and practice. This chapter provides a review of farm management⁴ and decision making.

Farm management definitions (Dillon, 1980) are introduced and discussed in Section 3.2. Both farm and business management textbooks prescribe models of management. These, commonly *normative*, models of farm management are outlined and compared with alternative, *behavioural*, models from the business management literature. An alternative framework of farm management is then developed which incorporates selected elements from these business models.

The theory of decision making is then reviewed. This review starts with Johnson and Haver's (1953) rational choice model and concludes with more recent normative and behavioural models. Few authors appear to have resolved the relationship between farm management and business management. Farm management is discussed in relation to business management and the few features unique to farm management are identified. The apparent ambiguities between both disciplines are then discussed. Three possible relationships between the paradigms of farm management and business management, particularly those relating to decision making, are presented in Figure 3.1.

Figure 3.1. Conceptual relationships between the paradigms of farm management and business management.



⁴ For the purposes of this study horticultural practice is considered to be governed by concepts common to farm management.

Historically, farm management appears to have been considered a separate discipline from business management⁵, governed by a different set of principles. This historical view is represented by the mutually exclusive paradigms depicted in Figure 3.1 (a). Farm and business management may, however, have some principles in common, as presented in Figure 3.1 (b). Whereas, Figure 3.1 (c) depicts farm management as a subset of the business management paradigm. Farm management textbooks unfortunately pay little attention to the wealth of information in the business literature (see for example, Boehlje & Eidman, 1984). The relationship between the principles of farm and business is explored further in Section 3.7.

3.2. DEFINITIONS OF MANAGEMENT

The number of definitions of farm management is as numerous as the number of "authors who have written about it and the managers who practice it" (Giles & Stansfield, 1980, p. 10). Authors of each textbook on farm management offer their own definition of management. The number of definitions offered in the literature was identified by Dillon (1980). Dillon presented eight definitions of farm management in his review, however, this still did not satisfy him. He preferred his own definition of farm management defining farm management as:

...the process by which resources and situations are manipulated by the farm manager in, trying with less than full information, to achieve his [or her] goals. (p. 258)

This definition highlights the process of combining resources by the farm manager to achieve personal goals. As the majority of farms are family-owned and operated (Kay, 1981; Osburn & Schneeberger, 1983) personal goals are assumed to be the same as

⁵ Business or general management commonly refers to management in secondary, tertiary, and service sectors. Some primary industries such as land- and water-based mineral extraction are also discussed in business management. Traditionally, land-based industries such as agriculture and forestry, however, have been implicitly excluded from business management theories.

those of the organisation. However, Dillon's definition is inadequate in cases where the organisation's goals and the manager's goals are not the same as may occur, for example, in corporate organisations. Osburn and Schneeberger (1983) recognised that organisational and management goals may not be the same in their definition of farm management. Osburn and Schneeberger defined farm management as:

...those activities relating to the organization and operation of a firm for the attainment of specific ends. It directs resource use after interpreting the goals of those controlling the firm. (p. 4)

It is important to recognise that despite the number of definitions of farm management, the general principles of management are claimed to be common to all disciplines (Giles & Stansfield, 1980; Meij, 1965). It is suggested, however, that there are several fundamental differences between farm management and general management. Kay (1981) suggested that the obvious differences are in size, type of business, the products or services produced, the relationship between labour and management, and the setting of goals. In addition, the uncertainty of managing a biological production system subject to largely uncontrollable climatic factors is a further difference. These differences do not appear to affect the underlying functions of management. It is interesting, though not surprising, to note that general definitions of management are similar to Osburn and Schneeberger's definition. Griffin (1990), for example, defined management as:

A set of activities, including planning, decision making, organizing, teaching, and controlling, directed at an organization's human, financial, physical, and information resources, with the aim of achieving organizational goals in an efficient and effective manner. (p. 6)

These three definitions (Dillon, 1980; Griffin, 1990; Osburn & Schneeberger, 1983) are representative of a large number offered in the literature. They emphasise the

manager's activity of combining resources with incomplete information⁶ to achieve goals. Dillon's definition also recognises that the information resource introduces uncertainty to the operation. However, Dillon's definition fails to account for possible differences between managers' and owners' goals. Both Osburn and Schneeberger (1983) and Griffin (1990) recognise that management's purpose is to achieve owners' goals. The definitions of Osburn and Schneeberger (1983) and Griffin (1990) are adopted for this thesis, i.e., in the case of an owner-operator management's and owner's goals are assumed to be synonymous. In the case of corporates, management is, supposedly, discharged with the responsibility of meeting owners' goals. However, management's goals may not wholly coincide with that of owners. Given these definitions the functions of the management process are now described.

3.3. THE MANAGEMENT PROCESS

Successful management begins by setting goals and objectives (Boehlje & Eidman, 1984; Giles & Stansfield, 1980; Osburn & Schneeberger, 1983). Farm managers' goals are likely to include profit maximisation, increasing net income or net worth, allowing for leisure time, maximising family consumption, maintaining lifestyle, business growth or business survival. Both individual manager's preferences and the type of enterprise influence the specific goals and objectives set. The priorities assigned to each objective will also vary between managers and enterprises. Goals give purpose and direction (Osburn & Schneeberger, 1983) and provide guidelines for decision making (Kay, 1981).

Profit maximisation is a widely accepted goal (Kay, 1981). Particularly as it contributes to other potential goals, for example, business growth or business survival. Profit maximisation is a useful point from which to examine the firm. Assuming profit maximisation, the firm can be described in terms of a production function (Sporleder, 1992), governance structure (Williamson, 1981) or resource dependency (Pfeffer &

⁶ Using incomplete information is discussed in Section 3.5.2.

Salancik, 1978). However, it is important to realise that goals other than profit maximisation may be given more priority by some owners and managers. Several surveys of farm managers show that profit maximisation is ranked below other goals (Gasson, 1973; Fairweather & Keating, 1990; McRae, 1993). These researchers found that important goals included family values and the succession of farm assets. Reid (1993) reported that Hawkes Bay farmers have multiple goals. The percentage of farmers in Reid's research that had goals including personal satisfaction, standard of living, security and succession is presented in Table 3.1.

Table 3.1. Percentage of Hawkes Bay sheep and beef farmers surveyed with personal satisfaction, standard of living, security, and succession as goals.

Goal	Frequency (%)
Personal satisfaction	90
Standard of living	40
Security	30
Assisting children (succession)	30

Source: Reid (1993).

Management is responsible for ensuring that owners' goals and objectives are achieved. Management is described as a series of functions, that can be followed, to meet goals and objectives. The majority of farm management authors define farm management as a process of three functions; planning, implementation and control (Boehlje & Eidman, 1984; Galloway, 1991; Giles & Stansfield, 1980; Kay, 1981; Lockhart, 1990).

3.3.1. Planning

Effective planning is essential to ensure objectives are met (Boehlje & Eidman, 1984; Giles & Stansfield, 1980). Planning is closely related to, although broader than, objective setting. Barnard and Nix (1973) suggest that the need to plan arises from three factors. The factors identified by Barnard and Nix are that:

1. Individuals have various wants they seek to satisfy [objectives].
2. The means available to satisfy these wants are scarce in supply.

3. The means available can be put to many uses. (p. 3)

The planning function is one of allocating scarce resources amongst alternative uses such that owners' objectives are achieved. Planning involves conscious thought, and often documentation, before an event to ensure that the manager has influence over events as they occur (Giles & Stansfield, 1980). This implies that forecasting is required. When forecasting the manager makes some assessment of the future that may be incorporated into the plan (Boehlje & Eidman, 1984). Successful forecasting requires the manager use personal experience, modelling, and often good luck and coincidence. However, often the manager is confronted with incomplete information due to vagaries, for example, of the biological system, climate, and market place (Boehlje & Eidman, 1984). Under such circumstances the manager is less likely to make accurate forecasts. In addition, uncertainty may arise from the social and political environment in which the manager operates such as the recent deregulation of New Zealand's domestic apple market.

Boehlje and Eidman (1984) suggest that under conditions of uncertainty it is desirable to develop contingency plans. Contingency plans incorporate several forecasts so that implementation can be easily altered as events unfold. Therefore, plans may need to be implemented before the planning process is complete, or in some instances the planning process may never be complete. For example, to capitalise on market conditions or to beat competitors to the release of a new product may require implementation before planning is complete, i.e., the manager accepts incomplete information and implements plans accordingly. *Early* implementation is also noted in the review of business management, Section 3.5.2.

Boehlje and Eidman (1984) suggest common planning tools include budgets, and written policy and procedural statements. Budgeting refers to all financial planning tools available, for example, cash forecast budgeting, Net Present Value (NPV) analysis, and gross margins. Policy and procedure statements may include job descriptions, marketing plans, guidelines for pruning, quality control and planting plans.

3.3.2. Implementation

The manager is responsible for implementing the plan where planning indicates that some form of action is required. Squire and Delahunty (1982) regard implementation as the most critical part of farming. Lockhart (1990) noted that, despite Squire and Delahunty's claim, implementation is largely neglected in the farm management literature.

Squire and Delahunty define implementation as "the process of converting the mental picture [or written plan] on which the decision was based into practice" (p. 10). Putting the plan into action involves the acquisition and co-ordination of resources (Boehlje & Eidman, 1984) including land, labour, capital and management. The manager must evaluate the land requirements for the plan and how, if necessary, land will be acquired. Options include existing land, freehold land or less than freehold (leasehold) land. Labour is often given little consideration when implementing plans (Squire & Delahunty, 1982). This is because the majority of farms are owner-operated, where the family including the manager, provide the majority of the labour (Black, Clawson, Sayre & Wilcox, 1947; Lockhart, 1990).

Labour planning is particularly critical for seasonal operations such as harvesting. The manager must ensure that adequate staff are available to implement the plan. The manager is also responsible for the training and personal development of the workforce (Boehlje & Eidman, 1984). Capital may be required to implement the plan. Capital includes fixed assets, for example, implement shed, tractors and ploughs, and working capital which will finance the plan, for example, overdraft facilities. Management co-ordinates, directs, and supervises the necessary land, labour, and capital required to implement the plan (Kay, 1981).

Implementation rarely proceeds as planned (Mitchell, 1981). Often circumstances change due to unforeseen events which may require an alteration to the plan. For example, an orchard manager may formulate a plan to harvest three varieties of fruit

requiring multiple picks, so that one picking gang can do the first pick of each variety, then move onto the second and third picks. However, inclement weather may cause uneven ripening between varieties. The manager should, therefore, have some contingency plan to put in place.

3.3.3. Control

The control function is necessary to detect divergence from the plan and identify reasons for divergence. Kay (1981) describes the control function as “observing the results of the implemented plan to see if the specified goals and objectives are being met” (p. 16). Control involves careful evaluation of outcomes to identify deviations, and their magnitude, from the stated plan.

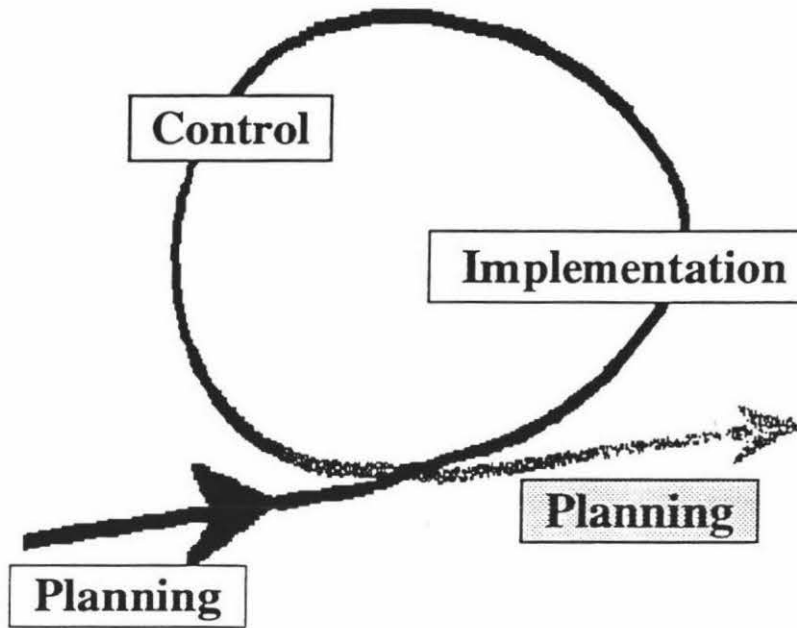
Record keeping is a major component of the control function (Boehlje & Eidman, 1984). Records that may be kept include, for example, actual yields, prices, and weekly increases in fruit size. Records can be compared with standards that have been determined from external information or past experience. Comparisons will identify the extent of the deviation and the manager can then decide whether alternative action is necessary to achieve the current plan.

The manager has two alternative courses of action where the control function indicates that performance targets in the current plan are no longer attainable. Management may decide to either modify their goals or implement modified (contingency) plans (Boehlje & Eidman, 1984). Management accepts changes to goals and objectives when the current plan, with unattainable outcomes, is maintained. Contingency plans are plans developed for several scenarios. As events unfold the manager is able to change to the plan which will best meet goals and objectives.

Management is an integrated process requiring the ability to plan, choose a particular course of action, implement the plan, and then evaluate the outcome against the plan (Boehlje & Eidman, 1984). The functions are not discrete with sufficient overlap to often make them indistinguishable. The management process is also iterative or

cyclical. The manager may plan, implement, and control several times for each event. The cyclical nature of the management process is described by Parker, Gray, Lockhart, and Townsley (1994). A cyclical representation of this process is presented in Figure 3.2.

Figure 3.2. A cyclical representation of the farm management process.



Source: Adapted from Todd, Gray, Lockhart, & Parker (1993).

Most farm management textbooks make little reference to business management paradigms. However, theories of business management may be useful for describing farm management. The management process as described in the business management literature is now briefly reviewed.

3.3.4. Business management

The French industrialist Henry Fayol introduced the functions of business management. He described the functions as planning, organising, commanding, co-ordinating and controlling (Boxall & Green, 1994; Fayol, 1916/1949). These functions⁷ have been

⁷ The business administration literature refers to roles rather than functions. Roles appear to be synonymous with farm management functions.

accepted in most business management textbooks (see for example Griffin, 1990; Koontz & Weihrich, 1988; Stoner & Freeman, 1992). Although, some management writers prefer to use the term leading instead of commanding (Koontz & Weihrich, 1988; Boone & Kurtz, 1987; Griffin, 1990; Stoner & Freeman, 1992) and some consider organising and co-ordinating part of the same role.

More recent textbooks are now offering an alternative *behavioural* definition of the management process (Griffin, 1990; Stoner & Freeman, 1992; Koontz & Weihrich, 1988). This alternative definition was first described by Mintzberg in 1975 (Stoner & Freeman, 1992). Important precursors to Mintzberg's work include those from Carlson (1951), Drucker (1954), and Stewart (1967).

Mintzberg was a graduate student at the MIT Sloan School of Management. During his Doctoral research he observed, in the course of one intensive week, the activities of five chief executives. In his thesis Mintzberg (1988) provided valuable insight into the actual functions of managerial activity. Subsequent to his doctoral dissertation he published a book, *The nature of managerial work*, (Mintzberg, 1973) and an article, 'The managers job: Folklore and fact', in *Harvard Business Review* (Mintzberg, 1975) in which he further discussed the roles of management.

Mintzberg did not identify the three normative functions of management; planning, implementation and control. Mintzberg (1975) identified ten roles of management which he grouped into functions of interpersonal, informational, and decisional. Mintzberg's ten managerial roles, grouped into his three functions, are presented in Table 3.2.

Table 3.2. Mintzberg's three functions of management, each subdivided into the roles of management.

Function	Role	Sample Activities
Interpersonal	Figurehead	Attending ribbon-cutting for new plant
	Leader	Encouraging employees to improve productivity
	Liaison	Co-ordinating activities of two project groups
Informational	Monitor	Scanning industry reports to stay abreast of developments
	Disseminator	Sending memos outlining new organizational initiatives
	Spokesperson	Making a speech to discuss substantive issues
Decisional	Entrepreneur	Developing new ideas for innovation
	Disturbance Handler	Resolving conflict between two subordinates
	Resource Allocator	Reviewing and revising budget requests
	Negotiator	Reaching agreement with a key supplier or labour union

Source: From Griffin (1990, p. 17).

Mintzberg described what managers do (Boxall & Green, 1994). He described management in terms of the tasks completed by the manager rather than management as a normative process (the normative process is a prescription for ideal management). The number of management textbooks that now refer to Mintzberg's managerial roles has proliferated in recent years (for example Griffin, 1990; Stoner & Freeman, 1992; Koontz & Weihrich, 1988). However, all of these texts, perhaps yet to be entirely convinced, introduce management as a normative process before referring to Mintzberg's work.

Normative descriptions are prescriptive, suggesting how management should perform (Johnson, 1986). They often appear as "stated laws, recipes, regulations, social mores and norms, or ethical imperatives" (p. 17). Normative models of management assume that success follows the adoption of normative practice. However, normative models are largely untested. Behavioural research suggests that managers do not necessarily

follow that recommended by normative models. Behavioural models are positivistic, dealing with “characteristics of conditions, situations, or things in the real world” (Johnson, 1986, p. 18). Mintzberg’s (1975) model is a description of how managers actually behave. Once it has been established how managers behave it should then be determined how successful those practices are at achieving organisational goals. Mintzberg’s behavioural model of management is yet to be verified.

3.4. ACTIVITIES OF MANAGEMENT

The descriptions of farm or firm management are often segmented into activities to better understand management’s role. For example, farm management may be described in terms of production, marketing and finance activities (Boehlje & Eidman, 1984). A classification of management by activities provides a framework in which the management process, including decision making, may be analysed.

3.4.1. Farm management

Several authors (Black, Clawson, Sayre, & Wilcox, 1947; Boehlje & Eidman, 1984; Osburn & Schneeberger, 1983) have classified the activities of farm management. Black et al., (1947) wrote about farm management problems in terms of management areas [activities]. They considered farm management problems under the headings of organization, operation, buying and selling, and financing. Authors to use similar classifications include Boehlje and Eidman (1984), Giles and Stansfield (1980), Johnson (1982), and Osburn and Schneeberger (1983). Osburn and Schneeberger (1983) describe farm management in terms of technical activities, commercial activities, financial activities and accounting activities. This classification is particularly useful as it provides a “rich picture” (Checkland, 1981, p. 317) of management activities. In addition, it cleaves the compliance activities of accounting from financial activities, as recommended by Lockhart (1990). Osburn and Schneeberger’s classification is now discussed in detail.

Technical activities include production based activities such as what to produce, how to produce, and what combination of inputs and outputs to use (Boehlje & Eidman, 1984). Management conducts technical activities in a changing economic and technical environment (Osburn & Schneeberger, 1983). Johnson (1982) suggests that timing is an important aspect of production based activities. Technical or production activities in orcharding, may include what varieties to grow, how to prune each variety and what size range and yield to produce.

Commercial activities include all buying and selling of inputs and outputs (Osburn & Schneeberger, 1983). Production activities are integrated with commercial activities as to what, where, when and how to buy and sell inputs and outputs (Boehlje & Eidman, 1984). Examples of commercial activities include what fertiliser to purchase, what fertiliser supplier to use, and contract negotiations for non-export fruit. Some authors refer to commercial activities as marketing (Boehlje & Eidman, 1984; Giles & Stansfield, 1980; Johnson, 1982). Marketing decisions are influenced by the external environment. In New Zealand, for example, the statutory marketing board exercises the sole right to export apples and pears absolving pipfruit growers of much individual responsibility with respect to the marketing activity. Management is seldom able to affect external environmental conditions (Johnson, 1982). Although, forecasting prices, market analysis, and knowledge of supply and demand are useful skills for managers making marketing decisions (Boehlje & Eidman, 1984; Osburn & Schneeberger, 1983).

