Examining Commitment and Heterogeneity within the Membership Base of Agricultural Co-operatives: An Empirical Study of a Large New Zealand Dairy Co-operative

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Abstract

A strong relationship between member and co-operative is vital for agricultural co-operatives. Yet most of the research on agricultural co-operatives is centered on non-relational aspects such as efficiency. Although these conventional economic centric approaches are useful in understanding co-operatives and evaluating its performance, they are not comprehensive enough. Studies on the member - co-operative relationship which require an examination of co-operatives from a socio-psychological perspective are lacking. This research gap is addressed in this thesis via first identifying three important socio-psychological phenomena in agricultural co-operatives – 1. Commitment, 2. Heterogeneity and 3. Social Capital, and presenting a conceptual framework that links the three. Thereafter, the commitment and heterogeneity sub-components of the framework were further unravelled and empirically examined by randomly surveying 2,000 members of Fonterra Co-operative Group, of which 568 responded**.** The organisational commitment dimension of commitment is decoupled into three components - affective (emotive), normative (ideological) and continuance (utilitarian), and the commitment to collective action dimension into two components – patronage and governance. Fonterra had moderately high levels of affective, moderate levels of normative and slightly low levels of continuance commitment. The level of commitment to collective action was moderately high as the levels of commitment to both patronage and governance were moderately high. Importantly, there was a positive association between commitment to collective action and affective and normative commitment but not continuance commitment. This suggests that it is the emotive followed by ideological aspects of membership that influence a member's commitment to collective action, and not the utilitarian or financial benefit aspects. Heterogeneity was measured and analysed using 35 heterogeneity sources that were categorized under three dimensions – farmer-member, farm-business and member-interest. Fonterra had high levels of heterogeneity with most of the sources in all three dimensions showing high heterogeneity. Of the three dimensions, member-interest, followed by farm-business showed the greatest heterogeneity and sources within them were most likely to result in difference in affective commitment, normative commitment, continuance commitment, commitment to collective action as well as commitment to governance and patronage. In contrast, most of the sources within the farmer-member dimension were not associated with either organisational commitment or commitment to collective action.

Keywords: Commitment, Collective Action, Heterogeneity, Co-operatives, Agribusiness

Executive Summary

There are over 3 million co-operatives in the world currently, serving the needs of over a billion members and providing employment to about 280 million people. The combined revenues of the top 300 co-operatives alone amounted to 2.1 trillion US$ in 2019. Although co-operatives exist in a wide range of sectors, it is in the agricultural sector that they have the most comprehensive and significant presence. 97 of the top 300 co-operatives in the world belong to the agri-food sector. In the United States, there were approximately 1,953 agricultural co-operatives and their average total assets and equity were US$ 47.1 million and US$ 20.9 million respectively in 2016. In the EU there are about 51,392 agricultural co-operatives and their combined annual turnover was US$ 475 billion in 2016. Particularly in the dairy industry, farmer-owned co-operatives play a rather dominant role with market shares above 80% in milk collection in the USA, Western Europe, Australia and New Zealand. Moreover, four (Fonterra, FrieslandCampina, Dairy Farmers of America and Arla Foods) of the top 10 dairy companies in the world by revenue are co-operatives.

Co-operatives play a significant role in New Zealand's (NZ) economy contributing to about 17% of NZ's GDP. Within NZ's co-operative landscape, agricultural co-operatives play a dominant part. Of the top 30 co-operatives in NZ, agri-food co-operatives account for 65% of revenues, 68% of assets and 83% of employees. Amongst agricultural co-operatives, dairy co-operatives are the most important. The four major dairy co-operatives in NZ had combined total revenues of over NZ$ 21 billion for the 2017/18 financial year. This approximates to a contribution of about 7.5% of NZ's GDP. However, the largest dairy co-operative, Fonterra Co-operative Group (Fonterra) alone had revenues of NZ$ 20.4 billion. Clearly indicating the role and significance of Fonterra to both the co-operative landscape and the NZ economy.

As an organisational form, co-operatives are unique member-oriented organizations that are purposefully organized to serve member needs and are focused on generating member benefits rather than return to investors. In return, members have a responsibility to provide equity capital and govern the business. This ensures that members have ultimate ownership and control of the organisation. This strong member-orientation of co-operatives is its biggest differentiator from the more common investor owned firm. The member – co-operative relationship therefore becomes central to the existence of the co-operative and forms the foundation upon which the co-operative stands. Despite the member-co-operative relationship

being vital, most of the research work on co-operatives tends to focus on the non-relational aspects and traditionally the performance of co-operatives has been examined primarily from a economic or financial perspective.

Although the non-relational aspects are useful in detailing the economic characteristics of the co-operatives and explaining the reasons for the formation, existence and behaviour, they are predominantly theoretical and therefore not empirically useful in evaluating the performance of co-operatives. Hence, they do not provide a comprehensive enough assessment and understanding of co-operatives. Moreover, with the evolving nature of the co-operative organisational form, a rethink on how co-operatives are traditionally examined, evaluated and interpreted is required.

In order to present a holistic evaluation of co-operative performance that complements the traditional approaches an examination of the member-co-operative relational aspects, specifically from a socio-psychological perspective, is required. To address this gap, the central premise of this thesis lay in identifying, describing and analysing the key socio-psychological phenomena that could potentially influence the member – co-operative relationship. This was achieved through four research papers. In each paper, a novel conceptual framework was developed and presented. In papers two, three and four an empirical test of the frameworks was also performed by surveying member-farmers of Fonterra. As a result, these frameworks also serve as a reference and coordination mechanism for efficient theory testing and are a vital step towards applying frameworks to the task of linking co-operative theory and structure to its performance.

This study identified three important socio-psychological phenomena that influence the member-co-operative relationship. These were – 1) Commitment, 2) Heterogeneity and 3) Social Capital. A conceptual framework that encapsulates these three phenomena and explains the relationship and interactions between them was developed and described. Existent literature on co-operatives suggests that social capital forms the foundation upon which a co-operative is built while commitment is the crucial element that holds the co-operative together. Literature indicates that there is a positive link between social capital and commitment, with an erosion in social capital likely to result in a weakening in commitment. Heterogeneity is a result of differences that arise between members and is usually the consequence of the co-operative growing in size and complexity. Literature suggest that there is a negative link between heterogeneity and both commitment and social capital. As co-

operatives are structured around collective decision making, an increase in heterogeneity could lead to a weakening of member commitment and erosion of social capital.

As all three phenomena are quite complex, their examination required un-ravelling each of them into probable dimensions that comprise them. In this thesis, member commitment was decomposed into two dimensions (organisational commitment and commitment to collective action), member heterogeneity into three dimensions (farmer-member, farm-business and member-interest) and social capital into six dimensions (groups & networks, trust & solidarity, collective action & co-operation, information & communication, social cohesion & inclusion, and empowerment & political action). Thereafter, the commitment and heterogeneity sub-components of the framework were further unraveled, and empirical studies of them were performed by randomly surveying 2000 members of Fonterra of which 568 members responded. Each empirical study was driven by a novel conceptual framework that was grounded in co-operative theory and literature. Although an instrument for measuring social capital was developed, its empirical assessment was excluded from the scope of this thesis. It is strongly recommended that future studies focus on the measurement and analysis of social capital.

The study on member commitment required the de-coupling of the two dimensions into its constituent components. Organisational commitment (which refers to the psychological state that characterizes the members' relationship with the co-operative and has implications on the decision to continue or discontinue membership in the co-operative) was decoupled into three components – 1. Affective (AC), 2. Normative (NC) and 3. Continuance (CC). Affective commitment is emotive in nature and relates to members' want or desire to be a part of the co-operative. Normative commitment is ideological in nature and relates to members' sense of obligation to be a part of the co-operative. Continuance commitment is utilitarian in nature and relates to members' need to be a part of the co-operative. Similarly, commitment to collective action, which refers to the initiatives taken by a group to realize their common interests and involves a willingness to make an effort towards the organization's success, was broken down into two components – 1. Commitment to Patronage (CP) and 2. Commitment to Governance (CG). As the name suggests commitment to patronage deals with the patronage aspects (as suppliers or buyers of product and providers of capital) and commitment to governance deals with governance aspects (monitoring management and participating in decision making). Fonterra had moderately high levels of affective commitment, moderate levels of normative commitment and slightly low levels of

continuance commitment. Importantly, 19% of respondents had high levels of all three components. However, since 10.9% of respondents had low AC, CC and NC it indicates that some degree of organisational commitment risk exists. The co-operative had moderately high levels of commitment to collective action in both CG and CP; with members more committed towards governance of the co-operative than towards patronage of the co-operative. More importantly it was found that CCA was positively influenced by members' emotional attachment to the co-operative (AC) and members' sense of obligation to the co-operative (NC). The economic or financial reasons, leading to an individual needing to be a member of the co-operative (CC), were not related to CCA. For Fonterra, recognising and strengthening affective and normative commitment is quite likely to result in members sacrificing short term economic gains in favour of long-term performance of the co-operative. While improving the utilitarian aspects of member commitment (CC) will have no influence or effect on a member's commitment to collective action.

Like in the case with member commitment, the three dimensions of member heterogeneity were disentangled into specific heterogeneity sources that comprise them. In total 35 sources of heterogeneity were identified. The farmer-member dimension, which is based on differences between members in personal characteristics, was comprised of 9 sources. The farm-business dimension, which includes physical, financial and product quality related properties, was made up of 14 sources. The member-interest dimension, which relates to the differences between members that arises due to their diverging interests, was comprised of 12 sources. A novel measure and explanation of these 35 sources was presented using the Gini-Simpson Index. Based on this measure considerable heterogeneity was found to exist in Fonterra with most sources in all three dimensions showing high levels of heterogeneity. As Fonterra is a large and fairly complex co-operative with a foundation built on several mergers of co-operatives over many decades, a high level of heterogeneity was expected. The farm-business dimensions showed the greatest homogeneity of the three dimensions and suggests that the membership base tends to be more uniform with respect to farm business related properties, which is not surprising as they are all dairy farms. The co-operative was most diverse when it comes to its member-interests.

Importantly, the findings tend to indicate that higher heterogeneity does not lead to lower commitment. It is possible that the challenges presented by heterogeneity in this co-operative are mitigated by having well designed structures in place. Interestingly, of the three dimensions it is the differences in members' interests followed by differences in farm-

business that were most likely to result in differences in AC, NC, CC, CCA as well as CG and CP. These findings on member heterogeneity have important implications for the development and delivery of co-operative communication and member engagement strategies that are focused on strengthening member commitment. For example, member commitment can be strengthened by segmenting members based on those heterogeneity sources that were associated with one or more components of organisational commitment and/or commitment to collective action; and developing segment specific engagement strategies thereafter.

Fonterra is a fairly successful dairy co-operative and business. An important driver of this success is the strong member and co-operative relationship that exists. Fonterra's organisational structure that comprises a unique share-holders council has been key to building and nurturing this relationship. The importance of a strong and healthy relationship between a member and the co-operative cannot be over emphasised, and member commitment is a core phenomenon that reflects this relationship. A weakening of member commitment is indicative of a failing relationship between the member and co-operative and could lead to issues such as – members exiting the co-operative and therefore resulting in inefficient asset utilization, members behaving opportunistically and leading to increased monitoring costs for the co-operative etc. Co-operative leadership and management should therefore prioritize the inclusion of AC, CC, NC and CCA as a core performance metric. A regular measurement and analysis of these would indicate to what extent the strategy pursued by the co-operative are impacting these critical member commitment indicators over time and how effective the member engagement and communication protocols are.

Lastly, a vital observation and finding of this thesis is that it is the emotive reasons for membership (AC) that forms the glue that holds the co-operative together. Hence, the greater a member's want or desire to be a member of the co-operative, the stronger will be the co-operative. It is imperative that the co-operative regularly monitor AC and constantly strive to further strengthen it. For any erosion or decrease in AC could have significant negative implications on co-operative performance and could also perhaps lead to its demise. Apart from developing specific protocols for strengthening a member's AC, the co-operative should also acknowledge and appreciate members that have a high AC. Moreover, steps should also be taken to identify the reasons for the stronger utilitarian basis for membership of the smaller farm- businesses, as it is the smaller farm-businesses, both in terms of physical and financial attributes, that have shown to have a relatively weaker emotive basis for membership.

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Chapter 1: Introduction

1.0 Introduction

1.1. What are Co-operatives?

A remark made by the renowned co-operative scholar Emilianoff (1942) nearly 75 years ago that…"*the diversity of co-operatives is kaleidoscopic and their variability is literally infinite*", could be argued still holds good today. This is primarily because, over the course of time the co-operative model has been modified and applied to numerous and a wide range of businesses, causing it to evolve in a variety of ways (Zeuli and Cropp 2004). The most widely accepted definition of a co-operative is the one provided by the International Co-operative Alliance (ICA), a non-governmental organization that represents 700 million individuals through its 309-member organizations from over 100 countries. The ICA defines a co-operative as "*an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through jointly owned and democratically-controlled enterprise"* (International Co-operative Alliance (ICA) 2018). This is a very broad definition covering off both functional and political elements of a co-operative (Evans and Meade 2006). More importantly it stresses on one of the most interesting and at the same time most challenging attributes of the co-operative: its double nature; that is a co-operative is both an association (i.e., society) of members and an enterprise (the co-operative firm) in which economic activities are conducted (Bijman 2016).

The greatest rival or possibly the closest relative of the co-operative business model would be the far more common model of investor-owned firms (IOFs). In fact it has been suggested that the co-operative form of organization is no different from the more common investor owned firms when it comes to a wide range of factors (Hansmann 1996, Zeuli and Cropp 2004). For example, both types of organizations participate in the same labor market, pay similar wages, management compensation and interest rates; and most operational practices such as packaging, storing, transporting, processing, and advertising are also very similar across both business forms (Zeuli and Cropp 2004).

However, there are a few significant differences between co-operatives and IOF's. It is therefore prudent to identify these few critical differences between the two at the very outset and possibly derive a definition based on the difference that exists. The first key difference is centered on the profit maximization motive of firms. While profit maximization is the primary objective of IOF's, whereas in the case of co-operatives, the primary objective is to maximize the benefits generated for their members (Hardesty and Salgia 2004). Secondly,

profit reimbursement (either through the dividend payout or rebate) is shared only amongst members of the co-operative, rather than shareholders as in an investor owned firm. This strong member orientation and focus of co-operatives as opposed to investor orientation of IOF's is the most important differentiating feature between the two. As a result, the core operating philosophies of the two organizational forms are very different.

Since co-operatives are purposefully organized to serve member needs and are focused on generating member benefits rather than return to investors, members have a responsibility to provide equity capital and govern the business (Coltrain, Barton et al. 2000). This ensures that that members (and not investors) have ultimate ownership and control (Hardesty and Salgia 2004). Therefore a co-operative can be viewed as a business that is owned and controlled by the people (Patrons[1]) who use its services and whose benefits (services received and earnings allocations) are shared by the users (typically on the basis of use) (Staatz 1987). According to Staaz (1987), only an enterprise conforming to the spirit and intent of this definition should be labeled a co-operative (Staatz 1987). In other words, a co-operative can be defined as a user-owned, user-controlled organization whose primary purpose is to maximize benefits for its users. This is the definition set by the United States Department of Agriculture (USDA) and it illustrates the fundamental attributes of a co-operative, i.e. those who use the co-op (members) - 1) help finance the co-op, and therefore own it; 2) help govern the business directly by voting on significant long term decisions and indirectly through their representatives on the board of directors, and therefore control it; and 3) derive benefits on the basis of use (patronage) (Zeuli and Cropp 2004).

It is important to note that like an IOF, a co-operative too must be focused on profitability and growth. Co-operatives are businesses and, in the years, ahead they must focus on solving business problems and providing value to their members. If it cannot survive as a business, other considerations become irrelevant, and members will stop patronizing them and they will just fade away. Moreover, co-operative principles provide an additional framework through which options for business strategies, organizational structures, and operations must be analyzed (Dunn, Crooks et al. 2002). Due to this framework, when it comes to making a decision the co-operative must also ask, how will this decision affect the members' ownership interests? What influence will it exert on members' ability to control their co-operative? How will it affect the distribution of benefits arising from the co-operative? And, most critically, if

[1] Patrons can be defined as those individuals or other firms who transact with the firm as – 1) purchaser of the firms products or 2) seller to the firm of - supplies, labour or other factors of production.

the business is to remain a co-operative, how will these user interests be protected? (Dunn, Crooks et al. 2002).

1.2. Co-operative principles

To get a better understanding of co-operatives, an exploration of the principles that define its existence is required. Going back in history, the earliest set of guiding principles for co-operatives were developed by the Rochdale Pioneers in 1844 and included twelve organizational points that manifested social, political as well as business concerns (Van Opstal 2010). These principles were significantly influenced by the historical context and economy at that period and were primarily meant to govern a small retail store. Due to which, only some of the Rochdale principles are still followed today (such as democratic control), most others are obsolete and/or in-applicable; and over time these co-operative principles have evolved and new sets have emerged (Zeuli and Cropp 2004).

Today the most widely accepted co-operative principles are those endorsed by the international co-operative alliance (ICA). The seven principles laid out by the ICA are –

1. Voluntary and open membership
2. Democratic member control
3. Member economic participation
4. Autonomy and independence
5. Education, training and information
6. Cooperation among co-operatives
7. Concern for community

1.3. History of Co-operatives

The historical development of co-operatives was strongly influenced and shaped by the prevailing social and economic forces of that period. The earliest co-operative associations, which could be called pre-cursors to co-operatives, were formed in Europe and North America during the 17th and 18th centuries during periods of great social upheaval and distress caused by significant shifts in agricultural and industrial production practices (Zeuli and Cropp 2004).

According to Hoyt (1989), the modern co-operative originated in Europe as a self-help method to counter extreme poverty and then spread to other parts of the industrializing world in the late 19th century. To fill the void created by the withdrawal of public assistance, the

people of Europe formed various types of self-help organizations such as mutual aid societies in England.

It could be argued that the history of modern co-operatives (co-operatives as we know them now) started with the formation of The Rochdale Society of Equitable Pioneers, Ltd. in 1844 by 28 weavers working in the cotton mills of Rochdale, England. This was a consumer co-operative and the workers formulated a set of basic operating rules based on a two-year study of co-operatives including some that were not successful (Ortmann and King 2007). The objective of the co-operative was to address a wide range of member's needs such as better housing, employment, food, education and other social requirements (Ortmann and King 2007). While it was not the first co-operative itself, the Rochdale Society is credited with popularizing the modern co-operative model (Evans and Meade 2006). The Rochdale society continues to operate even today as The Co-operative Group, the largest consumer co-operative in the UK with over 4.6 million members and revenues close to US$ 13.2 billion.

The next major development in the history of co-operatives happened in 1864 with the establishment of the Raiffeisen Bank in Germany by F.W. Raiffeisen (Ortmann and King 2007). Another reputed advocate of co-operatives was Horace Plunkett, an Irishman who invested considerable time and effort towards highlighting the benefits of agricultural co-operatives in Ireland and other parts of the world (Shaffer 1999).

In the specific area of agricultural co-operatives, Denmark is viewed as an good example of early and successful co-operative farm marketing and supply organizations (Shaffer 1999). An important factor in the growth of Denmark's co-operative movement was identified to be the establishment of Folk High Schools in the rural areas (Zeuli and Cropp 2004). Although not its intended purpose or objective, the Folk High school instilled in its students a strong spirit of cooperation.

Today co-operative businesses are found in nearly all countries in the world – from the developing and remote parts of Africa, Asia and South America to the more developed regions of North America, Europe and Oceania. They also exist across a broad membership base, with some agricultural co-operatives having less than 20 members while other can have over 10,000 (Boučková 2002).The rapid spread of the co-operative business model from 18th Century England to diverse and remote parts of the world reiterates the universal adaptability and diversity of the co-operative business model (Zeuli and Cropp 2004).

In the second half of the 20th century, the greatest increase in co-operative activity was observed in India, and by 1991 India had become a world leader in terms of numbers of co-operatives (401,139) and membership (166 million) (Williams 2007). However, more co-operatives does not imply that the co-operative sector as a whole is stronger or more competitive (Zeuli and Cropp 2004). Also, while it may seem reasonable to conclude that larger the co-operative the better, this is not necessarily true.

1.4. The Role & Significance of Co-operatives

In a world where economic viability needs to be delicately balanced with social responsibility, people are increasingly looking at co-operatives as an alternative to the traditional investor-owned business models. Co-operatives play an important role in many developed and developing countries worldwide (Ortmann and King 2007). There are approximately 2.94 million co-operatives in the world and account for more than 1.2 billion in membership and clients, and provide employment either directly or indirectly to about 279 million people (Hyung-sik 2017) . Furthermore, with revenues of about 2.98 trillion US$ (from an asset base of 19.6 trillion US$) co-operatives were the 5th largest economic unit (ahead of France and behind Germany) if they were to be viewed as a nation (Grace and Associates 2014). These facts suggest that co-operatives do not, as is sometimes assumed, contradict the goals of capitalism. Moreover, it reflects the general satisfaction and confidence of members towards their co-operatives and validates the efficiency and financial performance of co-operative businesses.

At a national level, co-operatives play a significant role and account for more than 10% of GDP in countries (Grace and Associates 2014). Based on 3 important parameters - co-operative membership as a percentage population, co-operative employment as a percentage of population and co-operative revenue as a percentage of GDP, the top 6 countries with the most co-operative economies were – New Zealand, France, Switzerland, Finland, Italy and Netherlands (Grace and Associates 2014). More interestingly, a fairly high level of correlation was found to exist between a countries co-operative economy index and its social progress index[2] (SPI) with New Zealand occupying the number 1 spot on both indexes. Given the importance of co-operatives and building on the momentum created by the United

[2] The SPI has 54 measures and includes items like basic human needs, opportunity and access to knowledge. It has been developed and promoted by the Social Progress Imperative Grace, D. and Associates (2014). Measuring the Size and Scope of the Cooperative Economy: Results of the 2014 Global Census on Co-operatives, United Nations Secretariat.

Nations by making 2012 the International Year of Co-operatives, the International Cooperative Alliance is focused on making the co-operative form of business (by 2020) – 1) the acknowledged leader in economic, social and environmental sustainability, 2) the model preferred by people, and 3) the fastest growing form of enterprise. However, until the scope and potential of co-operatives can be better understood research on smart policies to promote co-operatives will be hamstrung (Grace and Associates 2014).

A commonly held belief is that co-operatives are more likely to fail than standard corporations. However, to the contrary, data from the US shows that 60 – 80% of standard corporation tend to fail after their first year whereas only 10% of co-operatives fail after their first year (Williams 2007). Furthermore, only 5% of standard corporations remain active after five years, while in the case of co-operatives nearly 90% of them remain active after five years (Williams 2007).

1.5. Co-operatives in New Zealand

New Zealand has a long standing and deep presence of co-operatives across several sectors. The first co-operative in NZ, Southland Building Land and Investment Society (now SBS Bank) was established in 1869; and there are five NZ co-operatives that are over 100 years old. A UN study found that NZ was the most co-operative economy in the world. New Zealand ranked number one in the world for – 1) share of the co-operative's economy of national GDP (at 20% of NZ GDP), and 2) employment by co-operatives related to total population. A recent report by Garnevska, Callagher et al. (2017) found that the top 30 co-operatives and mutuals in NZ generated revenues of over 42 billion NZ$, provided direct employment to 48,000 individuals and catered to a membership base of 1.4 million people

In NZ the principle piece of legislature that governs co-operatives is the Co-operative Companies Act 1996, and serves as a companion act to the New Zealand general Companies Act 1993, as well as the Industrial and Provident Societies Act 1908 (Evans and Meade 2006). But this is not truly all encompassing as Evans & Meade (2006) point out that co-operative activity in NZ arises in a variety of legal organizational forms (Evans and Meade 2006). On the whole, the co-operative legislation in New Zealand is flexible, less tied to co-operative principles than corresponding legislation overseas, and free of policy preferences favoring co-operatives over IOF's and other organizational forms (Evans and Meade 2006).

The purpose of the Co-operative Companies Act is to allow co-operative owners to conduct business on a mutual basis, where they engage in co-operative activity (Evans and Meade

2006). The act defines a co-operative as – *A company, the principal activity of which is, and is stated in its constitution as being, a co-operative activity and in which not less than 60 percent of the voting rights are held by transacting members* (MBIE 2014).

All companies in NZ, co-operative or otherwise, need to be registered under the companies act. However, only a company that is in addition registered under the Co-operative Companies Act is allowed to use the term "co-operative" in its name. Most importantly, such a registration allows the co-operative company to have shares of nominal value, and to issue, or accept surrender of shares at the nominal value – features not provided for under the Companies Act (Evans and Meade 2006). Typically, only transacting share-holders are allowed to vote on co-operative company resolutions. Since co-operative owner-members can redeem their co-operative capital – via the surrender of their shares, such capital is treated/classified as debt in co-operatives, unlike in IOF's wherein it's classified as equity.

More importantly, the Co-operative Companies Act specifically modifies several items of the Companies Act that would constrain co-operative activity. For example, the act makes it very easy for a co-operative to provide its members with rebates. The Companies Act on the other hand makes it very difficult for an IOF to provide shareholder discounts on the companies' goods or services (Evans and Meade 2006).

1.6. Agricultural Co-operatives

Although co-operatives exist in a wide range of sectors, it is in the agricultural sector that they have the most comprehensive and significance presence. Co-operatives that operate along the agricultural value chain, starting from the supply of farming inputs to the cultivation of agricultural products and livestock farming, and further on to the industrial processing of agricultural products and animals, can be grouped together as agricultural co-operatives (International Cooperative Alliance (ICA) and Euricse 2014). There are approximately 1.2 million agricultural co-operatives in the world serving 122 million members and clients (Grace and Associates 2014). This is influenced by large numbers of agricultural co-operatives in India and China. In total, these agricultural co-operatives have an asset base of 133.8 billion US$ and generate revenues of about 337.7 billion US$ (Grace and Associates 2014). There were 328 agricultural co-operatives, distributed in 27 countries that reported an annual turnover in excess of 100 million US$ in 2012 (International Cooperative Alliance (ICA) and Euricse 2014). Looking at just the 1,465 large co-operatives (with turnover of greater than 100 million USD) monitored by the International Co-operative

Alliance (ICA), 28% are in the agriculture and food sectors. In 2019, 97 of the top 300 co-operatives in the world were agricultural co-operatives (ICA and EURICSE 2019).

The agricultural sector is extremely dynamic because the nature of production agriculture changes constantly and so does agricultural markets and public policy. Agricultural co-operatives are an integral part of this dynamic environment. Many changes occur outside (external) the co-operative system, which may or may not directly influence them. Yet, co-operatives have to recognize these changes and react to them (Dunn, Crooks et al. 2002). Internally, co-operatives' mission, structure, and practices not only set them apart from other forms of business, but also influence how they respond to external changes (Dunn, Crooks et al. 2002). It was identified in the 1987 report, "Positioning Farmer Co-operatives for the Future," that to be successful in fulfilling the needs of farmers, co-operatives must be able to provide an appropriate economic response to marketplace situations faced by members (USDA 1987). This response generally involves provision of competitive goods and services, or adoption of actions that balance or counter forces present in the business environment (Dunn, Crooks et al. 2002).

Agricultural co-operatives have played an important role in strengthening market access and generating competitive returns for independent farm operators during the 20th century (Ortmann and King 2007). Generally, there are two situations under which agricultural co-operatives are created. In most instances, the situation arises when farmers cannot obtain essential services from IOFs, since the provision of these services is judged to be unprofitable by the IOFs (Hardesty and Salgia 2004). Another situation is when the IOFs provide the services at prices that are too high for the farmers (Hardesty and Salgia 2004). The former situation is characterized in economic theory as *market failure* or missing services motive; on the other hand, the latter situation drives the creation of co-operatives as a *competitive yardstick* or as a means of allowing farmers to build countervailing market power to oppose the IOFs (Hardesty and Salgia 2004). In most instances, this concept of competitive yardstick often obliges the IOFs, through competition, to improve their service to farmers. In agricultural producer markets, co-operatives typically help set or stabilize market prices (Haller 1992).

The creation of agricultural co-operatives is most often intricately linked to the ability of farmers to pool production and/or resources (USDA 2002). In many situations, it is not financially viable for individual farmers to manufacture products or undertake a service. Co-operatives provide a method for farmers to join together in an '*association*', through which a

group of farmers can acquire a better outcome (typically financial) than by going alone. This approach is aligned to the concept of economies of scale and can also be related as a form of economic synergy, where two or more agents work together to produce a result that is not obtainable by any of the agents independently (Zeuli and Cropp 2004).

Above and beyond the economic benefits, an important strength of a co-operative for the farmer is that they retain the governance of the association, thereby ensuring they have ultimate ownership and control (Hardesty and Salgia 2004) . This ensures that the profit reimbursement (either through the dividend payout or rebate) is shared only amongst the farmer members, rather than shareholders as in an IOF.

In addition, in the field of agriculture, co-operatives play a vital role in ensuring farmers adapt their operations to agricultural technological innovations, such as the use of fertilizers, plant and livestock breeding, agricultural mechanization, electricity and other new sources of energy, and to new information systems (Ortmann and King 2007). In a non-economic capacity, co-operatives have also played an important role in rural communities, where they are an integral part of the social fabric. They encourage democratic decision-making processes, leadership development and education.

The significant trend in the agricultural economy of fewer, larger and increasingly corporate farms has created a significant concern among rural small holder farmers about their sustainability (Coltrain, Barton et al. 2000). One way for small and midsize farms to remain viable businesses is to increase income of their operation by participating in profitable value-added processing and marketing activities (Dunn, Crooks et al. 2002). A popular strategy being used by producers to achieve this goal is to pool their limited resources through co-operative development. This would help these small scale producers earn a larger share of the consumer's food dollar (Cook 1995). Besides, the challenge posed by consumers towards the food industry to tailor food products for specifically defined market niches encourages the coordination of producer groups and alliances, thus increasing the significance of co-operatives (Rogers and Petraglia 1994).

Co-operatives can also accelerate the process of development and participation of rural population in agricultural activities. In many countries, agricultural co-operatives prove to be an important model of enterprise by which small farmers can organize and optimize limited resources to increase their income (Boučková 2002). In Africa in particular agricultural co-operatives are recognized as an useful means to lift small holder farmers out of poverty

(Bouamra-Mechemache and Zago 2015). For example, poverty reduction through the participation of small holder farmers in local and international markets can be enhanced by technical assistance and collective action provided by co-operatives (Bouamra-Mechemache and Zago 2015).

Agriculture co-operatives play a very important role in the economies of developed countries too. In the United States, there were approximately 1,953 agricultural co-operatives and their average total assets and equity were US$ 47.1 million and US$ 20.9 million respectively in 2016 (Demko 2018). In the EU there are about 51, 392 agricultural co-operatives and their combined annual turnover was € 347 billion in 2015 (Cocolina and Cooperatives Europe 2016). Particularly in the dairy industry, farmer-owned co-operatives play a rather dominant role with market shares above 80% in milk collection in the U.S., the major dairy countries in Western Europe and also in Australia and New Zealand (Chaddad 2007). Moreover, four (Fonterra, FrieslandCampina, Dairy Farmers of America and Arla Foods) of the top 10 dairy companies in the world by revenue are co-operatives (Hunt and van Battum 2015).

1.6.1 Types of Agricultural co-operatives

Agricultural co-operative like most business organizations have complex legal, financial and organizational structures. However, the meaningful categorization of co-operatives has been difficult due to the structural evolution of co-operatives which has led to a wide range of formations and classifications, as well as the existence of a large number of agricultural co-operative types (Cook 1993) .

Classification based on – function, geography and commodity

Cook (1993) developed a co-operatives classification based on – function, geography and commodity, which resulted in 7 co-operative types. The seven co-operative types were – 1) Farm credit, 2) Rural utilities, 3) Sapiro I (Bargaining Co-operatives), 4) Sapiro II (Marketing Co-operatives), 5) Nourse I (Local supply and/or Marketing), 6) Nourse II (Regional Supply and/or Marketing) and 7) New Generation Co-operatives.

The USDA Classification

The USDA classifies agricultural co-operatives based on function into one of three types – 1) marketing co-operatives, 2) supply co-operatives and 3) service co-operatives (USDA, 2012).

- A ***marketing co-operative*** markets farm commodities produced by its member farmer and derives most of its total dollar volume from the sale of members' products. The marketing co-operative could simply purchase the commodity produced by its

members and sell it to food processing /food manufacturing firms or it could process the product and sell it to consumers or retailers (Royer 2014).

The marketing co-operative solves on of the biggest challenges that farmer's face, which is transportation and marketing of their products. Moreover, the relatively small volume supplied by an individual small farmer puts them in an unfavorable negotiating position with respect to intermediaries and wholesalers. In such cases it will be much more beneficial to form a co-operative which will act as an integrator that collects the output from members, sometimes undertaking manufacturing, and delivering it in large aggregated quantities downstream through the marketing channels.

- A ***supply co-operative*** supplies members with inputs they use in farm production (such as seeds, fertilizers, chemicals, fuel, and farm machinery (via machinery pools)) and derives most of its business volume from the sale of production supplies, machinery and equipment, and building materials. Farm supply co-operatives may manufacture these inputs or purchase them from other firms (Royer 2014). Many also handle farm, ranch, and home items, such as heating oil, lawn and garden supplies and equipment, and food.

  Supply co-operatives usually aggregate purchases, storage, and distribution of farm inputs for their members. By taking advantage of volume discounts and utilizing other economies of scale principles, supply co-operatives bring down the cost of the inputs that the members purchase from the co-operative compared with direct purchases from commercial suppliers.

- A ***service co-operative*** provides specialized services related to the business operations of farmers, ranchers, or co-operatives, such as banking/financial, trucking, storing, or drying. Amongst service co-operatives, the credit union requires special mention because it is an important and unique type of banking institution. Farmers, especially in developing countries, can be charged relatively high interest rates by commercial banks. In some cases, loans may not even be available for farmers to access. When providing loans, these banks are often mindful of high transaction costs on small loans, or farmers may be refused credit altogether due to lack of collateral – which is very common in developing countries. To provide a source of credit, farmers can pool together funds that can be loaned out to members and lower interest rates.

Alternatively, the credit union can raise loans at better rates from commercial banks due to the co-operative having a larger associative size than an individual farmer

1.6.2 Agricultural Co-operatives in New Zealand

New Zealand has a long history (144 years) of agricultural co-operatives; and co-operatives have been an important feature of New Zealand agricultural history (Evans and Meade 2006). Co-operative first emerged in the 1880's and developed rapidly in dairying in Taranaki, the Waikato, and later Southland (Stephens 1936). Agricultural industry coordination in New Zealand has happened via the combined usage of co-operative organization and, from 1920's to 1990's statutory control/producer boards.

During this 144-year journey, agricultural co-operatives in NZ appear to have evolved, especially in terms of ownership structures, management models and governance protocols, both within and across industries, resulting in a diversity of models. In recent times, co-operatives have become major players in a number of New Zealand's agricultural sectors, and account for a significant share of New Zealand's economic activity (Evans and Meade 2006, Garnevska, Callagher et al. 2017). Within the top 30 NZ co-operatives, agri-food co-operatives account for 65% of revenues, 68% of assets and 83% of employees (Garnevska, Callagher et al. 2017).

In some New Zealand agricultural sectors, co-operatives are either as dominant (e.g. Dairy) or more dominant (e.g. meat and fertilizer) than in overseas jurisdictions. Whereas in some other agricultural sectors (apple, fishing and forestry), New Zealand co-operatives have less involvement when compared to overseas jurisdictions (Evans and Meade 2006). An important finding reported by Evans and Meade (2006) is that the co-operatives in New Zealand demonstrate considerable adaptive efficiency in response to market and other pressures. This is an interesting point because it alleviates several criticisms that are associated with the traditional co-operative model – such as constrains to raise capital and therefore grow.

In the report prepared by Evans & Meade (2006), the authors presented the following conclusions on NZ agricultural co-operatives by specific sector –

Dairy - co-operatives play a very significant role and account for almost all milk processing in New Zealand. This is similar to dairy industries overseas.

Meat – co-operatives dominate this sector too, but not to the extent of dairy, since IOF's have a continuing presence and are commonly found in smaller, niche operations. Relative to most overseas meat industries, co-operative market share in New Zealand is higher.

Wool – co-operatives do not tend to play a large role in the Wool industry, and this is similar to the pattern observed overseas as-well. This is attributable to wool's heterogeneity and storability, both of which reduce the economic rationale for a co-operative.

Fishing & Aquaculture – co-operatives play a small role, with processors and marketers preferring to integrate backwards into catching and farming. However, it is IOF's, typically unlisted, that dominate this sector. Interestingly, these IOF's, faced with challenges similar to those faced by a co-operative (e.g. capital constrains), adopt co-operative like strategies.

Kiwifruit – this sector presents a unique characteristic in terms of being dominated by Zespri a grower-controlled organization. Zespri is in reality a functional co-operative. The high level of kiwifruit homogeneity and common challenges (mainly around export of product), facilitated the formation of a co-operative like organization in this sector.

Apple – co-operatives play a insignificant role in this sector. This is primarily attributed to high levels of grower interest heterogeneity and secondarily to the constant restructuring and removal of the single seller desk.

Forestry – similar to the fishing & aquaculture industry, backward integration of processors and marketers has ensured that co-operatives do not play much of role in this sector.

Rural Supplies – relative to other countries, co-operatives play a much larger role in this sector in NZ; and it is suggested by the authors that this could possibly be due to the importance of security of rural supplies in a small, isolated country.

Fertilizer – co-operatives are very dominant in this sector in NZ, even more so than in overseas countries. High level of product homogeneity and regional market power (due to lower transport costs) are suggested as being the reasons for this.

The report by Evans & Meade (2006) also highlights that there is a substantial dearth of research on agricultural co-operatives of New Zealand; and it's suggested that this is due to considerable data hurdles.

1.6.2 Evolution and Challenges faced by Agricultural Co-operatives

1.6.2.1 Evolution

In conventional businesses growth is accepted as an inevitable consequence of corporate existence, i.e. to grow or die (Hind 1997). Greiner developed a life cycle theory of business development and growth for investor owned firms (Greiner 1972). He described five distinct phases of growth each characterised by a unique feature which were – creativity, direction, delegation, coordination and collaboration (Greiner 1972). Like Greiner's model, most of the economic and management theories of firms in this space are grounded in profit, growth, sales maximization/optimization as the firms obvious goals (Hind 1997). From a perspective of co-operatives, these traditional corporate goals are either irrelevant or act as constraints within which other member benefit goals may be aimed at, possibly because in the case of co-operatives these goals are a means rather than the end (Hind 1997).

In the case of agricultural co-operatives the life- cycle theory developed by Cook (1995) is the most widely acknowledged as it provides a better understanding of the evolution of co-operatives – genesis, growth, decline and demise of co-operative business organizations. Chadad (2007) successfully used this framework for examining the evolution of dairy co-operatives in Brazil (Chaddad 2007).

The framework consists of 5 stages -

Stage 1 – The first stage in the formation of agricultural co-operatives is primarily a result of a defensive response, and has two economic justifications 1) to bring economic balance, and 2) correct market failure (Cook 1995). When the prices are depressed or if there are market failures, individual producers require institutional mechanisms to bring economic balance under their control and/or to countervail the opportunism. Since such a situation creates incentives for producers to react collectively and the institutional mechanism usually chosen is the co-operative (Cook 1995).

Stage 2 – In the second stage, the co-operatives that were formed to bring about economic balance slowly cease to exist. It is quite likely that these are the co-operatives Helmberger and Hoos (1962) referred to in his wave-theory (Cook 1995). Whereas the co-operatives formed to confront market failures tend to survive past the first stage because they remain competitive against IOF oligopolists/oligopsonists (Cook 1995).

Stage 3 - As the IOF's begin to offer significant competition to co-operatives and the playing field is levelled, the short run transaction costs incurred by co-operatives begin to gain

importance. These transaction costs arise out of *vaguely defined property rights* and lead to conflicts over residual claims and decision controls. Cook (1995) classifies the conflicts over residual claims and decision controls into five problem sets - 1) Free Rider Problem, 2) Horizon Problem, 3) Portfolio Problem, 4) Control Problem and 5) Influence Cost Problem.

Stage 4 - In stage 4, Cook (1995) argues that the Co-operative is challenged by the complexities arising from the trade-offs between vaguely defined property rights and unique opportunities; and at the end of the fourth stage the co-operative reaches a point where it is limited to three options.

Stage 5 - According to Cook (1995), in stage 5 the co-operative chooses between its three available strategic options - 1) Exit, 2) Continue and 3) Transition.

1.6.2.2 Challenges

Agricultural co-operatives are shaped and influenced by factors outside (external) and inside (internal) the co-operative system (Dunn, Crooks et al. 2002). Both the external and internal issues that agricultural co-operative face today are not dissimilar to those identified by Dunn, Crooks et al. (2002)). For example, the main external issues shaping co-operatives are - changing farmer demographics, technological innovations, changing competitive environment, role of the consumer, structural changes in food processing and marketing, globalization, the policy environment and industrialization & vertical integration via greater supply chain control (Dunn, Crooks et al. 2002). While the internal issues affecting co-operatives are inherent in the structure of co-operatives or result from the attitudes of the people in co-operatives (Dunn, Crooks et al. 2002). Given the unique framework within which co-operatives operative, it is the internal issues that tend to be quite significant in determining the fate of co-operatives. Moreover, the internal issues shaping co-operatives are also linked to the external ones mainly because they constrain efforts to respond to external forces. Some of the main internal issues that impact agricultural co-operative are – capital constraints and limited ability to generate sufficient equity (Richards and Manfredo 2003) heterogeneous member characteristics and needs (Hoehler and Kuehl 2018), board effectiveness and governance (Bijman, Hendrikse et al. 2013), management lack of co-operative focus (Dunn, Crooks et al. 2002), growing emphasis on value-added activity (Royer 1995), pressures on the traditional model (Bijman 2016), social capital (Valentinov 2004), and member commitment (Fulton 1999).

It is interesting to note that a vast majority of theories and explanations on the formation, existence and evolution of agricultural co-operatives are grounded in economic theory and the financial-benefit aspects of membership. For example, the most widely used theories to explain co-operatives are from the fields of economics such as – transaction cost economics, agency theory, property rights theory and collective action. Given that co-operatives are member focused organizations with a significant social construct, it is surprising that not much theory development or empirical research has been done from the social aspects. Moreover, as the demise of co-operatives could be due to the erosion of co-operative ethics within the membership (Hind 1997), it is prudent that future research examines the social aspects of co-operatives, especially the socio-psychology of the members.

2.0 Problem Statement

Despite the member-co-operative relational dimension being an important differentiator of the co-operative model from the more common Investor Owned Firm (IOF) model, and also a significant source of competitive advantage (Jussila, Goel et al. 2012), much of the work on co-operatives tends to focus on the non-relational aspects (Røkholt 1999, Byrne, McCarthy et al. 2012). The bulk of research about co-operatives have incorporated theoretical aspects and approaches such as agency theory (Eilers and Hanf 1999), property rights theory (Cook and Iliopoulos 2000) contracting theory (Sykuta and Cook 2001) , transaction cost theory (Hendrikse and Bijman 2002), and game theory (Karantininis and Zago 2001). Although these are useful in detailing the economic characteristics of the co-operatives and explaining the reasons for the formation, existence and behaviour, they are not empirically based; and hence not entirely useful in evaluating the performance of co-operatives. Moreover, the literature identifies that while the study and analysis of co-operatives are often strongly driven by economic aspirations (e.g. profit maximization) they are not always in total alignment with the social features of the co-operative organisational form.

With respect to agricultural co-operatives most of the research is rooted in economic theory, which is based on assumptions about human behaviour that is not always empirically grounded (Österberg and Nilsson 2009). Furthermore, the empirical studies that exist are mainly focused on applying the behaviour model of co-operatives as a profit-maximizing firm; and empirical applications of the other existing models is lacking (Soboh, Lansink et al. 2009). The absence of empirical application could be due to difficulty in obtaining the relevant data, lack of interest on the part of applied economists, or lack of theoretical approaches that are well developed for empirical application (Soboh, Lansink et al. 2009).

Nearly 80 years ago Bakken and Schaars (1937) stated that co-operative organizations are occasionally alluded to as self-liquidating corporations; and their success may cause their destruction. Furthermore, with the evolving nature of the co-operative organisational form, a rethink on how co-operatives are traditionally examined, evaluated and interpreted is required. Since social factors play an important role in the formation, development and performance of co-operatives, it is surprising that they have not been considered as a probable and significant challenge and/or cost, as specific strategies are pursued by co-operatives. One reason for this is the inherent complexity that they present. Factors such as the long-time horizons of decisions, the delayed effects of decisions on these factors, the

incrementality of the negative effects, the difficulty in measuring them makes understanding, acknowledging and acting on the issues posed by these factors complex to address (Cook 1995, Nilsson, Svendsen et al. 2012).

While the conventional financial and economic rationale for measuring co-operative performance and explaining the reasons for being a member of a co-operative continue to be important, there is a parallel view that stresses the need to recognise the critical role of other factors (Fulton 1999, Iliopoulos and Cook 1999, Nilsson, Svendsen et al. 2012). Besides, given that members assess their co-operatives in social terms in addition to economic ones; some reorientation of research on agricultural co-operatives with a focus on the socio-psychological perspective of members is also suggested (Österberg and Nilsson 2009).

The non-conventional or socio-psychological approach to examining co-operatives does not ignore the conventional views or values, but instead presumes that the study of co-operatives is incomplete if it does not include other components that are a defining feature of co-operatives. This non-conventional lens therefore provides a greater understanding of co-operatives, enabling an analysis of multiple factors and determinants; and compliments the conventional economic and finance centric view on co-operatives. In addition to operating within the scope of the co-operative organisational form, the methodology of a non-conventional examination of co-operatives should be informed by empirical data. Assumptions made based on opinion alone lack credibility, not because they are necessarily unreasonable or even incorrect, but because they do not satisfy the requirements of reasoned inquiry.

Lastly, despite the significance of co-operatives in general and agricultural co-operatives in specific to the NZ economy, not much research has been done in studying them in depth. Therefore, the aim of this thesis is to develop, describe and empirically test a conceptual model that provides a framework for examining NZ agricultural co-operatives from a non-conventional perspective. Informed by the literature, this conceptual model is grounded in three important non-conventional factors that can impact the performance of agricultural co-operatives. These are 1) Heterogeneity, 2) Commitment and 3) Social Capital.

3.0 Research Objectives

The research will have three main objectives –

i. The first objective is to review the literature on general co-operative theory, commitment, heterogeneity and social capital; and to develop a conceptual framework that provides a lens for a socio-psychological examination of co-operatives.

Although this thesis developed and presented a comprehensive theoretical framework, only some aspects of the framework are studied in more detail. These aspects included member commitment and heterogeneity because several co-operative scholars have suggested that these require further scrutiny. Moreover, since the measurement and interpretation of social capital is a very critical, complex and demanding task, it requires a significant amount of undivided focus. Therefore, the measurement and analysis of social capital was excluded from this thesis and the scope of the empirical examination of agricultural co-operatives was centered on commitment and heterogeneity. Consequently, the second and third objectives of this thesis read as follows -

ii. The second objective is to establish a measure of commitment and heterogeneity within the membership base of agricultural co-operatives.

iii. The third objective is to explore and analyse the relationship between commitment and heterogeneity within the membership base of agricultural co-operatives.

The pertinent questions that research objectives two and three will strive to address is – *what is the level of member commitment and member heterogeneity that exists in a large New Zealand agricultural co-operative? And what is the relationship between them?*

By seeking to achieve these objectives, the research will develop an instrument for measuring these factors; and in the process will also explore and highlight the value and role of these factors on the performance of agricultural co-operatives. The outcome benefits for agricultural co-operatives in general and to New Zealand agricultural co-operatives in specific from this research are both conceptual and applied. At one level the research will enable agricultural co-operatives, from an evidential base, to rationalise resources and investment, set strategy/priorities and measure outcomes – with regards to commitment and heterogeneity. At another level the research will contribute to the overall understanding and uniqueness of agricultural (dairy) co-operatives of New Zealand.

4.0 Research Approach

Holden and Lynch (2004), suggest that research should not be methodologically led, rather, the methodological choice should be a consequence to the researchers' philosophical stance and the social science phenomenon investigated. Based on this suggestion, this research takes

an objectivist approach. According to Hunt (1993) objectivists retain objectivity by – "requiring that theories, laws and explanations be empirically testable ensures that they will be inter-subjectively certifiable since different (but reasonably competent) investigators with differing attitudes, opinions, and beliefs will be able to make observations and conduct experiments to ascertain their truth of content". The objectivist approach to social research developed from natural sciences and is a consequence of social science researchers deciding to employ the highly successful methods of the natural sciences to investigate social science phenomenon. The major aim of objectivists and natural scientists is to identify causal explanation and fundamental laws that explain regularities in human social behaviour. Due to which, the generalization of results from sample sizes essentially utilizes a hypothetico-deductive process (Lawson 2015). This process begins with the formulation of hypothesis developed from the researchers' conceptualization of a particular phenomenon. Objectivists are grounded in causality, meaning that there are independent causes that lead to observed effects, and hypothesis are either verified or refuted by the observed effects. The hypothetico-deductive approach involves the quantitative operationalization of concepts, which involves reductionism, that is, the problem is reduced to its smallest elements (Lawson 2015). The reduction enhances a problems comprehension.

The research builds on previous work undertaken which revealed the extent to which socio-psychological factors, specifically social capital, heterogeneity and commitment are studied within the context of co-operative organisational forms. The approach to the research is fundamentally derived from the outcomes which are sought and an interest in contributing to a greater understanding of co-operatives in general and agricultural co-operatives in New Zealand in specific. The research requires methods which are explorative, informative, co-operative membership focused, and consistent with co-operative principles and expectations. Moreover, since the objective is to measure the level of commitment and heterogeneity within the membership base and understand the relationship between them that exists, the research adopted a quantitative approach whereby co-operative members were the principal participants in the research.

4.1 Research Background & Context

Dairy Industry and Dairy Co-operatives in NZ

Globally, farmer-owned co-operatives play a rather dominant role in the dairy industry with market shares above 80% in milk collection in the U.S.A, the major dairy countries in Western Europe and also in Australia and New Zealand (Chaddad 2007). Moreover, four

(Fonterra, FrieslandCampina, Dairy Farmers of America and Arla Foods) of the top 10 dairy companies in the world by revenue are co-operatives (Hunt and van Battum 2015).

In NZ, the first dairy co-operative was established in 1871. Since then, dairy co-operatives have played a significant role in the NZ economy, and continue to do so (Garnevska, Callagher et al. 2017). It provides employment to about 47,310 people and accounts for 28% of NZ's export revenues. Producing 21.3 million tonnes of milk, NZ is the 8th biggest milk producer in world (Shadbolt and Apparao 2016). Moreover as it exports 95% of its production, it is the largest dairy exporter in the world, accounting for over 30% of global dairy trade (Shadbolt and Apparao 2016). In 2016/17, dairy co-operatives accounted for over 86% of NZ's milk processing. The four major dairy co-operatives in NZ, Fonterra Co-operative Group (NZ$ 19.2 billion), Tatua Dairy Company (NZ$ 0.32 billion), Westland Milk Products (NZ$ 0.62 billion) and the Dairy Goat Co-operative (NZ$ 0.19 billion) had combined total revenues of NZ$ 20.4 billion for the 2016/17 financial year. This approximates to a contribution of about 7.5% of NZ's GDP (NZ$ 270 billion). In 2017/18, there were 11,590 dairy farms, 4.9 million dairy cows in NZ; and the average dairy farm size was 151 hectares. Given the role and importance of dairy co-operatives in the global dairy sector in general and in the NZ economy and agricultural sector in specific, they were identified as being the principal co-operative sector of interest in this research. Furthermore, amongst the dairy co-operatives in NZ, Fonterra Co-operative group is by far the largest and most significant. For this reason, Fonterra was selected as the co-operative organisational form that would be the single case-study that this research focused on.

A potential drawback of such an approach is that the selected co-operative sector (i.e. dairy) might not provide sufficient information through which generic outcomes can be identified or extrapolated. However, by adopting a quantitative approach and ensuring a large enough sample size is used, it is expected that it will be possible to identify key themes and issues which are generically applicable to all agricultural co-operatives. Moreover, the flexibility within the framework ensures that it is not restrictive in nature and can be purposefully modified quite easily to apply to other co-operative sectors should the need arise.

Fonterra

The Fonterra Co-operative Group (Fonterra) was formed in 2001, from an amalgamation of two large NZ co-operatives, New Zealand Dairy Group and Kiwi Cooperative Dairies, and the New Zealand Dairy Board. With revenues of about NZ$ 20 billion in 2016/17, it is the largest business enterprise in New Zealand. Fonterra is owned by around 10,000 self-

employed dairy farmers in NZ and sources about 22 billion litres of milk from NZ and overseas milk pools. It is the largest dairy exporter in the world, employs 22,000 people globally, exporting products to 140 countries (Fonterra, 2018).

Evolution of Fonterra

Although the final element that lead to the formation of Fonterra was the amalgamation of three entities mentioned earlier (i.e. New Zealand Dairy Group, Kiwi Co-operative Dairies, and the New Zealand Dairy Board), the origins of Fonterra can be traced back to the 1870's. The formation of Fonterra is hence characterised by several mergers over the course of many decades. It is reported that there were about 230 dairy co-operatives in the 1960's. These co-operatives were characterised by a unique identity, loyal membership base and strong regional specificity. More importantly there was intense competition between these co-operatives. Over the next three decades, especially in the 1980's and 1990's many dairy co-operatives gradually merged to form larger co-operatives in order to achieve economies of scale. As a result, there were just 3 dairy co-operatives in 2017/18, and the formation of Fonterra was the main outcome and culmination of this process of mergers (Lind, 2013). As explained by Nilsson and Madsen (2007) mergers between co-operatives are quite complex because a merger involves not only the integration of the business operations of the two co-operatives but also the breaking down of barriers between the members of the two co-operatives and aligning the different ways of thinking within the memberships. Moreover, the merger is further complicated by the concept of heterogeneity – heterogeneity in terms of business activities, logistics, organisational culture, leadership principles, ways of working, and other attributes (Nilsson and Madsen 2007). Fonterra's large membership base and a foundation based on several mergers of co-operatives that once had a unique identity of their own, and strongly competed against each other, is thought to have introduced considerable member heterogeneity in the co-operative.

Governance of Fonterra

Farmer members can own two types of shares in Fonterra, wet shares and dry shares. The wet shares are based on their level of production, additionally they can also own dry shares up to a co-operative cap of 20% of total shares (Shadbolt and Duncan 2016). Fonterra is governed by an eleven-member board (seven elected farmer shareholders and four appointed) with voting based on wet shares held. In addition, it has a 25 member shareholders' council which represents the views of all members as suppliers, owners and investors. Each councillor is

elected by farmers within the ward they represent, and voting is based on one vote per shareholder, more akin to traditional cooperative elections. According to Duncan Coull, the chairman of the shareholders council in 2017, there were three key areas of focus for the council in relation to their constitutional functions: 1. Connection – to ensure farmers' views are heard and that they have greater connection to the co-operative they supply and own; 2. Monitoring – to monitor the Fonterra board performance and hold it to account and inform farmers on the direction and performance of their co-operative; and 3. Guardianship – ensuring that the co-operative maintains its ethos, and that it acts within co-operative principles and is consistent to its strong values (Chandar 2017).

Structure & Status of Fonterra

Fonterra was formed under the Dairy Industry Restructuring Act (DIRA), 2001. At that stage it had a nearly 95% of New Zealand's milk supply so the DIRA was structured to encourage competitors and reduce the percentage to more globally acceptable levels. Now it is closer to 80% of NZ milk production, with almost all members having choice of who to supply, the new processors all being mostly overseas owned corporates. DIRA enabled the drop in market share through an unusual feature, for a co-operative, which was open entry and open exit at full market value (Shadbolt & Duncan, 2016). Shareholders could leave the co-operative with the full cashed up value of their shares with just a few months' notice. As a result, the co-operative was, and is, vulnerable to members leaving so relies heavily on member commitment and loyalty to maintain milk supply.

Despite the drop-in market share the volume of milk sourced by Fonterra has increased, by 28% over the last 10 years, reflecting increasing world demand for dairy. In 2016/17, Fonterra paid its farmer owners, NZ$ 6.12 / kilograms of milk solids (kg MS) and a dividend of NZ$ 0.40 per share. The milk price was an increase of 57% over the previous season. The forecast milk price for the 2017/18 season was NZ$ 7.20 – 7.30 per kg MS, made up of a forecast farm gate milk price of NZ$ 6.75 per kg MS and dividend payment of per share of 45-55 cents per share. However, given Fonterra's significant exposure to global markets, there has been volatility in both milk price and dividend payments. Over the 10 year period (2007 to 2017), milk price ranged from NZ$ 3.90 /kg MS (2015/16) to NZ$ 8.40 /kg MS (2013/14); while the dividend payments ranged from NZ$ 0.07 (2007/08) to NZ$ 0.45 (2008/09) per share (Livestock Improvement Corporation, 2018). The milk price volatility has been felt by all New Zealand farmers, with competitor milk prices mostly based on the Fonterra price. However, the volatility in dividend, and share values, is Fonterra specific and

could influence member attitudes and commitment to their co-operative. The shares are held by members at full market value, accounting for about 11% of their assets.

5.0 Research Process

The research process has been designed around six specific steps which describe the process through which the research outcomes will be met. It needs to be noted that although each step is described separately, some activities may be undertaken concurrently during various stages of the research. Flexibility has been deliberately embedded into the approach to provide for unforeseen obstacles or opportunities and to take account of researcher and participant working environments. An important objective and output of this process are four manuscripts that were either published, accepted for publication, under peer review or prepared for submission in peer reviewed journals.

5.1 Step One - Problem statement

In Step One, the problem statement, which presents the research gap that this research will seek to address, is explained. The problem statement was informed by the literature and an understanding of the research context, as well as conversations with leading academics in the area of co-operative research. The problem statement has been described previously (page 17).

5.2 Step Two – Defining the Research Objective

Based on the problem statement and informed by the literature, in Step Two, the research objectives are defined. As discussed earlier, this research will have three main objectives –

i. To review the literature on general co-operative theory, commitment, heterogeneity and social capital; and to develop a conceptual framework.
ii. To establish a measure of commitment and heterogeneity within the membership base of co-operatives.
iii. To explore and analyse the relationship between commitment and heterogeneity within the membership base of co-operatives.