Financial activities are necessary to determine capital requirements, resource availability and involve the acquisition and use of capital. Capital is required for the purchase of land, labour and management. Financial management includes the acquisition of funds, over what terms they will be acquired, how funds are repaid and for what purpose they are used (Boehlje & Eidman, 1984).

Accounting activities are the recording and compliance tasks that managers perform. Accounting activities among owner-operators largely remain the province of the farm accountant (Lockhart, 1990). They include the preparation of annual accounts, which

are used for taxation calculations, and the calculation of depreciation allowances. Accounting activities also include GST⁸ and PAYE⁹ calculations and payments. It appears that GST and PAYE calculations are now more commonly performed by the farm manager. Several authors are critical of the content of farm accounts suggesting that they are of little use and are little used by farm managers in New Zealand (Gay, 1979; Golub & Huffman, 1984; Lockhart & Hawkins, 1987). This observation provides evidence that accounting should be separated from financial activities and may even be removed from the description of management activities on owner-operated farms and orchards.

Accounting activities are expected, however, to be quite different on corporate orchards. The owner-operator prepares annual accounts, normally through an external accountant, for taxation purposes. Whereas, the corporate orchardist is likely to make greater use of annual accounts. The corporate orchardist has multiple owners, all of whom need to be kept informed about the performance and financial position of the corporate.

Some authors have included further management activities in addition to the four already discussed (technical, commercial, financial and accounting). Johnson and Haver (1953) and Giles and Stansfield (1980) offer staffing or personnel management as an additional activity of management. The majority of farms in New Zealand employ labour. On owner-operated enterprises this is typically limited to harvesting, for example, shearing, milking, or picking apples. However, staffing or personnel management becomes more important on larger or more intensive farms where family labour is insufficient for all operations. Staffing is important on orchards for the seasonal operations of pruning, thinning and harvesting.

The economic, political, and social situations in which a farm business operates may provide further problems for the manager (Johnson & Haver, 1953). Johnson and

⁸ GST is a tax on goods and services, currently set at a rate of 12.5 %. Each business is required to submit a record of the value of all transactions in which GST was incurred.

⁹ PAYE is an income tax that the employer deducts from employees' salary or wages.

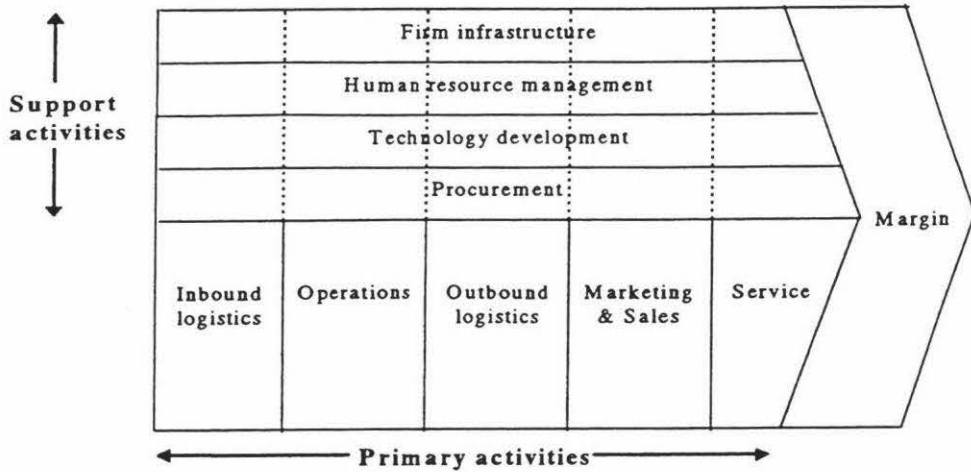
Haver suggest this should be a management activity in its own right. However, the environment in which the business operates is expected to affect decisions in all of the management activities identified above. Staffing or personnel, and the environment appear to transcend all other management activities (technical, commercial, financial, accounting), rather than being separate activities in their own right. For example, staff may be required for technical and commercial activities while the legal environment can affect compliance activities such as accounting. The relationship between the various activities is discussed further in Section 3.4.2.

3.4.2. Business management

Fayol (1916/1949) found that managerial activities could be divided into six groups; technical (production), commercial, financial, security, accounting and managerial. Variants of these groups are recognised in several business management textbooks (for example Griffin, 1990; Koontz & Weihrich, 1988). However, Porter (1985) offers an alternative model that may be useful for describing management activities.

Porter (1985) presents the firm as a value chain. The value chain provides a systematic way of examining all the activities a firm performs and how they *interact*. It was developed to help firms identify and analyse sources of competitive advantage. Although, not specifically developed as such, the value chain may provide a useful framework for describing management activities. Porter's generic value chain is presented in Figure 3.3.

Figure 3.3. The generic value chain.



Source: Porter (1985, p. 37).

The generic value chain consists of five categories of primary activities and four categories of support activities. Primary activities include inbound logistics, operations, outbound logistics, marketing and sales, and service. Support activities include firm infrastructure, human resource management, technology development and procurement. Each of the five primary activities are now defined.

Inbound logistics are activities associated with receiving, storing, and disseminating product inputs. For example, storage and distribution of harvest bins. The processes of transforming inputs to outputs are termed operations. Orchardring operations will include all production, husbandry and some postharvest operations associated with preparing fruit for sale. Outbound logistics are activities associated with collecting, storing, and physically distributing the product to buyers. For example, trucking packed fruit to NZAPMB coolstores. Marketing and sales activities include advertising, promotion, sales, quality control, export channel selection, export channel relations and pricing. In the New Zealand pipfruit industry these activities have been largely performed by ENZA New Zealand (International) Ltd to date. However, marketing and sales activities are becoming increasingly important for the orcharding firm following deregulation of the domestic apple market. The final primary activity is service. After-sales service is expected to be less common in the orcharding firm than the manufacturing firm. However, orchardists that directly supply retail outlets may make decisions regarding after-sales service.

Support activities are associated with all of the primary activities, i.e., activities that transcend the boundaries of logistics, operations, marketing and service. Each of the four support activities are now defined.

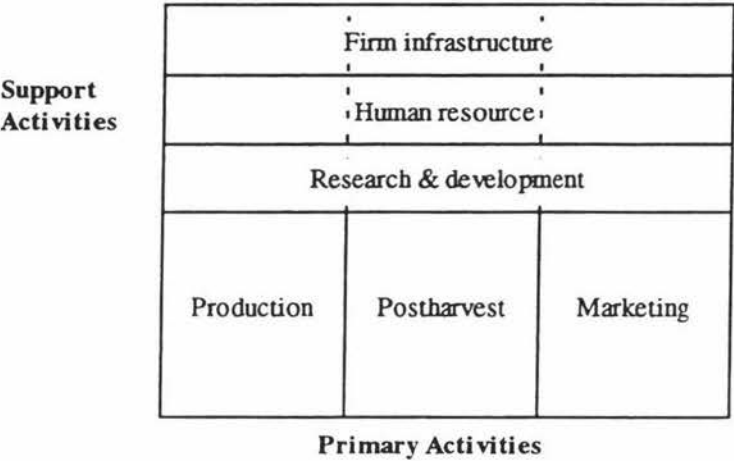
Procurement is the function of purchasing inputs such as raw materials, supplies, machinery, and buildings. Technology development consists of a range of activities that are designed to improve the product or process, for example, varietal or husbandry trials. Staff recruitment, hiring, training, development, and compensation are all human resource management issues. Firm infrastructure includes administration, planning, finance, accounts, legal, government affairs, and quality management. In Porter's model finance and accounting are included in firm infrastructure, transcending all primary activities.

The value chain is not a collection of independent activities, but a system of interdependent activities (Porter, 1985, p. 48). The performance of one activity affects the performance of other activities. In terms of decision making a decision may, therefore, involve components from several activities. For example, varietal trials provide information for operational decisions as well as sales and marketing decisions.

The primary activities of farm management, as they specifically relate to orcharding, include production, postharvest and marketing. The classification of primary activities is similar to those proposed by Boehlje and Eidman (1984) and Osburn and Schneeberger (1983). Orchard support activities appear to be firm infrastructure, human resource management, and research and development. The firm is also acknowledged as operating *in* an environment that influences management activities, as identified by Dillon (1980), Osburn and Schneeberger (1983) and Griffin (1990). These activities, and the relationships between them, may be modelled in a manner similar to Porter's value chain. This model, while not strictly a value chain, may be used to identify the important activities of orchard management. Postharvest operations have been included due to the increasing importance these activities are having on New Zealand orchards. The model provides a framework in which farm

management, within identifiable activities, can be described and then compared with other firms. The model for classifying farm management activities on orchards is presented in Figure 3.4.

Figure 3.4. Model used for classifying farm management decisions on orchards (based on Porter’s value chain, 1985).



Decision making is one common component of management among all activities. A description of the management process, to show the link between management and decision making, is provided in the following section, Section 3.5.

3.5. THE MANAGEMENT PROCESS AND DECISION MAKING

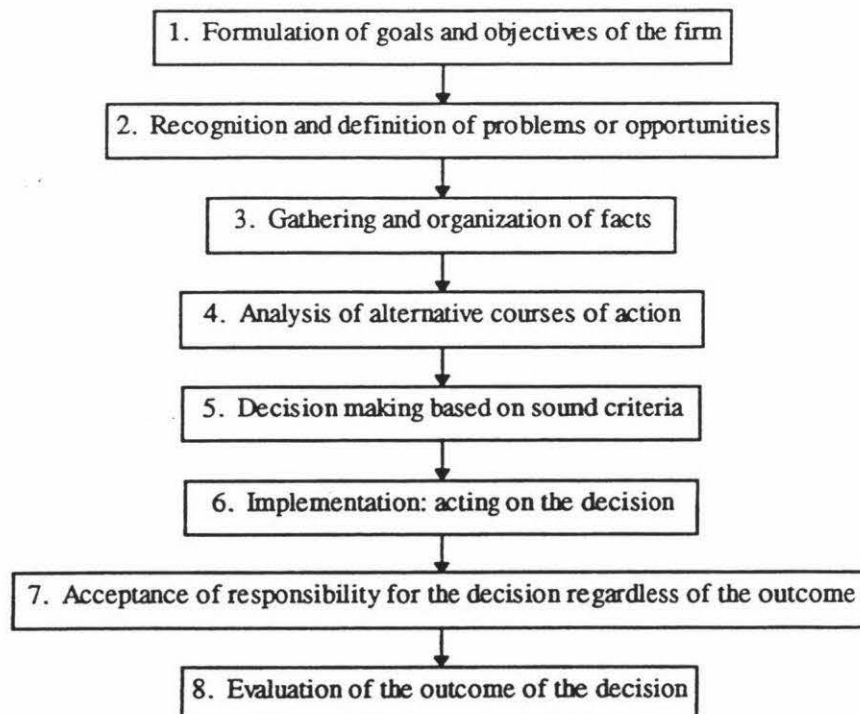
3.5.1. Farm management

The *farm management process* and *decision making* are often used interchangeably. Several textbooks refer to the management process as the decision making process or problem solving (for example Boehlje & Eidman, 1984; Giles & Stansfield, 1980). This appears to be partly due to the interrelated nature of management and decision making. In fact, some writers go so far as to say that management is essentially a decision making activity (Giles & Stansfield, 1980; Johnson, 1982). However, decision making is only one, albeit a major, part of the farm management process.

The farm management process includes three functions planning, implementation and control (described in Section 3.3). The process of the three functions has been elaborated on by many authors. In some instances up to eighteen steps are now included (for example Boehlje & Eidman, 1984). Johnson and Haver (1953) were among the first authors to write about the tasks of farm management and decision making. They suggested that managers perform five functions; (1) observation, (2) analysis, (3) decision concerning the problems under consideration, (4) action-taking, and (5) acceptance of economic responsibility. In a later work, Johnson refers to these functions as the managerial process (Johnson, Halter, Jensen, & Thomas, 1961). This definition of the farm management process has since been developed by several authors, many of whom give greater emphasis to decision making.

Osburn and Schneeberger (1983) presented an eight step farm management process in which they recognised decision making as a major component of the planning function. Osburn and Schneeberger's farm management process is presented in Figure 3.5.

Figure 3.5. The eight step farm management process.



Source: Osburn and Schneeberger, 1983.

Decision making is, therefore, only one step of the farm management process. *Decision making* is the instantaneous action of choosing between alternative plans. It requires that a choice be made, which may be to do something, to do nothing, or to go back and reformulate the problem, gather more information or do further analysis (Osburn & Schneeberger, 1983).

The steps leading up to, and including making the decision are more correctly termed the decision making *process*. Once goals are formulated the decision making process is likely to be the time consuming part of the planning function. Given this, Steps Two through Five of Osburn and Schneeberger's model (Figure 3.5) represent the decision making process. Step One is goal formulation and the steps following decision making are the implementation function (Step Six) and the control function (Steps Seven and Eight).

Most farm management writers provide a definition of the decision making process. Unfortunately, implementation and/or control is included in the majority of these definitions (see for example Bradford & Johnson, 1953; Boehlje & Eidman, 1984; Giles & Stansfield, 1980; Johnson, 1982). These definitions are misleading and only serve to confuse the entirety of management with that of decision making. The decision making process is complete once a decision is made. Although, the decision process may continue if implementation fails or the control function suggests the current decision, or the outcome is inadequate. To further confuse, Boehlje and Eidman (1984) suggest decision making occurs in each of the functions of farm management, planning, implementation and control. This is also difficult to interpret as decision making is, supposedly, one part of the planning function.

The decision making process is seldom as simple as following the steps outlined (Two to Five). A manager may be working with several problems or opportunities at one time. Typically the manager must stop in the middle of one decision making process to address another decision that may be more urgent (Osburn & Schneeberger, 1983). This makes it difficult for the outside observer to distinguish the discrete steps of the

decision making process. In addition, the manager may skip some of the steps (e.g., with routine decisions) or may return to earlier steps as new information is received. For example, a manager may define the problem, collect information, and analyse the alternatives for a decision only to identify a change in the environment which requires redefinition of the problem.

3.5.2. Business management

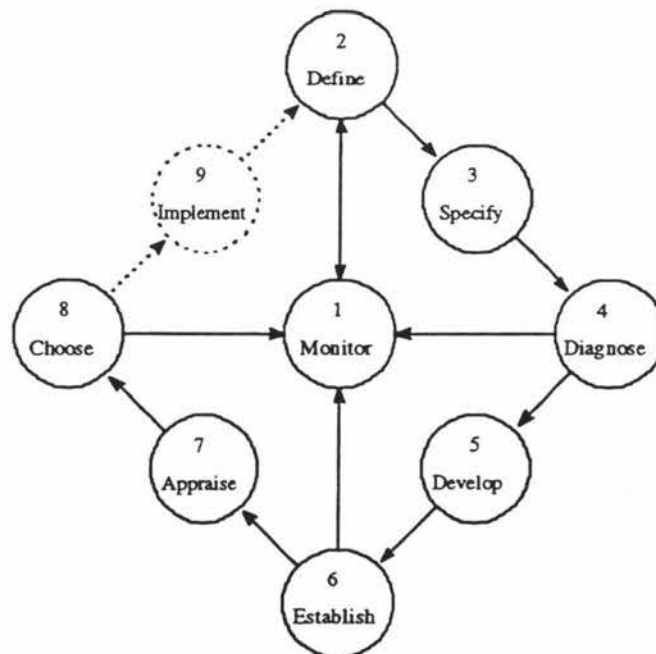
Descriptions of the business decision making process proliferated (Archer, 1980) following an article in *Fortune* by John McDonald (1955) and a response to that article by Peter Drucker (cited in Archer, 1980). McDonald (1955) raised the question, “was business decision making an unconscious and intuitive art form, or could a person be taught a conscious, rational, and systematic process for making business decisions?” Several authors have subsequently tried to answer that question by proposing a rational model of decision making. Drucker (cited in Archer, 1980) proposed a rational and systematic model of decision making. He listed the steps of the decision making process as; (1) defining the problem, (2) defining expectations, (3) developing alternative solutions, and (4) knowing what to do with the decision after it has been reached.

Variations of Drucker’s definition are now common in business texts (see for example, Boxall & Green, 1994; Griffin, 1990; Koontz & Weihrich, 1988; Stoner & Freeman, 1992). However, Archer (1980) questioned whether business managers actually use a definable decision making process. Archer conducted research of more than 2,000 managers, supervisors and executives and concluded that while the rational model may explain some decisions it had limitations. The rational model is abstract in nature and fails to adequately define the specifics of every decision. While this is not a fault of the model as an explanatory tool, it reduces its prescriptive usefulness. Archer developed a nine-phase decision making process based on actual observation. The model was designed to help managers make more successful decisions. The nine-phase process includes:

1. *Monitor* the decision environment.
2. *Define* the decision problem or situation.
3. *Specify* the decision objectives.
4. *Diagnose* the problem or situation.
5. *Develop* alternative solutions or courses of action.
6. *Establish* the methodology or criteria for appraising alternatives.
7. *Appraise* alternative solutions or courses of action.
8. *Choose* the best alternative solution or course of action.
9. *Implement* the best alternative solution or course of action.

The steps in the process interact with one another and the process is seldom linear or serial. Monitoring occurs throughout the process and such monitoring suggests that the decision maker must return to an earlier step in the process. The interacting, iterative and recursive relationships between the various steps of the process are presented in Figure 3.6.

Figure 3.6. Nine phase decision-making process.



Source: Archer, 1980, p. 58.

Archer's model provides more detail than previous rational models of decision making. His research did not, however, establish how managers and supervisors *actually* behave. The model is merely a detailed prescriptive tool to assist managers make decisions in a logical and rational manner. Consequently, Archer's model is best regarded as a refinement of the normative model, albeit based on observation. Archer's process appears useful for helping managers improve decision making. For example, a follow up survey showed that out of 752 supervisors and managers "only three felt the process did not substantially improve their decision making" (Archer, 1980, p. 57).

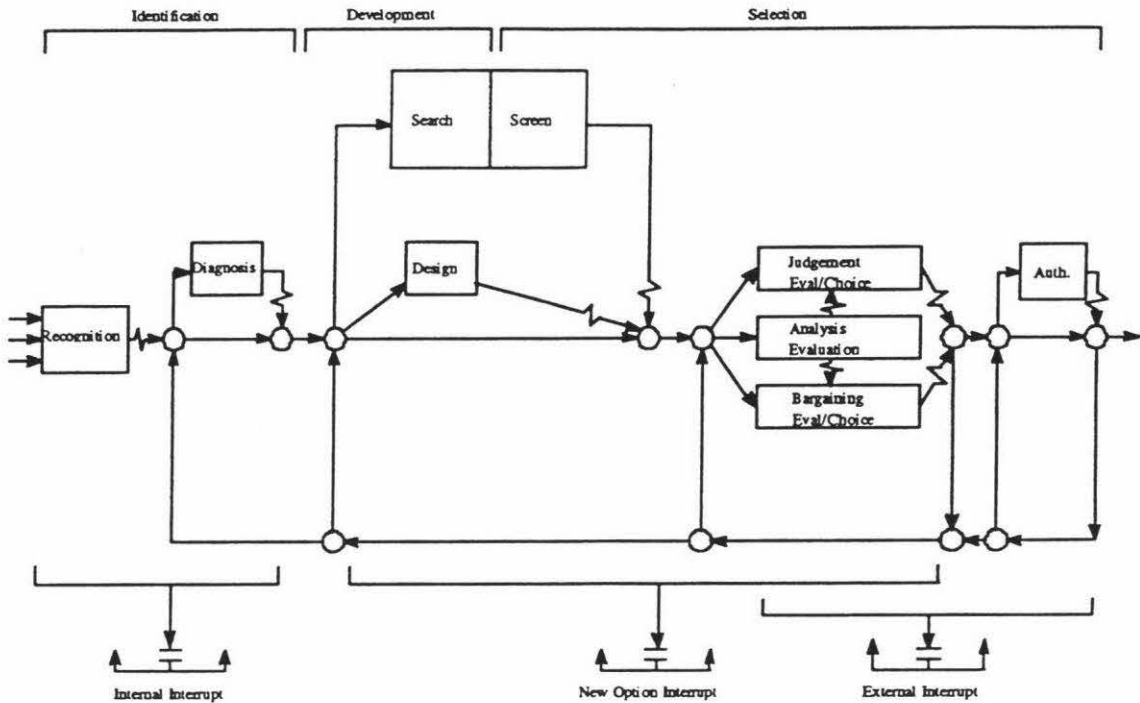
The rational or classical model is prescriptive and normative. It explains how managers should make decisions using logical and rational thinking. The model assumes managers structure an exhaustive search and analysis and behave rationally and logically to achieve the best solution (Griffin, 1990). However, rationality and logic seldom characterise *actual* decision making processes. Simon (1945) described actual decision making with his administrative model. The administrative model is a behavioural (descriptive) model that recognises managers; (1) have incomplete and imperfect information, (2) are constrained by bounded rationality, and (3) tend to satisfice when making decisions.