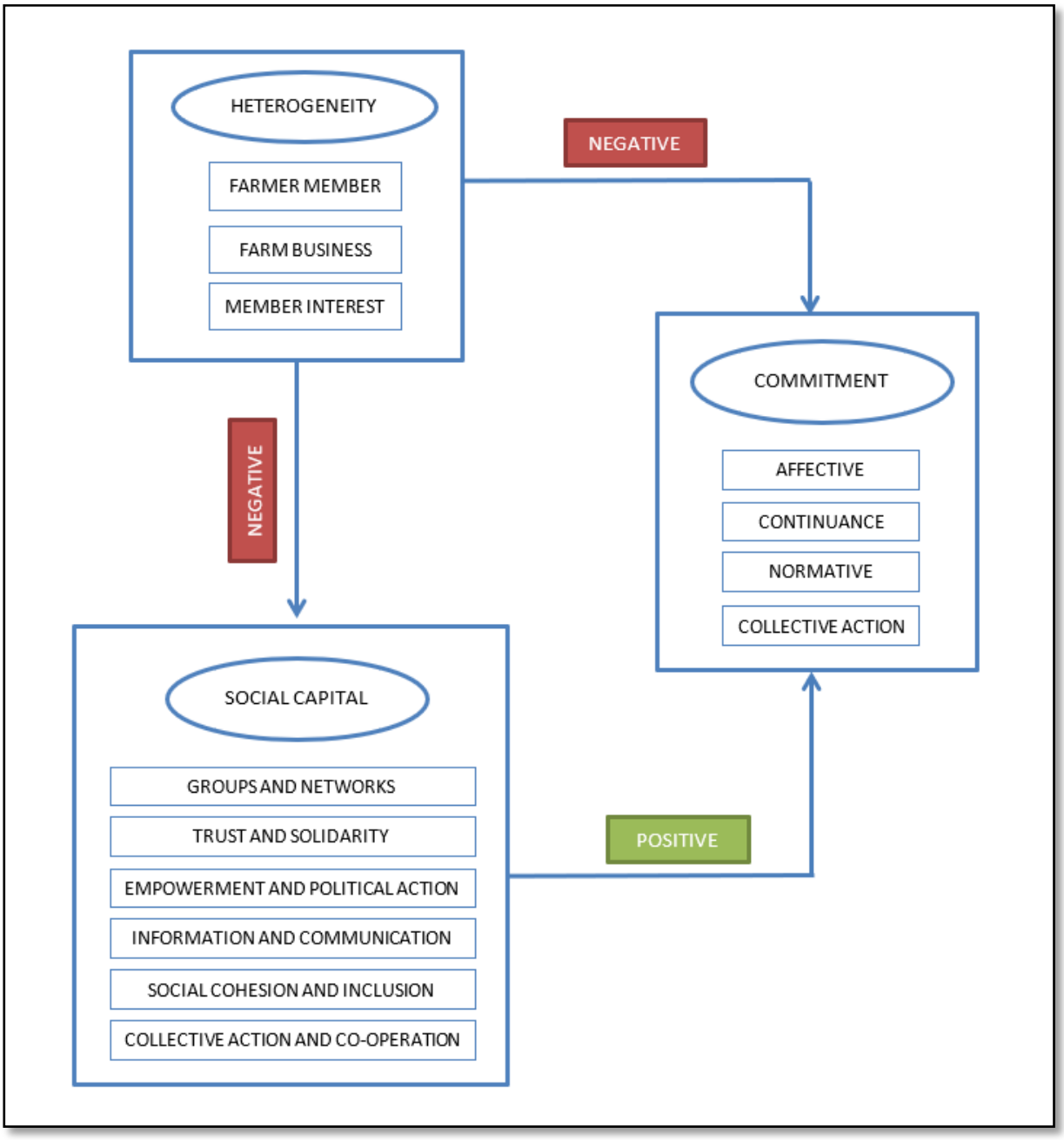
5.3 Step Three - Comprehensive Review of Literature & Development of a Conceptual Framework

A review of prior, relevant literature is an essential feature of any academic project and an effective review creates a firm foundation for advancing knowledge (Webster and Watson

2002). It facilitates theory development, closes areas where a plethora of research exists, and uncovers areas where research is needed (Webster and Watson 2002). This review systematically synthesises the literature on the co-operative organisational form within the contexts of commitment, heterogeneity and social capital.

Informed by the literature review, a conceptual framework that provides for a non-conventional examination of co-operatives from a socio-psychological perspective was developed (Figure 1). This framework brings together three key socio-psychological dimensions (i.e. commitment, heterogeneity and social capital) within the co-operative membership base. In Figure 1 these dimensions are represented as circles within a larger square box. The framework assumes that each dimension incorporates a number of components (constructs) that have been emphasised in research on co-operatives. In Figure 1, these components are shown as rectangular boxes within the larger square box. The line between the larger square boxes indicate the direction of relationship between the three dimensions. As indicated by the lines, the commitment dimension is influenced by both heterogeneity and social capital dimensions. The social capital dimension is influenced by the heterogeneity dimension but not the commitment dimension. The heterogeneity dimension is not influenced by either commitment or social capital dimensions (Figure 1). Further, it is hypothesised, that the relationship between heterogeneity and social capital is negative (inverse), i.e. when heterogeneity is high social capital is low and when heterogeneity is low social capital is high. This is represented by either a negative or positive sign on the lines (Figure 1). It is further argued that this relationship is expressed in the form of member commitment, with commitment having a positive relationship with social capital and a negative one with heterogeneity. Thus, the framework assists in identifying key components, measuring outcomes related to the objectives, and facilitating a critical analysis and discussion.

Figure 1 Three-Dimensional Conceptual Framework for Examining Co-operatives



5.4 Step Four – Data Collection

The survey strategy, a deductive approach, is commonly used in business and management for exploratory and descriptive research (Remenyi, Williams et al. 1998, Saunders, Lewis et al. 2011). This allows for the collecting of cross sectional primary data that can be analysed using descriptive and inferential statistics (Schindler and Cooper 2005, Saunders, Lewis et al. 2011). Hence, descriptive and inferential approaches using the survey strategy is chosen as the research method for this study.

Primary data can be collected by two approaches - observation and communication (Schindler and Cooper 2005). Observation involves the direct observation and recording of the behaviour of individuals according to well-designed rules and regulations, and is used less frequently in social research (Bryman 2008). In our research primary data was collected using the communication approach using a survey strategy.

Step four will begin with the development of a quantitative instrument capable of measuring commitment and heterogeneity within the co-operative membership base. This is a complex and technically challenging task as many of the issues identified (in step one) have been measured very poorly in agricultural co-operatives in general and have never been measured in the New Zealand context. Considerations were given to how best these concepts can be quantified and how the data might be captured, from where or from whom. Literature was reviewed to determine what additional approaches are possible and likely to be useful. This led to the construction of a draft set of measures.

Pilot Study

Pilot studies are small-scale trial runs that researchers undertake in order to pre-test how well their proposed research designs such as sampling designs and survey questions work (Gray 2009, Denscombe 2010). Results from the pilot study are very useful for improving the content validity of the research instrument and to plan for ensuring the main survey will run smoothly (Sekaran and Bougie 2016).

A pilot study using semi-structured questionnaires administered by the interviewer and involving a convenience sample of 10 members of dairy co-operatives, was conducted to obtain comment and guidance on - the validity of the indicators, how well they match or reflect the research objectives, and what modifications, enhancements, or amendments are required. Following this process and based on the comments received modifications to the measures were made.

Main Study

In a survey, there are several methods of primary data collection available to be chosen, i.e. mail, internet, telephone, and face to face. The specific choice depends on many aspects of the survey research process and has implications for response rate, question form, the quality of survey estimates and survey costs (Fowler Jr 2013). For the main study, the designed instrument, i.e. self-administered structured questionnaires, were mailed to 2000 members of Fonterra Co-operative Group that were randomly selected by a Fonterra manager. The

researchers were blind to the member's names and only had access to the postal contact information of the members. A packet that contained a cover letter, an information sheet, the survey questionnaire and a return envelope were mailed to this sample of 2,000 Fonterra members in July 2017. After six weeks a reminder was sent out in September to those members that did not respond. The estimated sample size for a finite population of 10,000 farmers, a 95% confidence level and a margin of error of 5% is 370.

In addition to primary data, secondary data was also be collected. The purpose of the secondary data was to inform the context of this research and therefore included information on co-operatives (global and NZ), agricultural co-operatives (global and NZ) and dairy co-operatives (global and NZ). More specifically, secondary data on Fonterra was collected to provide important background information and further refine the context.

5.5 Step Five – Data Analysis

Quantitative data are analysed using statistical techniques and these can be divided into two broad types – descriptive and inferential (Leedy and Ormrod 2005, Wiersma and Jurs 2009, Saunders, Lewis et al. 2011). Descriptive data analysis techniques as the name implies are used to explore, present and describe data; while inferential data analysis techniques are used to make inferences about a large population using small sample data (Leedy and Ormrod 2005, Saunders, Lewis et al. 2011). In Step five the data collected was analysed using both descriptive and inferential statistics.

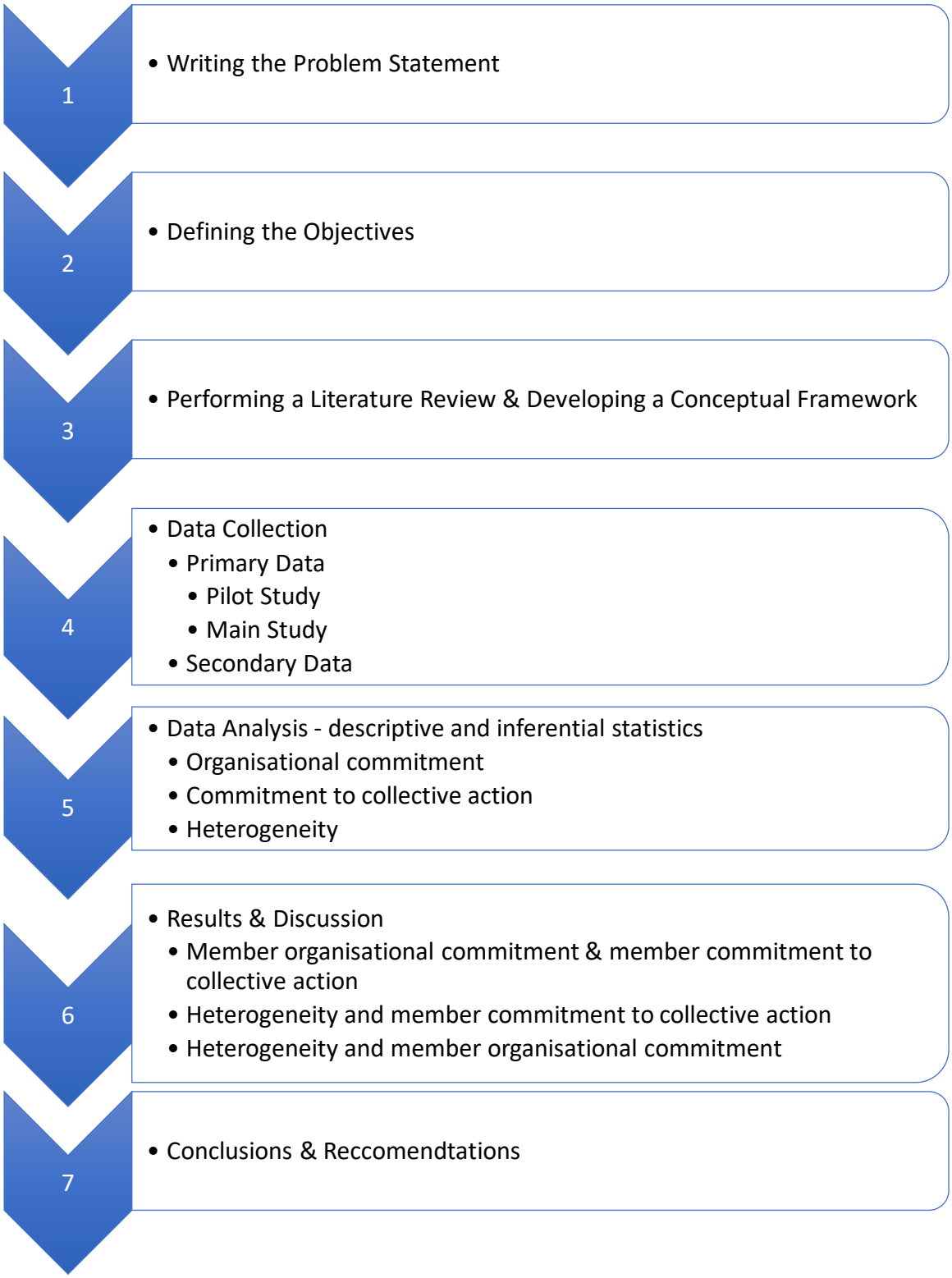
5.6 Step Six - Results & Discussion

The results and discussion section describe the important findings, compares them with previous work, and rationalizes them using casual arguments, speculations and deductive arguments. In Step six the results and discussions were structured in a manner that they align with the core questions that chapter 2 to chapter 5 of this thesis address.

5.7 Step Seven – Conclusions & Recommendations

In Step seven the key findings of the thesis are summarized, the main limitations are mentioned, the implications of the research are highlighted and the possible avenues for future research are discussed. The main outcomes from this thesis is that it presented a non-economic centric perspective of co-operatives and helped identify key socio-psychological priorities for agricultural co-operatives in general and dairy co-operatives in specific; thereby facilitating longer term strategic planning in a manner that would enable the co-operative model to be better nurtured and grown.

Figure 2. The Research Process Outline



6.0 Thesis Structure

This thesis is comprised of 6 chapters.

Chapter 1: This chapter provides an overview of the background and specific context within which this research is set. It then presents the problem statement, the aims and objectives of this research, the research approach and outlines the research process.

Chapter 2: This chapter presents a conceptual framework that encapsulates commitment, heterogeneity and social capital. The conceptual model developed is grounded in these three phenomena. Therefore, at a functional level, the framework forms the basis for examining and describing the level of and relationship between the three important phenomenon – commitment, heterogeneity and social capital, within the membership base of co-operatives. Since agricultural co-operatives play a significant role in the agribusiness sector in general and the New Zealand economy in specific (Garnevska, Callagher et al. 2017), the scope of this research is further narrowed down to focus on agricultural co-operatives. As this conceptual framework is derived from relevant literature, this chapter also contains an in-depth literature review. This chapter addresses research question 1 and has been structured as a manuscript, which has been published in the *Journal of Co-operative Organization and Management.*

Apparao, D., Garnevska, E., & Shadbolt, N. (2019). Examining commitment, heterogeneity and social capital within the membership base of agricultural co-operatives—A conceptual framework. *Journal of Co-operative Organization Management*. https://doi.org/10.1016/j.jcom.2019.03.003

Chapter 3: In this chapter the member–co-operative relationship is decoupled into two forms of commitment, organisational commitment and commitment to collective action. Thereafter organisational commitment is unraveled into three components — 1) affective, 2) normative and 3) continuance; and commitment to collective action into two components – 1) patronage and 2) governance. Following which a framework that explores the links (and/or relationship) between a members' organisational commitment and a members' commitment to collective action in agricultural co-operative is presented. The framework is then applied to a large New Zealand dairy co-operative (Fonterra) and the relationship between the three components of organisational commitment and the two components of commitment to collective action are empirically analysed and discussed. This chapter addresses research question 2 and the manuscript has been submitted to the *Journal of Co-operative Organization and Management.*

Chapter 4 In this chapter heterogeneity in agricultural co-operatives is disentangled into three dimensions- 1) farmer-member, 2) farming-business and 2) member-interest, and then

measured. A framework that explores the links (and/or relationship) between heterogeneity and members' commitment to collective action in agricultural co-operative is also presented. Thereafter the framework is applied to a large New Zealand dairy co-operative (Fonterra) and the relationship between heterogeneity and member commitment to collective action is empirically analysed and discussed. This chapter addresses research questions 2 and 3 and the manuscript has been accepted for publication in the *International Journal of Co-operative Accounting and Management.*

Chapter 5: This chapter presents a framework that explores the links (and/or relationship) between heterogeneity and members' commitment to organisational commitment in agricultural co-operatives. Following which the framework is applied to a large New Zealand dairy co-operative (Fonterra) and the relationship between heterogeneity and member commitment to organisational commitment is empirically tested, analysed and discussed. This chapter addresses research questions 2 and 3.

Chapter 6: This chapter summarizes the key findings of this research, identifies its significant limitations and provides recommendations for future research.

References

Bakken, H. H. and M. A. Schaars (1937). The Economics of Cooperative Marketing, McGraw-Hill Book Co., Inc. .

Bijman, J. (2016). Agricultural cooperatives and market orientation: A challenging combination? Market Orientation, Routledge**:** 151-168.

Bijman, J., G. Hendrikse and A. Van Oijen (2013). "Accommodating two worlds in one organisation: changing board models in agricultural cooperatives." Journal of Managerial Decision Economics **34**(3-5): 204-217.

Bouamra-Mechemache, Z. and A. Zago (2015). "Introduction: Collective action in agriculture." European Review of Agricultural Economics **42**(5): 707-711.

Boučková, B. (2002). "Agricultural co-operatives: perspectives for the 21st century." Agricultural economics **48**(4): 166-170.

Bryman, A. (2008). The End of The Paradigm Wars ? The Sage Handbook of Social Research Methods. A. Pertti, B. Leonard and B. Julia. London, Sage**:** 13-25.

Byrne, N., O. McCarthy, M. Ward and J. McMurtry (2012). "Credit Union Restructuring: Don't forget the member!" International Journal of Co-operative Management **6**(1.1): 33-41.

Chaddad, F. R. (2007). The evolution of Brazilian dairy cooperatives: A life cycle approach. XLV Congresso Da Sober," Conhecimentos para Agricultura do Futuro", Londrina.

Chandar, S. (2017). Fonterra Shareholders Council working for its farmers. Stuff. New Zealand, Stuff.co.nz.

Cocolina, C. Q. and Cooperatives Europe (2016). The Power of Cooperation - Cooperatives Europe Key Figures 2015, Cooperatives Europe.
Coltrain, D., D. Barton and M. Boland (2000). Differences between new generation cooperatives and traditional cooperatives. Risk and Profit 2000 Conference. Holiday Inn, Manhattan, Kansas, Dept. of Agricultural Economics, Kansas State University.
Cook, M. L. (1993). Cooperatives and Group Action. Food and Agricultural Marketing Issues for the 21st Century. D. Padberg. College Station TX, Texas A&M University.
Cook, M. L. (1995). "The Future of U.S. Agricultural Cooperatives: A Neo-Institutional Approach." American Journal of Agricultural Economics **77**(5): 1153-1159.
Cook, M. L. and C. Iliopoulos (2000). Ill-defined property rights in collective action: the case of US agricultural cooperatives. Institutions, Contracts and Organizations. C. Menard. Cheltenham, UK and Massachusetts, USA, Edward Elgar Publishing**:** 335-348.
Demko, I. (2018). Trends of US Agricultural Cooperatives (1913-2016).
Denscombe, M. (2010). Ground Rules for Social Research: Guidelines for Good Practice. Maidenhead, Berkshire, England, Open University Press/McGraw-Hill.
Dunn, J. R., A. C. Crooks, D. A. Frederick, T. L. Kennedy and J. J. Wadsworth (2002). Agricultural cooperatives in the 21st century, US Dept. of Agriculture, Rural Business--Cooperative Service. **60**.
Eilers, C. and C. H. Hanf (1999). Contracts between farmers and farmers' processing co-operatives: A principal-agent approach for the potato starch industry. Vertical relationships and coordination in the food system, Springer**:** 267-284.
Emilianoff, I. V. (1942). Economic Theory of Co-operation. Ann Arbor , Michigan, Edwards Bros. Inc.
Evans, L. and R. Meade (2006). The Role and Significance of Cooperatives in New Zealand Agriculture: A Comparative Institutional Analysis**:** 140.
Fonterra (2018). Fonterra Annual Report 2018. https://www.fonterra.com/content/dam/fonterra-public-website/phase-2/new-zealand/pdfs-docs-infographics/pdfs-and-documents/financial-results/fy19/Fonterra-Annual-Report-2018.pdf
Fowler Jr, F. J. (2013). Survey research methods, Sage publications.
Fulton, M. (1999). "Cooperatives and member commitment." LTA **4**(99): 418-437.
Garnevska, E., L. Callagher, M. Apparao, N. Shadbolt and F. Siedlok (2017). The New Zealand Co-operative Economy. New Zealand.
Grace, D. and Associates (2014). Measuring the Size and Scope of the Cooperative Economy: Results of the 2014 Global Census on Co-operatives, United Nations Secretariat.
Gray, D. (2009). Doing research in the real world. Los Angeles, Sage.
Greiner, L. E. (1972). "Evolution and Revolution as Organizations Grow." Harvard Business Review **50**(4): 37-46.
Haller, L. E. (1992). Branded product marketing strategies in the cottage cheese market: cooperative versus proprietary firms, Food Marketing Policy Center, Department of Agricultural and Resource Economics, University of Connecticut.
Hansmann, H. (1996). The ownership of enterprise. Cambridge, Mass. , The Belknap Press of Harvard University Press.
Hardesty, S. D. and V. D. Salgia (2004). Comparative Financial Performance of Agricultural Cooperatives and Investor-Owned Firms. 2004 Annual Meeting, November 2-3, NCERA-194 Research on Cooperatives.
Helmberger, P. and S. Hoos (1962). Cooperative Enterprise and Organization Theory, American Farm Economic Association**:** 275.

Hendrikse, G. and J. Bijman (2002). "On the emergence of new growers' associations: self-selection versus countervailing power." European Review of Agricultural Economics **29**(2): 255-269.
Hind, A. M. (1997). "The Changing Values of the Cooperative and Its Business Focus." American Journal of Agricultural Economics **79**(4): 1077-1082.
Hoehler, J. and R. Kuehl (2018). "Dimensions of member heterogeneity in cooperatives and their impact on organization–a literature review." Annals of Public and Cooperative Economics **89**(4): 697-712.
Holden, M. T. and P. Lynch (2004). "Choosing the appropriate methodology: understanding research philosophy." The marketing review **4**(4): 397-409.
Hoyt, A. (1989). Cooperatives in other countries. Cooperative in Agriculture. D. Cobia. New Jersey, USA, Prentice-Hall, Inc**:** 81-97.
Hunt, S. D. (1993). "Objectivity in marketing theory and research." Journal of Marketing **57**(2): 76-91.
Hunt, T. and S. van Battum (2015). Rabobank Global Dairy Top-20, Rabobank.
Hyung-sik, E. (2017). Cooperatives And Employment - Second Global Report. Contribution of cooperatives to decent work in the changing world of work, International Cooperative Alliance.
ICA and EURICSE (2019). World Cooperative Monitor : Exploring The Cooperative Economy.
Iliopoulos, C. and M. L. Cook (1999). The efficiency of internal resource allocation decisions in customer-owned firms: the influence costs problem. 3rd Annual Conference of the International Society for New Institutional Economics, Washington DC.
International Co-operative Alliance (ICA). (2018). "Cooperative identity, values & principles." Retrieved 05/08/2018, 2018, from https://www.ica.coop/en/cooperatives/cooperative-identity.
International Cooperative Alliance (ICA) and Euricse (2014). The World Co-Operative Monitor: Exploring The Co-Operative Economy.
Jussila, I., S. Goel and H. Tuominen (2012). "Member commitment in co-operatives: The utilitarian approach." Business and Management Research **1**(3).
Karantininis, K. and A. Zago (2001). "Cooperatives and Membership Commitment: Endogenous Membership in Mixed Duopsonies." American Journal of Agricultural Economics **83**(5): 1266.
Lawson, A. E. (2015). "Hypothetico-deductive method." Encyclopedia of Science Education: 471-472.
Leedy, P. D. and J. E. Ormrod (2005). Practical Research: Planning And Design. New Jersey, USA, Merrill.
Lind, C. (2013). Till the Cows Came Home: Inside the battles that built Fonterra. Wellington, New Zealand: Steele Roberts Aotearoa.
Livestock Improvement Corporation. (2018). New Zealand Dairy Statistics 2017-18.
MBIE (2014). Co-operative Companies Act 1996.
Nilsson, J. and O. Madsen (2007). "Issues in cross-border mergers between agricultural co-operatives." Journal of Co-operative studies **40**(3): 27-38.
Nilsson, J., G. L. Svendsen and G. T. Svendsen (2012). "Are large and complex agricultural cooperatives losing their social capital?" Agribusiness **28**(2): 187-204.
Ortmann, G. F. and R. P. King (2007). "Agricultural cooperatives I: History, theory and problems." Agrekon **46**(1): 18-46.
Österberg, P. and J. Nilsson (2009). "Members' perception of their participation in the governance of cooperatives: the key to trust and commitment in agricultural cooperatives." Agribusiness **25**(2): 181-197.

Remenyi, D., B. Williams, A. Money and E. Swartz (1998). Doing Research in Business and Management: An Introduction to Process and Method, SAGE.
Richards, T. J. and M. R. Manfredo (2003). "Cooperative mergers and acquisitions: the role of capital constraints." Journal of Agricultural Resource Economics **28**: 152-168.
Rogers, R. T. and L. M. Petraglia (1994). "Agricultural Cooperatives and Market Performance in Food Manufacturing." Journal of Agricultural Cooperation **9**.
Røkholt, P. O. (1999). Strengths and weaknesses of the co-operative form; A Matter of Perspective and Opinion. ICA International Research Conference, Quebec, Citeseer.
Royer, J. (1995). "Potential for cooperative involvement in vertical coordination and value-added activities." Agribusiness **11**(5): 473-481.
Royer, J. S. (2014). "The Theory of Agricultural Cooperatives: A Neoclassical Primer."
Saunders, M. N., P. Lewis and A. Thornhill (2011). Research methods for business students, Pearson Education India.
Schindler, P. S. and P. Cooper (2005). Business research methods, Mcgraw-hill.
Sekaran, U. and R. J. Bougie (2016). Research methods for business: A skill building approach, John Wiley & Sons.
Shadbolt, N. and A. Duncan (2016). Perspectives from the Ground: Fonterra Co-operative Case Study. The Capital Conundrum of Cooperatives. C. Tan Suee and W. Chuin Ting, International Coopeartive Alliance**:** 95-104.
Shadbolt, N. M. and D. Apparao (2016). "Factors Influencing the Dairy Trade from New Zealand." International Food and Agribusiness Management Review **19**(B): 241-255.
Shaffer, J. (1999). Historical Dictionary of the Cooperative Movement. London UK, The Scarecrow Press.
Soboh, R. A., A. O. Lansink, G. Giesen and G. Van Dijk (2009). "Performance measurement of the agricultural marketing cooperatives: the gap between theory and practice." Review of Agricultural Economics **31**(3): 446-469.
Staatz, J. M. (1987). "Farmers' incentives to take collective action via cooperatives: a transaction cost approach." Cooperative theory: New approaches **18**: 87-107.
Stephens, F. B. (1936). Cooperation In New Zealand. Agricultural organization in New Zealand : a survey of land utilization, farm organization, finance and marketing. H. Belshaw, D. O. Williams and F. B. Stephens, Melbourne [Vic.] : Melbourne University Press in association with Oxford University Press, 1936**:** 745-763.
Sykuta, M. E. and M. L. Cook (2001). A New Institutional Economics Approach to Contracts and Cooperatives, Blackwell Publishing**:** 1273.
USDA (1987). Positioning Farmer Cooperatives for the Future: A Report to Congress, United States Department of Agriculture, Agricultural Cooperative Service.
USDA (2002). Agricultural Cooperatives in the 21st century. Rural Business– Cooperative Service.
Valentinov, V. L. (2004). "Toward a social capital theory of cooperative organisation." Journal of Cooperative Studies **37**(3): 5-20.
Van Opstal, W. (2010). Rochdale Society of Equitable Pioneers. International Encyclopedia of Civil Society. H. K. Anheier and S. Toepler. New York, NY, Springer US**:** 1326-1327.
Webster, J. and R. T. Watson (2002). "Analyzing the Past to Prepare for the Future: Writing a Literature Review." MIS Quarterly **26**(2): xiii-xxiii.
Wiersma, W. and S. Jurs (2009). Research methods in education: An introduction, Pearson Education.
Williams, R. C. (2007). The Cooperative Movement : Globalization From Below. Aldershot, Hampshire, England, Ashgate.

Zeuli, K. A. and R. Cropp (2004). Cooperatives: Principles and practices in the 21st century. Madison, Wisconsin, University of Wisconsin.

Chapter 2: Examining commitment, heterogeneity and social capital within the membership base of agricultural co-operatives— A conceptual framework

This chapter addresses research objective one and was published in the Journal of Co-operative Organisation and Management, which is a leading international journal for the study of co-operatives. This journal specifically focuses on research questions that deal with how, why and when co-operative organizations occur and succeed, fail and disappear, and what can be done to influence the outcome. The manuscript presented in this chapter is therefore a well aligned with this journal.

Apparao, D., Garnevska, E., & Shadbolt, N. (2019). Examining commitment, heterogeneity and social capital within the membership base of agricultural co-operatives—A conceptual framework. *Journal of Co-operative Organization Management*. 7(1), 42-50. https://doi.org/10.1016/j.jcom.2019.03.003

Abstract

Although purely economic (conventional) reasons play a significant role in the development and performance of (agricultural) cooperatives; so do other (non-conventional) factors. A comprehensive assessment of co-operatives therefore requires an examination of non-conventional factors, in addition to the conventional factors. Three such non-conventional factors identified in the literature are 1) commitment, 2) heterogeneity and 3) social capital. Commitment is important for agricultural co-operatives because one pre-requisite for successful agricultural co-operatives is that farmer-members are willing to supply the co-operative with raw products, capital and managerial inputs. In this research affective, continuance, normative and other aspects of member commitment are examined. Heterogeneity is an important source of concern for co-operatives due to its impact on cohesiveness and collective decision making. This study used characteristics associated with the farmer-member and the farm-business to examine heterogeneity. It has been suggested that the social capital paradigm is the common denominator for all explanations and theories on co-operative formation and development. A modified version of the six dimensions' framework used by the World Bank to assess social capital was used in this study. Based on this theoretical underpinning, a Three-Dimensional Conceptual Framework, that encapsulates commitment, heterogeneity and social capital is developed and described.

1.0 Introduction

Despite the member-co-operative relational dimension being an important differentiator of the co-operative model from the more common Investor Owned Firm (IOF) model, and also a significant source of competitive advantage (Jussila, Goel, & Tuominen, 2012b), much of the work on co-operatives tends to focus on the non-relational aspects (Røkholt, 1999; Byrne, McCarthy, Ward, & McMurtry, 2012). The bulk of research about co-operatives have incorporated theoretical aspects and approaches such as agency theory (Eilers & Hanf, 1999), property rights theory (Cook & Iliopoulos, 2000) contracting theory (Sykuta & Cook, 2001) , transaction cost theory (Hendrikse & Bijman, 2002), and game theory (Karantininis & Zago, 2001). Although these are useful in detailing the economic characteristics of the co-operatives and explaining the reasons for the formation, existence and behaviour, they are not empirically based; and hence not entirely useful in evaluating the performance of co-operatives.

With respect to agricultural co-operatives most of the research is rooted in economic theory, which is based on assumptions about human behaviour that is not always empirically grounded (Österberg & Nilsson, 2009). Furthermore, the empirical studies that exist are mainly focused on applying the behaviour model of cooperatives as a profit-maximizing firm; and empirical applications of the other existing models is lacking (Soboh, Lansink, Giesen, & Van Dijk, 2009). The absence of empirical application could be due to difficulty in obtaining the relevant data, lack of interest on the part of applied economists, or lack of theoretical approaches that are well developed for empirical application (Soboh et al., 2009). Besides, the existing empirical studies on the performance of agricultural co-operatives frame co-operatives as being profit-maximizing firms; and these studies have been identified as being mainly of two types – 1) studies that measure financial and other types of economic ratios and 2) studies that measure (economic) efficiency (Sexton & Iskow, 1993). Additionally, the empirical studies concerning the financial performance of agricultural co-operatives pre-dominantly use financial ratios and are not based on any formal behavioural model.

Nearly 80 years ago Bakken and Schaars (1937) stated that co-operative organizations are occasionally alluded to as self-liquidating corporations; and their success may cause their destruction. Furthermore, with the evolving nature of the co-operative organisational form, a rethink on how co-operatives are traditionally examined, evaluated and interpreted is required. While the conventional financial and economic rationale for measuring co-operative performance and explaining the reasons for being a member of a co-operative continue to be important, there is a parallel view that stresses the need to recognise the critical role of other factors (Fulton, 1999; Iliopoulos & Cook, 1999; Nilsson, Svendsen, & Svendsen, 2012). Besides, given that members assess their co-operatives in social terms in addition to economic ones; some reorientation of research on agricultural co-operatives with a focus on the socio-psychological perspective of members is also suggested (Österberg & Nilsson, 2009). One such approach involves the viewing of co-operatives from a non-conventional perspective or lens.

Since social factors play an important role in the formation, development and performance of co-operatives, it is surprising that they have not been considered as a probable and significant challenge and/or cost, as specific strategies are pursued by co-operatives. One reason for this is the inherent complexity that they present. Factors such as the long-time horizons of decisions, the delayed effects of decisions on these factors, the incrementality of the negative

effects, the difficulty in measuring them makes understanding, acknowledging and acting on the issues posed by these factors complex to address (Cook, 1995; Nilsson et al., 2012).

The methodology underpinning the non-conventional focused research on co-operatives should not be confused with the more traditional finance and economics centric methods of assessing co-operatives. While both are concerned with explaining the co-operative position, they are essentially based on different orientations and approaches to the compilation and organisation of knowledge. However, the essential point is that co-operatives are influenced by a variety of factors operating together. The analysis of co-operatives therefore requires a multi-faceted exploration and an ability to analyse numerous factors against each other. For example, although at first glance the lower rates of participation in co-operative governance by the membership might be a cause of concern in itself; but when viewed against changes that are occurring in the co-operative as a result of growth in size of the membership base, the real issue might be linked more to other underlying phenomenon. It needs to be stressed that a non-conventional approach to examining co-operatives does not ignore the conventional views or values, but instead presumes that the study of co-operatives is incomplete if it does not include other components that are a defining feature of co-operatives. This non-conventional lens therefore provides a greater understanding of co-operatives, enabling an analysis of multiple factors and determinants; and compliments the conventional economic and finance centric view on co-operatives.

The aim of this paper is to develop and describe a conceptual model that provides a comprehensive framework for examining co-operatives from a non-conventional perspective. To achieve this a robust literature search was performed and three factors – i) commitment, ii) heterogeneity and iii) social capital – that several scholars have highlighted as being vital to co-operatives were identified, described and analysed. The conceptual model developed is grounded in these three factors. Therefore, at a functional level, the framework forms the basis for examining and describing the level of and relationship between the three important factors – commitment, heterogeneity and social capital, within the membership base of co-operatives. Since agricultural co-operatives play a significant role in the agribusiness sector in general and the New Zealand economy in specific (Garnevska, Callagher, Apparao, Shadbolt, & Siedlok, 2017), the scope of this research is further narrowed down to focus on agricultural co-operatives.

To comprehend this conceptual framework, an explanation of commitment, heterogeneity and social capital with relevance to co-operatives is required. The next section (Section 2) therefore explains the methodology used to perform a literature review of commitment, heterogeneity and social capital. This is followed by (Section 3) a summary of literature on commitment, heterogeneity and social capital with respect and relevance to co-operatives. This literature review informs the design and description of the Conceptual Framework, which is explained in Section 4. Finally, the conclusions of this research are presented in Section 5.

2.0 Methodology

A method grounded in the integrative literature review was chosen. This is because, the integrative review is the most comprehensive methodological approach of reviews and allows for the inclusion of both qualitative and quantitative research; as well as experimental and non-experimental studies. Thereby presenting an opportunity to fully understand the phenomenon being studied. It also combines data from theoretical and empirical literature, and has a wide range of purposes, such as definition of concepts, review of theories and evidence, and analysis of methodological problems of a topic. It helps in creating a consistent and comprehensive vista of complex concepts, theories or problems that are relevant for researchers. It is therefore a valuable theory- building technique, while also enabling frameworks and perspectives on the topic to be generated (Torraco, 2005).

Consequently, the search strategy primarily involved searching research databases for research material on – commitment, heterogeneity and social capital – with specific relevance to co-operatives. Key articles were mainly obtained from Discover, Scopus, Web of Science and Google Scholar research databases.

In order to ensure that relevant research was not missed, the search terms and time frame remained broad. The search terms were “commitment or heterogeneity (or diversity as a substitute for heterogeneity) or social capital” plus “co-operatives”. There were no language restrictions used. Research were eligible for consideration in this review if - 1) the focus of the research was commitment, or heterogeneity or social capital; and 2) there was a direct relevance to co-operatives or if it provided critical insight into the general theory on commitment or heterogeneity or social capital. Additionally, a comprehensive search was made of Internet resources in New Zealand and internationally. Several sites were searched, although the primary sites used were the University of Wisconsin-Madison Centre for Co-

operatives, the Canadian Co-operative Research Network and the International Co-operative Alliance.

As a result of the search of research databases and internet sources a pool of eligible articles were generated. Thereafter, the abstracts, results, discussion and conclusion sections of the eligible articles were read by the researcher and a score between 0 – 10 was assigned to each article. The score was based on two critical parameters 1) Quality of the study; and 2) Linkage (agreement with) to the aim of this research. Those articles that received a score of 5 or greater out of 10 were retained in this study while those that scored less than 5 were rejected. The pool of retained (selected) articles were then classified by each of the three central themes (i.e. commitment, heterogeneity, and social capital) under two possible categories – 1) Non co-operative specific and 2) Co-operative specific. For example, with the case of commitment, articles that were not specific to co-operatives, such as the work by Meyer and Allen (1987), were classified under the Non co-operative specific category of Commitment. While articles that were specific to co-operatives, such as the article by Fulton (1999) were classified under the co-operative specific category of Commitment.

In the next stage, a critical analysis of the selected articles was performed. Steps were taken to ensure the review is presented in a clear and complete manner to the reader; and to include relevant and detailed pieces of information. Based on the interpretation of results and synthesis of information, a comparison of the article to a theoretical reference was provided. This enabled identifying gaps in knowledge as well as provide direction for the framework and future studies. At the end of the review of each of the three themes, the authors own inferences and conclusions were also summarised and provided.

3.0 Commitment, Heterogeneity and Social Capital

3.1 Commitment

Becker (1960) defines commitment as the tendency to persist in a course of action (Becker, 1960); while, Meyer and Herscovitch (2001), define commitment as a force that binds an individual to a course of action of relevance to one or more targets (Meyer & Herscovitch, 2001). In more specific terms, commitment refers to joint values, goals and actions in a relationship leading to the intention of relationship continuation and deployment of resources (Mäkelä & Maula, 2006).

Commitment has been identified to be quite important in business relationships (Scheer & Stern, 1992). For example, commitment has been associated with stronger cooperation and a

desire for mutual profitability (Anderson & Weitz, 1992); greater access to market intelligence and loyalty, and being important for successful long-term relationships (Gundlach, Achrol, & Mentzer, 1995). Commitment can also influence the preferences for dealing with existing partners (Gounaris, 2005) and a propensity for relation continuity although alternatives exist (Anderson & Weitz, 1992; Morgan & Hunt, 1994).

Commitment can occur on different levels such as between individuals, between individuals and organizations, and between organizations (Mathieu & Zajac, 1990; Meyer, Stanley, Herscovitch, & Topolnytsky, 2002). Meyer & Allen (1987), argue that members of an association differ greatly in their degree of commitment to the organisation. Moreover, apart from the degree of commitment, there is also a difference in the form of commitment; and three distinct forms of commitment – affective, continuance and normative have been identified. It has been suggested that by knowing the differences in the form (as well as amount) of commitment an individual has to a group are likely to affect the degree and kind of influence that the group can exert upon him (Meyer & Allen, 1987).

Commitment in Co-operatives

As co-operatives rely on long-term and repeated exchange relationships with their members to generate a collective benefit that is greater than the sum of inputs of individual members (Jussila, Goel, et al., 2012b); commitment has been identified to be important in co-operatives. More specifically, one pre-requisite for successful agricultural co-operatives is that the farmer-members are willing to supply the co-operative with raw products, capital and managerial inputs (Fulton, 1999; Zeuli & Cropp, 2004); and member commitment is likely to be important for this to happen (Staatz, 1989; Anderson & Henehan, 2005).

According to Fulton (1999), with respect to co-operatives, commitment can be defined (in simplistic terms) as the preference of co-operative members to patronize a co-operative even when the co-operatives price or service is not as good as that provided by an Investor Owned Firm (IOF). However, such a simplistic view does not fully explain commitment because the concept of member commitment in co-operatives is multifaceted, since members have different roles in relation to the co-operative. Members participate in /engage with their co-operatives in a number of ways, ranging from, economic patronage to attending meetings, serving on committees, serving as elected officers, and/or in the recruitment of other members (Gray & Kraenzle, 1998). For example, as patrons, by either selling or buying larger or smaller volumes they can affect the utilization of the production capacity. As the financier of the co-operative they can affect the co-operatives ability to finance its

investments. As the governors of the co-operative, their commitment to vote for directors and participate in the governance structure can affect the degree of control management has on the board (Bhuyan, 2007). This wider participation in, and engagement with the co-operative is one of the reasons that makes the co-operative form different (Gray & Kraenzle, 1998).

Commitment improves co-operative performance in several ways. For example, it reduces the transaction costs in member-co-operative transactions because the likelihood of opportunistic behaviour is reduced since committed members are less likely to behave as free riders in their dealings with the co-operative (Bijman & Verhees, 2011). Commitment also incorporates in its members, a willingness to make a sacrifice to contribute to the organizations success (Solinger, Van Olffen, & Roe, 2008) and committed members are more likely to make an effort towards delivering to the co-operative's strategy – for example greater customer-orientation (Cechin, Bijman, Pascucci, & Omta, 2013).

Further, committed members are more likely to hold the management and board to high standards of performance (Trechter, King, & Walsh, 2002). Since participation and commitment have a mutual effect, if members are not committed, they may not want to invest the time and effort required in participating in the governance of the co-operative (Bijman & Verhees, 2011). Moreover, not only does participation in governance support commitment to the co-operative in general, it also supports commitment to the decisions of the board of directors, and thereby makes implementation of those decisions more easy (Reynolds, 1997; Bijman & Verhees, 2011)

Studying commitment throws valuable light on the nature of the relationship of members to their co-operative. Although not exhaustively researched, it is not a new phenomenon (Cechin et al., 2013); and it has been studied by several researchers Several factors have been identified and argued or empirically shown to affect members commitment to the co-operative (Fulton & Adamowicz, 1993; Fulton, 1999; Fulton & Giannakas, 2001). These include, social, economic and organisational factors as well as co-operative characteristics such as - the age of the members, complexity, role of the co-operative in the members financial health, size of the co-operative, heterogeneity of member base, and type of co-operative (Bijman & Verhees, 2011; Jussila, Goel, et al., 2012b).

In summary, commitment is a broad phenomenon, and an integral attribute of relationships, especially long-term relationships. It has a unique yet significant relevance to co-operatives in general and agricultural co-operatives in specific. This is based not only on the fact that the

farmer-member and agricultural co-operative relationship is a long term one characterised by repeated exchanges, but also because member commitment is required for the expression of other properties that are unique and essential for co-operatives. A decrease in member commitment can have a material impact on agricultural co-operative performance with the most visible feature being member's exiting the co-operatives; and if enough number of members exit, the co-operative will cease to exist. Additionally, a low level of member commitment can also influence co-operative performance by causing reduced participation in governance, non-alignment with the co-operative strategy, increased opportunistic and free-rider behaviour, reduction in patronage (as suppliers of buyers) and greater reluctance to supply the co-operative with capital. These can hinder co-operative performance and could potentially lead to its demise. It is therefore important to measure and monitor commitment within the membership base of the co-operative. Although commitment has been studied within the field of co-operative research, empirical studies are very limited. Moreover, there are few empirical studies that measure the psychological and social aspects of member commitment in agricultural co-operatives.

3.2 Heterogeneity

Heterogeneity (or Homogeneity) has an important bearing on collective action; and several studies have explored the relationship between group heterogeneity and the performance of common property institutions (Poteete & Ostrom, 2004). Studies have suggested that heterogeneity can have diverse sources. Baland and Platteau (1996) suggest that the major sources of heterogeneity result from racial, ethnic, or other kinds of cultural divisions, and the differences in the nature of economic interests among individuals. While Vedeld (2000) identifies five forms of heterogeneity: (1) heterogeneity in endowments; (2) political heterogeneity; (3) wealth and entitlements; (4) cultural heterogeneity; and (5) economic interests.

Scholars have found that heterogeneous groups have more difficulty in reaching a common definition of group goals, managing flow of work, sustaining members' attention and cooperation, minimizing turnover, and encouraging knowledge sharing over time (Malone, 1987; Jackson et al., 1991; Chompalov, Genuth, & Shrum, 2002; Okhuysen & Bechky, 2009). Similarly, studies have indicated that group heterogeneity, which is derived from member differences in knowledge, expertise, or experience, can increase group creativity, but only if group members bridge their social and intellectual differences and work on behalf of the group as a whole (Ancona & Caldwell, 1992; Homan, Van Knippenberg, Van Kleef, &

De Dreu, 2007). Further, it is argued that group heterogeneity creates barriers to identification with the group as a whole because members do not feel psychologically connected to those who are different (O'Reilly III, Caldwell, & Barnett, 1989; Tsui, Egan, & O'Reilly III, 1992). Similarly, Hinds and Mortensen (2005) observed that group members are more likely to remain more identified with their smaller and more homogeneous group than with a larger heterogeneous group. Olson (1971) argues that members involved in collective action often strive to influence corporate structure and decisions to reflect their preferences, resulting in organisational policies that fail to benefit the membership as a whole. Similarly, according to Varughese and Ostrom (2001), when the interests of appropriators differ, achieving a self-governing solution to common pool resource problems is particularly challenging.

Heterogeneity in Co-operatives

A core feature of co-operatives is that it's characterised by collective decision making and self-governance. As heterogeneity affects this feature, it significantly impacts co-operatives. Hansmann (1996) argues that a fundamental characteristic of co-operatives is that members (patrons) have highly homogenous interests. This ensures that the cost of collective decision making is relatively lower for co-operatives; and this comparative advantage is one of the most important reasons for firms taking up a co-operative form (Hansmann, 1996). It also provides an explanation as to why co-operatives tend to stick to just one commodity or service.

In co-operatives, services must be provided to all members of the group if provided to any, which sets it apart from other forms of organization (Olson, 1971). Due to which, co-operatives need to often handle the combined demands of meeting individual member needs while maintaining a balanced and consistent quality of services to all members. At the same time, they also need to compete with firms that do not operate within a structure of member governance and consensus. According to Reynolds (1997), this need for consistency in policy and procedure in the co-operative business model makes the handling of diverse member interests more challenging for co-operatives than for business entities where each transaction is private and distinct from all other individual deals they make. Furthermore, according to Iliopoulos and Cook (1999), as membership becomes diverse in a co-operative, various and sometimes conflicting interests needs to be addressed by the co-operative.

Reynolds (1997) suggests that the pressures from having to consider diverse interests build new values and innovative ideas for co-operatives and hence heterogeneity could be beneficial to the co-operatives. However, in contrast, Bijman (2005) argues that the functions

of a co-operative maybe negatively affected by heterogeneity of members due to issues involving coordination and commitment, as well as decision making, influence and agency costs. As the control of co-operatives is structured democratically, heterogeneity is likely to generate transaction costs to co-operative decision-making. As argued by Hansmann (1996), an increase in these transaction costs results in higher decision-making costs in co-operatives relative to IOF's. Similarly, according to Pozzobon, Zylbersztajn, and Bijman (2011), as a consequence of heterogeneity, decision making in traditional co-operatives is likely to be more costly than in investor owned firms.

On the whole, conflicting preferences can generate problems in co-operatives (Kalogeras, Pennings, van der Lans, Garcia, & van Dijk, 2009). For example, increasing heterogeneity could result in a decline in member commitment (Fulton & Giannakas, 2001) and a decrease in member willingness to supply equity capital (Van Bekkum, 2001), increasing costs related to damaging influence activities (Cook, 1995), tedious decision making process (Hansmann, 1996) and lack of strategic focus (Hendrikse & Bijman, 2002). These in turn are likely to affect the performance of co-operatives. Therefore identifying members preferences and the heterogeneity for the attributes is fundamental for understanding co-operatives structure and behaviour (Kalogeras et al., 2009).

While several scholars have highlighted the role, importance and impact of heterogeneity on co-operatives; empirical studies that examine heterogeneity and map out its expression are few in number. According to Kalogeras et al. (2009), the lack of empirical evidence, which can negatively affect the quality of decision-maker choice and researcher understanding of co-operative behaviour, is due in part to data constraints as well as difficulties in determining member preferences, which are not always directly observable, and in accounting for their heterogeneous nature.

In summary, heterogeneity (or diversity) is an inherent property of any group or collective. It has a significant bearing whenever collective decision making is required. This is because a rise in heterogeneity leads to members in the group increasingly wanting different outcomes and consequently arriving at an optimal decision in an effective and efficient manner becomes progressively challenging. This phenomenon has a significant impact on co-operatives in general and agriculture co-operatives in specific. As agricultural co-operatives become larger and more complex in their operations, membership becomes increasingly diverse (heterogeneous). The increase in heterogeneity is often suggested as a challenge to

the co-operative model. The effect of heterogeneity on the co-operative model stems from the fact that individual farmer-members are different (heterogeneous) in terms of their interests with respect to the co-operative. Apart from resulting in a rise in decision making costs, an increase in heterogeneity can have other significant negative effects on the co-operative such as – a decrease in member commitment, increase in opportunistic and free rider behaviour, and poor governance. It is therefore important to measure, monitor and better understand the phenomenon of heterogeneity. In agricultural co-operatives, heterogeneity is primarily driven by attributes that are personal (farmer-individual) and business (farming-business) related. A heterogeneity (or diversity) in the attributes therefore powers the heterogeneity in member interests. Although heterogeneity has been stated to be an important issue in co-operatives, research studies on heterogeneity are very few and empirical studies of heterogeneity in agricultural co-operatives are lacking.

3.3 Social Capital

Although no agreed definition of social capital exists, most of them contain references to norms, values, relationships, connections, networks as the characteristic feature of social capital. According to Lyda Hanifan social capital can be defined as those tangible assets that count for most in daily lives of people: namely goodwill, fellowship, sympathy, and social intercourse among the individuals and families who make up a social unit (Hanifan, 1916). According to Putnam (1993), social capital refers to any features of social organisation, such as networks, norms, and trust, that facilitate coordination and cooperation for mutual benefits. Ostrom (1994) believes that social capital is the arrangement of human resources to improve the flow of information to generate future income. Fukuyama (1995) defined social capital as the ability of people to work together for common purposes in groups and organizations. Woolcock (1998) suggests, social capital, as a broad term encompasses the norms and networks facilitating collective action for mutual benefit; and more generally it can be defined as the information, trust, and norms of reciprocity inherent in one's social networks. For the sake of simplicity social capital can be defined as the links, shared values and understandings in society that enable individuals and groups to trust each other and so work together (Brian, 2007).

A fundamental complexity of social capital is that it has two very divergent attributes – an individual feature and a group feature. Which in essence makes it a property of individuals, but only by virtue of their membership of a group (Szreter & Woolcock, 2004). Social capital is especially important for interpersonal behaviours, business decisions and government

actions (Feng, Friis, & Nilsson, 2016). Further, a unique attribute of social capital is that its stocks increase rather than decrease through use, for example, trust demonstrated today will be amplified tomorrow; whereas physical capital is worn out or consumed, (Woolcock, 1998). On the whole, having achieved considerable importance, social capital has been regarded as a constructive element in the creation and maintenance of economic prosperity (Fukuyama, 1995), regional development (Grootaert & Van Bastelaer, 2001), collective action (Ostrom, 1994) and democratic governance (Putnam, 1993, 1995).

Social Capital in Co-operatives

Although none of the definitions of co-operatives explicitly state the inclusion of social capital, they all indicate that co-operatives are based on the existence of social capital. According to Nilsson et al. (2012) the social capital paradigm is the common denominator for all explanations and theories on co-operative formation and development. In co-operatives, the planning of future joint business activities and adaptation to unforeseen contingencies all depend on the degree of mutual understanding, trust, and personal sympathy existing between members; and internal coordination and resource allocation in co-operatives is primarily determined by the quality of interpersonal relations between its members (Valentinov, 2004). It is suggested that the existence of such a social foundation of cooperation which gave rise to the democratic and people-oriented character of co-operatives, is an critical differentiating feature between co-operatives and IOF's (Valentinov, 2004). Further, co-operatives have an inherent double nature. Every co-operative represents simultaneously – 1) an association of persons in the sense of sociology and social psychology, (i.e. social group), and 2) a joint enterprise owned and operated by the same members of the group (Bonus, 1986).

In the early part of the existence of co-operatives, they formed a tightly connected group, such that co-operatives tended to be quite similar to one another and very different from other business forms. But co-operatives tend to become more corporate like as they develop through time and that in the later stages of the life cycle the aspirations of the managers rather than those of the farmers are realized (Hind, 1997). Nilsson et al. (2012) view this as an expression of less social capital.

Attaining large size is critical for many co-operatives. It lowers average costs through economies of scale as well as delivers benefits through economies of scope. But a study by Nilsson et al. (2012) found that large complex co-operatives are slowly loosing social capital; and the profits generated from economies of scale and scope could quite easily be outweighed by the loss sustained from the reduction of social capital (Nilsson et al., 2012). This would

typically be expressed as – less trust amongst members and between members and leaders, alienation and passivity amongst members, low involvement, weak democratic governance, private good provision rather than collective good provision, wide spread free riding, low satisfaction and loss of solidarity (Valentinov, 2004; Nilsson et al., 2012).

Similarly, as the co-operative horizontally integrates, its membership base increases; and with it so does the level of member heterogeneity (Nilsson & Madsen, 2007). As the size and/or member heterogeneity of a group expands, maintaining social capital becomes increasingly difficult (Coulter, Goodland, Tallontire, & Stringfellow, 1999; Markelova, Meinzen-Dick, Hellin, & Dohrn, 2009). In such a situation the members feel increasingly alienated (Nilsson et al., 2009; Ostenberg & Nilsson, 2009).

As discussed earlier, social capital theory suggests that small cooperatives with simple business operations have more social capital in their membership base than large complex cooperatives; and therefore the geographical and social proximity among members and between members and leadership fosters social capital (Feng et al., 2016). A recent study by Feng et al. (2016) investigated this phenomenon empirically using data from member surveys in three Swedish farm supply and grain marketing cooperatives that vary in size from about 150 to 36,000 to members. The findings of the study suggest that the smaller the co-operative, the higher the social capital expressed in terms of members involvement, trust, satisfaction and loyalty (Feng et al., 2016). Based on their findings, the authors suggest that a cooperative with a focused strategy (and business orientation), most likely has a small homogenous membership, so the members may have the same interests, communicate with each other, meet the leadership, etc., that is, there may be strong involvement within the membership (Feng et al., 2016).

Since co-operatives need social capital to be competitive, the drain of previously high stocks of social capital could be an important reason for the failure of a co-operative (Nilsson et al., 2012). Importantly, Nilsson et al. (2012) note that if a co-operative is un-aware of the comparative advantage it possess in terms of social capital, and does not therefore protect it, it risks losing this form of capital and with it a significant source of comparative advantage. But, despite its importance, traditionally, social capital has been ignored as capital by both researchers and decision makers of co-operatives (Nilsson et al., 2012). Given that social capital plays an instrumental role in the formation and development of cooperatives, it is

surprising that the reduction in social capital has not been considered as a probable and significant challenge and cost, as specific strategies are pursued by cooperatives.

In summary, social capital is a broad concept with specific relevance to social organisations (such as communities, groups, collectives etc.); and is comprised of several characteristic features such as norms, values, trust, networks and communication. It is a key element required for creating and maintaining - economic prosperity, development, collective action and governance. With respect to co-operatives, social capital is considered to be vital because it forms the social foundation upon which the co-operative exists. A significant loss of social capital could result in the erosion of this foundation and possibly lead to its demise or collapse. This decrease in social capital tends to occur when the co-operative grows to become a larger and more complex organisation. Moreover, a decrease in social capital can negatively affect co-operative performance by leading to – a decline in trust, reduced participation, weak governance, increased opportunistic and free riding behaviour, low satisfaction and loss of cohesion. It is therefore important to measure and monitor social capital in co-operatives. However very little research has been done in the area of social capital and co-operatives; and given the complexity it presents empirical studies that examine social capital in agriculture co-operatives are significantly lacking.

4.0 A Conceptual Framework for Examining Co-operatives

For the purpose of this research a novel framework that allows for the examination of co-operatives from a non-conventional perspective is conceptualized. The framework is constructed on the premise that a comprehensive examination of co-operatives, which encapsulates the social, psychological, organisational and economic aspects within the membership base, can be structured on three dimensions: commitment, heterogeneity and social capital.

In the conceptual framework, a strong emphasis is given towards objectively examining these three dimensions in agricultural co-operatives via outcomes than can be anticipated and measured. The reason being, demonstration of clearly observable results, and the way in which results are measured, are seen as necessary to the study of co-operatives from a non-conventional perspective that this research is pursuing.

4.1 The Commitment Dimension

As discussed previously, member commitment in co-operatives is a complex and multi-faceted phenomenon. In the conceptual framework, the commitment dimension is related to

empirically measuring these complex aspects of member commitment in agricultural co-operatives. Consequently, grounded in the three component model developed by Allen and Meyer (1990), the key commitment based outcome areas that this research is examining are – 1) affective, 2) continuance 3) normative and 4) other.

i. **Affective commitment -** Allen and Meyer (1990) defined this component of commitment as the affective or emotional attachment to the organisation such that the strongly committed individual identifies with, is involved in, and enjoys membership in the organisation. With respect to agricultural co-operatives, this component captures how strongly the farmer "wants" to be a member of the co-operative.

ii. **Continuance commitment -** This component of commitment has largely been viewed as a tendency to engage in consistent lines of activity based on the individuals recognition of the costs ("lost side bets") associated with discontinuing the activity (Becker, 1960; Farrell & Rusbult, 1981; Rusbult & Farrell, 1983). Hence, anything that increases the cost associated with leaving an organization has the potential to create continuance commitment (Meyer & Allen, 1991). In agricultural co-operatives, this component measures how strongly the farmer "needs" to be a member of the co-operative.

iii. **Normative commitment** - This component of commitment was defined by Wiener (1982) as the totality of internalized pressures to act in a way which meets organizational goals and interests, and suggests that individuals exhibit behaviours solely because they believe it is the "right "and "moral" thing to do; and is based on a belief about ones responsibility to the organisation (Meyer & Allen, 1991). This component captures how strongly farmers believe that being a member of the agricultural co-operative is the "moral" and "right" thing to do.

iv. **Other commitment** – Informed by the literature on commitment in co-operatives, this category (other) captures attributes that are very specific to commitment in agricultural co-operatives such as – participation in governance and decision making, propensity for opportunistic and free rider behaviour, and concern for the co-operative's future.

4.2 The Heterogeneity Dimension

The heterogeneity dimension explores the factors that influence, or have influenced, co-operatives via the introduction of greater heterogeneity within the membership base. As discussed earlier, there are many factors that can impact heterogeneity. However, since this

research is grounded in agricultural co-operatives, it is driven by the most important sources of heterogeneity in agricultural co-operatives. As identified by Cook and Iliopoulos (1999), and in order of importance, these sources of heterogeneity include: 1) differences between members in terms of volume of production, 2) variance in members education levels, 3) the geographic dispersion of membership, 4) differences between members in terms of farm objectives, 5) increased non-farm income for some members, 6) variance in members age, 7) the number of different commodities produced by members, and 8) the number of different inputs procured by members.

This framework further expands on these sources and groups them under one of two possible constructs – 1) Farmer-member (individual) derived, or 2) Farm business (enterprise) derived.

i. **Farmer-member** (individual) derived sources are primarily related to attributes directly associated with the farmer such as the farmers' age, gender, level of education etc.
ii. **Farm business** (enterprise) derived sources are primarily related to attributes associated with the farming business such as the farm size, quality of milk produced, gross farm revenue, total farm assets etc.

4.3 The Social Capital Dimension

The social capital dimension aims to capture the characteristics of the co-operative organisational form from a social construct. However, as discussed previously, capturing and measuring social capital in co-operatives is complicated. Further, no study that we are aware of has comprehensively measured social capital in agricultural co-operatives. Given the limited amount of research and the need for a holistic instrument for measuring social capital, this research is driven by the framework developed by the World Bank for measuring social capital (Grootaert, 2004). This framework captures social capital within the membership base along six themes –

i. **Groups and networks** – this examines the nature and extent to which a member participates in various types of social organisations and informal networks.
ii. **Trust and solidarity** – this reviews the degree of trust that exists towards other members of the co-operative, key service providers, and strangers and how these have changed over time.

iii. **Collective action and co-operation** - this examines whether and how members have worked with others in their co-operative on joint projects and/or in response to a crisis.

iv. **Information and communication** - this reviews the routes through which members receive information and the extent to which they have access to communication infrastructure.

v. **Social cohesion and inclusion** - this identifies the nature and extent of the divisions and differences that exist, and the mechanisms by which they are managed.

vi. **Empowerment and political action** – this aims to examine the extent to which individuals have control over institutions and processes that directly affect them.