All decisions that managers make involve the prediction of future events. The degree to which managers can make accurate predictions ranges from relative certainty to great uncertainty. The information that a manager uses to make decisions will not always provide an accurate prediction of future events. Managers must make decisions on the best available information, recognising that incomplete information may prevent the manager from making the decision that will *best* meet objectives (Koontz & Weihrich, 1988). Farm management academics appear to make a major issue out of incomplete information. Iacocca (1984), however, accepts incomplete information and recommends that managers make decisions, despite uncertainty, to at least beat competitors to market opportunities. Continued analysis to ensure certainty in any business is likely to stifle progress, while opportunities could be lost.

Simon (1945) suggests managers behave in a rational manner but that they are limited in their ability to do so. Managers are constrained by limited resources and their values, unconscious reflexes, skills and habits, and bounded rationality (Simon, 1945). As a result of incomplete and imperfect information, and bounded rationality managers tend to satisfice when making decisions. Satisficing (Simon 1945) refers to the concept of selecting a decision alternative that meets some minimum level of performance. The exhaustive search for an optimal solution is not undertaken. As soon as the decision maker has reached a sufficient arbitrary solution further search is abandoned (Baird, 1989).

During the 1970's a team of decision researchers at McGill University in Montreal was working in association with the National Association of Accountants (NAA), and The Society of Industrial Accountants of Canada (SIAC). These researchers investigated business decision models and how managers use information in decision making (Gordon, Miller, & Mintzberg, 1975). Their approach was firstly, to review common managerial decision processes postulated in the normative literature. This review was then followed by empirical (descriptive) research investigating actual decision processes in manufacturing firms. This empirical research was conducted by more than fifty teams of four or five students taking courses in management policy at masterate level. These researchers conducted a field study of 25 strategic decision processes. Mintzberg, Raisinghani, and Théorêt (1976) developed a behavioural model of the decision making process from the results of this research. The model presented in Figure 3.7 describes the process of making an unstructured decision.

Figure 3.7. A general model of the decision making process.



Source: Mintzberg, Raisinghani, and Théorêt (1976, p. 266).

The model consists of three central phases; identification, development and selection. Within these three phases are subgroups, or routines that provide detail regarding the manager's activities. Identification includes recognition and diagnosis. Development includes search, and design routines. Selection consists of screen, evaluation/choice and authorisation routines. The model also includes interrupts that are frequently an integral part of the decision making process. Interrupts refer to the sudden events that interrupt the decision maker and cause changes in pace or direction of a decision making process.

All decisions will not, however, follow logically through all routines. Some decisions will be made rapidly involving only recognition and choice routines. Whereas, more complex decisions will require more steps and cycles before a choice is made. Mintzberg, Raisinghani, and Théorêt (1976) identified seven types of path configuration for strategic decision processes. Each path is distinguished by the type of outcome involved. Decisions with similar outcomes follow similar paths.

While the model was developed to help describe unstructured strategic decision making processes some path configurations could be used to describe other decision types and levels of decision making in farm management. Decision types and levels of decision making are now discussed.

3.6. DECISION MAKING

Decision making is one step, usually the last, in the decision making process. Most business management writers recognise this with their definitions of decision making. One definition representative of the business literature is offered by Boxall and Green (1994). They define decision making as “simply the art of choosing among alternatives” (p. 84). The steps leading up to choosing which alternative will best address the problem, opportunity or crisis, are not decision making.

The decision making process varies for different types and levels of decisions (Stoner & Freeman, 1992). Decisions are commonly grouped into two types and three levels. Decisions may be structured (programmed) or unstructured (non-programmed) (Griffin, 1990; Harrison, 1975; Hickson, Butler, Cray, Mallory, & Wilson, 1986) and occur at the strategic, tactical or operational level (Gordon, Miller, & Mintzberg, 1975; Griffin, 1990; Heller, Drenth, Koopman, & Rus, 1988). Decision types are now discussed.

3.6.1. Type of decisions

Structured decisions are decisions that occur frequently, the appropriate response is known (Griffin, 1990), and the outcome is near certain. Therefore, managers are able to respond to such situations quickly in a ‘structured’ manner. Once a problem or opportunity is recognised to require a structured decision process the manager knows what the alternatives and likely outcomes are, and which will be implemented. Often managers are able to directly, or with minor modification, apply policy or procedural statements to structured decision situations. Structured decisions processes are

unlikely to incur interrupts or feedback between the three phases. For example, control of BlackSpot on orchards is likely to require a structured decision process. Orchard managers have a set of *Mills period*¹⁰ guidelines they adhere to when spraying for BlackSpot.

Structured decisions can be described using the model described by Mintzberg, Raisinghani, and Théorêt (1976). The decision maker follows the steps, albeit often subconsciously, represented by the centre line, in Figure 3.7. The decision maker moves quickly from recognition to choice, implementing a policy or procedural statement. Identification is an important part of the decision making process for structured decisions. Managers, however, must be careful not to simply apply policy or procedures as stated, particularly in cases where diagnosis has indicated the policy or procedure may not be appropriate.

Unstructured decisions occur less often than structured decisions (Griffin, 1990). They do not have ready made solutions and the decision making process includes more steps, will involve feedback between the steps, and may be subject to interrupts and delays before a decision is made. For example, an orchardist deciding whether or not to buy or lease more land will have several options which may be investigated in detail. The orchardist may choose one option; buy, only to find that land already sold. The orchardist may then re-examine alternatives and make a choice. A further interrupt could follow in the form of objections from neighbouring properties. The model in Figure 3.7 appears useful for describing unstructured decisions.

Between the structured and unstructured classifications of decisions (described in the literature) appear to lie intermediate decisions with features common to both. These decisions are likely to include diagnosis, which indicates that some modification to procedure is required because the outcome is less certain, the exact level of performance is unknown, i.e., as is the case with domestic marketing. The manager

¹⁰ A Mills Period occurs "when certain criteria favouring the release and germination of Black Spot ascospores or conidia have been fulfilled" (Brenton-Rule, 1993, p.16). Following a Mills Period chemical spraying is recommended to prevent fruit infection.

has a set of general practices that should be adhered to when determining where fruit should be sold. However, this procedure is constantly changing due to outlet performance, fruit quality and fruit maturity or supply. The manager must be aware of such changes, through monitoring of information sources, so that suitable modifications can be made to the procedure.

Intermediate, *semi-structured* decisions exist in the continuum between structured and unstructured decisions. Semi-structured decisions can be described by the model in Figure 3.7. These decisions are expected to require more steps in the process than structured decisions but are expected to be subject to less vigorous diagnosis, search and screen routines than unstructured decisions. The manager recognises the situation and which procedure, given further modification or design, will meet the required level of performance. Semi-structured decisions are likely to incur less interrupts or delays than unstructured decisions. The characteristics of structured, semi-structured, and unstructured decisions are summarised in Table 3.3.

Table 3.3. Summary characteristics of decision types.

Decision type	Frequency	Response	Outcome
Structured	High	Known	Certain
Semi-structured	Medium	Known	Uncertain
Unstructured	Low	Unknown	Uncertain

3.6.2. Levels of decision making

Decisions may also be classified according to level. Levels of decision making are described as operational, tactical, and strategic (Gordon, Miller, & Mintzberg, 1975; Griffin, 1990; Heller, Drenth, Koopman, & Rus, 1988). Operational decisions are highly repetitive, often occurring on a daily basis with known response and certain outcome. Consequently, these decisions are commonly structured (Gordon, Miller, & Mintzberg, 1975). In a hierarchical corporate structure these decisions are performed by lower level managers (Griffin, 1990). For example, when the orchard should be

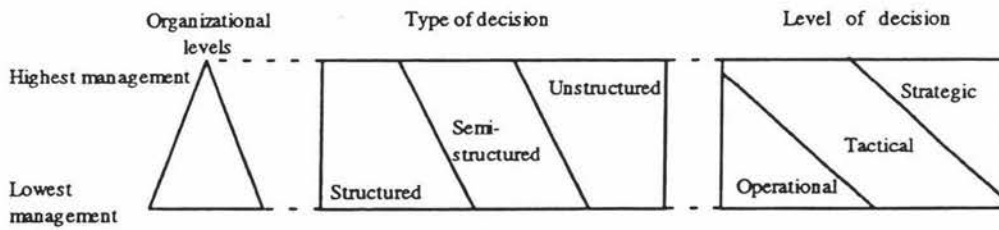
irrigated is an operational decision. In the corporate setting this decision should be made by an orchard manager.

Tactical decisions “focus on how to operationalize actions necessary to achieve strategic goals” (Griffin, 1990). For example, an orchardist may wish to be a supplier of export quality apples and pears. The orchardist must then make the necessary annual (medium frequency) crop load decisions to produce export quality fruit in the appropriate size range. Tactical decisions are likely to be performed by middle managers in hierarchical corporate organisations. Tactical decisions are likely to be semi-structured because although the response is known the outcome involved uncertainty.

Strategic decisions determine the overall direction or focus of the business. For example, the core business. These decisions are made by the business owner or high level management. Strategic decisions occur less frequently than operational or structured decisions and are generally unstructured in nature (Griffin, 1990).

Owner-operated orchards usually have one manager who is responsible for all levels of decision making. The manager must be able to recognise and make structured, semi-structured and unstructured decisions. A corporate orchardist is likely to have a hierarchical management structure, as described in Section 1.1. Decision making in such management structures is likely to vary with each management level. As such managers at each level may possess a different set of skills and technological know-how. The expected relationship between hierarchical level of management, decision type, and level of decision making is presented in Figure 3.8.

Figure 3.8. The expected relationship between organisational level, decision type and level of decision.



Source: Modified from Koontz and Weihrich (1988).

Koontz and Weihrich (1988) depicted types of decisions (structured, semi-structured, unstructured) and the level of management (hierarchy) most commonly associated with those decisions. The level (operational, tactical, strategic) of decision making has been added to the right-hand side of the figure to represent that *expected* at each organisational level. Higher management is seldom expected to make operational decisions, being more concerned with making unstructured strategic decisions. Whereas, lower management is expected to make a greater number of structured operational decisions.

3.6.3. Relationship between levels, types and activities

The relationship between decision activities (primary or support), described in Section 3.4, decision types, and management level is unclear. This proposition appears to have been largely ignored by both farm and business management writers. However, it would be imprudent to conclude this discussion without at least exploring possible relationships between the activity concept and types and levels of decisions. Primary activities, including production, postharvest and marketing, may include more structured operational decisions. Primary activities constitute the core business of the firm. As such these are likely to occur more frequently than support activities. Lower management would be expected to make more decisions in primary activities, the core business, than higher management. Less frequent decisions in primary activities, such as crop loading are tactical rather than operational decisions. Such decisions are relatively few in most farming operations, for example, Todd, Gray, Lockhart, and Parker (1993) identify drying-off as one of three tactical decisions on a seasonal supply

dairy farm. Strategic decisions may occur at times Hardaker & Anderson (1981) term *orgastic* change; in response to events that are expected to occur only once or twice in a lifetime often marked by major crisis.

Support activities in orcharding include firm infrastructure, human resource, and research and development. Support activities are conducted in each of the primary activities but may be performed by higher management or separate divisions of the corporate. Lower management are not expected to make many decisions in support activities being concerned primarily with the core business, in this case apple production. As with primary activities there will be some exceptions. For example, seasonal staffing decisions is an operational support activity. The empirical relationship between management activities, decision types and levels will be explored further in Chapter Six.

3.7. THE RELATIONSHIP BETWEEN FARM AND BUSINESS MANAGEMENT

There appear to be few behavioural studies of decision making in farm management similar to those identified in the business management literature. Two notable exceptions are the studies by Johnson, Halter, Jensen, and Thomas (1961) and Todd, Gray, Lockhart, and Parker (1993). Johnson, Halter, Jensen, and Thomas conducted studies of actual farm managers in order to develop a description of the managerial functions. The five functions discovered were; (1) observation, (2) analysis, (3) decision, (4) action, and (5) acceptance of responsibility. In addition, they recognised that managers are involved with co-ordinating and supervising labour. The five functions outlined are remarkably similar to those postulated in the rational model of decision making by Johnson and Haver (1953), some eight years earlier. While not wishing to appear cynical, expectations may have biased the later study.

The second behavioural study involves a team of researchers at Massey University (Gray, Lockhart & Todd). This team has focused on modelling summer-autumn

management on high performing seasonal supply dairy farms. They conducted intensive research of four *expert* farm managers. They discovered that these farmers sequentially deploy resources the researchers termed a *portfolio* of management options. The manager monitors the environment as lactation progresses to decide which drying-off option will *best* suit the prevailing circumstances (Gray & Lockhart, 1994).

The decision making process observed by the Massey University researchers can better be described by Mintzberg, Raisinghani, and Théorêt's (1976) behavioural model. The case study farmers recognise the need for a decision regarding the drying-off date for their dairy herd. This decision is semi-structured, because although a defined set of alternatives is available uncertainty remains. The time available to *consume* each resource is unknown.

These two examples suggest that decision making principles in farm management may be similar to those in business management. However, it would not be wise to dismiss the contribution offered by farm management literature altogether. Therefore, the relationship depicted in Figure 3.1 (a), that of mutually exclusive paradigms, is not correct. It is reasonable, however, to expect considerable, maybe even total, overlap between the two disciplines. Further similarities between farm management and business management based on actual orchardist's decision making will be identified later in the study.

3.8. SUMMARY

The management process consists of three functions planning, implementation and control. These functions can be described in a number of, supposedly identifiable, steps. In some cases up to eighteen steps are offered. An important part of management is the decision making process. One step of the decision making process is decision making, the actual selection of an alternative, which may be to do nothing. Management is applied to a number of overlapping activities and decisions will be

made in all of these. An adaptation of Porter's (1985) value chain was presented that identifies an orchardist's activities, described as either primary or support.

The decision making process has been described using both normative and behavioural models. Normative models describe how decisions should be made, whereas behavioural models describe actual decision making. Management makes three types of decisions structured, semi-structured, and unstructured. These decision types occur at three levels of decision making operational, tactical, and strategic. Strategic decisions are expected to be unstructured and operational decisions structured. Different decision making processes are expected to be used by managers to make structured, semi-structured and unstructured decisions. The behavioural model of decision making developed by Mintzberg, Raisinghani, and Théorêt (1976) is postulated as being useful to describe decisions across all decision levels and types of decision making.

The farm management process has many similarities to the business management process. Business management, like farm management, is likely to face forms of seasonality of demand. However, business management has the capacity to readily alter production to meet demand. This is seldom possible in farm production where management is constrained by seasonality of supply. Therefore, despite several similarities seasonality of supply creates additional uncertainty, not confronted in business management. This situation is presented in Figure 3.1 (b), which depicts farm and business management sharing part of the same paradigm.

Research Method and Data Collection

"Everything of importance has been said before by somebody who did not discover it"

ALFRED NORTH WHITEHEAD

4.1. INTRODUCTION

The research method is the procedure (strategy) adopted to collate and analyse data (Yin, 1989). The research procedure in this study is represented by *E, J and A*, in Einstein's model for constructing scientific theories, discussed in Chapter Two. The procedure determines how the specific research questions are answered. Yin provides a pluralistic view (p. 15) of research procedures, which he calls strategies, and their merits for answering various forms of research questions.

The procedure used for research depends on the type of research question, the control the researcher has over actual behavioural events and the degree of focus on contemporary, as opposed to historical events (Yin, 1989). Relevant situations for different research procedures, as described by Yin, are presented in Table 4.1.

Research questions may be categorised according to type, for example, *who*, *what*, *where*, *how* and *why*. Who questions (e.g., who attended pipfruit industry workshops?) could be answered by conducting a survey or examining archival records to establish which individuals or groups were involved. A survey could be conducted to learn what action the participants recommended. What questions also come in the form of how much or how many (Yin, 1989) (e.g., how many people were involved?). What questions could easily be answered by a survey or analysis of archival records. Surveys and archival analysis are also useful procedures for answering where questions (e.g., where are apples grown in New Zealand?).

Table 4.1. Relevant situations for different research procedures.

<i>Procedure</i>	<i>Form of Research Question</i>	<i>Requires Control Over Behavioural Events?</i>	<i>Focuses on Contemporary Events?</i>
Experiment	how, why	yes	yes
Survey	who, what*, where how many, how much	no	yes
Archival analysis (e.g., economic study)	who, what*, where how many, how much	no	yes/no
History	how, why	no	no
Case study	how, why	no	yes

Source: Yin, 1989.

How and why questions are commonly used to clarify issues, such as how and why people attended the industry workshop. How and why questions target more detailed information than could be obtained from who, what or where questions. Experiments, histories and case studies are useful for answering how and why questions (Yin, 1989).

The degree of control the researcher has over behavioural events is the second consideration when selecting a procedure. Experimental research requires a high level of control over the environment and factors that influence the outcome. The experimental investigator can “manipulate behaviour directly, precisely, and systematically” (Yin, 1989, p. 20). Experimentation provides the investigator the freedom to focus on selected variables of interest without the fear of erroneous results through contamination. This approach, however, reduces the ability to generalise to actual events where little control is possible (which is why few scientists seriously attempt to generalise from elaborate experiments). Other research procedures do not require control over behavioural events. In fact, control is seldom desirable when the researcher wishes to observe actual behaviour in its natural setting.

Temporal focus is the third consideration when selecting a research procedure (Yin, 1989). Case study research procedures are particularly useful for researching events as they occur. For example, questions regarding how orchardists' decide where to sell their fruit could be answered by conducting a case study as they sell their fruit. Experiments, surveys, and archival analysis may also be used to focus on contemporary events (Yin, 1989).

This research will use case studies to answer the research questions stated in Section 1.4. The objectives of the research are to describe decision making on corporate and owner-operated orchards. The case study participants are commercial orchardists, as such they were operating independent of the study. The researcher had no control over the organisations' decision making. In addition, it was desirable to observe actual decision making without outside influence from the researcher as is the aim, for example, of action research (Kemmis & McTaggart, 1988). The actual case study method used in this research is described in Section 4.2.

Section 4.3 provides a description of the data collection techniques used in the research. The techniques employed to formulate the case study included interviewing, document analysis, and observation. The methods used for analysis of the data collected are then discussed in Section 4.4.

4.2. RESEARCH METHOD

Case studies have long been accepted as a useful educational tool. This method, popularised by the Harvard Business School, remains the basis of the Harvard MBA programme (Goldberg, personal communication, August 5th, 1994). One of the earliest and clearest statements of the general educational theory underlying the use of the case study method was written by Arthur Stone Dewing (Dewing, 1931; McNair, & Hersum, 1954). The case study method is also identified as a useful procedure for research in the Social Sciences (Hakim, 1987; D. Nachmias & C. Nachmias, 1976).

Further, case studies have now become widespread as a procedure for management research (Gummesson, 1991; Yin, 1989). Yin (1989) defines case study research 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.

(p. 23)

This definition emphasises that case study research investigates actual situations in their natural setting. Whereas, in experiments the investigator controls the variables that affect the research subject. The case study procedure is used to analyse events at, or soon after, they occur (real-time). The other distinguishing feature of case study research is the use of several sources of evidence. Case study researchers have used documentation, archival records, interviews, direct observations, participant observation, and physical artifacts as evidence for preparing a case study (Yin, 1989).

Case study procedures may be exploratory, descriptive, or explanatory (Yin, 1989). Critics of the case study method suggest it is only useful for exploratory investigations (Yin, 1981) that lead to real research using other procedures (Yin, 1989). However, Yin argues that this stereotype is naive. Case studies are useful for describing situations, or to test explanations for why specific events have occurred (Yin, 1981). The explanatory case study may lead to causal inference and hypotheses. Explanatory case studies have also been used for the development of theory (Eisenhardt, 1989).

This study, although largely descriptive, draws aspects from the three types of case study described above. Exploratory, given that it is the first such study of orchardists' decision making. Within-case and cross-case comparison of the decision making processes provides a broad and detailed description of decisions making. These descriptions can then be linked to extant theory of management's decision making leading to explanatory inferences (testable hypotheses).

There are four case study designs available for each of the case study types (Yin, 1989). These designs can be represented by a 2 x 2 matrix. The design matrix of case study types is presented in Figure 4.1. The single case design is analogous to a single experiment, and similar justifications for use as a research procedure are applicable. The single case study may be the critical case that meets all the conditions of an existing theory. This is useful for testing the propositions of a theory, offering alternative explanations or expanding the existing theory. A single case study is justified where the case is an extreme or unique case. This often occurs with rare clinical disorders where each new occurrence can offer new clues to the nature of the disorder. A third rationale for a single case is the revelatory case (Yin, 1989). A revelatory case is a case that has previously been inaccessible to scientific investigation.

Figure 4.1. Basic types of designs for case studies.

	Single-Case Designs	Multiple-Case Designs
Holistic (single unit of analysis)	TYPE 1	TYPE 3
Embedded (multiple units of analysis)	TYPE 2	TYPE 4

Source: Yin, 1989.

The second type of case study is the multiple case design. Multiple case designs are research procedures that examine more than one case. Multiple case designs are used to allow replication, and contrasting or comparison of results. Replication of cases may be used to increase the researcher’s ability to generalise. The researcher can generalise using a technique known as replication logic (Yin, 1989). If the same results occur in multiple case studies a *literal* replication exists. These results could then be generalised to include similar cases that had not specifically been studied. Replication logic is similar to that used in multiple experiments (see Hersen & Barlow, 1976).

Multiple case studies can also be used for contrasting or comparative purposes. A *theoretical* replication (Yin, 1989) exists where multiple cases produce contrary results for predictable reasons. Cases that vary in a few variables can be studied to examine how those variables effect the unit of analysis. For example, case studies of high and low performing orchardists could be used to help explain the reasons for high and low performance.

This study uses a multiple case design to investigate the decisions made by orchardists. Case studies are prepared for both a corporate and an owner-operated orchard. The known variables that differ in each case study include size, in terms of land area and total production, and management structure. The case studies are compared and contrasted to establish similarities and differences between the decisions made by the management of each enterprise. This *cross-case* comparison will help identify differences in managements' decision making. Differences may be explained by hypotheses regarding size and/or the management structures' effect on decision making.

The unit of analysis is the primary focus of the study (Patton, 1990; Yin, 1989; Zikmund, 1991). For example, the unit of analysis for a study comparing reasons for high and low performance on orchards could be management style of each orchardist. Comparison of cases can only be achieved if the cases have a similar focus or unit of analysis. The unit of analysis determines whether a study uses a holistic or embedded design. The case study is the minimum unit of analysis in a holistic design. For example, a researcher may use a holistic design to study the reasons why a marketing strategy failed. The unit of analysis is the marketing strategy. Whereas, embedded design uses one or several unit(s) of analysis within the case study. For example, an embedded design may be used to learn how orchardists market fruit on the domestic market; the orchardist is the case study and the marketing strategies are the unit of analysis. This study adopts an embedded design where the unit of analysis are the decisions made in each enterprise and the case studies are the corporate and owner-operated enterprises.

4.2.1. Generalising from case studies

A common criticism of case studies is the inability to generalise from results (Bryman, 1989). Critics assume that there is only one method of generalisation, that of *statistical* generalisation. Statistical generalisation is possible where a statistically representative sample of the population is selected. As case study research often focuses on a single, or limited number of cases it is seldom possible to make statistical generalisations. This is only possible where the population is very small, say corporate orchardists in New Zealand. Generalisation from case studies is possible, however, using *analytic* generalisation. Analytic generalisation is the process of linking the results of the case study to theoretical propositions. The researcher may expand extant theory or develop new theory from case study research (Eisenhardt, 1989). The ability to predict results in other situations increases once theory is refined. Using analytic generalisation the researcher does not attempt to enumerate frequencies to generalise results. Issues of sample size and representation are irrelevant. The results of the within- and cross-case analysis conducted in this study are then compared with the existing theory, as that described and summarised in Chapter Three.

The ability to generalise from these results depends on the links to existing theory and the strength of the concepts and propositions developed in the descriptions of the decisions made by the orchardists. Concepts and propositions are the building blocks of theory (Zikmund, 1991). This research identifies the concepts and propositions used by orchardists in decision making. The strength of the concepts and propositions is linked to the level of abstraction necessary to describe the processes. The greater the level of abstraction the greater the strength of the concepts and propositions and, therefore, the ability to generalise (Kuhn, 1970).

4.2.2. Selection of cases

The research questions determined the suitability of the specific case study orchards. The study required one corporate and one owner-operated orchard. Although studying

more orchards would allow the use of replication logic, resource and time constraints limited the study to one of each type of organisational structure.

Access is a major consideration when selecting case study subjects (Gummesson, 1991; Yin, 1989). The author had maintained communication with a Director of one of the corporates in Hawkes Bay since 1990. This relationship provided an opportunity to invite the corporate to participate in the study. Approval was given for data collection to commence in January 1994 following an initial meeting with the Director and General Manager. The corporate is an above average producer, compared with other Hawkes Bay orchardists, and other corporates. For example, the corporate has produced yields per hectare in excess of the MAF Hawkes Bay Pipfruit Model Orchard (Ministry of Agriculture & Fisheries, 1994b).

The New Zealand Apple and Pear Marketing Board's Field Officers provided selected names of growers from the Hastings District they considered above average performers. Growers who have regular contact with Massey University were excluded from the study. The first grower approached, due to time constraints, was unavailable for the study. The second grower approached enthusiastically agreed to participate. This orchardist has also produced yields per hectare in excess of the MAF Hawkes Bay Pipfruit Model Orchard (Ministry of Agriculture & Fisheries, 1994b).

4.3. DATA COLLECTION

The case study research procedure is unique in that it uses multiple sources of evidence to answer the research questions. Yin (1989) identified six separate techniques for data collection. These techniques include interviews, documentation, archival records, direct observation, participant observation and physical artifacts.

Interviews are one of the most important sources of evidence for case studies (Yin, 1989). They can take many forms but are most commonly *open ended*. This allows the researcher freedom to explore issues in greater detail than traditional survey

methods. In case study research multiple documents can also be collected to help build the case. Documentation is a useful source of evidence for corroborating and augmenting evidence from other sources. Archival records are similar to documentation, however, they include formal records stored by an organisation. Service records, organisational records and personal records are all evidence from archival records. Direct observations are observations made in the field, often while collecting other forms of evidence. Observations can range from formal to casual data collection activities. Participant observation is observation in which the investigator is more than a passive observer, the researcher actually takes an active role in events under study. The final source of evidence is physical artifacts. These include objects, tools or instruments that may be collected as part of a field visit. For example, apples and computer software are considered physical artifacts. Interviews, documentation, and direct observation were the main techniques used for data collection. In some instances physical artifacts were also collected, for example, apples used for demonstrating maturity.

4.3.1. Interviewing

The major technique used for data collection was personal interviews with each of the decision makers on the corporate and owner-operated orchards. These interviews were semi-structured and focused on areas of decision making. Semi-structured interviewing is a technique in which the interviewer focuses on areas of interest (Aaker & Day, 1990; Minichiello, Aroni, Timewell, & Alexander, 1991). The interviewer uses prompts and probes, based on general subject areas, to maintain conversation and dialogue with the respondent (Zikmund, 1991). A set of likely decision areas was developed from the researcher's knowledge of orcharding prior to the first interview. This list of decision areas provided the interview focus that was then modified as the study progressed.

All interviews were taped to increase the accuracy of the interview data. Two interviewers were present for each interview (see Hall, 1995) which helped the flow of

the interview, operation of recording equipment and the discussion of alternative perspectives.

Pilot interviews were used to identify decision areas that would be focused on during monthly semi-structured personal interviews. Pilot interviews were conducted with the decision makers on both the corporate and the owner-operated orchards. Five people were interviewed in the corporate including an Executive Director, the General Manager of the Horticultural division, two Operations Managers and an Orchard Manager. These five people were chosen to represent higher, middle, and lower management in the horticultural division. Only one person was interviewed in the owner-operated orchard, the person responsible for the decision making.

Semi-structured questionnaires were then formulated before each monthly interview (questionnaires are not be included in the appendices to preserve confidential discussions). The interviewer would initially confirm the details of the previous months interview for each decision area. New developments in each area were then discussed, as recommended by Todd, Gray, Lockhart, and Parker (1993). Questions on new developments were often the result of documentation or direct observation. On occasions new issues from new areas were also discussed. The questions would attempt to discover what decisions were made, and the process leading up to making those decisions. Interviews continued for a seven month period, from February to October 1994, to ensure that a wide variety of decisions were examined.

4.3.2. Documentation

Documentation is a particularly useful source of evidence for case study research (Yin, 1989). Documentation examined from the corporate included meeting minutes, internal production and financial reports, job descriptions, packhouse reports, harvest plans, political and commercial submissions, company procedural statements and internal analysis documents. There was a lesser amount of documentation evidence collected from the owner-operator. Documents from the owner-operator included production reports, packhouse reports and industry statistics. In addition documents

were collected from sources other than the case study orchardists. These included newspaper clippings, annual reports, industry reports and industry newsletters.

Documents were collected during the visits that directly related to the decision areas discussed in the interviews. These documents often provided information regarding the decisions. On rare occasions some documents would identify new areas of decision making that had not been discussed. The meeting minutes and newspaper clippings were particularly useful for identifying potential decision areas. Media reports and discussion with industry commentators and participants was also useful for identifying new decision areas. For example, radio broadcasts were the first indication a hail storm may have affected the orchardists' decision making. Issues such as this were followed up in subsequent interviews.

4.3.3. Direct observation

Observations of behaviour and environmental conditions is another useful source of case study evidence (Yin, 1989). Observations can range from formal, such as attending meetings, to casual collection, for example, observing office interaction while waiting for interviews.

The interviews were always conducted at the decision makers' offices. This provided an opportunity to observe decision makers in their operational environment. Direct observations were also made during attendance at management meetings. These meetings included the General Manager and the two Operations Managers. Meetings between the corporate's Managing Director, Company Secretary, General Manager, the two Operations Managers and the Packhouse Manager were also attended. Observations made during these meetings were particularly useful for identifying issues discussed later during interviews.

4.4. DATA ANALYSIS

Data analysis, as described by Miles and Huberman (1994), consists of three concurrent flows of activity; data reduction, data display, and conclusion drawing and verification. These three activities occur throughout the research process. The continuous nature of data analysis allows modification of data collection to ensure that accurate and complete data are obtained. In this study data analysis included summaries of transcripts by decision areas (data reduction), case study narratives (data display), and within-case and cross-case comparison of decision areas and decision processes (conclusion drawing and verification).

All the interviews were taped and transcribed into full narratives. Each transcript was then summarised. The summaries included who was interviewed, when, where and what areas of decision making were discussed. Summaries proved particularly useful to identify gaps in the data regarding each decision area which were then pursued during the next month's interview.

A database of decision areas for each case was built up over the seven month period (see Appendix I and Appendix II for the condensed¹¹ decision database for the corporate and owner-operator). The database included the decision area, decision descriptor, the indicative decisions, the decision type (structured, semi-structured, or unstructured), decision level, and a description of the decision making process involved with that decision. The majority of this information was summarised directly from the transcripts supported by documentation and direct observation.

The decision areas identified in each of the case studies were then compared with each other and then with the broad decision activities described in the literature, summarised in Section 3.4. The model developed in Chapter Three, based on Porter's value chain (1985), is then used to classify decisions and decision areas. The descriptions of the

¹¹ Specific details are often excluded for reasons of confidentiality.

decisions in each decision area are then compared and contrasted within- and cross-case using pattern matching.

4.4.1. Pattern matching

Pattern matching is a technique described by Campbell (1975). Patterns can be described from summarised data. Pattern matching links several pieces of information, from the same case, to theoretical propositions (Yin, 1989). The search for patterns is facilitated by in-depth analysis of each case. Eisenhardt (1989) suggests the number of approaches to within-case analysis is as numerous as the number of case study researchers. Presenting within-case data, known as a data display (Miles & Huberman, 1994), commonly includes narrative descriptions, graphs and tabular displays (Eisenhardt, 1989). The overall idea of any within-case analysis is to “become intimately familiar with each case as a stand-alone entity” (Eisenhardt, 1989, p. 540). The unique patterns of each case can then be discovered and documented. Patterns are particularly useful for “making sense” of many separate pieces of data (Miles & Huberman, 1994, p. 246).

Patterns were expected within each case study between management activity, decision type, and level in each decision area. Consistent patterns reveal the concepts and propositions used in decision making on either the corporate or owner-operated orchards. The patterns are then compared and contrasted with each other and similarities and differences identified and discussed. If similarities are consistent, based on decision area and/or decision type, concepts and propositions can be suggested that describe orchardists’ decision making. Finally, these patterns, concepts and propositions can be described using hypotheses.

4.5. SUMMARY

There are several research procedures suitable for farm management research. Procedures include experiment, survey, archival analysis, history and case study (Yin,

1989). This study uses multiple cases to investigate decision making in corporate and owner-operated orchards in Hawkes Bay.

Yin (1989) suggests three types of case studies that may be one of four designs. Types of case study include exploratory, descriptive, or explanatory. This study is primarily descriptive. Designs are either holistic or embedded and either single or multiple. An embedded design has been adopted to study the decisions made within each case study.

The case study orchardists were selected such that size and management structure was the primary difference between the cases. One case study was a large scale corporate orchardist while the second case was an *average* size owner-operated orchard. Access was another important consideration when selecting cases.

The data collection techniques used were interviewing, documentation and observation. The collected data is combined and analysed using a procedure described as data reduction (Miles & Huberman, 1994). The data is then further analysed using data display, and conclusion drawing and verification. Pattern matching is used for within- and cross-case analysis.

The Case Studies

“Education...has provided a vast population able to read but unable to distinguish what is worth reading”

GEORGE TREVELYAN

5.1. INTRODUCTION

Case study reports for the corporate and owner-operated orchards are presented in this chapter (Sections 5.2 & 5.3). Each case study report includes a brief description of the capital, land, labour, and management employed on the enterprise. The chapter concludes with a comparison between the resources of the corporate and the owner-operated business.

5.2. THE CORPORATE

The corporate's interests are in transport, contracting, and horticulture. Each of these interests are managed as separate divisions. The horticultural division was the subject of the case study. In 1994 the horticultural division had total assets of \$24.5 million and received approximately \$11 million from apple sales. The division has 365 planted hectares located in Napier, Hastings and Central Hawkes Bay. The majority (351 hectares) of this land is planted in apples. The main varieties are Braeburn, Fuji, Red Delicious and Royal Gala. The division employs 50 permanent employees and up to 450 casual employees at the peak of the harvest season.

In recent years the horticultural division has undergone a period of rapid expansion. In 1992, the corporate acquired an additional seven orchards and a coolstore complex. These assets were purchased from Brierley Investments Limited (BIL) as they rationalised their core businesses. The acquisition had a significant effect on the overall

size of the horticultural division. Before the acquisition the corporate had 147 hectares planted in apples, and produced 230,690 cartons of apples (Eastern Equities Corporation Limited, 1992). Planted area increased to 347 hectares, and production increased to 971,000 cartons following the acquisition.

The corporate orchardist operates an ISO 9002 accredited packhouse. This packhouse, built in 1992, has the ability to process some one million cartons of fruit in a season (5% of New Zealand's crop). The corporate owns a nearby coolstore complex with a capacity of 4,500 bins. In addition a 3,000 bin coolstore is being built adjacent to the packhouse, and is due to be completed in March, 1995. This new coolstore will also have controlled atmosphere¹² capabilities. The corporate operates a nursery in conjunction with new plantings. The nursery produces enough stock to supply trees for the redevelopment of existing orchards and future development. The division's main office and administration department is located near the new coolstore and packhouse complex.

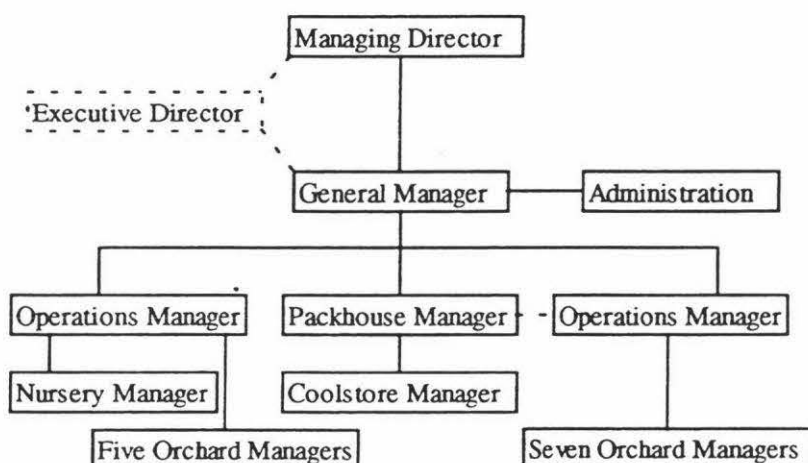
In 1994 the corporate produced 966,135 cartons of which 495,168 were submitted for Class I export. In addition, the corporate supplied fruit for Class II export, local market and processing. The local market was deregulated prior to the start of the 1994 season. Under the new regulations growers are able to supply local market fruit to whomever they choose, including direct sale to retailers and processing companies. The corporate supplied the majority of their local market fruit to one outlet. Four outlets were supplied fruit for processing. On March 2nd, 1994 a severe hail storm decimated many orchards in Hawkes Bay. The corporate had three orchards affected. Two of these orchards suffered minor reductions in production and packout, and one orchard was severely effected. The horticultural division lost approximately 50,000 export cartons in total as a result of the hail storm.

The horticultural division is operated by a hierarchical management structure. This structure is relatively fluid. During the study the division's management structure

¹² Controlled atmosphere storage is achieved by decreasing the oxygen level and increasing the carbon dioxide level in a coolstore to slow down fruit respiration and, therefore, reduce fruit ageing.

changed several times. These structural changes appeared to be largely the result of acquisition of the BIL assets. Initially the two orcharding enterprises were operated relatively independently. Since October 1992, however, changes have slowly been made as the *ideal* management structure is pursued. In addition, there were several changes at the corporate level. The Managing Director was employed from 1992 and the Executive Director for the horticultural division resigned on August 31st, 1994, and will not be replaced. Figure 5.1 presents the horticultural division's management structure at the conclusion of the study. The Executive Director, who contributed to the study, is represented by dotted lines indicating his contribution to the study.

Figure 5.1. Case study corporate's (horticultural division) management structure.



The Managing Director reports directly to the corporate's Board of Directors and is responsible for overseeing the operation of all of the corporate's divisions. The Executive Director is a board member who is directly involved with the management of the horticultural division. The Executive Director was often involved with investigating special projects, not necessarily related to the day-to-day operations, and consulting to lower management on business and horticultural issues. The General Manager now has a direct link with the Managing Director following the resignation of the Executive Director.