4.4 Framework Constructs

As described earlier, the conceptual framework brings together three important dimensions associated with a non-conventional examination of co-operatives. However, an important consideration is that although the three dimensions are presented at the macro-level, it needs to be noted and understood that there are several factors comprising each dimension, and it is by separating them into their component parts (constructs) that the relationships between the three can be examined, analysed and presented in–depth. For example, separation of commitment measures into affective, normative, and continuance outcomes could provide for greater insight into the distinct components within member commitment that exists. Based on this rationale, the three framework dimensions were further separated along 12 constructs. Appendix 1 lists these constructs and presents the sources that were critical to understanding, developing and framing of the constructs.

4.5 A Three-Dimensional Conceptual Framework for Examining Co-operatives

As indicated in Figure 1, the conceptual framework is centred on three dimensions – represented as circles within a larger square box. The framework assumes that each dimension incorporates several components (constructs) that have been emphasised in research on co-operatives. In Figure 1, these components are shown as rectangular boxes within the larger square box; and line diagrams with arrows at the end represent the connection between the components and the specific dimensions that they comprise.

The line between the boxes indicate the direction of relationship between the three dimensions. As indicated by the lines, the commitment dimension is influenced by both heterogeneity and social capital dimensions. The Social capital dimension is influenced by the heterogeneity dimension but not the commitment dimension. The heterogeneity

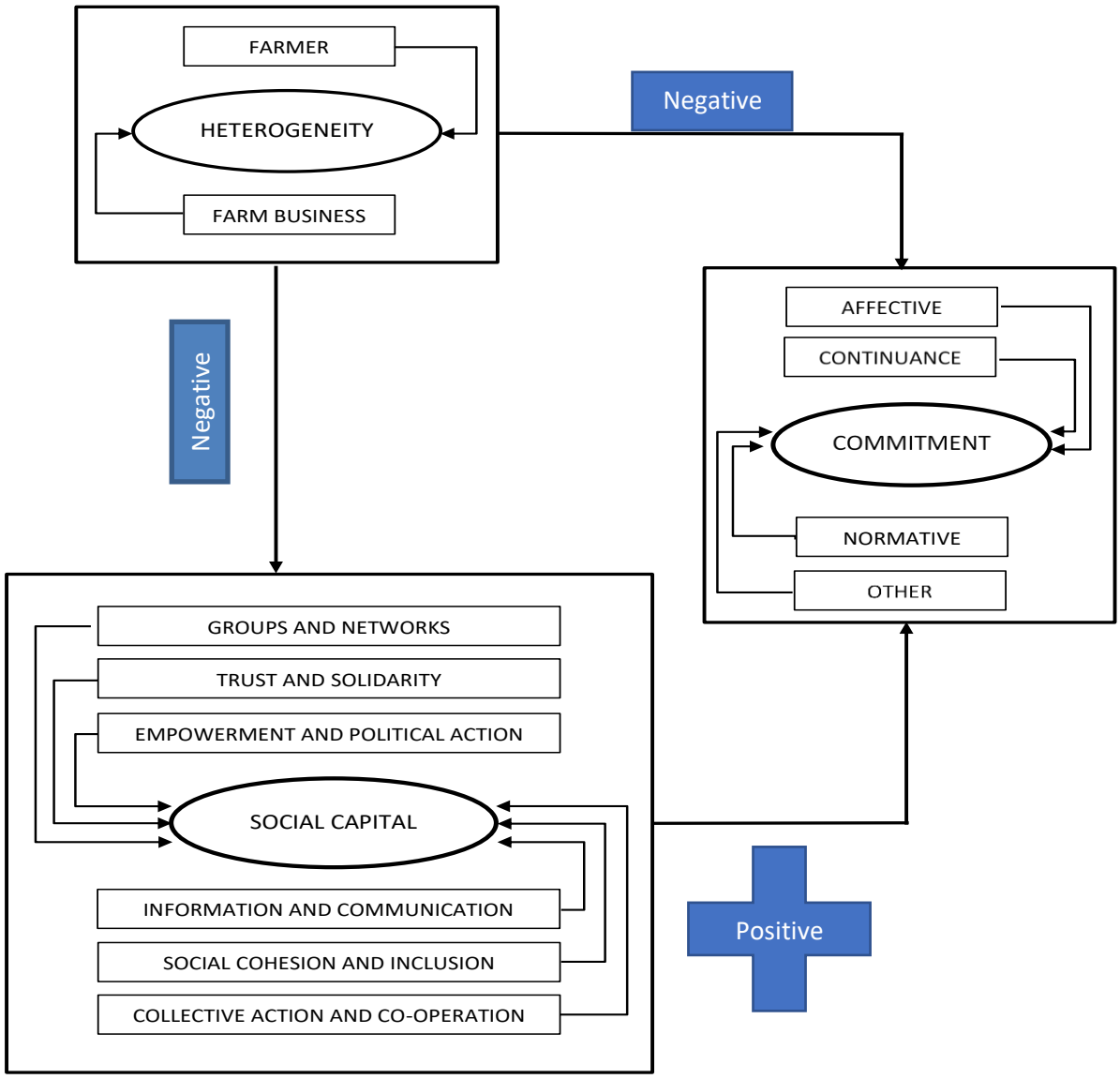
dimension is not influenced by either commitment or social capital dimensions (Figure 1). Further, it is hypothesised, that the relationship between heterogeneity and social capital is negative (inverse), i.e. when heterogeneity is high social capital is low and when heterogeneity is low social capital is high. This is represented by either a negative or positive sign on the lines (Figure 1). It is further argued that this relationship is expressed in the form of member commitment, with commitment having a positive relationship with social capital and a negative one with heterogeneity. Although a positive and negative connotation to the relationship between the three dimensions is provided, it needs to be noted that the relationship is not assumed to be linear. The three hypothesises that are framed based on this assumed relationship between – commitment, heterogeneity and social capital are -

Hypothesis 1 – *There is a negative relationship between Heterogeneity and Commitment*

Hypothesis 2 – *There is a positive relationship between Social Capital and Commitment*

Hypothesis 3 – *There is a negative relationship between Heterogeneity and Social Capital*.

Figure 1. Three-Dimensional Conceptual Framework for Examining Co-operatives



5.0 Conclusions

It has been suggested that much of the work on co-operatives tends to focus on the non-relational aspects such as efficiency; and a large part of the research on agricultural co-operatives is centred in economic theory. However, members to a large extant assess their co-operatives in social terms rather than only on economic ones. While the economic benefit reasons for being a member of a co-operative continue to be important, there is a parallel view that stresses the need to recognise the critical role of other factors that are not explicitly related to the financial or economic aspects of the co-operatives. Neglecting these other factors, which we term non-conventional factors, in the analysis and evaluation of co-operatives will perhaps fail to provide a holistic view of co-operative performance. Hence it

is argued that a slight reorientation of research on agricultural co-operatives with an added focus on aspects that are not purely financial or economic is required.

This research takes an important step towards addressing this gap in research; and contributes to the literature on agricultural co-operatives with a clear focus on expanding the scope of examining and analysing agricultural co-operatives. The research identifies and argues that commitment, heterogeneity and social capital within the membership base are critical non-conventional factors influencing the co-operative organisational form. Consequently, the Three-Dimensional Framework developed and described in this study provides a context within which these co-operative centric non-conventional factors (commitment, heterogeneity and social capital) can be comprehensively explored, measured, analysed and objectively be interpreted. As a result, this framework takes an important step towards providing a broader yet pertinent lens for examining and evaluating co-operative performance. Moreover, the framework creates a useful structure comprising of a range of variables that need to be considered by researchers when examining and analysing agricultural co-operatives.

By encapsulating the three factors, the conceptual framework, adds value to the methodological literature on agricultural co-operatives by developing a novel and unique approach for examining agricultural co-operative performance. Further refinement of this framework will enable the next stage, its application to dairy co-operatives in New Zealand to be more effective. The insights generated from the application of this framework could be valuable for co-operative management as it has the potential to help lead to better informed decisions, especially around strategy, governance, policy, planning and implementation. Importantly, should future research suggest that member commitment is influenced by heterogeneity and social capital, it could have significant implications on how co-operatives are managed.

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References

Allen, N., & Meyer, J. (1990). The measurement and antecedents of affective, continuance and normative commitment to the organization. *Journal of occupational psychology, 63*(1), 1-18.

Ancona, D. G., & Caldwell, D. F. (1992). Demography and design: Predictors of new product team performance. *Organization Science, 3*(3), 321-341.
Anderson, B., & Henehan, B. (2005). What Gives Cooperatives a Bad Name? *International Journal of Co-operative Management, 2*(2), 9-15.
Anderson, E., & Weitz, B. (1992). The Use of Pledges to Build and Sustain Commitment in Distribution Channels. *Journal of Marketing Research, 29*(1), 18-34. doi:10.2307/3172490
Bakken, H. H., & Schaars, M. A. (1937). *The Economics of Cooperative Marketing*: McGraw-Hill Book Co., Inc. .
Baland, J.-M., & Platteau, J.-P. (1996). *Halting degradation of natural resources: is there a role for rural communities?* : Food & Agriculture Org.
Becker, H. S. (1960). Notes on the concept of commitment. *American journal of sociology*, 32-40.
Bhuyan, S. (2007). The "people" factor in cooperatives: an analysis of members' attitudes and behavior. *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie, 55*(3), 275-298.
Bijman, J., & Verhees, F. (2011). *Member or customer? Farmer commitment to supply cooperatives.* Paper presented at the International Conference on the Economics and Management of Networks (EMNet), Limassol, Cyprus.
Bonus, H. (1986). The Cooperative Association as a Business Enterprise: A Study in the Economics of Transactions. *Journal of Institutional and Theoretical Economics (JITE), 142*(2), 310-339. Retrieved from http://www.jstor.org/stable/40750872
Brian, K. (2007). *OECD Insights Human Capital How what you know shapes your life: How what you know shapes your life*: OECD Publishing.
Byrne, N., & McCarthy, O. (2005). An analysis of the credit union's use of Craig's commitment building measures. *Journal of Co-operative Studies, 38*(1), 20-27.
Byrne, N., McCarthy, O., Ward, M., & McMurtry, J. (2012). Credit Union Restructuring: Don't forget the member! *International Journal of Co-operative Management, 6*(1.1), 33-41.
Cechin, A., Bijman, J., Pascucci, S., & Omta, O. (2013). Decomposing the Member Relationship in Agricultural Cooperatives: Implications for Commitment. *Agribusiness, 29*(1), 39-61. doi:10.1002/agr.21321
Chompalov, I., Genuth, J., & Shrum, W. (2002). The organization of scientific collaborations. *Research Policy, 31*(5), 749-767.
Cook, M. L. (1995). The Future of U.S. Agricultural Cooperatives: A Neo-Institutional Approach. *American Journal of Agricultural Economics, 77*(5), 1153-1159. doi:10.2307/1243338
Cook, M. L., & Iliopoulos, C. (1999). Beginning to Inform the Theory of the Cooperative Firm: Emergence of the New Generation Cooperative. *LTA, 4*(99), 525-535.
Cook, M. L., & Iliopoulos, C. (2000). Ill-defined property rights in collective action: the case of US agricultural cooperatives. In C. Menard (Ed.), *Institutions, Contracts and Organizations* (pp. 335-348). Cheltenham, UK and Massachusetts, USA: Edward Elgar Publishing.
Coulter, J., Goodland, A., Tallontire, A., & Stringfellow, R. (1999). Marrying farmer cooperation and contract farming for service provision in a liberalising sub-Saharan Africa. In (Vol. 48, pp. 1-4): Natural Resources Perspective.
Eilers, C., & Hanf, C. H. (1999). Contracts between farmers and farmers' processing co-operatives: A principal-agent approach for the potato starch industry. In *Vertical relationships and coordination in the food system* (pp. 267-284): Springer.

Farrell, D., & Rusbult, C. E. (1981). Exchange variables as predictors of job satisfaction, job commitment, and turnover: The impact of rewards, costs, alternatives, and investments. *Organizational behavior and human performance, 28*(1), 78-95.
Feng, L., Friis, A., & Nilsson, J. (2016). Social Capital among Members in Grain Marketing Cooperatives of Different Sizes. *Agribusiness, 32*(1), 113-126. doi:10.1002/agr.21427
Fukuyama, F. (1995). *Trust: The social virtues and the creation of prosperity*: JSTOR.
Fulton, J., & Adamowicz, W. (1993). Factors that influence the commitment of members to their cooperative organization. *Journal of Agricultural Cooperation, 8*, 39-53.
Fulton, M. (1999). Cooperatives and member commitment. *LTA, 4*(99), 418-437.
Fulton, M., & Giannakas, K. (2001). Cooperatives and Membership Commitment: Organizational Commitment in a Mixed Oligopoly: Agricultural Cooperatives and Investor-Owned Firms. *American Journal of Agricultural Economics, 83*(5), 1258.
Garnevska, E., Callagher, L., Apparao, M., Shadbolt, N., & Siedlok, F. (2017). *The New Zealand Co-operative Economy*. Retrieved from New Zealand: https://nz.coop/wp-content/uploads/2017/01/Co-op-report-v9-WEB.pdf
Gaurwitsch, S., & Nilsson, J. (2010). Members' readership of annual reports–a cross-national comparison of supply co-operatives. *Journal of Co-operative Studies, 43*(1), 5-13.
Gounaris, S. P. (2005). Trust and commitment influences on customer retention: insights from business-to-business services. *Journal of Business Research, 58*(2), 126-140. doi:http://dx.doi.org/10.1016/S0148-2963(03)00122-X
Gray, T. W., & Kraenzle, C. A. (1998). *Member participation in agricultural cooperatives: A regression and scale analysis*: United States Department of Agriculture, Rural Development, Rural Business-Cooperative Service.
Grootaert, C. (2004). *Measuring social capital: An integrated questionnaire*: World Bank Publications.
Grootaert, C., & Van Bastelaer, T. (2001). *Understanding and measuring social capital: A synthesis of findings and recommendations from the social capital initiative* (Vol. 24): World Bank, Social Development Family, Environmentally and Socially Sustainable Development Network.
Gundlach, G. T., Achrol, R. S., & Mentzer, J. T. (1995). The Structure of Commitment in Exchange. *Journal of Marketing, 59*(1), 78-92. doi:10.2307/1252016
Hanifan, L. J. (1916). The Rural School Community Center. *The Annals of the American Academy of Political and Social Science, 67*, 130-138. Retrieved from http://www.jstor.org/stable/1013498
Hansmann, H. (1996). *The ownership of enterprise*. Cambridge, Mass. : The Belknap Press of Harvard University Press.
Hendrikse, G., & Bijman, J. (2002). On the emergence of new growers' associations: self-selection versus countervailing power. *European Review of Agricultural Economics, 29*(2), 255-269.
Hind, A. M. (1997). The Changing Values of the Cooperative and Its Business Focus. *American Journal of Agricultural Economics, 79*(4), 1077-1082. Retrieved from http://www.jstor.org/stable/1244265
Hinds, P. J., & Mortensen, M. (2005). Understanding conflict in geographically distributed teams: The moderating effects of shared identity, shared context, and spontaneous communication. *Organization Science, 16*(3), 290-307.
Homan, A. C., Van Knippenberg, D., Van Kleef, G. A., & De Dreu, C. K. (2007). Bridging faultlines by valuing diversity: diversity beliefs, information elaboration, and performance in diverse work groups. *Journal of applied psychology, 92*(5), 1189.
Iliopoulos, C., & Cook, M. L. (1999). *The efficiency of internal resource allocation decisions in customer-owned firms: the influence costs problem.* Paper presented at the 3rd

Annual Conference of the International Society for New Institutional Economics, Washington DC.
Jackson, S. E., Brett, J. F., Sessa, V. I., Cooper, D. M., Julin, J. A., & Peyronnin, K. (1991). Some differences make a difference: Individual dissimilarity and group heterogeneity as correlates of recruitment, promotions, and turnover. *Journal of applied psychology, 76*(5), 675.
Jussila, I., Byrne, N., & Tuominen, H. (2012). Affective commitment in co-operative organizations: What makes members want to stay? *International Business Research, 5*(10), 1.
Jussila, I., Goel, S., & Tuominen, H. (2012a). Member commitment in co-operatives: The utilitarian approach. *Business and Management Research, 1*(3), p9.
Jussila, I., Goel, S., & Tuominen, H. (2012b). Member commitment in co-operatives: The utilitarian approach. *Business and Management Research, 1*(3).
Jussila, I., Roessl, D., & Tuominen, T. (2014). Should I Stay or Should I Go? Normative Member Commitment in Co-operatives. *International Journal of Marketing Studies, 6*(6), 26.
Kalogeras, N., Pennings, J. M., van der Lans, I. A., Garcia, P., & van Dijk, G. (2009). Understanding Heterogeneous Preferences of Cooperative Members *Agribusiness, 25*(2), 289-289.
Karantininis, K., & Zago, A. (2001). Cooperatives and Membership Commitment: Endogenous Membership in Mixed Duopsonies. *American Journal of Agricultural Economics, 83*(5), 1266. Retrieved from http://ezproxy.massey.ac.nz/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=6183782&site=eds-live&scope=site
Liang, Q., Huang, Z., Lu, H., & Wang, X. (2015). Social Capital, Member Participation, and Cooperative Performance: Evidence from China's Zhejiang. *International Food and Agribusiness Management Review, 18*(1), 49.
Mäkelä, M. M., & Maula, M. V. J. (2006). Interorganizational Commitment in Syndicated Cross-Border Venture Capital Investments. *Entrepreneurship Theory and Practice, 30*(2), 273-298. doi:10.1111/j.1540-6520.2006.00121.x
Malone, T. W. (1987). Modeling coordination in organizations and markets. *Management science, 33*(10), 1317-1332.
Markelova, H., Meinzen-Dick, R., Hellin, J., & Dohrn, S. (2009). Collective action for smallholder market access. *Food policy, 34*(1), 1-7.
Mathieu, J. E., & Zajac, D. M. (1990). A review and meta-analysis of the antecedents, correlates, and consequences of organizational commitment. *Psychological Bulletin, 108*(2), 171-194. doi:10.1037/0033-2909.108.2.171
Mazzarol, T., Soutar, G. N., & Limnios, E. M. (2012). *Member Loyalty in Co-operative Enterprises: A Preliminary Assessment.* Paper presented at the 26th Annual ANZAM Conference.
Megyesi, B., Kelemen, E., Schermer, M., Renting, H., & Oostindie, H. (2010). Social capital as a success factor for collective farmers marketing initiatives. *Int. J. Sociol. Agric. Food, 18*(1), 89-103.
Meyer, J., & Allen, N. (1987). A longitudinal analysis of the early development and consequences of organizational commitment. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement, 19*(2), 199.
Meyer, J., & Allen, N. (1991). A three-component conceptualization of organizational commitment. *Human resource management review, 1*(1), 61-89.

Meyer, J., & Allen, N. (2004). TCM employee commitment survey academic users guide 2004. *London, Ontario, Canada: The University of Western Ontario, Department of Psychology*.
Meyer, J., & Herscovitch, L. (2001). Commitment in the workplace: Toward a general model. *Human resource management review, 11*(3), 299-326.
Meyer, J., Stanley, D., Herscovitch, L., & Topolnytsky, L. (2002). Affective, Continuance, and Normative Commitment to the Organization: A Meta-analysis of Antecedents, Correlates, and Consequences. *Journal of vocational behavior, 61*(1), 20-52. doi:http://dx.doi.org/10.1006/jvbe.2001.1842
Morgan, R. M., & Hunt, S. D. (1994). The Commitment-Trust Theory of Relationship Marketing. *Journal of Marketing, 58*(3), 20-38. doi:10.2307/1252308
Nilsson, J., Svendsen, G. L., & Svendsen, G. T. (2012). Are large and complex agricultural cooperatives losing their social capital? *Agribusiness, 28*(2), 187-204.
O'Reilly III, C. A., Caldwell, D. F., & Barnett, W. P. (1989). Work group demography, social integration, and turnover. *Administrative science quarterly*, 21-37.
Okhuysen, G. A., & Bechky, B. A. (2009). 10 coordination in organizations: an integrative perspective. *The Academy of Management Annals, 3*(1), 463-502.
Olson, M. (1971). *The logic of collective action; public goods and the theory of groups*: Cambridge, Mass., Harvard University Press [1971].
Österberg, P., & Nilsson, J. (2009). Members' perception of their participation in the governance of cooperatives: the key to trust and commitment in agricultural cooperatives. *Agribusiness, 25*(2), 181-197.
Ostrom, E. (1994). 6. Constituting Social Capital and Collective Action. *Journal of Theoretical politics, 6*(4), 527-562.
Poteete, A. R., & Ostrom, E. (2004). Heterogeneity, group size and collective action: the role of institutions in forest management. *Development and change, 35*(3), 435-461.
Pozzobon, D. M., Zylbersztajn, D., & Bijman, J. (2011). *Modeling heterogeneity and member participation in cooperative governance.* Paper presented at the Fifth International Conference on Economics and Management of Networks (EMNet). Limassol, Cyprus.
Putnam, R. D. (1993). The prosperous community. *The american prospect, 4*(13), 35-42.
Putnam, R. D. (1995). Bowling alone: America's declining social capital. *Journal of democracy, 6*(1), 65-78.
Reynolds, B. (1997). *Decision-making in cooperatives with diverse member interests* Retrieved from https://naldc.nal.usda.gov/download/20801/PDF
Røkholt, P. O. (1999). *Strengths and weaknesses of the co-operative form; A Matter of Perspective and Opinion.* Paper presented at the ICA International Research Conference, Quebec.
Rusbult, C. E., & Farrell, D. (1983). A longitudinal test of the investment model: The impact on job satisfaction, job commitment, and turnover of variations in rewards, costs, alternatives, and investments. *Journal of applied psychology, 68*(3), 429.
Scheer, L. K., & Stern, L. W. (1992). The effect of influence type and performance outcomes on attitude toward the influencer. *Journal of Marketing Research*, 128-142.
Sexton, R. J., & Iskow, J. (1993). What do we know about the economic efficiency of cooperatives: an evaluative survey. *Journal of Agricultural Cooperation, 8*.
Soboh, R. A., Lansink, A. O., Giesen, G., & Van Dijk, G. (2009). Performance measurement of the agricultural marketing cooperatives: the gap between theory and practice. *Review of Agricultural Economics, 31*(3), 446-469.
Solinger, O. N., Van Olffen, W., & Roe, R. A. (2008). Beyond the three-component model of organizational commitment. *Journal of applied psychology, 93*(1), 70.

Staatz, J. M. (1989). *Farmer Cooperative Theory: Recent Developments*. (84). Washington, D.C: United States Department of Agriculture

Sykuta, M. E., & Cook, M. L. (2001). Cooperative and Membership Commitment: A New Institutional Economics Approach to Contracts and Cooperatives. *American Journal of Agricultural Economics, 83*(5), 1273-1279. Retrieved from http://ezproxy.massey.ac.nz/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.1244819&site=eds-live&scope=site

Szreter, S., & Woolcock, M. (2004). Health by association? Social capital, social theory, and the political economy of public health. *International Journal of Epidemiology, 33*(4), 650-667.

Torraco, R. J. (2005). Writing Integrative Literature Reviews: Guidelines and Examples. *Human Resource Development Review, 4*(3), 356-367. doi:10.1177/1534484305278283

Trechter, D. D., King, R. P., & Walsh, L. (2002). Using communications to influence member commitment in cooperatives. *Journal of Cooperatives, 17*.

Tsui, A. S., Egan, T. D., & O'Reilly III, C. A. (1992). Being different: Relational demography and organizational attachment. *Administrative science quarterly*, 549-579.

Valentinov, V. L. (2004). Toward a social capital theory of cooperative organisation. *Journal of Cooperative Studies, 37*(3), 5-20.

Van Bekkum, O.-F. (2001). *Cooperative models and farm policy reform: Exploring patterns in structure-strategy matches of dairy cooperatives in regulated vs. liberalized markets*. The Netherlands: Koninklijke Van Gorcum.

Varughese, G., & Ostrom, E. (2001). The contested role of heterogeneity in collective action: some evidence from community forestry in Nepal. *World Development, 29*(5), 747-765.

Vedeld, T. (2000). Village politics: heterogeneity, leadership and collective action. *The Journal of Development Studies, 36*(5), 105-134.

Wiener, Y. (1982). Commitment in organizations: A normative view. *Academy of Management review, 7*(3), 418-428.

Woolcock, M. (1998). Social capital and economic development: Toward a theoretical synthesis and policy framework. *Theory and society, 27*(2), 151-208.

Zeuli, K. A., & Cropp, R. (2004). *Cooperatives: Principles and practices in the 21st century*. Retrieved from Madison, Wisconsin: http://learningstore.uwex.edu/assets/pdfs/A1457.PDF

Appendix 1. The Frameworks Constructs

Construct	Source
1. Commitment- affective	Meyer and Allen (2004), Byrne and McCarthy (2005), Bijman and Verhees (2011), Mazzarol, Soutar, and Limnios (2012), Jussila, Byrne, and Tuominen (2012)
2. Commitment- continuance	Meyer and Allen (2004), Bijman and Verhees (2011), Jussila, Goel, and Tuominen (2012a) , Mazzarol et al. (2012)
3. Commitment- normative	Meyer and Allen (2004), Byrne and McCarthy (2005), Bijman and Verhees (2011), Jussila, Roessl, and Tuominen (2014)
4. Commitment – other	Fulton (1999), Gaurwitsch and Nilsson (2010), Bijman and Verhees (2011), Cechin et al. (2013)
5. Heterogeneity - farmer	Iliopoulos and Cook (1999), Reynolds (1997), Kalogeras et al. (2009), Pozzobon et al. (2011)
6. Heterogeneity- farm business	Reynolds (1997), Iliopoulos and Cook (1999), Hendrikse and Bijman (2002); Kalogeras et al. (2009), Pozzobon et al. (2011)
7. Social Capital- groups and networks	Grootaert (2004), Bhuyan (2007), Megyesi, Kelemen, Schermer, Renting, and Oostindie (2010)
8. Social Capital - trust and solidarity	Grootaert (2004), Bhuyan (2007), Megyesi et al. (2010), Nilsson et al. (2012), Liang, Huang, Lu, and Wang (2015)
9. Social Capital- collective action and co-operation	Grootaert (2004), Valentinov (2004), Megyesi et al. (2010), Liang et al. (2015), Feng et al. (2016)
10. Social Capital- information and communication	Grootaert (2004), Megyesi et al. (2010)
11. Social Capital- social cohesion and inclusion	Grootaert (2004), Megyesi et al. (2010), Nilsson et al. (2012), Liang et al. (2015)
12. Social Capital- empowerment and political action	Grootaert (2004), Megyesi et al. (2010), Nilsson et al. (2012)

Chapter 3: Member commitment in a large New Zealand dairy co-operative: An empirical study

This chapter addresses research objective two. It is submitted to the Journal of Co-operative Organisation and Management (JCOM) and is under peer review. This is a leading international journal for the study of co-operatives and it specifically focuses on research questions that deal with how, why and when co-operative organizations occur and succeed, fail and disappear, and what can be done to influence the outcome. As member commitment is a vital element that can influence the success, failure and disappearance of co-operatives, the manuscript presented in this chapter is a good fit with this journal.

Abstract:

This paper explores the inter-relationship between three conceptualizations of attitudinal commitment, namely affective (affective attachment), continuance (perceived costs) and normative (obligation) and their relationship to commitment to collective action in dairy co-operatives. Based on survey responses from 568 members of a NZ dairy co-operative (Fonterra Co-operative Group), the study measured the levels of affective (67.5%), normative (56.6%) and continuance commitment (53.9%); as well as commitment to collective action. (63.1%), and its two components commitment to patronage (59.4%) and commitment to governance (67.1%). Commitment to collective action showed a significant and positive relationship with affective and normative commitment, but not continuance commitment. For this cooperative, responding to and strengthening member affective and normative commitment, not continuance commitment, would improve member commitment to collective action. A significant and positive relationship was also found between affective and normative commitment; while the relationship between affective and continuance commitment was significant and negative. Both the control variables age and production volumes had a significant and positive relationship with commitment to collective action, indicating that the older farmers and those with larger farms are the mainstay of the cooperative members' commitment to collective action. Managerially, our study provides a roadmap for optimizing member commitment. Measuring these commitment metrics over time would enable Fonterra to better understand what activities resulted in changes to member commitment, a key to the future of the co-operative. Moreover, we recommend that the co-operative include member commitment as a key performance indicator and incentivise management to strengthen member commitment levels, especially affective commitment.

Key Words: Commitment, affective, normative, continuance, collective action, co-operatives, performance, strategy, agribusiness

1. Introduction

The member-co-operative relational dimension is an important differentiator of the co-operative model from the more common Investor Owned Firm (IOF) model, and also a significant source of competitive advantage (I. Jussila, S. Goel, & H. Tuominen, 2012a). Yet much of the work on co-operatives tends to focus on the non-relational aspects such as efficiency (Røkholt, 1999; Byrne, McCarthy, Ward, & McMurtry, 2012). The bulk of agricultural co-operatives research is rooted in economic theory, which are based on assumptions about human behaviour that are not always empirically grounded (Österberg & Nilsson, 2009). Although it is important for co-operatives to be an efficient and productive business (e.g. being able to offer competitive prices and quality service) (Spear, 2000); there is a parallel view that they also need to have social efficiency (Birchall & Simmons, 2004; I. Jussila, S. Goel, & P. Tuominen, 2012b; Nelson et al., 2016). This is because members to a large extent assess their co-operatives in social terms in addition to purely economic ones. A study by Byrne and McCarthy (2014) of credit unions found that majority of members value the relational over, or to the same extent as, the technical dimensions of the credit union. Hence a reorientation of research on co-operatives is required, with a greater focus on the socio-psychological perspective of members (Österberg & Nilsson, 2009). One approach to achieving this in agricultural co-operatives is by studying member commitment (Apparao, Garnevska, & Shadbolt, 2019).