The General Manager is responsible for the efficient day-to-day and long term operation of the horticultural division. He is assisted by an administration division that provides secretarial service, maintains an information system, and performs general administration duties.

The horticultural division has two Operations Managers, one Postharvest and the other Staff & Harvest. These two positions are at the same level in the management hierarchy. The Operations Manager (Staff and Harvest) provides staff support and coordinates the harvest. In addition, he is responsible for overseeing the operation of five orchards and provides advice to the orchard managers of these orchards as required. The Operations Manager (Postharvest) controls the apple crop from the packhouse to submission to the New Zealand Apple and Pear Marketing Board, local market outlets and local processors. This Operations Manager also supervises seven orchards.

The Packhouse Manager has recently been moved in the management hierarchy to report directly to the General Manager. Throughout the majority of the study he was responsible to the Operations Manager (Postharvest). He oversees the operation of the packhouse and coolstores complexes. A Nursery Manager has recently been employed to manage the division's nursery operations. This role was performed by the Operations Manager (Staff & Harvest) throughout the majority of the study.

Each orchard is managed on a day-to-day basis by an Orchard Manager. The Orchard Manager is responsible for the development of, and profitable production from, their orchard to ensure company objectives are achieved. The Orchard Managers report directly to one of the Operations Managers.

5.3. THE OWNER-OPERATOR

The owner-operated orchard, located near Hastings, produces apples and pears on 8.4 effective hectares. The orchard was purchased as a going concern in 1988. The majority of the land is planted in apples, the main varieties being Braeburn, Gala and

Red Delicious. In 1994, the orchard (including residence) was valued at \$600,000 and was expected to gross \$250,000 from pipfruit sales. The same hail storm which affected the corporate decimated the owner-operated orchards' crop after only minimal fruit had been harvested. Some income from domestic market sales was received. The owner provides the majority of labour on the orchard. In addition, the orchard employed one full-time employee for six months during 1994. Up to ten seasonal staff are employed during the harvest period. All fruit is then packed and coolstored off the orchard by two separate firms. The orchard produced 13,823 cartons of apples and 511 cartons of pears in 1993¹³. Of this 8,957 cartons of apples were packed for export. The remaining apples, and all of the pears were supplied to the New Zealand Apple and Pear Marketing Board for local and process markets.

The owner is responsible for the management of the orchard. He essentially has sole charge for all decision making on the enterprise. However, occasionally there may be influences from a bank manager or his spouse, who is a partner in the business.

5.4. COMPARISON BETWEEN THE CORPORATE AND OWNER-OPERATED ENTERPRISES

There are significant differences in the scale and management structure between the two case study enterprises. The corporate produces approximately one million cartons of apples from 351 hectares compared to the owner-operator's 14,000 cartons from 8.4 hectares. In 1994, the corporate expected to earn \$11 million from apple sales whereas the owner-operator's expected income was only \$250,000. The corporate's horticultural division has assets valued at \$24.5 million compared to the owner-operator's orchard valued at \$600,000. The corporate operates a hierarchical management structure whereas the owner-operator is responsible for all decision making on the orchard. The effect that these differences have on decision making is discussed in Chapter Six.

¹³ Production figures for 1993 have been used because minimal fruit was available for sale in 1994.

Results and Discussion

"Someone once defined the manager, only half in jest, as that person who sees the visitors so that everyone else can get the work done"

HENRY MINTZBERG

6.1. INTRODUCTION

This chapter provides an analysis and discussion of the results. Decision areas and activity, decision types, and decision levels are identified and discussed. Patterns of decision making are then explored in the owner-operator, the corporate and at various levels of the corporate's management structure. Patterns from within- and cross-case comparisons are then contrasted with the models identified in the literature review, Chapter Three.

6.2. DECISION AREAS

A database of decisions was created during the study. The database included the decision area, personnel involved, indicative decision, decision classification by activity, type and level, and a description of how each decision was made. The database was derived from summaries of the interview transcripts, collated documents, observations and collected artifacts. A copy of the corporate orchardist's database is presented in Appendix I.

Thirty-three decision areas were identified on the corporate during the study. These areas, initially based on a priori knowledge of orcharding, were modified throughout the study. The corporate's decision areas are presented in Table 6.1. A brief description of each decision area is provided for clarification.

Table 6.1. Decision areas and their descriptors for the corporate orchard.

Decision area	Decision relating to:
Budgeting	Preparation of annual budgets
Colour sorter	The acquisition of an electronic colour sorter
Coolstore	The acquisition of a coolstore
Crop estimate	The formulation of crop estimates
End of season report	The contents of end of season reports
Export fruit destination	Where and how exporting should be conducted
Frost	The contents of frost protection procedures
Hail	Activities completed following a hail storm
Harvest	Removing the fruit from the trees
ISO	Achieving ISO 9002 accreditation
Management by objectives	The contents of MBO programmes
Management structure	Altering the management structure
Non-export fruit destination	Where and how non-exported fruit should be sold
Nursery	The contents of the nursery
Overseas visits	What and why people are sent overseas
Fruit packing	Where specific fruit will be packed
Political structure	The reaction to a proposed industry political structure
Property ownership	The acquisition and disposal of assets
Redevelopment	What tree (variety) redevelopment occurs
Research and development	What research and development occurs
Resignation	The resignation of a key member of higher management
Sincturing	Which trees should be ring barked (sinctured)
Soil sampling	Where soil samples should be taken from
Spraying	What spraying of the trees is necessary
Staffing	The level of staff required at any point in time
Staff training	Further training for any staff
Strategic business units	The investment in off orchard activities
Summer pruning	The extent of pruning during the summer
SWOT/Strategic planning	The contents of the division strategic plan
Taskforce	The participation in an industry working group
Thinning	The extent removing immature fruit
Trucking	How fruit is transported to packhouses
Winter pruning	The extent of pruning carried out during the winter

The owner-operator's decision database is presented in Appendix II. Decisions were initially classified into 19 areas. The owner-operator's decision areas are presented in Table 6.2. A description of the areas is also provided to clarify the contents of each decision area.

Table 6.2. Decision areas and their descriptors for the owner-operated orchard.

Decision area	Decision relating to:
Alternative employment	Sourcing additional employment during quiet periods
Budgeting	Preparation of annual budgets, include crop estimates
Cultivation	Preparing or improving the soil structure
Export fruit destination	Where and how exporting should be conducted
Frost	The contents of frost protection procedures
Hail	Activities that completed following a hail storm
Harvest	Removing the fruit from the trees
Irrigation	Watering the orchard
Non-export fruit destination	Where and how non-exported fruit should be sold
Fruit packing	Where specific fruit will be packed
Pollination	Requirements for pollinating the apple blossoms
Property ownership	The acquisition and disposal of assets
Redevelopment	What tree (variety) redevelopment occurs
Soil sampling	Where soil samples should be taken from
Spraying	What spraying of the trees is necessary
Staffing	The level of staff required at any point in time
Summer pruning	The extent of pruning during the summer
Thinning	The extent of removing immature fruit
Winter pruning	The extent of pruning carried out during the winter

Decisions were always allocated to one specific decision area, although often decisions in one area would spill-over into others. For example, redevelopment decisions would lead to decisions classified under the decision area nursery.

The decision areas were then classified into either primary or support activities (as in the model adapted from Porter's value chain, described in Section 3.4.2). The support activities described in this model are firm infrastructure (FI), human resources (HR), research and development (R&D). The primary activities are production (P), postharvest (PH) and marketing (M). The classifications for the corporate and owner-operated orchards are presented in Table 6.3 and Table 6.4 respectively.

Table 6.3. Corporate's (horticultural division) decision areas classified into primary and support activities.

Support Activities			Primary Activities		
FI	HR	R&D	P	PH	M
Budgeting	Staffing	Research & development	Crop estimate	Colour sorter	Export fruit destination
End of season reports	Staff training		Frost	Coolstore	Non-export fruit destination
MBO			Hail	ISO	
Management structure			Harvest	Packing	
Overseas visits			Nursery	Trucking/fruit flow	
Political structure			Redevelopment		
Property ownership			Sincturing		
Resignation			Soil sampling		
Strategic business units			Spraying		
Strategic planning			Summer pruning		
Taskforce			Thinning		
			Winter pruning		

Table 6.4. Owner-operator's decision areas classified into primary and support activities.

Support Activities			Primary Activities		
FI	HR	R&D	P	PH	M
Alternative employment	Staffing		Cultivation	Packing	Export fruit destination
Budgeting			Frost		Non-export fruit destination
Property ownership			Hail		
			Harvest		
			Irrigation		
			Pollination		
			Redevelopment		
			Soil sampling		
			Spraying		
			Summer pruning		
			Thinning		
			Winter pruning		

Classification of the decision areas into activities was often obvious. However, in some cases the classification was more difficult. When difficulties were encountered the decision area was only classified after extensive examination of all evidence, tempered by the researcher's knowledge of orcharding. Decision areas were classified into one decision activity. Nevertheless, it is recognised that decisions in one activity would influence decisions in other activities. Also, one decision area may be classified into several activities. In such cases, the area was classified into the predominant activity and other, secondary, activities recorded in the database. The classification was then presented to the General Manager of the corporate orchard. He examined the classifications and questioned the reasons for each classification. He then verified that the decision areas were representative of the division's activities and were classified to his satisfaction. The owner-operator was also contacted at the end of the study period, to clarify the content of selected decision areas.

In some instances, several decisions were made in each of the areas identified. There were simply too many decisions made during the study to analyse each. Therefore, for each decision area, one (and in some cases two) decision(s), normally the indicative one, was isolated for further analysis. Two decisions have been included in selected decision areas where a greater understanding was required. The number of separate decision areas on the corporate was nearly double that on the owner-operated enterprise. On the corporate, 33 distinct decision areas were identified, whereas 19 decision areas were identified on the owner-operated enterprise.

Primary activities are those activities associated with the core business of the firm (production, postharvest and marketing). Support activities are those activities associated with all primary activities (firm infrastructure, human resources, and research and development). It appears there has been little research investigating effects of ownership structure on decision activities. Therefore, it is unclear how decision activity should vary between corporate and owner-operated orchards. However, the number of primary activity decisions were found to be relatively similar between both enterprises. Eighteen decision areas were classified as support activities on the corporate and four on the owner-operated enterprise. The differences in the

total number of decisions areas is largely due to the increased number of support activities performed in the corporate environment. The number of decisions areas classified into primary and support activities is summarised in Table 6.5.

Table 6.5. Number (and percentage) of decision areas classified into primary and support activities on the corporate and owner-operated enterprises.

	Corporate	Owner-operator
Primary activities	19	15
Support activities	14	4
Total	33	19

To identify pattern variations between the case study enterprises the decision areas common to both case studies were isolated. There were 15 decision areas common to both the corporate and owner-operated enterprise. The common decision areas are presented in Table 6.6.

Table 6.6. Decision areas common to both case studies.

Decision areas	
Primary activities	Support activities
Export fruit destination	Budgeting
Frost	Property ownership
Hail	Staffing
Harvest	
Non-export fruit destination	
Packing	
Redevelopment	
Soil sampling	
Spraying	
Summer pruning	
Thinning	
Winter pruning	

The majority of decision areas common to both enterprises were, as expected, classified in primary activities. The common support activities were budgeting, property ownership and staffing. Therefore, despite the large differences in scale,

ownership and management structure, management on both enterprises is conducted within similar primary decision areas reflecting the core business of the enterprises.

The classification of decision areas into primary and support activities is particularly useful for identifying differences in decision making between the two case studies. The reasons for the differences in primary activities are explored first. The reasons for the differences in support activities follows.

There were three decision areas, classified as primary activities (of 15), included in the owner-operator's management that were not identified in the management of the corporate. These primary decision areas were cultivation, irrigation and pollination. Decisions regarding cultivation¹⁴ were not made on the case study corporate orchard during the study period. It is reasonable to expect that when such decisions are made, they are made by the Orchard Manager. Pollination had not commenced on the corporate orchards during the study period. It is expected that pollination decisions would be made by the Orchard Manager or by the Operations Managers on behalf of all orchard managers (this issue is discussed further in Chapter Seven).

Irrigation decisions were not explored in depth on the corporate because decisions within this area were predominantly made by personnel below the Orchard Manager. For example, an orchard foreman was responsible for scheduling irrigation on the orchard studied. Orchard foremen were not interviewed during the study (this issue is elaborated on in Chapter Seven).

The corporate also had primary activities that were not identified on the owner-operated orchard. Seven decision areas were classified as primary activities on the corporate and not on the owner-operated enterprise. These areas were colour sorter, coolstore, crop estimates, ISO, nursery, sincturing and trucking.

¹⁴ Cultivation included soil preparation for planting and deep ripping.

Two of the seven, crop estimates and trucking, are combined with other areas. Crop estimates were classified as a primary activity on the corporate and were not recognised on the owner-operated enterprise. Crop estimates have been included in budgeting for the owner-operator as he completed crop estimates as part of the budgeting exercise. Whereas on the corporate, while crop estimates were also completed for budgeting, they were used for several other reasons including decisions regarding property ownership, redevelopment and strategic planning.

Trucking includes decisions regarding how fruit will be transported from the orchard to the packhouse. This activity was sufficiently straight-forward on the owner-operated orchard that it was not regarded as a management decision. Trucks were simply requested to collect fruit at the end of each day and transport it to the packhouse. Trucking decisions on the corporate were, however, more complex. Fruit from twelve orchards had to be trucked on one-of-nine trucks to one-of-five packhouses. The decision was further complicated by five bin types, some of which could not be sent to all the packhouses.

The other five decision areas, classified as primary activities, not included in the owner-operator's database were colour sorter, coolstore, ISO, nursery, and sincturing. Decisions regarding a colour sorter, coolstore, ISO and nursery were not made on the owner-operator, apparently due to the scale of the operation. The owner-operator did not have his own packhouse or coolstore. Likewise, he did not propagate trees on his orchard. Lastly, the owner-operator did not conduct any sincturing on the orchard.

The corporate is involved in a greater number of support activities than the owner-operator. The corporate's support activities include reporting, industry organisation, overseas visits and exploring opportunities outside the core business of growing pipfruit. The reason for the increase in support activities in the corporate setting appears to be largely related to structure and size. The structure of the organisation requires that communication takes the form of formal reports between management personnel, the board of directors and the owners. Formal reports included annual reports, strategic plans, end of season performance reports, objectives, ISO quality

standards, and hail damage assessments. In addition, formal reports provide a store of information that can be used for future decision making.

By contrast, the owner-operator has minimal need for conveying information regarding the nature and scope of the business to other parties. The owner-operator prepares few formal reports, instead relying on memory and experiential learning. Seldom is more formal reporting or recording required, although problems may arise when recalling information for current decision making. For example, if another hail storm were to occur in 15 years time would the details of this last hail storm be recalled in a useful form? Succession of the property may provide another reason for recording information in written reports.

The second group of support activities are industry organisation activities. The corporate is more involved with industry organisation than the owner-operator. This may be due to both the size and the pro-active nature of corporate personnel. The owner-operator often expressed a desire to become more involved in industry organisation. However, industry involvement for the owner-operator may be limited as some working groups are *restricted* to larger producers or packhouse groups.

Overseas visits was the third group of support activities not included in the owner-operator's management. The corporate invested in several overseas visits for management personnel. These visits were primarily used for collecting market related information¹⁵.

The corporate also investigated opportunities for adding value by stretching their core business (Hamel & Prahalad, 1993) beyond apple production to packaging, postharvest, coolstorage and marketing. Adding-value activities, beyond packaging, were not considered by the owner-operator. The horticultural division appeared to have a greater ability to raise the finance required through the parent structure than the

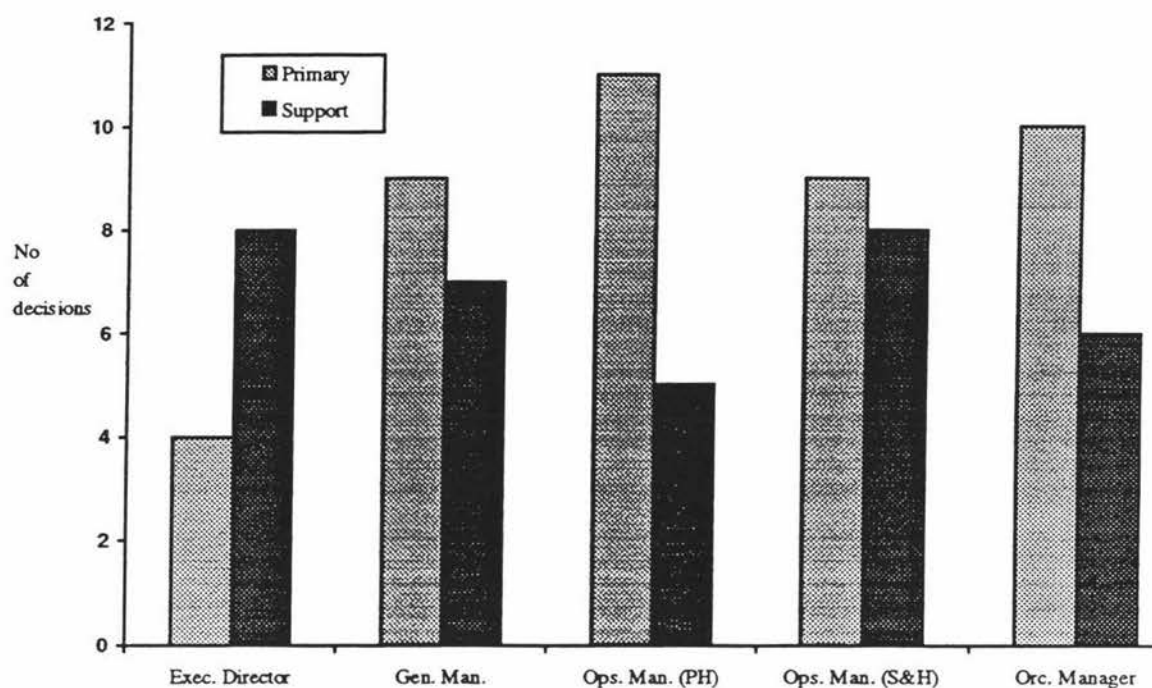
¹⁵ In the interests of confidentiality this decision area will not be further elaborated.

owner-operator, who would have had to raise debt capital to pursue an equivalent added-value strategy.

The only owner-operator's decision area in support activities excluded from the corporates was alternative employment. Alternative employment was not a decision area for the corporate. Management personnel were not involved with making decisions regarding additional employment during the off-season. On the owner-operated orchard, the manager is also the labour unit. Due to hail, or because of the seasonal nature of pipfruit production, there were not 52 weeks of full employment for the manager. Management is separate from labour on the corporate. Due to the seasonal nature of pipfruit production, and the ability to employ contractors as required, labour requirements fluctuate while management requirements remain relatively constant.

Management personnel involved with each decision activity (primary or support) may vary at each level of the management hierarchy. The owner-operator is responsible for making all decisions in all activities. However, in the corporate, the number of primary and support activities may vary with different levels of the management hierarchy. The number of primary and support activities each member of the corporate's management was involved with is presented in Figure 6.1. In this figure, the Executive Director represents the highest management level while the Orchard Manager is the lowest level (refer to the management structure in Figure 5.1). The corporate also has a Managing Director and Board of Directors which set the corporate's policy. These personnel were not included in monthly data collection.

Figure 6.1. Number of primary and support activities performed by management personnel in the corporate (horticultural division).



Porter's (1985) primary and support activities describe the firm as a value chain to identify sources of competitive advantage. They were not developed with specific reference to decision making. Consequently, it is not surprising there is no theory to suggest a relationship between activity and the level of managements' decision making. However, as proposed in Section 3.6.3 there appears to be a pattern of more support activities being performed by higher management and more primary activities being performed by lower management levels. This pattern is evident for the three personnel on the left of Figure 6.1. The pattern is less clear at the lowest management level. The decline in primary activities at lower management levels appears to be due to the amount of expertise in higher management and the scope of the personnel interviewed. Higher management, due to their greater expertise, were often *meddling* with orchard managers' decision making. In addition, foremen, a level below the orchard manager, should have been included in the study. It is expected they would make decisions mostly in primary activities.

Lower management were also involved with a large number of support activities. These support activities included reporting, staff employment and training, and budgeting. Reports were written by lower management for higher management. The number of these reports often meant lower management were spending a considerable amount of time writing reports rather than the core business of growing apples. Reporting activities for lower management could be reduced to allow more time to concentrate on primary activities. It appears necessary to have lower management involved with decisions regarding staffing and budgeting. The Orchard Manager was in the best position to make these decisions as he was in contact with the orchard. He knew how many staff would be required and what training would be necessary. The Orchard Manager also had a good indication of budget information and is, therefore, included in setting annual budgets. At first glance many of these decision areas, classified as support, resemble *compliance* activities imposed by higher management. However, as long as lower management remains involved with determining the nature and content of such reports and budgets they will be classified as decision areas.

6.3. DECISION TYPES

Decisions were classified by type (structured, semi-structured or unstructured) in accordance with the definitions provided in Section 3.6.1. On many occasions this classification again was obvious. Where it was less obvious, the decision and associated decision making were described in terms of Mintzberg, Raisinghani and Théorêt's (1976) model. By contrast the normative model of the decision making process (Steps Two through Five of Osburn & Schneeberger's model, Section 3.5.1) was not found to be useful in differentiating between types. For example, the steps in the normative process could not be identified in the case of structured decisions.

Three of the corporate's decision areas consisted of two decisions and two decisions changed between decision types during the course the study. Consequently, there are 38 (33+3+2) decision areas classified according to decision type. The owner-operator also had two decision areas with two decisions, making a total of 21 (19+2) decision

types analysed. The number (and percentage) of the three decision types identified on each case study is presented in Table 6.7.

Table 6.7. Number (and percentage) of each decision type on the corporate and owner-operated enterprises.

	Corporate		Owner-operator	
	Number	%	Number	%
Structured	7	18	4	19
Semi-structured	15	40	13	62
Unstructured	16	42	4	19
Total	38	100	21	100

The corporate has a significantly larger proportion of unstructured decisions than the owner-operator. In 1992 the corporate underwent a period of rapid expansion. This expansion led to significant changes in resources and management structure. These changes, coupled with management's lack of experience in managing large-scale horticultural operations, could help explain the large number of unstructured decisions. However, if the corporate was making a greater number of structured decisions before the acquisition of further assets (say BIL), several problems may have been avoided. Structured decision making could simply have been replicated by the management of additional assets as *clone* orchards. Instead, it appears the corporate had no formal *system* in place for reporting, storing and accessing information for decision making.

The corporate makes a small number of structured decisions. The reason for this also appears related to the lack of experience in managing large-scale horticultural operations. As the corporate's management gains experience it is expected that more decisions are structured.

Throughout the study it was evident that the General Manager and operations managers would prefer fewer unstructured decisions and more semi-structured and structured decisions. Mintzberg, Raisinghani, and Théorêt (1976), and Newell and Simon (1972) also suggest managers try to make decisions structured. For example, operations managers would often be involved in writing formal policy and procedural statements for orcharding operations. Orchard managers would recognise situations

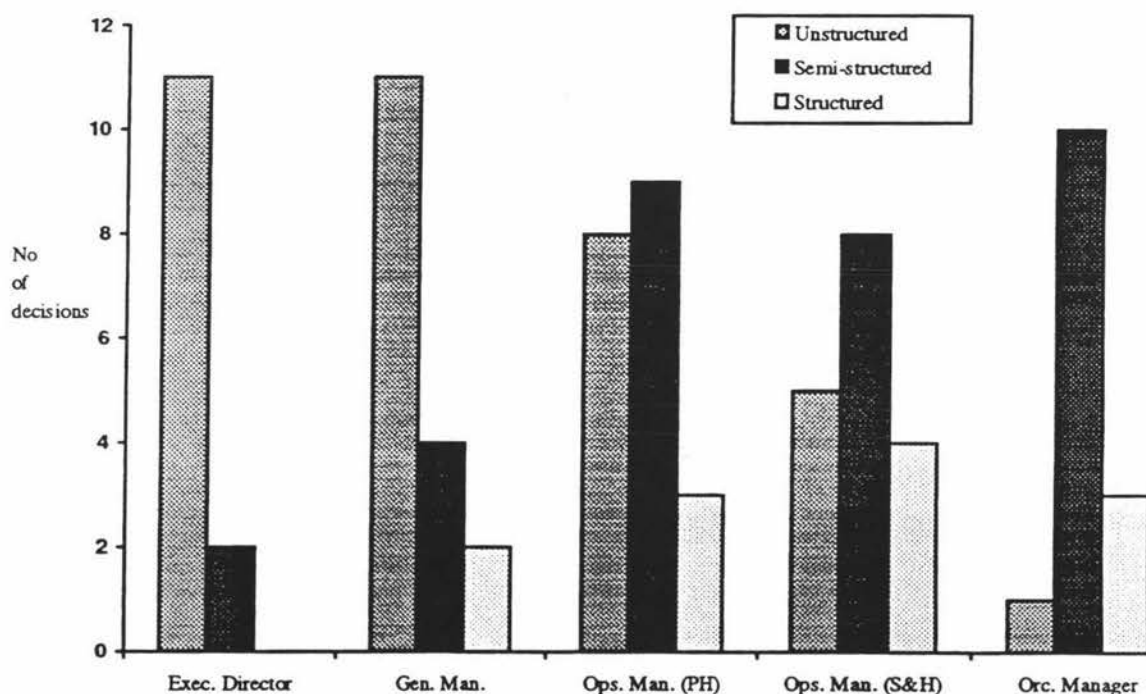
and make decisions based on these written procedures. Using procedures for structured decisions has also been suggested by Griffin (1990). However, it appeared the better orchard managers were able to make adjustments to written procedures to suit specific orchard situations (semi-structured). Adjustments would always require authorisation from higher manager otherwise end-of-season bonuses could be reduced.

The results suggest there are too many unstructured decisions and not enough structured decisions. Management spends a significant amount of time making unstructured decisions. This often led to *pressure situations* in which decision makers were stretched to the limits of sanity. If more decisions were made structured decision making could be simplified liberating management's time, outcomes made near certain, and more importantly, become reproducible (Stoner & Freeman, 1992). If further expansion were to occur the corporate must have a sufficiently robust *system* in place so that structured decision making could be delegated to additional staff as required. However, the system still requires sufficient flexibility so that management is able to recognise opportunities, and flair and innovation not stifled.

The owner-operator has a larger number of semi-structured decisions and a smaller number of structured decisions. The owner-operator purchased the orchard in 1988 as a going concern. He was new to orcharding and during the first two seasons faced a 'steep learning curve' as he learnt orchard techniques. As such these early decisions would have appeared unstructured. The owner's knowledge of orcharding has since increased and the majority of decisions are now semi-structured. He often knows what decision is necessary but seeks further advice or confirmation from a consultant before making or implementing a decision. As the one person is responsible for the decision making, communicating procedures to others is seldom necessary. Therefore, it does not appear necessary to make these semi-structured decisions structured by developing formal written procedures. The data supports Hardaker and Anderson's (1981) comment regarding the lack of formal recording systems in farm management. However, documentation of some decisions may help decision making, particularly memory recall for infrequent decisions, or to help introduce someone else to the management of the orchard (e.g., a son or daughter).

Management personnel involved with each decision type may vary at each level of the management hierarchy (Koontz & Weihrich, 1988). The owner-operator is responsible for making all types of decisions. However, in the corporate different types of decisions may be made by different levels of the management hierarchy (Griffin, 1990; Koontz & Weihrich, 1988). The number of unstructured, semi-structured and structured decisions made by each member of the corporate's management is presented in Figure 6.2. In this figure the Executive Director is presented as the highest management level while the Orchard Manager is again the lowest level (refer to the management structure presented in Figure 5.1).

Figure 6.2. Number of each decision type made by management personnel in the corporate (horticultural division).



The pattern of higher management making more unstructured decisions than lower management is consistent with that suggested by Koontz and Weihrich (1988). However, lower management is also making some unstructured decisions and a large number of semi-structured decisions. As noted earlier the corporate is still going

through a developmental phase following expansion, which may explain the unexpectedly large number of semi-structured decisions being made by lower management. Higher management, in the corporate, has a wealth of technical knowledge regarding orcharding. Consequently, these higher management personnel are often involved with making lower level decisions. Decision making is expected to become more structured as lower management gains experience. In addition, the orchard foremen, not included in the study, predominantly are expected to make structured decisions.

The number of semi-structured decisions made by lower management could be reduced. If this were achieved the pattern of decision type and management level would become clearer. Higher management would make the difficult unstructured decisions, encouraging entrepreneurial flair. Whereas, lower management would make the simpler structured decisions, often based on procedures developed by higher management. Griffin (1990) suggested that higher management should make unstructured decisions and lower management should make more structured decisions.

In addition, it appears middle management would primarily make semi-structured decisions. It would be middle management's responsibility to recognise opportunities and ensure that lower management's decision making was appropriate. This pattern may be depicted by using a bell shaped curve to represent the semi-structured decisions in Figure 6.2. The graph would then show that middle management make the most semi-structured decisions. Unstructured decision making would reduce as management level became higher and structured decision making would increase as management level decreased.

A comparison of the decision areas common to both the corporate and owner-operator was made, searching for patterns across case studies. The comparison of decision types for common areas is presented in Table 6.8.

Table 6.8. Decision types for areas common to both case studies.

Common decision areas	Decision type	
	Corporate	Owner-operator
Budgeting	Semi-structured	Semi-structured
Export fruit destination	Unstructured & structured	Structured
Frost	Semi-structured	Semi-structured
Hail	Semi-structured	Unstructured
Harvest	Structured	Semi-structured
Non-export fruit destination	Unstructured to semi-structured	Semi-structured
Packing	Semi-structured	Structured
Property ownership	Unstructured	Unstructured
Redevelopment	Unstructured & semi-structured	Unstructured & semi-structured
Soil sampling	Structured	Semi-structured
Spraying	Semi-structured	Semi-structured
Staffing	Semi-structured	Semi-structured
Summer pruning	Semi-structured	Semi-structured
Thinning	Semi-structured	Semi-structured
Winter pruning	Semi-structured	Semi-structured

Budgeting, export fruit destination, frost, property ownership, redevelopment, spraying, staffing, summer pruning, thinning and winter pruning were decision areas of the same type on both enterprises. The decision areas of different types included export fruit destination, hail, non-export fruit destination, packing, and soil sampling. Common decision types will now be discussed followed by the reasons for differences in decision type.

Ten of the decision areas were of similar decision types. Export fruit destination contained decisions that were structured for both enterprises. Structured decisions were always made quickly with one option, and associated outcome, being immediately obvious to the decision maker. For example, fruit of export quality that had a market indicator rate giving returns higher than returns from other markets would be submitted to the general export pool, unless that product was required for other market opportunities.

Common decisions that were semi-structured included budgeting, frost, redevelopment, spraying, staffing, summer pruning, thinning and winter pruning. Semi-

structured decisions for the corporate often had some written procedures but were often altered to specific situations. For example, there were written procedures being developed for spraying decisions. However, these were often inadequate and the decision maker would have to search for additional information. These decisions could be expected to become more structured as information is gathered. The owner-operator would make semi-structured decisions based on previous experience, intuition and consultant's advice. These were not classified as structured because the owner-operator had few formal procedures for addressing these decision areas. Formal procedures, however, may be unnecessary where one person is responsible for decision making. Although it is still recommended as structured decision making would reduce time, effort and energy required for decision making (Stoner & Freeman, 1992). Perhaps even reducing labour costs, as the requirement for a permanent worker is expected to reduce. Alternatively, the manager would be free to explore alternative employment or other business opportunities.

Unstructured decisions for both enterprises included property ownership and redevelopment. These decisions were often new opportunities or problems that had not previously been encountered. They always required a large amount of information. These decision areas were brought to the attention of the decision maker as a result of industry change and marketing initiatives. The decision maker would then analyse the information in an *organised* manner and make a decision, often in the absence of set guidelines or procedures. Decisions that should remain unstructured, in both enterprises, include export marketing, redevelopment (varietal selection) and fixed asset ownership. Structuring these decisions could prevent the decision maker from exploiting new opportunities in preferred varieties, niche markets, or stretching the value chain.

The decision areas containing decisions of different types were export fruit destination, hail, non-export fruit destination, packing, and soil sampling. The decision area export fruit destination, described a decision made by the corporate and not by the owner-operator. The decision to seek rewards for product differentiation was not made by the owner-operator. He considered that he was not big enough to exploit

opportunities outside the general export pool. The export fruit destination decision regarding supplying the general pool was the same for both enterprises. This decision was structured for both enterprises.

The corporate orchardist was able to draw from existing knowledge when making decisions following the hail storm. Whereas, the owner-operator had never experienced a hail storm and had to rely on new sources of information to make decisions. Consequently, these decisions were semi-structured for the corporate and unstructured for the owner-operator. It is expected that hail related decisions made by the owner-operator would, unfortunately, become semi-structured as he gains more knowledge regarding hail.

Non-export fruit destination decisions were largely unstructured for the corporate (although there were efforts to make them semi-structured) whereas they were semi-structured for the owner-operator. This difference was primarily due to the size of the crop each enterprise had available for the non-export market. The corporate had a greater number of possible outlets that could be supplied. Consequently, the decision regarding the quantities and timing of supply for each outlet was often complex, and complicated further by the hail storm.

Packing decisions were also of different types on the two enterprises. This decision was semi-structured for the corporate. The corporate used four additional packhouses to pack fruit at the height of the season. The Operations Manager (Postharvest) had a set of criteria for determining which fruit would be packed at each packhouse. However, this was often complicated by truck capacity, truck type, bin type, fruit type and likely destination. The packing decision was structured for the owner-operator. The owner-operator decided which packhouse to use at the beginning of the season based on the capability of various local packhouses. As fruit was harvested it would be sent to this packhouse. Due to the quantity of fruit the owner-operator was supplying, it was unlikely an additional packhouse would have been required. This variation in decision type is directly related to the relative scale of the two enterprises. The corporate's scale meant a considerably larger amount of fruit needed to be packed and

resources were currently inadequate. Whereas, the owner-operator had a smaller crop and had suitable resources and systems to cope.

Soil sampling decisions also varied in type between the two enterprises. The corporate had developed a set of guidelines for determining where on the orchard, and how many soil samples should be taken. The orchard manager would then delegate the collection of soil samples to a foreman or permanent worker. Whereas, the owner-operator sought advice from his consultant before a decision was made.

6.4. DECISION LEVELS

The corporate's 38 decisions, and the owner-operator's 21 decisions have been classified by level (operational, tactical, or strategic) in accordance with the definitions provided in Section 3.6.2. The number (and percentage) of the three decision levels for each case study is presented in Table 6.9.

Table 6.9. Number (and percentage) of decisions at each decision level on the corporate and owner-operated enterprises.

	Corporate		Owner-operator	
	Number	%	Number	%
Operational	17	45	14	67
Tactical	13	34	5	24
Strategic	8	21	2	9
Total	38	100	21	100

The corporate makes a greater number (and percentage) of strategic decisions than the owner-operator. The corporate is making more decisions regarding expansion of core business activities, for example, a new colour sorter, coolstore facilities, and new strategic business units. The corporate is also investigating opportunities for marketing differentiated products. The corporate's strategic decisions appear to be related to economies of scale, the availability of finance in the corporate situation and a desire to explore a greater number of opportunities. The owner-operator did not consider

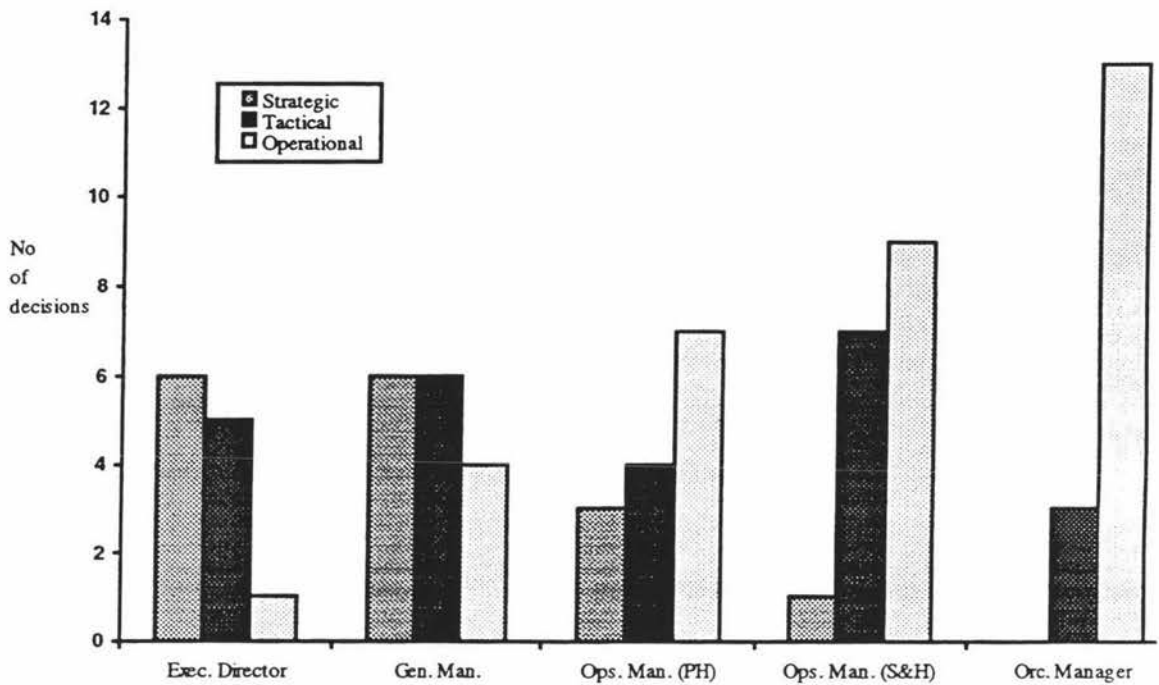
opportunities for marketing differentiated products largely due to his perception of insufficient scale.

Tactical decisions focus on how to operationalise actions to achieve strategic goals. The corporate makes a larger number (and larger percentage) of tactical decisions than the owner-operator. However, all but one of the tactical decisions observed on the corporate, and not observed on the owner-operated enterprise, were support activities. The reason for the increased number of support activities on the corporate was discussed in Section 6.2.

The owner-operator appears to make a greater proportion of operational decisions than the management personnel of the corporate. However, as mentioned in Section 6.2, some decisions were delegated by lower management to foremen in the corporate and, therefore, excluded from the study. An alternative pattern is revealed when looking at the actual number of operational decisions for each enterprise. Not surprisingly the number of operational decisions is similar for both enterprises. This is because both enterprises are involved in the same core business, growing apples.

The decision level for each common decision is the same regardless of ownership structure. This was expected, although how decisions are made may vary with decision level (see Section 6.5). In addition management personnel involved with decisions at each level may vary (Griffin, 1990). The owner-operator is responsible for all levels of decision making. However, in the corporate different levels of decision making may be performed at different levels of the management hierarchy. The number of strategic, tactical and operational decisions each member of the corporate's management was involved with is presented in Figure 6.3. In this figure the Executive Director is again presented as the highest management level while the Orchard Manager is again the lowest level (refer to management structure presented in Figure 5.1).

Figure 6.3. Number of each decision level made by management personnel in corporate (horticultural division).



Lower levels of management make more operational decisions and less strategic decisions. This pattern supports the theory described by Griffin (1990). However, it is still surprising the Executive Director and General Manager are involved with operational decisions. These two people have significant operational knowledge that is invaluable to lower management. The easiest way to impart this knowledge is to make operational decisions on behalf of lower managers, at least in the short term. If decisions were made more structured, operational decisions would be eliminated from higher management. Higher management were found to be making more strategic decisions than lower management, as described by Griffin (1990).