Scholars have argued that member commitment is a critical and demanding task for co-operatives and a basis of a strong and well-functioning co-operative (Fulton & Adamowicz, 1993; Jussila, Goel, et al., 2012a; Puusa, Tuominen, & Havukainen, 2018; Apparao et al., 2019). Member commitment is strategically important for co-operatives because member's have multiple roles as owners, patrons, investors and members of a community of common purpose for which the enterprise was founded (Limnios, Mazzarol, Soutar, & Siddique, 2018). Furthermore, a pre-requisite for successful agricultural co-operatives is that farmer-members are willing to supply the co-operative with raw products, capital and managerial inputs (Fulton, 1999; Zeuli & Cropp, 2004), and member commitment is important for this to happen (Staatz, 1989; Anderson & Henehan, 2005; Cechin, Bijman, Pascucci, & Omta, 2013). According to Palmer (2002), for established co-operatives, member commitment is the most significant influence on organisational effectiveness after formal governance.

It has been suggested that commitment improves co-operative performance in several ways. For example, Bijman and Verhees (2011) maintain that it decreases the transaction costs in member-co-operative transactions because the likelihood of opportunistic behaviour is reduced since committed members are less likely to behave as free riders in their dealings with the co-operative. Solinger, Van Olffen, and Roe (2008) report that commitment incorporates in its members, a willingness to make a sacrifice to contribute to the organizations success, and Cechin et al. (2013) suggest committed members are more likely to make an effort towards delivering to the co-operative's strategy.

Fulton (1999) maintains that previously an assumption of high and stable member commitment in co-operatives was realistic because co-operatives faced relatively stable markets, membership bases were well defined, members were quite close to co-operatives and only few new co-operatives were being formed. However, over time, the markets in which co-operatives operate have become highly dynamic, the rate of formation of new-co-operatives has increased, changes in co-operative's characteristics are constantly happening, and farmer co-operatives have become larger, more complex and diverse, both in membership and activities. As a result the commitment of their members cannot be as logically assumed (Fulton, 1995; Fulton & Giannakas, 2001; Lang & Fulton, 2004; Byrne & McCarthy, 2005; Bhuyan, 2007; Österberg & Nilsson, 2009).

For co-operative leaders, it is important that they support and increase their members desire to remain as members and active users of the organisation they own (Jussila, Byrne, & Tuominen, 2012). Therefore managers of co-operative organizations need to evaluate member commitment, and how their strategies and operations affect it (Cechin et al., 2013). Given that member commitment is critical for agricultural co-operatives, the key question that arises is – *"How can the co-operative leadership develop and implement strategies (i.e. member-facing as opposed to market-facing) that will strengthen or maintain member commitment"?* To answer this question, one must first unravel commitment, which in-turn requires a framework that links organizational commitment to the interests and actions of members, that is, commitment to collective action. Drawing from the organisational behaviour literature, and specifically from Meyer and Allen (1991), we define organizational commitment as a psychological state that characterizes the members relationship with the co-operative, and has implications for the decision to continue or discontinue membership in the co-operative. Commitment to collective action, as explained by Cechin et al. (2013), involves a willingness

to make an effort towards the organization's success; and not demonstrating behaviours that increase exit risk, side-selling and free-riding.

This study decouples the member and co-operative relationship into two forms of commitment, 1) organisational commitment and 2) commitment to collective action. It then unravels organisational commitment into three forms, i) affective, ii) normative and iii) continuance; and commitment to collective action into two forms, i) patronage and ii) governance. Thereafter, it examines the relationship between the three forms of organisational commitment and the two forms of commitment to collective action in co-operatives.

Many co-operative studies have identified affective (emotive), continuance (utilitarian), and normative (ideological) dimensions of member commitment reflecting a member's desire to, need to, and obligation to maintain membership in the co-operative (Jussila & Tuominen, 2010; Jussila, Byrne, et al., 2012; Jussila, Goel, et al., 2012a; Mazzarol, Soutar, & Limnios, 2012; Jussila, Roessl, & Tuominen, 2014). Some studies have examined the phenomenon of commitment to collective action in co-operatives (Cechin et al., 2013). While there has been significant theoretical development on this subject, less progress has been made empirically; and with few efforts to operationalize and test them. Moreover, empirical studies of members' commitment, participation, satisfaction, loyalty and other behavioural elements are primarily qualitative (Limnios et al., 2018). Therefore, in this paper an effort is made provide a quantitative empirical test of the conceptualizations of member commitment.

The primary objective of this paper is to explore and test the relationship between organisational commitment and members' commitment to collective-action in a dairy co-operative in New Zealand. A secondary objective is to explore the interrelationships between the three forms of organisational commitment, and also the two forms of commitment to collective action. In doing so, this paper integrates these different concepts and tests their links in the larger context of dairy co-operatives. Organizational commitment is a multidimensional attitudinal concept used to describe the relationship between an individual and an organization. To the authors' knowledge, no study has explored the link between the three components of organisational commitment and commitment to collective action in agricultural co-operatives. A more general scientific contribution of this study is in applying the three component model (Meyer & Allen, 1991), originally developed for examining intra-organization commitment, to the relationship between farmer-member and agricultural co-operative.

The paper is structured as follows. Section 2 describes our theoretical framework on member commitment and formulates hypotheses on the expected relationships. Section 3 outlines the background, describes the data collection methods, explains the measurement of concepts and details the procedures for data analysis. Results are presented in Section 4 and discussed in Section 5. The conclusions, implications and limitations are covered in the Section 6.

2. Theoretical Framework and Hypothesis

According to Achrol, Reve, and Stern (1983), a framework can be viewed as a first step in the direction of identifying and dimensionalising the major variables influencing and ordering the structure and processes of social entities. It is primarily an attempt to layout the variables and to chart a field of interaction. We follow this recommendation. The unit of analysis is the relationship between member and co-operative. This dyad forms the main construct around which the framework on member commitment revolves. Such a relational framework is required to meet both technical and relational needs (Byrne & McCarthy, 2014). A description of the major variables influencing member commitment and their interaction is provided. An illustration is included to present some clues about how this framework might be used for possible predictions. Since the objective was to develop a comprehensive framework, some topics have only been hinted at and not explained in detail.

2.1 Commitment

Becker (1960) defines commitment as the tendency to persist in a course of action; while, O'Reilly and Chatman (1986) defined commitment as a psychological attachment felt by the person for the organization. In more specific terms, commitment refers to joint values, goals and actions in a relationship leading to the intention of relationship continuation and deployment of resources (Mäkelä & Maula, 2006). Commitment has been identified to be important in business relationships (Scheer & Stern, 1992), and has been associated with stronger cooperation and a desire for mutual profitability (Anderson & Weitz, 1992), greater access to market intelligence and loyalty, and being important for successful long-term relationships (Gundlach, Achrol, & Mentzer, 1995). Commitment can also influence the preferences for dealing with existing partners (Gounaris, 2005); and a propensity for relation continuity although alternatives exist (Anderson & Weitz, 1992; Morgan & Hunt, 1994).

2.2 Organisational Commitment

The examination of commitment in the area of organizational behaviour is primarily focused on the role it plays in systems that are characterized by employer (i.e., the organization) and employees. Porter, Steers, Mowday, and Boulian (1974) defined organisational commitment as the relative strength of an individual's identification with and involvement in a particular organisation. Meyer and Herscovitch (2001) suggest organisational commitment can be viewed as a binding force that is experienced as a mind-set or as a psychological state that leads an individual towards a particular course of action. Although many definitions have been proposed for organisational commitment, an underlying and recurring theme appears to be the idea of a psychological bond between the member and the organisation, which can be conceived as an intrinsic attachment or identification of a person with something outside of oneself (Firestone & Pennell, 1993). In co-operatives, organizational commitment has often been referred to as "member-commitment" (Jiménez, Martí, & Ortiz, 2010), and it has been suggested that it plays an important role in the formation and development of co-operatives (Puusa et al., 2018).

2.2.1 Components of Organisational Commitment

Gouldner (1960) found that commitment to one organisational value is sometimes independent of commitment to another, leading him to conclude that commitment is not a homogenous and unidirectional variable, but a multidimensional phenomenon. These arguments were supported by Meyer and Allen (1987) who identified that members of an association can differ greatly in their degree of commitment to the organisation, and apart from the degree of commitment there is also a difference in the form of commitment.

According to Meyer and Allen (1987), three distinct yet general themes, affective attachment, perceived costs and obligation, reflect several conceptualizations of attitudinal commitment in literature. Thus, commitment is viewed as having an affective orientation toward the organisation, recognition of the costs associated with leaving the organisation, and a moral obligation to remain with the organisation. These distinct themes were labelled as "affective", "continuance" and "normative" commitment. These themes are important because they involve the psychological state reflected in commitment, the antecedent conditions leading to its development, and the behaviours that are expected to result from commitment (Allen & Meyer, 1990). Moreover, common to the three components and an underlying basis of the model is the view that commitment is a psychological state that (a) characterizes the employee's

relationship with the organization, and (b) has implications for the decision to continue or discontinue membership in the organization (Meyer & Allen, 1991). As a result, each member of the organisation has a commitment profile reflecting his or her degree of desire (affective), need (continuance), and obligation (normative) to remain. These factors are also widely accepted within the field of marketing as key drivers of customer commitment (Keiningham et al., 2017). The interconnections between trust, satisfaction and loyalty to organizational commitment have been studied in research of consumer behaviour (Morgan & Hunt, 1994; Mukherjee & Nath, 2007; Keiningham, Frennea, Aksoy, Buoye, & Mittal, 2015). For example, Keiningham et al. (2017) in their study of customer commitment and customer experience, decoupled customer experience (CE) into five domains—cognitive, emotional, physical, sensorial, and social—and examined examining how each of these domains impacts the CE.

2.2.1.1 Affective commitment

Buchanan (1974) conceptualised commitment as a partisan affective attachment to the goals and values, and to the organisation for its own sake, apart from its purely instrumental worth. Thereafter, this dimension of commitment was defined by Allen and Meyer (1990) as the affective or emotional attachment to the organisation such that the strongly committed individual identifies with, is involved in, and enjoys membership in the organisation. Importantly, in simplistic terms, organisational members who are committed to an organisation on an affective basis continue working for the organisation because they want to (Meyer & Allen, 1991). In co-operatives, the affective dimension of commitment is based on emotional attachments to and bond with the co-operative (Foreman & Whetten, 2002; Byrne & McCarthy, 2005; Jiménez et al., 2010; Jussila, Byrne, et al., 2012). It reflects the members desire to remain attached to the particular co-operative, as the relationship feels good, brings a sense of belonging, and is satisfying (Byrne & McCarthy, 2005).

2.2.1.2 Continuance commitment

According to Stebbins (1970), continuance commitment is the awareness of the impossibility of choosing a different social identity, because of the high penalties associated with making the switch. This form of commitment has largely been viewed as a tendency to engage in consistent lines of activity based on the individuals recognition of the costs (“lost side bets”) associated with discontinuing the activity (Becker, 1960; Farrell & Rusbult, 1981; Rusbult & Farrell, 1983). It has been proposed that the continuance component of organisational

commitment will develop on the basis of two factors – the magnitude and the number of investments (or side bets) individuals make and a perceived lack of alternatives, and may have two aspects to it, calculative commitment (an assessment of the sacrifices the leaving will entail) and imperative commitment (there are no alternatives) (Allen & Meyer, 1990; Meyer, Allen, & Gellatly, 1990). Anything that increases the cost associated with leaving an organization has the potential to create continuance commitment (Meyer & Allen, 1991). In co-operatives, it is suggested that continuance commitment is calculative and rational in nature and refers to a members need to stay in order to gain the benefits of membership (Jussila, Goel, et al., 2012a).

2.2.1.3 Normative commitment

Normative commitment was defined by Wiener (1982), as the totality of internalized pressures to act in a way which meets organizational goals and interests, and suggests that individuals exhibit behaviours solely because they believe it is the "*right*" and "*moral*" thing to do. Similarly, Best (1994) states that committed individuals enact specific behaviours due to the belief that it is morally correct rather than personally beneficial. According to Wiener (1982), the normative component of organisational commitment is influenced by the individuals experiences both prior to (familial or cultural socialization) and following (organisational socialization) entry into the organisation. In co-operatives, normative commitment reflects the members sense of duty to remain a patron because they feel as though they ought to maintain that relationship (Byrne & McCarthy, 2005). This moral obligation manifests itself when a member considers that opportunistic behaviour is wrong; and the member thereby is willing to maintain their contribution (Fulton & Adamowicz, 1993; Jussila et al., 2014).

2.3 Commitment to Collective Action in Co-operatives

Through collective action, groups of agricultural producers both small and large, come together to make joint investments in processing and marketing facilities, share a collective reputation, bargain with supplying, processing and retailing firms, gain access to markets, and to spread costs of extension services (Bouamra-Mechemache & Zago, 2015). Collective action is thus an inherent feature in agriculture and represents an efficient way to increase market access and the competitiveness of food chains (Bouamra-Mechemache & Zago, 2015).

Co-operatives are one such important collective action group in agriculture. Members participate in and engage with their co-operatives in a number of ways, ranging from, economic

patronage to attending meetings, acting as managers, serving on committees, serving as elected officers, and recruiting other members (Gray & Kraenzle, 1998). As patrons, by either selling or buying larger or smaller volumes they can affect the utilization of the production capacity. As the financier of the co-operative they can affect the co-operative's ability to finance its investments. As the governors of the co-operative, their commitment to vote for directors and participate in the governance structure can affect the degree of control management has on the board (Bhuyan, 2007). This wider participation in, and engagement with, the co-operative is one of the reasons that makes the co-operative form different (Gray & Kraenzle, 1998). If member participation is restricted to purely economic reasons, a co-operative would be little different from other forms of business. We define this attribute, i.e. the member's wider participation and engagement with the co-operative as the member's commitment to collective action.

As explained by Cechin et al. (2013), in co-operatives, commitment to collective action can be viewed as the members' willingness to sacrifice short-term economic gains and contribute towards the co-operative's long-term success. However, individually, members might not be willing to assume these collective-action responsibilities and short-term costs resulting in the free rider problem (Cook, 1995). Moreover, according to the rational choice literature, which is based on the assumption that human behaviour is self-interested, achieving cooperation toward collective objectives is inherently problematic (Olson, 1971) . Yet collectives and co-operatives exist and operate successfully. A key element to overcoming this problem is by improving a member's commitment to collective action, as it motivates individuals to act cooperatively in pursuit of shared collective goals. It has been suggested that commitment to collective action reduces side selling thus preventing economic costs for the co-operative resulting from idle capacity, decreases free-riding behaviour, and increases willingness to make an effort towards the organization's success (Cechin et al., 2013).

2.3.1 Components of Commitment to Collective Action in Co-operatives

In this study, we decouple member commitment to collective action into two components 1) commitment to patronage and 2) commitment to governance. The commitment to patronage component is based on the premise that co-operatives rely on long-term and repeated exchange relationships with their members to generate a collective benefit that is greater than the sum of the inputs of individual members (Jussila, Goel, et al., 2012a); and if enough patrons are disloyal then the co-operative will cease to exist (Fulton & Adamowicz, 1993). The

commitment to governance component is based on the premise that members' participation in the governance of a co-operative is the distinctive characteristic of this form of organization (Gray & Kraenzle, 1998), and is conceptually similar to an organizational citizenship behaviour of civic virtue (Barraud-Didier, Henninger, & El Akremi, 2012). It is defined as an individual's mobilization and active participation in the life of his or her organization, and the fact of feeling concerned by what goes on within that organization (Organ, 1988; Organ, Podsakoff, & MacKenzie, 2005). This behaviour results in better performance of the organisation (Podsakoff, Whiting, Podsakoff, & Blume, 2009; Whitman, Van Rooy, & Viswesvaran, 2010); and can therefore drive the success of farming co-operatives (Gray & Kraenzle, 1998; Bhuyan, 2007).

2.4 Hypotheses

We propose that co-operative members who feel an emotional attachment to the co-operative and have a want or desire to be a member (affective commitment) are likely to have a positive attitude towards the co-operative and therefore have high levels of commitment to collective action. Similarly, members who believe that they have a responsibility or obligation towards the co-operative (normative commitment), are also likely to have a positive attitude towards the co-operative and therefore have high levels of commitment to collective action. In contrast, members who remain within the co-operative because they perceive that the costs of leaving it are too high or because they have no alternative but to continue as members (continuance commitment), may feel frustrated and have a negative attitude towards the co-operative, resulting in low levels of commitment to collective action.

Thus, the following hypotheses are proposed–

Hypothesis 1: There is a positive relationship between Affective Commitment and Commitment to Collective Action

Hypothesis 2: There is positive relationship between Normative Commitment and Commitment to Collective Action.

Hypothesis 3: There is a negative relationship between Continuance Commitment and Commitment to Collective Action.

In the co-operative context and to the authors' knowledge, organizational commitment has not been used to explain a members' commitment towards collective action.

Additionally, it is proposed that members with an emotional attachment to the co-operative (affective commitment) believe that they have a responsibility or obligation towards the co-operative (normative commitment). In contrast, members who remain within the co-operative because they perceive that the costs of leaving it are too high or because they have no alternative but to remain (continuance commitment), have low levels of emotional attachment (affective commitment) to the co-operative and also low levels of belief that they have a responsibility or obligation towards the co-operative (normative commitment). Lastly, it is also proposed that members with a strong propensity for continued patronage of the co-operative will also be active participants in the governance of the co-operative.

This leads to further hypotheses:

Hypothesis 4: There is positive relationship between Affective Commitment and Normative Commitment

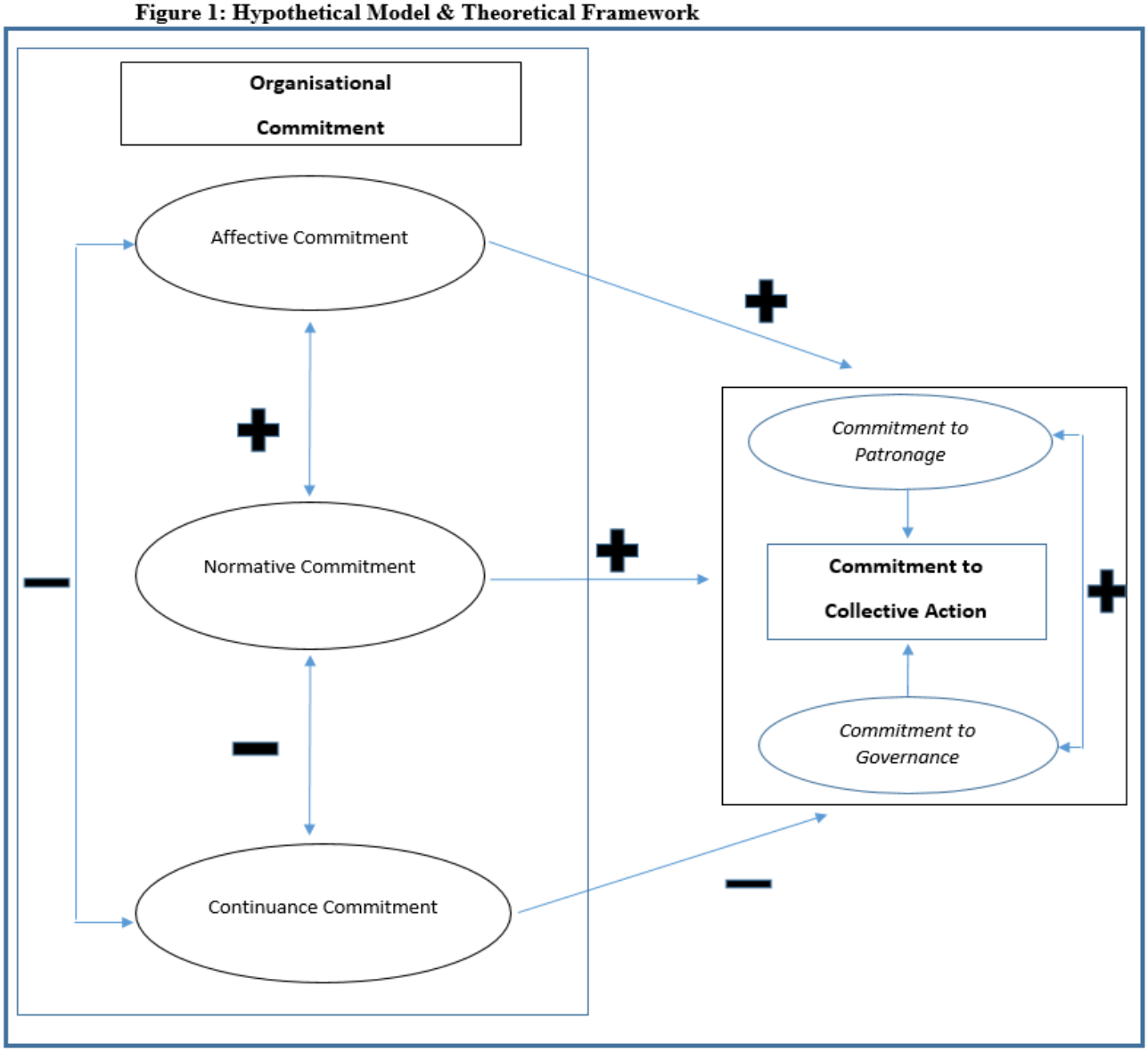
Hypothesis 5: There is a negative relationship between Affective Commitment and Continuance Commitment

Hypothesis 6: There is negative relationship between Normative Commitment and Continuance Commitment.

Hypothesis 7: There is a positive relationship between Commitment to Patronage and Commitment to Governance.

The hypothetical model is shown in Figure 1.

Figure 1: Hypothetical Model & Theoretical Framework



3. Methods

3.1 Background

3.1.1 Dairy Industry and Dairy Co-operatives in NZ

The dairy industry plays a significant role in New Zealand's economy. It provides employment to about 47,310 people and accounts for 28% of NZ's export revenues. Producing 21.3 million tonnes of milk, NZ is the 8th biggest milk producer in world (Shadbolt & Apparao, 2016). Moreover as it exports 95% of its production, it is the largest dairy exporter in the world, accounting for over 30% of global dairy trade (Shadbolt & Apparao, 2016).

Globally, farmer-owned co-operatives play a rather dominant role in the dairy industry with market shares above 80% in milk collection in the U.S.A, the major dairy countries in Western Europe and also in Australia and New Zealand (Chaddad, 2007). In NZ, the first dairy co-operative was established in 1871. Since then, dairy co-operatives have played a significant role in the NZ economy, and continue to do so (Garnevska, Callagher, Apparao, Shadbolt, & Siedlok, 2017). In 2016/17, dairy co-operatives accounted for over 86% of NZ's milk processing. The four major dairy co-operatives in NZ, Fonterra Co-operative Group (NZ$ 19.2 billion), Tatua Dairy Company (NZ$ 0.32 billion), Westland Milk Products (NZ$ 0.62 billion) and the Dairy Goat Co-operative (NZ$ 0.19 billion) had combined total revenues of NZ$ 20.4 billion for the 2016/17 financial year. This approximates to a contribution of about 7.5% of NZ's GDP (NZ$ 270 billion).

3.1.2 Fonterra

The Fonterra Co-operative Group (Fonterra) was formed in 2001, from a merger of two large NZ co-operatives, New Zealand Dairy Group and Kiwi Cooperative Dairies, and the New Zealand Dairy Board. With revenues of about NZ$ 20 billion in 2016/17, it is the largest business enterprise in New Zealand. Fonterra is owned by around 10,000 self-employed dairy farmers in NZ and sources about 22 billion litres of milk from NZ and overseas milk pools. It is the largest dairy exporter in the world, employs 22,000 people globally, exporting products to 140 countries.

Farmer members can own two types of shares in Fonterra, wet shares and dry shares. The wet shares are based on their level of production, additionally they can also own dry shares up to a co-operative cap of 20% of total shares (Shadbolt & Duncan, 2016). Fonterra is governed by an eleven-member board (seven elected farmer shareholders and four appointed) with voting based on wet shares held. In addition, it has a 25 member shareholders' council which represents the views of all members as suppliers, owners and investors. Each councillor is elected by farmers within the ward they represent, and voting is based on one vote per shareholder, more akin to traditional cooperative elections.

Fonterra was formed under the Dairy Industry Restructuring Act (DIRA), 2001. At that stage it had a nearly 95% of New Zealand's milk supply so the DIRA was structured to encourage competitors and reduce the percentage to more globally acceptable levels. Now it is closer to 80% of NZ milk production, with almost all members having choice of who to supply, the new

processors all being mostly overseas owned corporates. DIRA enabled the drop in market share through an unusual feature, for a co-operative, which was open entry and open exit at full market value (Shadbolt & Duncan, 2016). Shareholders could leave the co-operative with the full cashed up value of their shares with just a few months' notice. As a result, the co-operative was, and is, vulnerable to members leaving so relies heavily on member commitment and loyalty to maintain milk supply.

Despite the drop in market share the volume of milk sourced by Fonterra has increased, by 28% over the last 10 years, reflecting increasing world demand for dairy. In 2016/17, Fonterra paid its farmer owners, NZ$ 6.12 / kilograms of milk solids (kg MS) and a dividend of NZ$ 0.40 per share. However, given Fonterra's significant exposure to global markets, there has been volatility in both milk price and dividend payments. Over the 10 year period (2007 to 2017), milk price ranged from NZ$ 3.90 /kg MS (2015/16) to NZ$ 8.40 /kg MS (2013/14); while the dividend payments ranged from NZ$ 0.07 (2007/08) to NZ$ 0.45 (2008/09) per share. The milk price volatility has been felt by all New Zealand farmers, with competitor milk prices mostly based on the Fonterra price. However, the volatility in dividend, and share values, is Fonterra specific and could influence member attitudes and commitment to their co-operative. The shares are held by members at full market value, accounting for about 11% of their assets.

3.2 Data Collection

3.2.1 Sample

A survey method was used to collect data on member commitment. Prior to the survey, a pilot study using a semi-structured interview method was conducted using ten dairy farmers chosen by convenience. Results of the pilot study informed the development and refinement of the questionnaire. The structured questionnaire that was finalised following the pilot study, was then sent to a random sample of 2,000 members of Fonterra between July 2017 and November 2017. This sample of 2,000 member farmers of Fonterra was randomly generated by a Fonterra manager and their postal contact details was provided to the researchers. Hence, the researchers were blind to the member's names. A cover letter, an information sheet, the survey questionnaire and a return envelope were mailed to the sample of 2,000 Fonterra members in July 2017. After six weeks, a reminder was sent out to those members who had not responded.

Of the 2,000 surveys, 294 (15%) were returned by the postal service as being undeliverable. Of the remaining surveys (1,706), 576 were returned by the respondents, giving a response rate

of 34%. After the initial survey round 384 (67%) responses were obtained and a further 192 (33%) were received after sending the reminder. Of the 576 responses that were returned, eight were classified as being incomplete and were discarded from the analysis, leaving the study with a sample of 568 responses that were used in the analysis.

3.2.2 Measures

For the set of items related to organisational commitment and commitment to collective action respondents had to mention their degree of agreement according to a Likert type 7-point scale (from 1: Strongly disagree to 7: Strongly agree).

Organisational Commitment: Organisational commitment was measured by the three component model and scale developed by Allen and Meyer (1990). The statements were purposefully modified to suit the measurement of the farmer and co-operative relationship in a dairy co-operative. All three components, affective, continuance and normative commitment, were measured using eight statements (items) for each. *"I enjoy discussing my co-operative with people outside it"* is an example of an item from the affective commitment scale. Similarly, *"It would be too costly for me to leave my co-operative right now"* is an example of an item used to measure continuance commitment; and *"I do not believe that a member must always be loyal to his or her co-operative"* is an example of an item from the normative commitment scale.

Commitment to Collective Action: Commitment to collective action measures were based on the items developed by Cechin et al. (2013) and Barraud-Didier et al. (2012). These were further adapted to measure commitment to collective action within the context of dairy co-operatives. First, the farmers propensity for continued supply, importance placed on the relationship with the co-operative, and willingness to invest in the co-operative were considered as an indicator of commitment to patronage of the co-operative. Second, farmer's readership of annual reports, attendance of the cooperative's meetings and voting on co-operative matters were considered as an indicator of commitment to governance of the co-operative.

Control variables: Member's age and farm production volume were used as control variables because they are often associated with commitment variables (Meyer, Stanley, Herscovitch, & Topolnytsky, 2002; Trechter, King, & Walsh, 2002; Lind & Åkesson, 2005; Barraud-Didier et al., 2012). Farmers may display different attitudes or behaviours towards the co-operative

depending on their age or the size of the farm under their responsibility (Klein, Richards, & Walburger, 1997; Hansen, Morrow, & Batista, 2002; Österberg & Nilsson, 2009). Age was captured in years under 6 levels (1. 18-30, 2. 31-40, 3. 41-50, 4. 51-60, 5.61-70 and 6. 70+). Production volumes were measured as kilogram milk-solids produced for the 2015/16 season and was recorded under 6 categories (1. < 50,000, 2. 50,000 – 100,000, 3. 100,000 – 150,000, 4. 150,000 – 200,000, 5. 200,000 – 300,000, 6. > 300,000).

3.3 Statistical Analysis

Data was analysed using SPSS (IBM® SPSS Statistics). First, a scale reversal was performed for the inverted scale statements. Second, a descriptive analysis of the data set was conducted by determining the median, mode, mean, standard deviation and frequencies of the variables. Third, the construct reliability of the statements used to measure affective, normative and continuance commitment as well as commitment to collective action was determined using the Cronbach Alpha. Fourth, a principal component analysis (PCA) was performed to examine and confirm the constituent components of commitment to collective action. Fifth, the affective commitment, normative commitment, continuance commitment, commitment to collective action, commitment to patronage and commitment to governance scores were determined. The affective, normative and continuance commitment score for each respondent was calculated by summing the responses to each of the eight statements used to measure them. Since the scale length for each statement was 7, the lowest score possible is 8 (8 x 1) and the highest possible score 56 (8 x 7). The commitment to patronage and commitment to governance scores for each respondent was calculated by summing the responses for the three statements used to measure each of these. As the scale length for each statement was 7, the lowest score possible is 3 (3 x 1) and the highest score 21 (3 x 7). Thereafter, the commitment to collective action score for each respondent was calculated as the sum of the six statements (i.e. 3 patronage and 3 governance statements) with the lowest score possible being 6 (6 x 1) and the highest possible score 42 (6 x 7). Sixth, a Pearson correlation was performed to identify whether a linear relationship existed between organisational commitment, commitment to collective action and the control variables. Seventh, an analysis of variance (ANOVA) was performed to examine the relationship between the three forms of organisational commitment.