There is no clear pattern for tactical decisions. It appears a similar number of tactical decisions are made by all levels of management. However, the literature suggests tactical decisions should predominately be made by middle management (see for example, Griffin, 1990). The relationship between tactical decisions and management level needs to be investigated in future studies.

The pattern of fewer operational decisions at higher management and more operational decisions at lower management indicates an attempt, at least, has been made to compartmentalise decision making, as recommended by Hodge and Anthony (1991). However, compartmentalisation is not complete because of the decision type patterns (discussed in Section 6.3) and the number of operational decisions made by higher management. Given the number of operational decisions made by lower management it is surprising that the number of structured decision types is not also higher. This issue is discussed further in Section 6.5.

6.5. COMBINING PATTERNS

Each decision has been classified according to management activity (primary or support), decision type (structured, semi-structured, unstructured) and decision level (operational, tactical, strategic). The results of the classification are presented in matrix form for the corporate and owner-operated enterprises respectively, Figure 6.4 and Figure 6.5. The shaded areas represent the relationship expected between decision type and decision level.

Figure 6.4. Decisions made within the corporate (horticultural division) classified according to type, level, and activity.

Strategic			ppppssss
Tactical	pp	pppss	psssss
Operational	pppss	pppppppp ps	ps
	Structured	Semi- structured	Unstructured

Legend
p=primary
s=support

Figure 6.5. Decisions made within the owner-operated orchard classified according to type, level and activity.

Strategic			ps
Tactical	p	pps	s
Operational	ppp	pppppppp ss	p
	Structured	Semi- structured	Unstructured

Legend
p=primary
s=support

The corporate (as presented in Figure 6.4) attempts to compartmentalise decision making by level within the management hierarchy. Decisions are compartmentalised to some extent by type and level and to a lesser extent by activity. More operational

decisions are made by lower management and more strategic decisions are made by higher management. Likewise different decision types are performed at different levels in the hierarchy. Lower management make more structured and semi-structured decisions, whereas higher management make more unstructured decisions.

Compartmentalisation of decisions, however, is not complete in the corporate. There is still a significant proportion of semi-structured and unstructured decisions that could be made more structured. In addition higher management is involved with operational decisions that should be being made by lower management. Decision making could be improved if more decisions, particularly lower-level, were made more structured, represented by the lower left hand shaded portion of Figure 6.4. Stoner and Freeman (1992) suggest that making more decisions structured saves time, liberating management for more important activities. However, higher-level decisions should not be made more structured as this would stifle flair, innovation and the ability to modify solutions to specific situations. Tactical decisions should remain semi-structured to account for seasonal variation.

Members of the corporate were involved with a total of 81 decisions, from 38 decisions. Often more than one person was involved with any particular decision. The corporate has meetings on a regular basis, during which a lot of decision areas were discussed. Decisions were often made during these meetings. Meetings were an excellent means of sharing information that other personnel had not received. Group discussions appeared to be particularly useful to discuss several viewpoints and interpretations of decision areas. Meetings were also used for delegating responsibility, requesting action, following up actions and authorising decisions. However, meetings could also serve to confuse management personnel. It was often unclear who had made a decision, what was required, and even if authorisation had been granted.

The fact that several people were often working on one decision served to diffuse responsibility. If more than one person was working on a decision, instead of providing an additional viewpoint, they may have been wasting time. This was particularly evident when, during the interview process, more than one person claimed

to be responsible for making one decision. The allocation of responsibility to decisions needs to be addressed. Effective decision making cannot possibly be achieved if management do not fully understand their responsibilities. Job descriptions need to be updated and areas of responsibility redefined.

The owner-operator is responsible for decision making across all activities, all types and at all levels. The decisions made by the owner-operator classified by type, level and activity are presented in Figure 6.5. The majority of these decisions made by the owner-operator are semi-structured operational decisions in primary activities. The owner-operator employs a consultant and seeks information from other orchardists. This could be likened to management personnel in the corporate sharing knowledge on a specific issue. As the owner gained experience the need for consultant's advice has diminished. However, making more decisions structured may further reduce the need for paying a consultant, save time and reduce costs.

Structuring more decisions may assist with the operational management of primary activities. Nevertheless, the incentive to do so is weak as the owner-operator has no need to convey procedures to other parties. Documenting decisions to make them structured, therefore, appears unnecessary in the case of the owner-operator. However, documentation could still be useful to help with memory recall for infrequent decisions (e.g., hail or expansion), could speed up the transition to more structured decisions, or could help explain the business to new management personnel (e.g., succession).

Conclusion

"Management seems to have concluded that the answer to most management problems is with management itself"

WILLARD E. BENNETT

7.1. EVALUATION OF THE CASE STUDY PROCEDURE

A multiple case study procedure was used to investigate how orchardists make decisions. The procedure was described in detail in Chapter Four. The procedure allowed an in-depth and detailed investigation of the organisations studied. The strength of the procedure is that it provides an opportunity for the researcher to become intimately familiar with each case as a stand-alone entity. Whether or not the researcher takes this opportunity is, however, dependent on their values (Covey, 1989) and innate ability. Generalisations are possible where the case study data can be linked to extant theory; the process of defining Einstein's *A*, from the arc *J*. A detailed understanding of each case was established through data collection (in various forms), data reduction, data analysis and data display.

Pattern matching was used to establish patterns within- and cross-case. These patterns were then linked to the theory, identified as relevant in the literature review. The pattern matching relied heavily on the researcher's ability to extract patterns within the literature and the data; both of which contribute to Einstein's *E*, the plane representing experience and empirical observation.

Weaknesses of the procedure used in this study include the scope of management personnel investigated and the time-frame of interviewing. In terms of the management hierarchy orchard foremen were found to be involved in decision making. It has been assumed in the discussion that orchard foremen predominately made structured operational decisions. Foremen should have been included in the study to confirm their

role in decision making. Higher management should also have been more involved in the study. The Managing Director was involved with decision making in the horticultural division. He was interviewed only once and was observed only twice. It may be necessary to include the Managing Director more regularly in future studies to gain a more complete picture of decision making. In addition, the Board of Directors and *even* shareholders may have been involved or influenced decision making in the horticultural division. These personnel could have been interviewed, in the case of the Board or surveyed (Hoinville & Jowell, 1985), in the case of the shareholders to establish their, if any, involvement in management's decision making.

The study investigated decision making over a nine month period. During this time a substantial number of decisions were investigated. A full twelve month period could not be investigated because of constraints imposed by the Massey University timetable. Therefore, some decisions that occur on an annual basis were not discussed, for example, pollination on the corporate. Future studies should be designed to include at least a complete production cycle. Some decisions may not even occur on an annual basis, particularly strategic decisions. A much longer term study would be required to examine a range of strategic decisions beyond those encountered here.

7.2. IMPLICATIONS FOR DECISION MAKING ON CORPORATE AND OWNER-OPERATED PIPFRUIT ORCHARDS.

Decision areas can be classified into primary and support activities, using the model adapted from Porter's (1985) value chain. The majority of primary activities were common for both enterprises. Therefore, it was possible to focus on management without being distracted by technology. Analysis of decisions common to both case studies was completed by isolating decision areas.

Classifying decisions by type and level is particularly useful in understanding what decisions are being made by management. It helped identify where decision making could be improved. In summary, operational decisions should predominately be

structured, tactical decisions should predominately be semi-structured and strategic decisions should predominately be unstructured.

Documentation of decisions is required to increase structuredness on the corporate. Documentation helps when communicating procedures to lower management levels. It is unnecessary for the owner-operator to document decisions to make them structured, although it may help memory recall (e.g., hail, expansion). The owner-operator rarely needs to communicate procedures except, for example, when succession is likely. The owner-operator appears to develop structuredness by experiential learning rather than documentation.

It is hypothesised that decision making in the corporate environment should be compartmentalised by management level. Lower management should make more structured operational decisions, predominately in primary activities. Middle management should make semi-structured tactical decisions, in both primary and support activities. Whereas, higher management, for example, the General Manager, should make a greater number of unstructured strategic decisions in support activities. It is likely that the Board of Directors (not included in this study) will define the core business of the corporation.

Decision making by the corporate and the owner-operator consisted of patterns (activities, types, and levels) that have been linked to the literature. The model described by Mintzberg, Raisinghani, & Théorêt (1976) is useful for identifying and describing structured, semi-structured and unstructured decisions. The corporate and the owner-operator made decisions described by this model in all decision areas. Conversely, normative models provided in farm management appear inadequate for describing actual decision making. For example, Osburn and Schneeberger's model of management and decision making fails to recognise all types of decisions and fails to depict the cyclical and interrupted nature of decision making. The failure of normative models to recognise what management actually does severely limits their use. Normative models are, unfortunately, the traditional tools for teaching farm

management. It is suggested that normative models be *discarded to the past* in favour of behavioural models of management which describe actual practices.

The behavioural model suggested by Mintzberg, Raisinghani, & Théorêt (1976) was developed from observing actual decision making in 25 businesses over a range of industries. Their model was useful for describing management's decision making on both the corporate and owner-operated pipfruit orchards. Therefore, the principles of decision making on pipfruit orchards appear no different from businesses that are dependent on other technologies.

There exists a set of abstract principles of management that are invariant to the technology of specific industries. These principles include decision activities, decision types, decision levels and decision making processes. This situation is represented by the Figure 3.1 (c), where the farm management paradigm is depicted as a subset of business management. An understanding of the technology in any industry is required, however, for informed decision making. It is recognised that technology may be important for teaching purposes so that academics and students can readily associate with *user-friendly* examples. To further the teaching of farm management it is necessary to recognise the principles of managements' decision making before their application to technologies. It is too easy to become distracted by the latter, to the neglect of the former.

Decision making on the corporate can be compartmentalised by management level. Compartmentalising decision making allows the employment of people with the specific skills for each management level. This is one advantage of scale. The smaller scale owner-operator is expected to possess the same complement of skills. Or the owner-operator can employ skills necessary on a casual basis, for example, an accountant, packhouse manager or farm consultant.

Due to the scale and specialisation of management the corporate is able to explore opportunities more readily than the owner-operator, represented by the greater number of unstructured strategic decisions. However, management need to refrain from

meddling with lower management's responsibilities, again an attraction to all too familiar technologies.

7.3. IMPLICATIONS FOR FUTURE RESEARCH

Decision making concepts (activities, types and levels) common to farm and business management have been identified. Propositions between these concepts have been offered. Further research is now necessary to test and develop these axioms (*A*) so that their explanatory and predictive worth can be verified and refined; to complete Einstein's process from *A*, *S* to *E*. The hypotheses suggested in Section 7.2 provide suitable beginnings to test and refine the propositions of decision making identified in this research.

The effect of making more decisions structured needs to be investigated further. Structured decisions are made more quickly and with less stress than other decision types. It is unclear, however, what effect increasing structuredness will have on business performance and profitability. Future research should measure performance and profitability of enterprises in conjunction with investigations of management decision making.

In conclusion, hypotheses emanating from this study are:

H_o: That operational decisions are not structured.

H_o: That strategic decisions are not unstructured.

H_o: That in a corporate management structure decision making is not compartmentalised by decision activity.

H_o: That in a corporate management structure decision making is not compartmentalised by decision type.

H₀: That in a corporate management structure decision making is not compartmentalised by decision level.

The method used in this study is suitable for collecting and interpreting the data necessary to test these hypotheses. The classification of decisions by activity, type and level are concepts that may be applied to any decision making. Unfortunately, the relationship between these concepts can be distorted when the responsibility for decision making overlaps, i.e., more than one person is involved in making any decision. However, despite future best efforts to measure the number of decisions by type, across levels, and in activities, there currently remains the difficulty of determining statistical significance.

The pipfruit orchardists studied would benefit from improvements to their decision making. Savings in time, particularly in the corporate, would represent measurable cost reductions. The concepts of managements' decision making are the same regardless of ownership structure. The corporate, however, also has the ability to compartmentalise decision making, and as a result, appears to more readily pursue strategic opportunities.

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Appendix I

Database of decisions areas for the corporate listed in alphabetical order.

BUDGETING

Decisions relating to: preparation of annual budgets.

Operations Manager (Staff & Harvest), Orchard Manager

Decision: What should be included in individual profit centre budgets?

Firm infrastructure, Semi-structured, Tactical

Separate budgets for all orchards and other profit centres.

Manager's responsibility based on guidelines from Operations Managers and Information Manager.

List of notes and meetings.

Procedure developed by:

1. Operations Manager in consultation with orchard managers.
2. Procedure conveyed to managers.
3. Managers develop and submit.

How is the cash forecast budget developed for all the orchards.

Decision: **What is the cashforecast budget for the horticultural division?**

Firm infrastructure, Semi-structured, Tactical

Procedure

1. Managers submit budget figures.
2. Figures reviewed by Operations Managers.
3. Figures entered into spreadsheet, including revisions.
4. Spreadsheets returned to managers, check and confirm.
5. Changes discussed and made as appropriate - Manager and Operations Manager responsible.
6. Entered to spreadsheet.
7. Budgets reviewed by General Manager, Managing Director and Company Secretary.

COLOUR SORTER

Decisions relating to: the acquisition of an electronic colour sorter.

General Manager, Operations Manager (Postharvest), Packhouse Manager.

Decision: Should the corporate install an electronic colour sorter in the packhouse?

Postharvest, Unstructured, Strategic

Start:

Feasibility study by Packhouse Manager. Specific investigation and informal gathering of information.

- Operations and Packhouse managers - report to General Manager.

Brief for feasibility study by General Manager and Operations Manager (Postharvest).

Collecting information so when time comes are in a position to make informed decision.

Interrupt:

Incomplete information from ENZA New Zealand (International), requiring assumptions and forecast by corporate: reward for colour sorted apples?

General Manager and Managing Director will talk with ENZA New Zealand (International) regarding reward for differentiation.

Talks continuing with supplier to ensure quick supply, if necessary to keep pace with technology.

COOLSTORE

Decisions relating to: the acquisition of a coolstore.

Executive Director, General Manager, Operations Manager (Postharvest).

Decision: What are the divisions coolstore requirements for coolstore capacity? How would this best be achieved?

Postharvest, Unstructured, Strategic

Executive Director: collecting information.

Leads to decisions in other activities e.g. Finance

Feasibility study to be completed. Costs/benefits - brief for study defined by General Manager, 2 pages.

Feasibility study completed by Packhouse Manager.

Decision made to build on site, subject to authorisation.

Gut feeling initially that will be backed up following a feasibility study.

Approval is unclear: lower management not sure whether or not approval has been gained. Led to delays in construction such that coolstore was not ready for the beginning of the season.

Once approved the optimal coolstore configuration must be decided.

CROP ESTIMATES

Decisions relating to: the formulation of crop estimates.

Operations Manager (Staff & Harvest), Orchard Manager

Decision: What is the estimated total production for the division?

Production, Structured, Tactical

Operations Manager oversees and checks.

Orchard managers complete estimates on block by block basis. Spreadsheet model calculates orchard and company totals.

END OF SEASON REPORT

Decisions relating to: the contents of end of season reports.

General Manager, Operations Manager (Staff & Harvest), Operations Manager (Postharvest), Orchard Manager.

Decision: What should be included in orchard managers end of season reports?

Firm Infrastructure, Structured, Operational

- Reports include issues from all activities.

Reports written by Orchard Managers. Sections for EOS reports are defined by General Manager and Operations Managers. Although there is freedom to discuss any issue concerning the manager.

Based on EOS reports bonus and salaries are negotiated with Orchard Managers. General Manager, Operations Manager (Staff & Harvest) and Operations Manager (Postharvest) present during negotiations. Two way conversation, not imposed or threatening. Input from Operations Managers directly responsible. Bonus allocated in conjunction with MBO's. Salaries review according to set criteria.

EXPORT FRUIT DESTINATION

Decisions relating to: where and how exporting should be conducted.

Executive Director, General Manager, Operations Manager (Postharvest)

Decision: How should export opportunities, not accounted for in the general pool, be pursued?

Marketing, Unstructured, Strategic

For example: CA - Board tender
- Whakatu coolstores
Regala
Waxed Red Delicious

Operations manager responsible for marketing decisions. However, opportunities appear to be recognised by all senior staff and discussed with Operations Manager, Executive Director, and particularly General Manager. All new marketing relationships appear the responsibility of the General Manager. General Manager and Executive Director are involved in discussions with the APMB regarding new opportunities.

Discussions regarding each opportunity are held, informally and formally. If further information, analysis, work required normally delegated to Operations Manager.

Supply to general export pool is structured, if opportunity exists outside pool then unstructured.

UN: New options sought e.g. CA, RD. These are largely explored by General Manager and Executive Director although discussions include Operations Managers, particularly at operations meetings.

Management meetings and Management Committee meetings appear essential for discussing opportunities and different interpretations.

Operations Manager (Postharvest)

Decision: **Where should export quality fruit be sold?**

Marketing, Structured, Tactical

Separate from new opportunities, i.e. exporting within the general pool.

Structured: Known objective, maximise export return while increasing knowledge and building relationships. Options assessed according to objective (not explicitly stated).

General Manager, Operations Manager (Postharvest) & Executive Director (and Operations Manager (Staff & Harvest)) after own interpretation of information and information from different sources.

FROST

Decisions relating to: the contents of frost protection procedures.

Operations Manager (Staff & Harvest), Orchard Manager

Decision: How should the frost risk to the orchards be minimised?

Production, Semi-structured, Operational

In the process of moving decision to a structured decision with authorisation required for some decisions.

Two parts to decision

1. Formulate procedure
 2. Daily implementation of procedure.
-
1. Formulated by discussion with managers and Operations Manager (Postharvest). All participants offering interpretation of information and experience.

Very important decision: potential financial impact.

1. Is made by both Operations Managers for their separate orchards.
2. Implemented by managers, some parts by Operations Managers. Level of responsibility clearly defined in procedure.

HAIL

Decisions relating to: activities completed following a hail storm.

**Executive Director, General Manager, Operations Manager (Postharvest),
Operations Manager (Staff & Harvest).**

Effects a lot of other decision areas. For example, harvest, marketing.

Decision: What activities should be carried out on the hail damaged orchards?

Production, Semi-structured, Operational

Options for husbandry and fruit disposal.

Operations Manager (Postharvest) makes fruit disposal decisions and renegotiates contracts.

Hail assessments were made by Executive Director, General Manager, Operations Manager (Staff & Harvest) (and Operations Manager (Postharvest)). Estimates made by Operations Manager (Staff & Harvest) and Operations Manager (Postharvest) by General Manager instruction. Reports to Managing Director and Board of Directors.

HARVEST

Decisions relating to: removing the fruit from the trees.

Operations Manager (Staff & Harvest), Orchard Manager

Decision: When should fruit be harvested?

Production, Structured, Operational

Orchard managers submit harvest plan which provides a guide for the flow and quantity of fruit removal. Helps with labour scheduling to ensure fruit harvested within windows as long as maturity allows.

Grade standard based on background colour and influenced by foreground colour (NZAPMB Standards) provides a guide for harvest date. Operations Manager provides examples and guides for Orchard Managers to ensures managers are picking to the same standards.

Starch tests are also done to extend NZAPMB specified harvest dates, if required.

ISO

Decisions relating to: achieving ISO 9002 accreditation.

General Manager, Operations Manager (Postharvest).

Decision: Should the division seek ISO 9002 accreditation for the packhouse?

Management Committee decision made before study commenced. Not included in results.

Decision: What is required to ensure accreditation is achieved?

Postharvest, Structured, Operational

Series of decisions based on stated ISO 9002 protocol to ensure Corporate procedures adhere to protocol.

Known protocol, worked through and implemented.

Order came from General manager to remove old consultant.

Operations Manager (Postharvest) directed Packhouse Manager to make decisions to ensure protocol met and accreditation achieved, after problems with initial person charged with ensuring accreditation.

Two failures led to higher level involvement and re-assigned responsibility.