Lastly, ordinary least squares (OLS) regression was used to test for the relationship between organisational commitment and commitment to collective action using the following model:

$$Yj = B1 + B2Aj + B3Nj + B4Cj + B5Kj + Ej$$

Where Y_j represents commitment to collective action, A_j represents affective commitment, N_j represents normative commitment, C_j represents continuance commitment and K_j represents the control variables (members age and farm production). A similar analysis was performed by substituting the dependent variable CCA (Y_j) with the commitment to patronage and commitment to governance variables in the model.

4. Results

4.1 Organisational Commitment

4.1.1 Reliability

The Cronbach alpha of the statements used to measure the three different constructs of organisational commitment were all greater than 0.70, indicating that the statements were a reliable measure of the underlying construct being studied (Table 1). The Cronbach alpha of affective commitment was highest (0.87). While that for continuance commitment was the lowest (0.75). The Cronbach alpha for the eight statements used to measure normative commitment was 0.76 (Table 1).

4.1.2 Descriptive Statistics for Organisational Commitment

The mean affective commitment score was 37.8 (SD = 9.7) which is 67.5% of the potential maximum score (Table 1). Scores ranged from 9 (n = 1) to 56 (n = 3). The median was 39 with 25% and 75% of respondents having AC scores less than 31 and 45 respectively. 74.3% (n = 422) of respondents had an affective commitment score greater (High AC) than the mid-point of 32.

The mean continuance commitment score was 30.2 (SD = 9.0), which is 53.9% of the potential maximum score (Table 1). The scores ranged from 8 (n = 1) to 56 (n = 1). The median was 29, with 25% and 75% of respondents having CC scores less than 23 and 37 respectively. 42.6% (n = 242) of respondents had a continuance commitment score greater (High CC) than the mid-point of 32.

The mean normative commitment score was 31.7 (SD = 8.1), which is 56.6% of the potential maximum score (Table 1). The scores ranged from 8 (n = 1) to 56 (n = 1). The median was 32,

with 25% and 75% of respondents having NC scores less than 26 and 37. 51.7% (n = 294) of respondents had a normative commitment score greater (High NC) than the mid-point of 32.

4.2 Commitment to Collective Action

4.2.1 Reliability

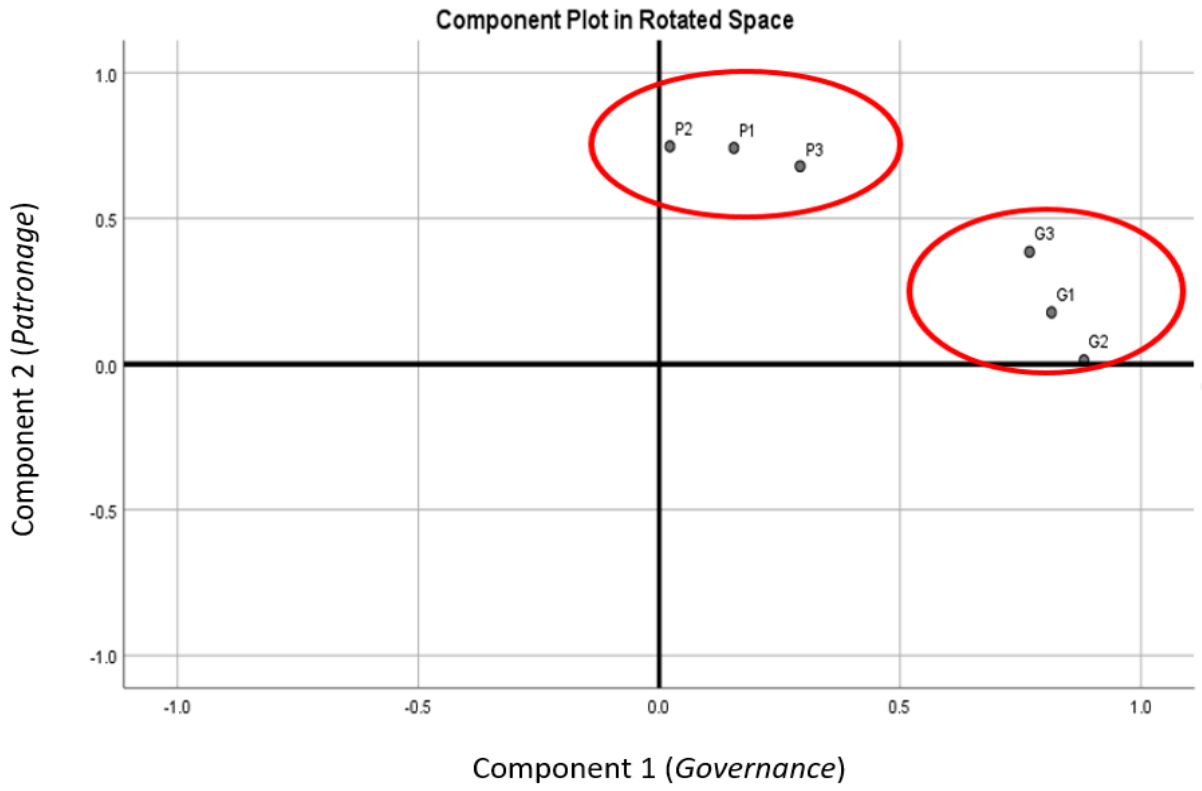
The Cronbach alpha of the six statements used to measure commitment to collective action was 0.72. Since this is greater than the accepted threshold of 0.70, they can all be considered reliable measures of the underlying construct, i.e. commitment to collective action. Excluding five of the statements resulted in a decrease in Cronbach alpha (Table 2), whereas deleting the statement *A good relationship with the cooperative is more important than a higher milk price*, resulted in a slight increase (0.73) (Table 2). However, since there was a positive correlation (0.29) with the total, and the increase in Cronbach alpha was only 0.01, all 6 statements were included in the analysis.

4.2.2 Principle Component Analysis of Commitment to Collective Action

Based on the principal component analysis (PCA), two components had eigen values greater than the cut-off value of one, and both components together explained 61.4% of the variance (Table 3). Consequently, we identified two constructs or latent variables or factors.

Based on the grouping of the statements, we identify that the three items (manifest variables) on governance (Reading the Co-operatives Annual report (G1), Attending Co-operatives meetings (G2) and Voting on Co-operative matters (G3)) load heavily on Component 1 (Figure 2). Similarly, we also identify that the three items (manifest variables) on patronage (Continue to sell to the Co-operative (P1), Milk price vs relationship with the Co-operative (P2), Investing in the Co-operative (P3), load heavily on Component 2 (Figure 2). Consequently, we name the latent variables captured by components 1 and 2 as *governance* and *patronage* respectively.

Figure 2. Principal Components of commitment to collective action



4.2.3 Descriptive Statistics for Commitment to Collective Action

The mean and median patronage score was 12.4 (SD = 3.6) and 13.0 respectively and ranged from 3 (n = 6) to 21 (n = 3). The mean (14.1, SD = 4.1) and median (15.0) governance score was slightly higher and also ranged from 3 (n = 8) to 21 (n = 16) (Table 4). Consequently, the mean and median CCA score was 26.5 (SD = 6.3) and 27.0 respectively and ranged from 6 (n = 1) to 42 (n = 1). The mean commitment to patronage, governance and collective action were 59.4%, 67.1% and 63.1% of the maximum possible score, respectively.

4.3 Descriptive Statistics for Control Variables

The mean age category of respondents was 4.2 (SD = 1.2) and the median was 4.0 (Table 1); these correspond to the 51- 60 years category. The mean production level category of respondents was 3.9 (SD = 1.6) and the median was 4.0 which equated to a production of 150,000 to 200,000 kg MS. This is similar to the New Zealand average (156,223 kg MS) for the 2016/17 season.

4.4 Relationships

4.4.1 Correlations

4.4.1.1 Commitment Variables

There was a significant (P < 0.01) and positive correlation (0.32) between commitment to patronage and commitment to governance. Affective commitment was significantly (P < 0.05) and positively correlated with both commitment to patronage (0.60) and commitment to governance (0.41) and therefore to commitment to collective action (0.62). Similarly, NC was significantly (P < 0.05) and positively correlated with both commitment to patronage (0.60) and commitment to governance (0.29) and therefore to commitment to collective action (0.57). However, the correlation between CC and commitment to patronage (-0.03), governance (-0.06) and collective action (-0.06) was not significant and weakly negative (Table 5).

There was a strong positive (0.57) and significant (P < 0.05) correlation between AC and NC (Table 5). The correlation between AC and CC was also significant (P < 0.05), but negative (-0.11). However, the correlation between CC and NC (P = 0.08) was not significant at 5% LOS and was weakly positive (0.07) (Table 5).

A categorisation of organisation commitment scores into high and low levels based on the mid-point score of 32.0, and a Cochran-Mantel-Haenszel test thereafter, reiterated that there was a significant association (P <0.05) between AC and CC, and also AC and NC, while the relationship between CC and NC was not significant. Interestingly, 19.2% (n = 109) of respondents had high levels of AC, CC and NC; while 10.9% (n = 62) had low levels of all three components of organisational commitment (Table 6A and Table 6B). Similarly, categorisation of patronage and governance scores into high and low levels based on the mid-point score of 12.0, showed that there was a significant association (P <0.05) between the two. 59.1% (n = 336) had high levels of patronage and governance, while 9.1% (n = 52) had low levels of both.

4.4.1.2 Control Variables & Commitment

Age was found to be significantly (positive) correlated (P < 0.05), to AC, NC, CCA and commitment to governance (Table 5). However, it was not correlated with CC and commitment to patronage. Production level was significantly (P < 0.05) correlated with (positive) AC,

(negative) CC, (positive) CCA and (positive) commitment to governance. It was not significantly correlated with NC and commitment to patronage.

4.4.2 Analysis of Variance

4.4.2.1 Organisational Commitment

Amongst the organisational commitment variables, there was a significant relationship ($P < 0.05$) between AC with both NC ($F= 7.01$) and CC ($F = 1.57$) (Table 5). However, there was no relationship between NC and CC ($F= 1.06$). With regards to the control variables, there was a significant relationship between ($P < 0.05$) AC and production volumes ($F = 3.16$). However, there was no significant relationship between ($P > 0.05$) AC and age ($F = 1.46$). Similarly, there was no significant relationship ($P > 0.05$) between CC and age ($F = 2.09$), but there was a significant relationship ($P < 0.05$) between CC and production volumes ($F = 4.31$). NC had no significant relationship ($P > 0.05$) with either age ($F = 1.62$), or production volumes ($F = 0.99$) (Table 5).

4.4.3 Regression Analysis

Three regression models with commitment to patronage ($R^2 = 0.46$), commitment to governance ($R^2 = 0.22$) and commitment to collective action ($R^2 = 0.44$) as dependent variables, was run (Table 7). AC showed a significant relationship ($P < 0.05$) with all three dependent variables, i.e. patronage ($\beta = 0.15$), governance ($\beta = 0.14$) and collective action ($\beta = 0.28$). NC showed a significant relationship ($P < 0.05$) with commitment to patronage ($\beta = 0.17$) and collective action ($\beta = 0.21$), but not with commitment to governance ($P = 0.08$). CC showed a negative but non-significant coefficient for all three dependent variables. Both the control variables, age and production volume, showed a significant relationship ($P < 0.05$) with commitment to governance and collective action, but not with patronage (Table 7).

5. Discussion

In this study we provided a description of the three forms of organisational commitment in co-operatives and explored the inter-relationship between them. We then unravelled commitment to collective action in agricultural co-operatives into commitment to patronage and commitment to governance; and provided a measure and explanation of these. Thereafter, we examined the relationship between organisational commitment and commitment to collective

action. In taking this approach, our study has generated some valuable insights that are useful in comprehending member commitment in co-operatives; and thereby aids in the understanding of the relationship between a member and his or her co-operative.

The finding that affective commitment was greater than both continuance commitment and normative commitment indicates that a members' desire or want to be a member of the cooperative is higher than either their need to be a member or sense of obligation to be a member. This finding brings into question the arguments of several scholars, that it is the economic or utilitarian aspects (continuance commitment) that is of most importance to members. Similar to our findings, Puusa et al. (2018) in their study of a retail co-operative in Finland, found that affective commitment levels were greater than both normative and continuance. The authors suggest that due to strong competition and the exchange costs being relatively low, continuance commitment has to some extent lost its meaning and is not enough; and therefore it is important for co-operatives to strive towards increasing their members´ affective commitment toward their co-operative (Puusa et al., 2018).

Although we found affective commitment levels to be higher than the other two, 26% of members had affective commitment levels that were lower than the scale mid-point. This proportion was greater for continuance (57%) and normative (48%) commitment. Further, the fact that 10.9% of respondents had low levels of all three forms, affective, continuance and normative, indicates that some degree of commitment risk exists for this co-operative. These finding, along with the findings on commitment to collective action levels should be of value to cooperative management as it could have implications on the co-operative's performance via free riding and exit by its members.

The results of the principal component analysis with the clear grouping of statements under one of two distinct components, reiterates our argument that commitment to collective action in agricultural co-operatives can be decoupled into two dimensions, commitment to patronage of the co-operative and commitment to governance of the co-operative. The significantly higher mean governance scores suggest that members are more committed towards governance of the co-operative than towards patronage of the co-operative.

As proposed in hypothesis 1 and 2, the significant and positive relationship between commitment to collective action and affective and normative commitment suggests that these two organisational commitment components are important drivers of commitment to collective

action. In contrast, economic or financial reasons, leading to an individual needing to be a member of the co-operative (continuance commitment), are not related to commitment to collective action. These findings are similar to that observed in a meta-analysis of organisational commitment studies performed by Meyer et al. (2002). The authors found that there was significant and positive correlation of both affective and normative commitment with organisational citizenship behaviour; whereas there was weak negative and non-significant correlation between continuance commitment and organisational citizenship behaviour (Meyer et al., 2002). Our findings are also in line with other studies that have found a significant relationship between affective commitment and favourable behaviour towards the organisation (Peng & Chiu, 2010; Rezaiean, Givi, Givi, & Nasrabadi, 2010; Barraud-Didier et al., 2012). Moreover, with relevance to co-operatives, these results are similar to the findings reported by Mazzarol, Soutar, and Mamouni Limnios (2019) that it is the "soft" (emotional) rather than "hard" (price) factors that are likely to be the key drivers of member loyalty in co-operatives. Similarly, Byrne and McCarthy (2014) found that those who express relational value dominance are more likely to be active patrons of a credit union. It is therefore the emotional attachment to the co-operative, leading to a want or desire to be a member; and the sense of obligation that results in members perceiving that being a member of the co-operative is the moral and right thing to do, which influence commitment to collective action. Importantly, this suggests that strengthening affective and normative commitment, will lead to members sacrificing short term economic gains in favour of long-term performance of the co-operative; and also overcoming the free rider problem in co-operatives. Furthermore, findings suggest that improving the utilitarian aspects of member commitment will have no influence or effect on a member's commitment to collective action. Although this finding is not in line with our proposed hypothesis 3 (significant but negative relationship between continuance commitment and commitment to collective action), it is similar to the study by Barraud-Didier et al. (2012) who showed that there was no relationship between continuance commitment and participation in governance in co-operatives. The exact nature of the relationship between continuance commitment and favourable behaviour towards the organisation is still unclear. Some studies have shown a significant negative relationship, while others, like our own study, have found no relationship (Meyer et al., 2002).

More importantly there was a significant positive relationship between affective commitment and both the components of commitment to collective action, while normative commitment had a significant positive relationship with one component, commitment to patronage. These

findings are in line with arguments and findings reported by several scholars (Jussila, Byrne, et al., 2012; Jussila et al., 2014; Talonen, Jussila, Saarijärvi, & Rintamäki, 2016; Limnios et al., 2018). It suggests that strengthening affective commitment in the co-operative will result in improved patronage and increased participation in governance, while strengthening normative commitment could lead to improved patronage but not governance. For the co-operative, this implies that strengthening affective and normative commitment within its membership base would reduce the risks and challenges associated with: losing or decreasing supply, deterioration of the relationship between members and the co-operative, raising capital from its membership. Additionally, reinforcing affective commitment would also reduce the risks and challenges associated with: members staying poorly informed about the co-operative, not attending co-operative meetings and not voting on co-operative matters. These findings reinforce the point made by Jussila, Byrne, et al. (2012) that affective commitment is a key factor in alleviating the generic problems challenging co-operatives.

Utilitarian reasons (continuance commitment) were not related to either commitment to patronage or commitment to governance, indicating that commitment to collective action within the membership base of the co-operative cannot be improved by providing purely utilitarian benefits. While competitive costs and pricing, or plus attractive dividends, or quality and efficiency in service delivery, are important for members and can form the foundation of a strong member value proposition (MVP), it is the intangible emotional and affective attributes that are likely to provide the critical elements needed to maintain loyalty and commitment (Jussila, Byrne, et al., 2012; Limnios et al., 2018). This is because a critical element of the co-operative business model is its ability to develop and deliver a clear member value proposition that is in line with the co-operatives purpose, resonates with members and is sustainable (Limnios et al., 2018). As the perception of value is associated with both utilitarian (i.e. function and financial dimensions), and hedonic factors (i.e. emotional and social dimensions) (Talonen et al., 2016), the MVP offered to co-operative members should not necessarily be founded exclusively on financial and functional dimensions.

The significant relationship and positive correlation between control variables age and production volumes with commitment to governance as well as commitment to collective action aligns with arguments presented by other scholars. Fulton (1999) suggested that younger farmers are less committed because ideological reasons are of less importance to them than older members. Furthermore, as younger members are more likely to have a slant towards

individualistic values, they are more likely to free ride and take advantage of the public goods provided by the co-operative (Fulton & Adamowicz, 1993). It is also possible that older farmers are more likely to have developed a strong bond with the co-operative, obtained a better understanding of the co-operative model and possess an implicit appreciation of the importance of commitment to collective action. Similarly, Jussila, Goel, et al. (2012a)) suggested that the proportion of the members income derived from the co-operative has a significant bearing on commitment. Members with greater production volumes are more likely to obtain a greater proportion (and magnitude) of their income from the co-operative and could therefore have higher levels of commitment. However, the significant relationship and negative correlation between production volumes and continuance commitment suggests the smaller farms are more aligned with the perceived costs commitments than the emotional or obligation commitments. This finding contradicts other co-operative scholars who argue that larger farmers are likely to be less committed to collective action or loyal (Ollila, Nilsson, & von Brömssen, 2012; Cechin et al., 2013).

The strong positive relationship between the affective and normative components, as proposed in hypothesis 4 was expected, and in line with other studies on organisational commitment (Meyer et al., 2002; Chen & Francesco, 2003; Mindy, 2006; Keiningham et al., 2015). This finding indicates that an increase in one will result in an increase in the other. Suggesting that higher the affective or emotive attachment a member has to the co-operative, the greater is the sense of obligation or normative basis for being a member. Similarly, it also indicates that the erosion of one form could possibly lead to a decrease in the other as well. The weak but significant and negative relationship between affective and continuance components, as proposed in hypothesis 5, is also expected. As explained earlier, greater the need (utilitarian reasons) to be a member, the lesser is the want (emotive reasons) to be a member of the co-operative. This finding suggests that by increasing affective commitment within the membership base, the co-operative can decrease continuance commitment. It also suggests that any increase in continuance commitment has the potential to further erode affective commitment within the membership base. The lack of relationship and weak positive correlation between normative and continuance components is not in line with hypothesis 6. This suggests that the utilitarian reasons (or need to be a member) are not related to normative reasons (or an obligation to be a member) for membership of the co-operative. This finding re-iterates the importance of measuring normative commitment rather than assuming the high correlation between normative and affective commitment would result in identical findings for

both. As norms influencing normative commitment are situation-specific, the specific context of a co-operative or sector need to be considered as well. Similar to the findings and recommendation of Keiningham et al. (2015), these results also show that the goal of managers should be to optimize each dimension of commitment rather than simply maximize overall commitment.

Several scholars have explored the phenomenon of managing and improving an employee's organisational commitment (Nyhan, 1999; Meyer & Smith, 2000; Whitener, 2001; Bikker, 2016). Given the importance of member commitment in co-operatives, it would be valuable if the management placed emphasis on developing similar structures to manage and improve organisational commitment of their members. Drawing from the literature on employee organisational commitment, few of the ways by which the co-operative can possibly achieve this is by 1) providing members with increased participation in decision making (Zeidan, 2006), 2) showing greater recognition and appreciation of its members (Zeidan, 2006), 3) providing training and development for its members (Liden, Wayne, & Sparrowe, 2000), 4) ensuring effective and constructive communication with members (Van Den Hooff & De Ridder, 2004), 5) creating a sense of community within the membership base (Dessler, 1999), and 6) building an environment wherein member perceive that they and their businesses are safe and secure (Pfeffer & Jeffrey, 1998). With specific relevance to co-operatives, Bijman and Verhees (2011) argue that strengthening hierarchy mechanisms in a co-operative might eventually erode the commitment of the members and could lead to the collapse of the co-operative. This is because approaches to deal with opportunism might destroy intrinsic motivation and result in further increased rather than decreased opportunism (Ghoshal & Moran, 1996). Especially in co-operatives, where the relationship between the principal (manager) and agent (farmer) is personal, the agent can perceive increased monitoring as an indication of distrust and this could result in an reduction in effort by the farmer (Frey, 1994). Further, in co-operatives, Trechter et al. (2002) found that good communication with the managers of the co-operative is strongly and positively related to member commitment. According to Pesämaa, Pieper, Da Silva, Black, and Hair Jr (2013) and Gupta (2014) the communication of member-ownership and the inherent democracy of most co-operatives can be a key element in building affective attachment and helping maintain member loyalty. Similarly Jussila, Byrne, et al. (2012), suggest that member ownership and democratic governance, as well as the focus of co-operatives on communicating with members and engendering a sense of common purpose, have also been noted as factors likely to enhance affective commitment.

6. Conclusion, Implications and Limitations

This study makes several significant empirical and theoretical contributions. As mentioned earlier, this study is one of few empirical assessments of organisational commitment and commitment to collective action in co-operatives. While the conceptual literature in co-operatives on member commitment has recognized the role and importance of organisational commitment and to a lesser extent commitment to collective action, quantitative studies of the phenomenon have not followed. This study provides valuable empirical insight that is overdue. The paper also fills an important gap in the literature by recognising the importance of organisation commitment and commitment to collective action in agricultural co-operatives and makes an important contribution towards examining agricultural co-operatives from a socio-psychological perspective. It thereby enhances the understanding of member and co-operative relationships in agricultural co-operatives. The research also presents a rigorous framework and instrument for understanding and measuring the relationship between member and the co-operative. Such member commitment models may be a powerful means of explaining many aspects of member organization relationships. Moreover, by measuring organisational commitment and commitment to collective action it provides a means to monitor member commitment in the co-operative over time, and also for examining the effects of the co-operatives strategies or policies on member commitment. Our study therefore provides an actionable blueprint for a co-operative's member commitment strategy.

As such, the findings support the core proposition of this paper—that organisational commitment has a significant effect on commitment to collective action and forms the foundation for members' relationships with their co-operatives. It was demonstrated that a member's affective and normative commitment influenced their commitment to collective action, while a member's continuance commitment did not. The main implication for managers and board members of agricultural co-operatives is that commitment to collective action can be strengthened by focusing the co-operative's efforts towards recognising and reinforcing affective and normative commitment. That is, members are more likely to make short term sacrifices and put in a sincere effort towards ensuring good long term performance of the co-operative, if they feel a strong want or desire to be a member, and if they believe that being a member of the co-operative is the right and moral thing to do. More importantly, since utilitarian reasons or the need to be a member of the co-operative (continuance commitment) has no relationship with commitment to collective action, focusing on improving purely

utilitarian (economic) aspects may not be of much value, if the aim is to improve commitment to collective action. Finally, by strengthening affective commitment within the membership base, the co-operative can not only reap the benefits that increased affective commitment directly present, but also benefit from a consequent potential increase in normative commitment.

For management of agricultural co-operatives, these findings indicate the importance of not focusing only on offering competitive pricing and excellent service to members. While these are important and necessary foundations for member loyalty and co-operative success, the members' sense of emotional value and affective commitment are also very important drivers of success. It is therefore vital to create conditions that nurture or strengthen affective and normative commitment because these are a source of favourable behaviours by members. Although the economic objectives of co-operative are important, it must not neglect its social relationship with its members. Furthermore, it is vital that managers understand that there are differences among the various commitment types and more importantly do not make the mistake of treating them as interchangeable. Instead, they can strengthen member commitment by differentially allocating resources to manage each type of commitment in a context-specific manner. However, without understanding each commitment type, its associated costs and benefits and its effect on member commitment in co-operatives, managers can end up over or underinvesting in resources. Our results provide an initial step toward developing such a strategic roadmap for managing member commitment. It is recommended that the co-operative include member commitment as a key performance indicator and measure and monitor it regularly by developing a member commitment dashboard. Furthermore, it is suggested that management should be incentivised to strengthen member commitment, specifically affective commitment.

Limitations: This study was conducted at a single point in time and was a cross-sectional analysis of one co-operative. It is important to note that the relationship between a member and the co-operative is a dynamic one and a member's psychological state and attitude towards the co-operative could be different at various points of the relationship. As a result, the research does not throw light on any changes in the relationships between organisational commitment and commitment to collective action; and between the three forms of organisational commitment that occurs over time. Therefore, a longitudinal study that takes into account the evolution and variability in a members psychological state would be valuable. Secondly, since

this research focused on only one co-operative (Fonterra), agricultural sector (dairy), and nation (NZ) generalizations of the findings, especially to non-dairy co-operatives need to be made with caution. Despite these limitations, this research provides some meaningful contributions towards the understanding of member commitment in agricultural cooperatives. The empirical research on member commitment in agricultural cooperatives is still in its infancy and many interesting questions remain to be addressed. Future research should also consider making comparisons between co-operative members and IOF suppliers or customers, to identify similarities or differences between these two groups in relation to affective, normative and continuance commitment.

References

Achrol, R. S., Reve, T., & Stern, L. W. (1983). The Environment of Marketing Channel Dyads: A Framework for Comparative Analysis. *47*(4), 55-67. doi:10.1177/002224298304700407

Allen, N., & Meyer, J. (1990). The measurement and antecedents of affective, continuance and normative commitment to the organization. *Journal of occupational psychology, 63*(1), 1-18.

Anderson, B., & Henehan, B. (2005). What Gives Cooperatives a Bad Name? *International Journal of Co-operative Management, 2*(2), 9-15.

Anderson, E., & Weitz, B. (1992). The Use of Pledges to Build and Sustain Commitment in Distribution Channels. *Journal of Marketing Research, 29*(1), 18-34. doi:10.2307/3172490

Apparao, D., Garnevska, E., & Shadbolt, N. (2019). Examining commitment, heterogeneity and social capital within the membership base of agricultural co-operatives—A conceptual framework. *Journal of Co-operative Organization Management, 7*(1), 42-50.

Barraud-Didier, V., Henninger, M.-C., & El Akremi, A. (2012). The relationship between members' trust and participation in the governance of cooperatives: The role of organizational commitment. *International Food and Agribusiness Management Review, 15*(1), 1-24.

Becker, H. S. (1960). Notes on the concept of commitment. *American journal of sociology*, 32-40.

Best, P. W. (1994). *Locus of control, personal commitment and commitment to the organization.* (Doctor of Philosophy). University of South Africa,

Bhuyan, S. (2007). The "people" factor in cooperatives: an analysis of members' attitudes and behavior. *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie, 55*(3), 275-298.

Bijman, J., & Verhees, F. (2011). *Member or customer? Farmer commitment to supply cooperatives.* Paper presented at the International Conference on the Economics and Management of Networks (EMNet), Limassol, Cyprus.

Bikker, W. (2016). *How to improve organizational commitment among young employees by means of HRM.* (BSc in Management Studies). Wageningen University

Birchall, J., & Simmons, R. A. (2004). What motivates members to participate in co-operative and mutual businesses? *Annals of Public & Cooperative Economics, 75*(3), 465-495.

Bouamra-Mechemache, Z., & Zago, A. (2015). Introduction: Collective action in agriculture. *European Review of Agricultural Economics, 42*(5), 707-711. doi:10.1093/erae/jbv027

Buchanan, B. (1974). Building Organizational Commitment: The Socialization of Managers in Work Organizations. *Administrative science quarterly, 19*(4), 533-546. doi:10.2307/2391809

Byrne, N., & McCarthy, O. (2005). An analysis of the credit union's use of Craig's commitment building measures. *Journal of Co-operative Studies, 38*(1), 20-27.

Byrne, N., & McCarthy, O. (2014). Value proposition preferences of credit union members and patronage activity. *The International Journal of Bank Marketing, 32*(6), 567-589.

Byrne, N., McCarthy, O., Ward, M., & McMurtry, J. (2012). Credit Union Restructuring: Don't forget the member! *International Journal of Co-operative Management, 6*(1.1), 33-41.

Cechin, A., Bijman, J., Pascucci, S., & Omta, O. (2013). Decomposing the Member Relationship in Agricultural Cooperatives: Implications for Commitment. *Agribusiness, 29*(1), 39-61. doi:10.1002/agr.21321

Chaddad, F. R. (2007). *The evolution of Brazilian dairy cooperatives: A life cycle approach.* Paper presented at the XLV Congresso Da Sober," Conhecimentos para Agricultura do Futuro", Londrina.

Chen, Z. X., & Francesco, A. M. (2003). The Relationship between the Three Components of Commitment and Employee Performance in China. *Journal of vocational behavior, 62*, 490-510. doi:10.1016/S0001-8791(02)00064-7

Cook, M. L. (1995). The Future of U.S. Agricultural Cooperatives: A Neo-Institutional Approach. *American Journal of Agricultural Economics, 77*(5), 1153-1159. doi:10.2307/1243338

Dessler, G. (1999). How to earn your employees' commitment. *Academy of Management Perspectives, 13*(2), 58-67.

Farrell, D., & Rusbult, C. E. (1981). Exchange variables as predictors of job satisfaction, job commitment, and turnover: The impact of rewards, costs, alternatives, and investments. *Organizational behavior and human performance, 28*(1), 78-95.