Although programmed decisions, protocol is very strict and pedantic which caused problems combined with personnel and consultant.

Series of events:

Protocol failure readdress failure action from senior management readdress (more through) accreditation.

MBO

Decisions relating to: the contents of MBO programmes.

Operations Manager (Staff & Harvest), Orchard Manager.

Decision: What should be included in an MBO?

Firm infrastructure, Structured, Operational

Operations Manager (Staff & Harvest) outlines what managers need to cover. Input from General Manager and Operations Manager (Postharvest).

Managers follow guidelines as per Operations Manager (Staff & Harvest) outline.

MANAGEMENT STRUCTURE

Decisions relating to: altering the management structure.

**Operations Manager (Staff & Harvest), Operations Manager (Postharvest),
General Manager**

**(Management meeting: In addition to the above staff Executive Director,
Managing Director, Company Secretary (Corporate), Packhouse Manager)**

Decision: What management structure should the division adopt?

Firm infrastructure, Unstructured, Tactical

The management structure is developing; it changed twice during the study and further alterations are likely.

Discussion: Operations Manager (Staff & Harvest) put forward proposal discussed and implemented.

Discussion: At Management meeting on 20/9 changes made.

NON-EXPORT FRUIT DESTINATION

Decisions relating to: where and how non-exported fruit should be sold.

Management Committee: Executive Director, General Manager, Operations Manager (Postharvest).

Decision: How will the marketing of non-export fruit be handled?

Marketing, Unstructured (to semi-structured), Tactical

Moving towards a semi-structured decision as knowledge of local market increases.

Responsibility of Operations Manager (Postharvest) but most decisions discussed at meetings (General Manager, Operations Manager (Staff & Harvest)).

Operations Manager (Postharvest) is “really in charge of keeping an eye on all of those things, but I basically bring them back to General Manager.....it’s between the three of us, we discuss it and then you’ll find that price may not be the ultimate dictator”.

Options: ENZA Fresh
 Snacky
 2nd Grade export
 Watties
 Plus a few small outlets and other processors.

NURSERY

Decisions relating to: the contents of the nursery.

General Manager, Operations Manager (Staff & Harvest).

Decisions related to varietal mix and development/redevelopment decisions.

Decision: What varieties and stocks should be planted/ grafted in the nursery?

Production, Semi-structured, Tactical

Nursery responsibility of Operations Manager (Staff & Harvest) makes plans based on desired varietal mix and development/redevelopment plans. Plans with input from General Manager and Operations manager (Postharvest).

Day to day implementation of the plan delegated to a Nursery Manager.

OVERSEAS VISITS

Decisions relating to: what and why people are sent overseas.

**Executive Director, General Manager, Operations Manager (Staff & Harvest),
Operations Manager (Postharvest)**

INFORMATION COLLECTING

**Decision: What staff should travel overseas to collect information? What
topics should be investigated?**

Firm infrastructure, Unstructured, Tactical

Information on production, postharvest, marketing.

Several staff were sent overseas. These trips ranged from specific projects to general information collecting, primarily market data. Trip to USA for husbandry information, trip to Australia for post harvest information. Four of the five interviewed were involved with overseas travel (fifth person was to travel after study ceased).

PACKING

Decisions relating to: where specific fruit will be packed.

Operations Manager (Staff & Harvest), Operations Manager (Postharvest), Orchard Manager.

Decision: Where should each line of fruit be packed?

Postharvest, Semi-structured, Operational

Harvest plans and flow diagrams can be used to determine optimal packing arrangements. However, as events unfold alterations are often made on a daily basis.

Harvest and Trucking decisions also related and requires co-ordination.

Possibly a specifically designed spreadsheet based programme would help fruit flow.

POLITICAL STRUCTURE

Decisions relating to: the reaction to a proposed industry political structure.

Executive Director

Decision: **What submissions should be made regarding the industry political structure?**

Firm infrastructure, Unstructured, Tactical

A new governing body is being established to represent growers on national issues. The corporate made submissions. These were effective in altering some of the Rules of the Society.

PROPERTY OWNERSHIP

Decisions relating to: the acquisition and disposal of assets.

Executive Director, General Manager.

Decision: Should fixed asset ownership be altered?

Firm infrastructure, Unstructured, Strategic

Maintain physical size. Subjective decision 1.1 - 1.2 m.

Production targets total and geographical spread total.

Export production may vary with packouts.

Connected to desired varietal mix/development. Need to sell undesired orchards and replace by purchase/lease to maintain production targets.

Management committee involved with authorising decisions or sell, purchase. Always discussed with management committee. Seldom input from operations managers.

Directions can come from Managing Director & Board of Directors.

REDEVELOPMENT

Decisions relating to: what tree (variety) redevelopment occurs.

General Manager, Operations Manager (Staff & Harvest).

Decision: What should the orchard's varietal mix be?

Production, Unstructured, Strategic

Varietal mix - desired - determined.

Overall mix authorised at management committee level based on profitability or assessment of profitability.

Decision: What development/ redevelopment should be carried out within the division?

Production, Semi-structured, Tactical

Linked to varietal mix decisions, development and nursery.

Each orchard individually compared with overall company mix.

Crop forecast/estimates useful.

Information from within, Nelson, Markets, new variety committee, other growers.

Operations Manager (Staff & Harvest) makes recommendations for varietal mix and redevelopment.

Once Varietal Mix, Redevelopment and Development finalised. Operations Manager Staff & Harvest responsibility to ensure available trees.

Nursery Manager responsible for nursery operations.

RESEARCH & DEVELOPMENT

Decisions relating to: what research and development occurs.

General Manager

Decision: What research and development should be carried out by the division?

Research and development, Unstructured, Tactical

General Manager appoints specific trials to orchards, part of MBO programme.

Orchard managers may also suggest trials for their orchards.

Needs formal policy or procedure for conducting trials (is this already occurring within MBO).

R&D level needs increasing. Policy may help this.

Up to 100 trials on the various orchards varying in degree of formality.

RESIGNATION

Decisions relating to: the resignation of a key member of higher management.

Executive Director

Decision: Should the Executive Director resign?

Firm infrastructure, Unstructured, Tactical

Decision made by the Executive Director under no influence from other management personnel.

Executive Director's decision to resign had significant impact on workloads and then other decision areas.

Details excluded due to confidentiality.

Included as a decision area as it helps gain insight to the thought processes of the Executive Director.

SINCTURING

Decisions relating to: which trees should be ring barked (sinctured).

Orchard Manager

Decision: What trees should be sinctured on the orchard?

Production, Semi-structured, Operational

Know desired effect and suitable varieties. Based on discussions with Operations Manager, Orchard Manager recommends which specific blocks will be sinctured.

Some sincturing trials are carried out as part of research and development.

SOIL SAMPLING

Decisions relating to: where soil samples should be taken from.

Orchard Manager

Decision: What soil samples should be taken on the orchard?

Production, Structured, Operational

Discussion instigated by Operations Manager to determine extent of sampling and interpretation.

Opinion of orchard managers, Operations Manager, General Manager, Fruitfed and fertiliser reps.

Decision ultimately made by Orchard Manager, based on previous experience, structured.

SPRAYING

Decisions relating to: what spraying of the trees is necessary.

Orchard Manager

Decision: What spraying is required on the orchard?

Production, Semi-structured, Operational

Withholding periods important for final sprays before harvest. Last year's harvest dates are the basis for timing withholding periods.

Orchard managers' knowledge extensive on pest and disease and appropriate sprays. Use of published spray programmes minimal. There is enough knowledge within the corporate to make most decisions. Looking to minimise spray usage, sometimes constrained by USA protocol requirements. May seek consultants advise on new difficult spraying problems.

STAFFING

Decisions relating to: the level of staff required at any point in time.

General Manager, Operations Manager (Postharvest), Operations Manager (Staff & Harvest), Orchard Manager.

Decision: Are any further staff required within the division?

Human resource, Semi-structured, Operational

Staff for harvest, each manager determines own requirements. Past experience, history, records.

Staff may be moved between orchards if harvest progress lags. Movements identified and directed by Operations Manager (Staff & Harvest).

Permanent staff are selected and interviewed by operations managers. General Manager gives final approval to selections.

Permanent people must be technically competent, possess man-management skills, time management skills, be trustworthy and responsible.

Employment necessary where orchards leased instead of sold, resignation and splitting of a larger maturing block.

STAFF TRAINING

Decisions relating to: further training for any staff.

Operations Manager (Staff & Harvest), Operations Manager (Postharvest), Orchard Manager

Decision: Do any staff require any training?

Human resource, Unstructured, Operational

Operational Manager (Staff & Harvest) responsible for staff training.

Procedural statements to help training to set uniformity amongst staff i.e. Budget guidelines, QC sheets. Relate to all areas of production/postharvest/marketing.

Management training is ongoing task.

Management consultants used for two day management training programme.
Organised by Managing Director.

Operations Manager (Staff & Harvest) should (does) try to tailor training to individual managers' situations.

STRATEGIC BUSINESS UNITS

Decisions relating to: the investment in off orchard activities.

Executive Director

Decision: Should Corporate add new strategic business units?

Firm infrastructure, Unstructured, Strategic

Executive director responsible for investigating new options for adding to profit, e.g. processing, exporting, marketing.

What benefits to corporate group?

Options within strategic objectives.

Strategic business plan.

SUMMER PRUNING

Decisions relating to: the extent of pruning during the summer.

Orchard Manager

Decision: What summer pruning should be carried out on the orchard?

Production, Semi-structured, Operational

Pruning largely for colour. Also to increase light and access.

Varieties/blocks identified and monitored.

Economic benefit from improved colour (P/O, maturity) and increased volume.

Some summer pruning completed as part of research and development.

SWOT/STRATEGIC PLANNING

Decisions relating to: the contents of the division strategic plan.

Executive Director, General Manager

Decision: What should be included in the divisions strategic plan?

Firm Infrastructure, Unstructured, Strategic

Swot analysis forms basis of strategic plan.

Details confidential. Includes targets and projections.

TASKFORCE

Decisions relating to: the participation in an industry working group.

Executive Director

Decision: Should corporate participate in the Industry Taskforce group.

Firm infrastructure, Unstructured, Strategic

Issues discussed and product differentiation, reward for innovation, point of contact for NZAPMB, price curve relationships (supply/demand). Executive Director involved and also Managing Director in some cases.

Issues mainly unstructured (all areas).

THINNING

Decisions relating to: the extent removing immature fruit.

Operations Manager (Postharvest), Orchard Manager

Decision: What thinning should be carried out on the orchard?

Production, Semi-structured, Operational

Assessment also discussed but not really decision but adds information for future thinning regimes.

Moving towards a structured decision as more information is gained regarding chemical thinning. Guideline issued by operations managers with input from orchard managers.

Chemical thinning is a relatively structured decision of manual thinning follows up after assessment of success of chemicals.

Timing and particularly weather conditions important for chemical applications.

Two chemical applications. Second one based on success of first application.

TRUCKING/FRUIT FLOW TO PACKING HOUSE

Decisions relating to: how fruit is transported to packhouses.

Operations Manager (Postharvest)

Decision: How will fruit be transported from the orchards to the appropriate packhouse?

Postharvest, Semi-structured (Unstructured), Operational

Problem activity this season.

Alternated between unstructured and semi-structured throughout the study.

This season very complicated.

9 trucks, 12 orchards, 5 packhouses, 5 bin types.

Could be structured using procedural statements relational database or spreadsheet.

Need to organise sufficient trucks: lease, contract or own?

Flow diagrams based on harvest plans useful in initial stages.

Should become less important with commission of coolstore adjacent to packhouse. as fruit can be stored prior to packing and still maintain coolchain.

WINTER PRUNING

Decisions relating to: the extent of pruning carried out during the winter.

Operations Manager (Staff & Harvest), Operations Manager (Postharvest), Orchard Manager

Decision: What winter pruning should be carried out on the orchard?

Production, Semi-structured, Operational

Moving toward structured as plans and guidelines are developed.

Techniques developed (formal written plan) modified for individual situations.

Training sessions for orchard managers to help refine and standardise techniques.

Operations Managers regularly visit orchards and discuss techniques with managers.

Final decision (detail) left to managers.

Operations Managers may check quality of pruning down to individual pruner.

Problems with pruners directed to manager.

Information from past experience, other orchardists (overseas trip: dwarf tree convention).

Operations Managers may use lists to remind themselves of pruning techniques.

Most influence from General Manager but managers are beginning to develop their own ideas and styles. Some dissent at lack of communication is changing with improved management structure and relationships.

Appendix II

Database of decisions areas for the owner-operator listed in alphabetical order.

ALTERNATIVE EMPLOYMENT

Decisions relating to: sourcing additional employment during quiet periods.

Decision: Should additional employment be sought during the quiet period?

Firm infrastructure, Unstructured, Tactical

Firm infrastructure as providing extra finance for the orchard.

Several options for alternative employment. *Input* from bank manager, friends, other orchardists. Some *written analysis* was completed for some options. Decision based on perceived profitability and risk.

“Stapelok” provided opportunities for information collecting. Talking to other participants which are part of the industry. Not continued due to orchard activities building up again and perceived inadequacies with the product.

BUDGETING

Decisions relating to: preparation of annual budgets, include crop estimates.

Decision: What should be included in the annual budget?

Firm infrastructure, Semi-structured, Tactical

Input from bank manager and consultant. Developed yearly, updated 2-3 times throughout the year.

Estimates based on history, previous data, best guesses, NZAPMB, Bank data and orchard changes. Crop estimates based on historical information, walk through orchard with consultant, intuitive view compared to previous observations, best guesses.

Monitored at least monthly actual Vs budget.

CULTIVATION

Decisions relating to: preparing or improving the soil structure.

Decision: What cultivation practices are required around the orchard?

Production, Semi-structured, Operational

Recognise problem, cultivate now or don't cultivate, cultivate later input from consultant to tailor decision to situation.

Method of cultivation is also discussed with contractor and consultant..

Information from personal experience and consultant's advice.

EXPORT FRUIT DESTINATION

Decisions relating to: where and how exporting should be conducted.

Decision : **Where should export quality fruit be sold?**

Marketing, Structured, Tactical

Export fruit: committed to supply ENZA New Zealand (International). Few opportunities to exploit other options.

Considers too small to explore export opportunities.

FROST

Decisions relating to: the contents of frost protection procedures.

Decision: How should the frost risk to the orchard be minimised?

Production, Semi-Structured, Operational

Set of alternatives, monitor ground and screen temperatures to implement frost protection measures when necessary, based on historical MAF guidelines.

(No formal written plan, hence semi-structured). Could be formalised.

HAIL

Decisions relating to: activities that completed following a hail storm.

Effects a lot of other decision areas. For example, harvest, marketing, budgeting.

Decision: Following the hail storm what practices are necessary to ensure the health of the orchard?

Production, Unstructured, Operational

New area/event.

Some responses are known.

Advice from consultant as knowledge increases this decision could become semi-structured or structured.

Hail has effected decisions in most other areas

- | | | | |
|------|------------------------|---|---|
| i.e. | alternative employment | - | more time |
| | budgeting | - | no crop, financial effect |
| | crop destruction | - | no crop, no marketing requirements |
| | harvest | - | no crop, no harvest |
| | irrigation | - | more stress on trees, water stress needs |
| | | - | close monitoring |
| | packing | - | no crop, no packing |
| | redevelopment | - | no crop, no money for redevelopment? |
| | Spraying | - | more different spraying to minimise stress, infection |
| | Staffing | - | no crop, no harvest staff, permanent staff |
| | | - | alter job specification |
| | Pruning | - | alter pruning regime |

Scientists entered orchard to conduct trials.

Has also affected decisions relating to finance (part of firm infrastructure)

Crop was insured so financial effect minimised.

Main effect on husbandry practices, staffing, marketing.

HARVEST

Decisions relating to: removing the fruit from the trees.

Decision: When should fruit be harvested?

Production, Structured, Operational

Monitor fruit size.

Provided NZAPMB standards for background and foreground colour.

Colour and starch levels used to test maturity, helps identify a harvest date.

IRRIGATION

Decisions relating to: watering the orchard.

Decision: What blocks/varieties need irrigating?

Production, Structured, Operational

Monitor moisture stress and apply water when appropriate based on tensiometer readings, given limitations of system.

Critical following hail to minimise stress on trees.

NON EXPORT FRUIT DESTINATION

Decisions relating to: where and how non exported fruit should be sold.

Domestic market: decision interrupted by hail.

Decision: How will the marketing of non-export fruit be handled?

Marketing, Semi-structured, Tactical

All fruit supplied to ENZA New Zealand (International) unless problem or opportunity indicates another worthwhile option.

For example, some Fiesta was sunburnt and Turners & Growers was approached to take some fruit, particularly the sunburnt ones.

Questions were asked of marketing personnel to identify problems and opportunities.

PACKING

Decisions relating to: where specific fruit will be packed.

Decision: Where should fruit be packed this season?

Postharvest, Structured, Operational

New packhouse will be used in the 1995 season. This decision made based on limitations of previous packhouse. Limitations in terms of packing options.

When fruit ready for packing sent to packhouse via truck.

POLLINATION

Decisions relating to: requirements for pollinating the apple blossoms.

Decision: What should be done to aid pollination?

Production, Semi-structured, Operational

Number of hives determined based on advice from consultant and hive supplier. No formal requirement based on tree type, age and orchard size. This may be possible to structure decision, or may be an unnecessary complication.

PROPERTY OWNERSHIP

Decisions relating to: the acquisition and disposal of assets.

Decision: **Should fixed asset ownership be altered?**

Firm infrastructure, Unstructured, Strategic

Considered expansion into adjoining properties either as a purchase or lease. Varietal mix on one property was undesirable. The other section of land was undeveloped and could be a possibly if favourable lease could be negotiated. Considerations also include availability of capital and finance.

REDEVELOPMENT/DEVELOPMENT

Decisions relating to: what tree (variety) redevelopment occurs.

Decision: What should the orchard's varietal mix be?

Production, Unstructured, Strategic

Decision: What development/redevelopment should be carried out on the orchard?

Production, Semi-structured, Tactical

Based on development plan (written plan for varietal mix). Developed a five year development plan when the orchard was purchased. This is reviewed each year in terms of replacement varieties.

Following hail development restricted to available finance.

Budgeting can identify least profitable varieties which could be redeveloped.

Information from grower new variety days best information from other growers on these days.

Variety of sources of information.

SOIL SAMPLING

Decisions relating to: where soil samples should be taken from.

Decision: What soil samples should be taken on the orchard?

Production, Semi-structured, Operational

Based on past experience of nutrient levels and input from consultant.

Soil tests not critical this season.

Information from fertiliser representatives and recommendations from consultant.

SPRAYING

Decisions relating to: what spraying of the trees is necessary.

Decision: What spraying is required on the orchard?

Production, Semi-structured, Operational

Orchard 2000 helps for some spraying. Consultant provides advice overlaid on NZAPMB spray calendar.

STAFFING

Decisions relating to: the level of staff required at any point in time.

Decision: How many staff are required for the harvest?

Human resource, Semi-structured, Operational

Staff for harvest. Decision based on crop load, size, and past experience.

Decision: Are any further staff required on the orchard?

Human resource, Semi-structured, Operational

Staff for general activities.

No written plans to determine requirements for staffing.

SUMMER PRUNING

Decisions relating to: the extent of pruning during the summer.

Decision: What summer pruning should be carried out on the orchard?

Production, Semi-structured, Operational

Pruned for colour.

Based on past experience and consultant's advice.

THINNING

Decisions relating to: the extent of removing immature fruit.

Decision: What thinning should be carried out on the orchard?

Production, Semi-structured, Operational

Monitoring on a regular basis. Advise from consultant and past experience.

WINTER PRUNING

Decisions relating to: the extent of pruning carried out during the winter.

Decision: What winter pruning should be carried out on the orchard?

Production, Semi-structured, Operational

Set criteria adjusted for varieties individual trees.

Information largely from past experience, and additional advice from consultant.