Firestone, W. A., & Pennell, J. R. (1993). Teacher commitment, working conditions, and differential incentive policies. *Review of educational research, 63*(4), 489-525.

Foreman, P., & Whetten, D. A. (2002). Members' identification with multiple-identity organizations. *Organization Science, 13*(6), 618-635.

Frey, B. S. (1994). How intrinsic motivation is crowded out and in. *Rationality and society, 6*(3), 334-352.

Fulton, J., & Adamowicz, W. (1993). Factors that influence the commitment of members to their cooperative organization. *Journal of Agricultural Cooperation, 8*, 39-53.

Fulton, M. (1995). The future of Canadian agricultural cooperatives: A property rights approach. *American Journal of Agricultural Economics, 77*(5), 1144-1152.

Fulton, M. (1999). Cooperatives and member commitment. *LTA, 4*(99), 418-437.

Fulton, M., & Giannakas, K. (2001). Cooperatives and Membership Commitment: Organizational Commitment in a Mixed Oligopoly: Agricultural Cooperatives and Investor-Owned Firms. *American Journal of Agricultural Economics, 83*(5), 1258.

Garnevska, E., Callagher, L., Apparao, M., Shadbolt, N., & Siedlok, F. (2017). *The New Zealand Co-operative Economy*. Retrieved from New Zealand: https://nz.coop/wp-content/uploads/2017/01/Co-op-report-v9-WEB.pdf

Ghoshal, S., & Moran, P. (1996). Bad for practice: A critique of the transaction cost theory. *Academy of Management review, 21*(1), 13-47.

Gouldner, H. P. (1960). Dimensions of organizational commitment. *Administrative science quarterly*, 468-490.

Gounaris, S. P. (2005). Trust and commitment influences on customer retention: insights from business-to-business services. *Journal of Business Research, 58*(2), 126-140. doi:http://dx.doi.org/10.1016/S0148-2963(03)00122-X

Gray, T. W., & Kraenzle, C. A. (1998). *Member participation in agricultural cooperatives: A regression and scale analysis*: United States Department of Agriculture, Rural Development, Rural Business-Cooperative Service.

Gundlach, G. T., Achrol, R. S., & Mentzer, J. T. (1995). The Structure of Commitment in Exchange. *Journal of Marketing, 59*(1), 78-92. doi:10.2307/1252016

Gupta, C. (2014). The co-operative model as a 'living experiment in democracy'. *Journal of Co-operative Organization and Management, 2*(2), 98-107.

Hansen, M. H., Morrow, J., & Batista, J. C. (2002). The impact of trust on cooperative membership retention, performance, and satisfaction: an exploratory study. *The International Food and Agribusiness Management Review, 5*(1), 41-59.

Jiménez, M. C. R., Martí, E. G., & Ortiz, M. J. H. (2010). Member commitment in olive oil co-operatives: Cause and consequences. *Journal of Co-operative Studies, 43*(2), 24-35.

Jussila, I., Byrne, N., & Tuominen, H. (2012). Affective commitment in co-operative organizations: What makes members want to stay? *International Business Research, 5*(10), 1.

Jussila, I., Goel, S., & Tuominen, H. (2012a). Member commitment in co-operatives: The utilitarian approach. *Business and Management Research, 1*(3).
Jussila, I., Goel, S., & Tuominen, P. (2012b). Governance of co-operative organizations: A social exchange perspective. *Business and Management Research, 1*(2), 14-25.
Jussila, I., Roessl, D., & Tuominen, T. (2014). Should I Stay or Should I Go? Normative Member Commitment in Co-operatives. *International Journal of Marketing Studies, 6*(6), 26.
Jussila, I., & Tuominen, P. (2010). Exploring the consumer co-operative relationship with their members: an individual psychological perspective on ownership. *International Journal of Co-operative Management, 5*(1), 23-33.
Keiningham, T., Ball, J., Benoit, S., Bruce, H. L., Buoye, A., Dzenkovska, J., . . . Zaki, M. (2017). The interplay of customer experience and commitment. *Journal of Services Marketing, 31*(2), 148-160.
Keiningham, T. L., Frennea, C. M., Aksoy, L., Buoye, A., & Mittal, V. (2015). A five-component customer commitment model: implications for repurchase intentions in goods and services industries. *Journal of Service Research, 18*(4), 433-450.
Klein, K. K., Richards, T. J., & Walburger, A. (1997). Determinants of co-operative patronage in Alberta. *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie, 45*(2), 93–110.
Lang, K., & Fulton, M. (2004). Member commitment and the market and financial performance of the Saskatchewan Wheat Pool. *Current Agriculture, Food and Resource Ideas, 5*, 238-252.
Liden, R. C., Wayne, S. J., & Sparrowe, R. T. (2000). An examination of the mediating role of psychological empowerment on the relations between the job, interpersonal relationships, and work outcomes. *Journal of applied psychology, 85*(3), 407.
Limnios, E. M., Mazzarol, T., Soutar, G. N., & Siddique, K. H. (2018). The member wears Four Hats: A member identification framework for co-operative enterprises. *Journal of Co-operative Organization and Management, 6*(1), 20-33.
Lind, L. W., & Åkesson, E. (2005). Pig Producers' Choice of Slaughterhouse: co-operative or investor-owned? 14. *International Journal of Co-operative Management, 14*, 40.
Mäkelä, M. M., & Maula, M. V. J. (2006). Interorganizational Commitment in Syndicated Cross-Border Venture Capital Investments. *Entrepreneurship Theory and Practice, 30*(2), 273-298. doi:10.1111/j.1540-6520.2006.00121.x
Mazzarol, T., Soutar, G., & Mamouni Limnios, E. (2019). Member loyalty and WOM in co-operative and mutual enterprises. *Journal of Services Marketing, 33*(3), 303-315. doi:10.1108/JSM-07-2018-0195
Mazzarol, T., Soutar, G. N., & Limnios, E. M. (2012). *Member Loyalty in Co-operative Enterprises: A Preliminary Assessment.* Paper presented at the 26th Annual ANZAM Conference.
Meyer, J., & Allen, N. (1987). A longitudinal analysis of the early development and consequences of organizational commitment. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement, 19*(2), 199.
Meyer, J., & Allen, N. (1991). A three-component conceptualization of organizational commitment. *Human resource management review, 1*(1), 61-89.
Meyer, J., & Herscovitch, L. (2001). Commitment in the workplace: Toward a general model. *Human resource management review, 11*(3), 299-326.
Meyer, J., & Smith, C. (2000). HRM practices and organizational commitment: Test of a mediation model. *Canadian Journal of Administrative Sciences/Revue canadienne des sciences de l'administration, 17*(4), 319-331.
Meyer, J., Stanley, D., Herscovitch, L., & Topolnytsky, L. (2002). Affective, Continuance, and Normative Commitment to the Organization: A Meta-analysis of Antecedents, Correlates, and Consequences. *Journal of vocational behavior, 61*(1), 20-52. doi:http://dx.doi.org/10.1006/jvbe.2001.1842
Meyer, J. P., Allen, N. J., & Gellatly, I. R. (1990). Affective and continuance commitment to the organization: Evaluation of measures and analysis of concurrent and time-lagged relations. *Journal of applied psychology, 75*(6), 710.
Mindy, E. B. (2006). The Relationship between Affective and Normative Commitment: Review and Research Agenda. *Journal of Organizational Behavior, 27*(5), 645-663.

Morgan, R. M., & Hunt, S. D. (1994). The Commitment-Trust Theory of Relationship Marketing. *Journal of Marketing, 58*(3), 20-38. doi:10.2307/1252308

Mukherjee, A., & Nath, P. (2007). Role of electronic trust in online retailing: A re-examination of the commitment-trust theory. *European Journal of Marketing, 41*(9/10), 1173-1202. doi:10.1108/03090560710773390

Nelson, T., Nelson, D., Huybrechts, B., Dufays, F., O'Shea, N., & Trasciani, G. (2016). Emergent identity formation and the co-operative: theory building in relation to alternative organizational forms. *Entrepreneurship & Regional Development, 28*(3-4), 286-309.

Nyhan, R. (1999). *Increasing Affective Organizational Commitment in Public Organizations: The Key Role of Interpersonal Trust* (Vol. 19).

O'Reilly, C. A., & Chatman, J. (1986). Organizational commitment and psychological attachment: The effects of compliance, identification, and internalization on prosocial behavior. *Journal of applied psychology, 71*(3), 492-499. doi:10.1037/0021-9010.71.3.492

Ollila, P., Nilsson, J., & von Brömssen, C. (2012). *Characteristics of membership in agricultural cooperatives.* Paper presented at the Proceedings of International Conference" Cooperative Responses and Global Challenges", Humbolt University.

Olson, M. (1971). *The logic of collective action; public goods and the theory of groups*: Cambridge, Mass., Harvard University Press [1971].

Organ, D. W. (1988). *Organizational citizenship behavior: The good soldier syndrome*: Lexington Books/DC Heath and Com.

Organ, D. W., Podsakoff, P. M., & MacKenzie, S. B. (2005). *Organizational citizenship behavior: Its nature, antecedents, and consequences*: Sage Publications.

Österberg, P., & Nilsson, J. (2009). Members' perception of their participation in the governance of cooperatives: the key to trust and commitment in agricultural cooperatives. *Agribusiness, 25*(2), 181-197.

Palmer, A. (2002). Cooperative marketing associations: an investigation into the causes of effectiveness. *Journal of Strategic Marketing, 10*(2), 135-156. doi:10.1080/09652540210125288

Peng, J.-C., & Chiu, S.-F. (2010). An integrative model linking feedback environment and organizational citizenship behavior. *The Journal of Social Psychology, 150*(6), 582-607.

Pesämaa, O., Pieper, T., Da Silva, R. V., Black, W. C., & Hair Jr, J. F. (2013). Trust and reciprocity in building inter-personal and inter-organizational commitment in small business co-operatives. *Journal of Co-operative Organization and Management, 1*(2), 81-92.

Pfeffer, J., & Jeffrey, P. (1998). *The human equation: Building profits by putting people first*: Harvard Business Press.

Podsakoff, N. P., Whiting, S. W., Podsakoff, P. M., & Blume, B. D. (2009). Individual-and organizational-level consequences of organizational citizenship behaviors: A meta-analysis. *Journal of applied Psychology, 94*(1), 122.

Porter, L. W., Steers, R. M., Mowday, R. T., & Boulian, P. V. (1974). Organizational commitment, job satisfaction, and turnover among psychiatric technicians. *Journal of applied psychology, 59*(5), 603.

Puusa, A., Tuominen, P., & Havukainen, M. (2018). The interrelations between member-commitment, trust, satisfaction and loyalty in a cooperative context. *International Journal of Co-operative Accounting and Management, 1*(1), 35-44.

Rezaiean, A., Givi, M., Givi, H., & Nasrabadi, M. B. (2010). The relationship between organizational justice and organizational citizenship behaviors: the mediating role of organizational commitment, satisfaction and trust. *Research Journal of Business Management, 4*(2), 112-120.

Røkholt, P. O. (1999). *Strengths and weaknesses of the co-operative form; A Matter of Perspective and Opinion.* Paper presented at the ICA International Research Conference, Quebec.

Rusbult, C. E., & Farrell, D. (1983). A longitudinal test of the investment model: The impact on job satisfaction, job commitment, and turnover of variations in rewards, costs, alternatives, and investments. *Journal of applied psychology, 68*(3), 429.

Scheer, L. K., & Stern, L. W. (1992). The effect of influence type and performance outcomes on attitude toward the influencer. *Journal of Marketing Research*, 128-142.

Shadbolt, N., & Duncan, A. (2016). Perspectives from the Ground: Fonterra Co-operative Case Study. In C. Tan Suee & W. Chuin Ting (Eds.), *The Capital Conundrum of Cooperatives* (pp. 95-104): International Coopeartive Alliance.

Shadbolt, N. M., & Apparao, D. (2016). Factors Influencing the Dairy Trade from New Zealand. *International Food and Agribusiness Management Review, 19*(B), 241-255.

Solinger, O. N., Van Olffen, W., & Roe, R. A. (2008). Beyond the three-component model of organizational commitment. *Journal of applied psychology, 93*(1), 70.

Spear, R. (2000). The co-operative advantage. *Annals of Public and Cooperative Economics, 71*(4), 507-523.

Staatz, J. M. (1989). *Farmer Cooperative Theory: Recent Developments*. (84). Washington, D.C: United States Department of Agriculture

Stebbins, R. A. (1970). On misunderstanding the concept of commitment: A theoretical clarification. *Soc. F., 48*, 526.

Talonen, A., Jussila, I., Saarijärvi, H., & Rintamäki, T. (2016). Consumer cooperatives: Uncovering the value potential of customer ownership. *AMS review, 6*(3-4), 142-156.

Trechter, D. D., King, R. P., & Walsh, L. (2002). Using communications to influence member commitment in cooperatives. *Journal of Cooperatives, 17*.

Van Den Hooff, B., & De Ridder, J. A. (2004). Knowledge sharing in context: the influence of organizational commitment, communication climate and CMC use on knowledge sharing. *Journal of Knowledge Management, 8*(6), 117-130.

Whitener, E. M. (2001). Do "high commitment" human resource practices affect employee commitment? A cross-level analysis using hierarchical linear modeling. *Journal of Management, 27*(5), 515-535.

Whitman, D. S., Van Rooy, D. L., & Viswesvaran, C. (2010). Satisfaction, citizenship behaviors, and performance in work units: A meta-analysis of collective construct relations. *Personnel psychology, 63*(1), 41-81.

Wiener, Y. (1982). Commitment in organizations: A normative view. *Academy of Management review, 7*(3), 418-428.

Zeidan, S. (2006). *The relationship between high commitment management and employee attitudes and behaviours: the role of psychological contract fulfilment and justice.* (Doctor of Philosophy Doctoral Dissertation). Victoria University,

Zeuli, K. A., & Cropp, R. (2004). *Cooperatives: Principles and practices in the 21st century*. Retrieved from Madison, Wisconsin: http://learningstore.uwex.edu/assets/pdfs/A1457.PDF

Table 1: Descriptive statistics – Organisational Commitment and Control Variables

	N	Mean (% of Max Score)	SD	Median	Quartile 1	Quartile 3	Cronbach Alpha
Affective Commitment	568	37.8 (67.5)	9.7	39.0	31.0	45.0	0.87
Continuance Commitment	568	30.2 (53.9)	9.0	29.0	23.0	37.0	0.75
Normative Commitment	568	31.7 (56.6)	8.1	32.0	26.0	37.0	0.76
Age	564	4.2	1.2	4.0	3.0	5.0	NA
Production Level	565	3.9	1.6	4.0	2.0	6.0	NA

Table 2: Cronbach Alpha of Commitment to Collective Action (CCA) with items excluded

	Item Excluded	Correlation with Total	Cronbach Alpha
1.	Continue to sell milk to Co-op even if another company offers a higher price	0.38	0.68
2.	A good relationship with the cooperative is more important than a higher milk price	0.29	0.73
3.	Willing to invest in the Co-op	0.46	0.65
4.	Reading the Co-ops Annual report every year	0.44	0.66
5.	Attending Co-op meetings	0.57	0.62
6.	Voting on Co-op matters	0.46	0.65

Table 3: PCA - Extraction Sums of Squared Loadings

Components	Total Eigenvalues	% of Variance	Cumulative %
1	2.47	41.2	41.2
2	1.21	20.2	61.4

Table 4: Descriptive Statistics – Commitment to Collective Action

	N	Mean (% of Max Score)	SD	Median	Quartile 1	Quartile 3
Commitment to Collective Action	568	26.5 (63.1%)	6.3	27.0	22.0	31.0
Commitment to Patronage	568	12.4 (59.4%)	3.6	13.0	10.0	15.0
Commitment to Governance	568	14.1 (67.7%)	4.1	15.0	11.0	18.0

Table 5: Correlations and ANOVA Results for Affective Commitment, Normative Commitment, Continuance Commitment, Commitment to Patronage, Commitment to Governance, Commitment to Collective Action and Control Variables

	Age	**Production Level**	**AC**	**CC**	**NC**	**CP**	**CG**	**CCA**
Age	1							
Production Level	-0.02	1						
Affective Commitment (AC)	0.08*	0.14**	1					
	(1.46)	(3.16) **						
Continuance Commitment (CC)	0.01	-0.17**	-0.11**	1				

	(2.09)	(4.31) **	(1.57) *					
Normative Commitment (NC)	0.10*	0.06	0.57**	0.08*	1			
	(1.62)	(0.99)	(7.01) **	(1.06)				
Commitment to Patronage (CP)	0.06	0.05	0.60**	-0.03	0.60**	1		
Commitment to Governance (CG)	0.19**	0.21**	0.41**	-0.06	0.29**	0.32**	1	
Commitment to Collective Action (CCA)	0.16**	0.17**	0.62**	-0.06	0.54**	0.78**	0.84**	1

( ) ANOVA F statistic in parenthesis
*** P < 0.05, ** P < 0.01**

Table 6A: High Levels of Affective Commitment (n = 422)

		Continuance Commitment	
		High	Low
Normative Commitment	High	109 (19.2%)	58 (10.2%)
	Low	155 (27.3%)	100 (17.6%)

Table 6B: Low Levels of Affective Commitment (n = 146)

		Continuance Commitment	
		High	Low
Normative Commitment	High	21 (3.7%)	54 (9.5%)
	Low	9 (1.6%)	62 (10.9%)

Table 7: Regression Analysis

	Dependent Variable					
	Commitment to Patronage		Commitment to Governance		Commitment to Collective Action	
Independent Variables	*B*	SE	*B*	SE	*B*	SE
Organisational Commitment						
• Affective Commitment	0.15*	0.01	0.14*	0.02	0.28*	0.02
• Continuance Commitment	-0.00	0.01	-0.00	0.01	-0.01	0.02
• Normative Commitment	0.17*	0.01	0.04	0.02	0.21*	0.03
Control Variables						
• Age	-0.02	0.09	0.56*	0.14	0.52*	0.17
• Production Volume	-0.07	0.07	0.42*	0.10	0.34*	0.13
R^2	0.46		0.22		0.44	

*** P < 0.05**

Chapter 4: Heterogeneity and Commitment to Collective Action: An empirical study of a New Zealand dairy co-operative

This chapter addresses research objective 3 and the manuscript has been accepted for publication in the International Journal of Co-operative Accounting and Management (IJCAM). The IJCAM is a product of the merger of the Journal of Co-operative Accounting and Reporting (JCAR) with the International Journal of Co-operative Management (IJCM). It is a co-operatives specific journal and explores a wide range of topics related to the accounting and management of co-operatives. The journal is attached to the Centre of Excellence in Accounting and Reporting for Co-operatives (CEARC) at the Sobey School of Business, St Mary's University, Canada. The CEARC actively researches Co-operative Performance Indicators with a current research project being on the *Non-Financial Impact Assessment for Co-operatives: Demonstrating the Co-operative Difference*. As this manuscript explores and assesses the non-financial aspects that influence co-operative performance, it is well aligned and relevant to IJCAM.

Abstract

This paper presents and empirically tests a novel framework that links member heterogeneity with member commitment to collective action (CCA). Member heterogeneity was first decoupled into three dimensions – 1) farmer-member, 2) farm-business and 3) member-interest and was then linked to CCA and the two components that comprise it - 1) commitment to patronage (CP) and 2) commitment to governance (CG). Following which the framework was assessed by performing an empirical study of 568 members of Fonterra Co-operative Group. A total of 35 sources of heterogeneity, 9 farmer-member, 14 farm-business and 12 member-interest were used to measure heterogeneity. The study found that the membership base of this co-operative was heterogeneous because a high level of heterogeneity was found in all three dimensions - farmer-member (66%), farm-business (64%) and member-interest (83%). Moreover, as the CCA level was also high, it tends to suggest that high heterogeneity does not lead to low commitment to collective action. Several of the 35 sources showed a significant difference in CCA (n = 18), CG (n = 20) and CP (n = 12) between groups that comprised them. Further, our findings tend to indicate that there is a relationship between the farm-business and member-interest dimensions of heterogeneity and CCA, CG and CP but not the farmer-member dimension.

Keywords: Commitment, Collective Action, Heterogeneity, Governance, Performance, Dairy, Co-operative

1. Introduction

As voluntary organizations, co-operatives are based on a democratic decision-making process that rests upon collective participation, cohesion among members, and balance of countervailing powers (Hendrikse & Bijman, 2002). In agricultural co-operatives, an essential element for success is that the farmer-members are willing to supply the co-operatives with raw products, capital, and managerial inputs (Fulton, 1999). For this to take place member commitment is important (Staatz, 1989; Anderson & Henehan, 2005). In other words, success of the co-operative depends on the members commitment to collective action; wherein collective action refers to initiatives taken by an identifiable group to realize their common interests (Gray & Kraenzle, 1998).

However, farmers differ in their individual commitment to participate in the co-operative (Cechin, Bijman, Pascucci, Zylbersztajn, & Omta, 2013). Importantly, co-operative scholars have reported a decrease in members' participation in co-operatives (Harte, 1997; Holmstrom, 1999; Levi & Davis, 2008; Nilsson, Svendsen, & Svendsen, 2012). Whether members behave opportunistically (Cook, 1995; Nilsson, Kihlén, & Norell, 2009) or as free-riders (Bhuyan, 2007), the main reason for this change in farmers' behaviour is attributed to the phenomenon of concentration and restructuring of agricultural co-operatives (Lang & Fulton, 2004; Nilsson et al., 2012). Österberg and Nilsson (2009) suggest that farmers find themselves in large, diversified and international co-operatives with a heterogeneous membership base; and with strategy so complex that farmers find it difficult to understand.

This phenomenon of heterogeneity of membership has been claimed to have a negative effect on the efficiency of co-operatives (Cechin, Bijman, Pascucci, Zylbersztajn, et al., 2013). It may become particularly problematic when co-operatives become larger and/or more diverse in their activities, and where different activities of the co-operative cater to different groups of members (Fulton & Giannakas, 2001). Hansmann (1996) argues, the more heterogeneous the membership the more difficult to achieve goal congruence and, thereby, the higher will be the decision-making costs. Heterogeneity due to large memberships may also generate passivity because some member categories do not get their interests well attended to (Österberg & Nilsson, 2009). Furthermore, as the management obtains few, unclear, and conflicting signals from a heterogeneous membership, there is a risk that neither the board of directors nor the Chief Executive Officer (CEO) can interpret what the members want them to do (Cook & Iliopoulos, 2000; Hendrikse, 2007).

Increase in heterogeneity among members over the life span of a co-operative can be due to factors that are either external or internal to the co-operative organization (Cook, 2018). The external factors include divergence in farm size, multiple farming strategies, cooperative consolidation through merger and acquisition, and changing consumer demand (Bogetoft & Olesen, 2003; Cook, 2018; Weersink, 2018). Similarly, the endogenous or internal organizational processes include divergence in equity allocation, patron drift, membership growth, substitution effects, diversification and special interest groups arising internally that seek to apply pressure on management (Staatz, 1987; Cook & Burress, 2009; Iliopoulos & Valentinov, 2017; Cook, 2018). However, increasing heterogeneity due to either exogenous or endogenous factors are likely lead to similar issues for the co-operative (Cook & Burress, 2009).

While several scholars have highlighted the role, importance and impact of heterogeneity on co-operatives; empirical studies that examine heterogeneity and map out its expression are lacking. Often, member heterogeneity appears as an assumption in theoretical models or becomes visible in significant coefficients of member, farm and product characteristics as independent variables (Hoehler & Kuehl, 2018). As a result, the picture of member heterogeneity and its impact on co-operatives is largely incomplete (Hoehler & Kuehl, 2018); and a comprehensive understanding of member heterogeneity and its dimensions is missing (Cook & Iliopoulos, 2016).

Österberg and Nilsson (2009) argue that there is an increasing need to study member behaviour within large and complex agricultural co-operatives. Moreover, given the trend towards increase in members' detachment and decrease in participation, it is important that co-operatives understand such attitudes and behaviours of its members, and what could perhaps be causing them (Fulton & Adamowicz, 1993; Birchall & Simmons, 2004; Bhuyan, 2007; Nilsson et al., 2012; Cechin, Bijman, Pascucci, Zylbersztajn, et al., 2013). Such studies are integral to the very survival of the co-operative business model (Österberg & Nilsson, 2009). However, very few studies have examined the behaviours of farmers and the antecedents of these behaviour's in the specific context of agricultural co-operatives (Barraud-Didier, Henninger, & El Akremi, 2012; Cechin, Bijman, Pascucci, & Omta, 2013; Cechin, Bijman, Pascucci, Zylbersztajn, et al., 2013).

Importantly, the impact of heterogeneity on the capacity of individuals to self-organize and sustain collective action is highly contested. These concepts are generally used in the social

science domain to describe the relationship between a group and a common pool resource. Although empirical studies have explored the relationship between group heterogeneity and the performance of common property institutions (Varughese & Ostrom, 2001; Poteete & Ostrom, 2004); none have explored this relationship within the context of agriculture co-operatives. Also, the relationship between heterogeneity and member commitment, which is a multidimensional attitudinal concept, has not yet, to our knowledge, been studied in the context of agricultural co-operatives. Moreover, a critical aspect to overcoming the perceived heterogeneity problem in agricultural co-operatives is to ensure members reconcile their differences and exhibit a commitment to the collective good or collective action. Yet, empirical research on this phenomenon is lacking.

We strive to address these gaps by pursuing two main objectives. First, to disentangle heterogeneity in agricultural co-operatives, and develop a measure for it. Second, to present and test a framework that explores the links between heterogeneity and members' commitment to collective action in a large New Zealand agricultural co-operative.

We contribute to the literature on member heterogeneity and commitment in at least three ways: 1) we develop a new theoretical framework for linking member heterogeneity and commitment to collective action in co-operatives; (2) based on the framework, we distinguish heterogeneity in agricultural co-operatives into three dimensions- i) farmer-member, ii) farming-business and iii) member-interest; and (3) by measuring heterogeneity and exploring its link with commitment to collective action, we provide a much-needed empirical assessment of important phenomena that have been suggested to impact co-operative performance.

The next section of this article covers the theoretical framework. This is followed by the third section which deals with the methodological aspects of the study carried out on a sample of 568 members of Fonterra Co-operative Group, a large dairy co-operative in New Zealand. The fourth section focuses on the results and the fifth section presents a discussion of these. The conclusions, limitations and possibilities for future research are presented in the sixth section.

2. Theoretical Framework

For the purpose of this research a novel framework that allows for the examination of two important phenomena in agricultural co-operatives, heterogeneity and commitment to collective action is conceptualized. In the framework, a strong emphasis is given towards

objectively examining these two phenomena in agricultural co-operatives via outcomes than can be anticipated and measured. The reason being, the way in which results are measured and demonstration of clearly observable results, are necessary to further enhance the understanding of agricultural co-operatives. To achieve this, as a first step, a description of heterogeneity and commitment to collective action, and an identification of the dimensions that comprise them is required.

2.1 Heterogeneity

A core feature of co-operatives is that it is characterised by collective decision making and self-governance (Apparao, Garnevska, & Shadbolt, 2019). As heterogeneity is perceived to affect this feature, it impacts the performance of co-operatives (Apparao et al., 2019). Moreover, the heterogeneity (diversity) of co-operatives' membership is increasing (Simmons & Birchall, 2004). For example, Elliott, Elliott, and Sluis (2018) project future changes to cooperative member heterogeneity such as greater member aging, more member asset value, greater value-added dollars at the farm level, and greater diversity of farm size. This increase in heterogeneity is because, as co-operatives become larger and more diverse in their operations, membership becomes increasingly heterogeneous (Nilsson et al., 2012). Globalisation and international expansion of co-operatives coupled with structural changes in the farming sector have led to further magnification of the differences between farmer members. Consumer demand for higher quality and more variety have resulted in an increase in diversification at farm level (Bogetoft & Olesen, 2007). Moreover, in search of efficiency gains and additional bargaining power, co-operatives are seeking new members and merging partners outside their original areas (Hoehler & Kuehl, 2018).

Increase in member heterogeneity is suggested to be a major challenge for co-operatives (Bijman, Hanisch, & Van der Sangen, 2014). Scholars have argued that members with different characteristics and conflicting interests are inclined to compete for rents (Kalogeras, Pennings, van der Lans, Garcia, & van Dijk, 2009). When members possess disparate preferences for attribute alternatives, disagreements can emerge as to which combination is most desirable (Zusman, 1992). As discussed by Vitaliano (1983), Cook (1995), and Hansmann (1996) the divergence in incentives and preferences is particularly problematic for the assignment of contractual property rights among members with diverse characteristics.

Collective decision making costs (Staatz, 1987; Bijman, 2002), agency costs (Gorton & Schmid, 1999) and influence costs (Iliopoulos & Cook, 1999) are believed to be greater in co-operatives than in investor owned firms (IOF). Increased heterogeneity of co-operatives and their members is suggested to be an important reason for further increase in these costs and resulting decrease in competitiveness of co-operatives (Fulton & Giannakas, 2001; Bijman, 2002; Bogetoft & Olesen, 2004). More specifically, since the control of co-operatives is structured democratically, heterogeneity is likely to generate transaction costs to co-operative decision-making. As argued by Hansmann (1996) an increase in these transaction costs results in higher decision-making costs in co-operatives relative to IOF's. Similarly, according to Pozzobon, Zylbersztajn, and Bijman (2011), as a consequence of heterogeneity, decision making in traditional co-operatives is likely to be more costly than in IOF's. Hansmann (1996) further posits that farmers are the most efficient owners of agricultural co-operatives because the costs of market contracting are highest for farmers while their cost of ownership is lowest. The low cost of ownership for farmers is because of high homogeneity of interest amongst farmers (Hansmann, 1996).

On the whole, increasing heterogeneity leading to conflicting preferences can generate problems in co-operatives (Kalogeras et al., 2009) such as decline in member commitment (Fulton & Giannakas, 2001), decrease in member willingness to supply equity capital (Van Bekkum, 2001), increasing costs related to damaging influence activities (Cook, 1995), tedious decision making process (Hansmann, 1996) and lack of strategic focus (Hendrikse & Bijman, 2002). Increasing heterogeneity could therefore present challenges to cooperative sustainability (Elliott et al., 2018), particularly in traditional cooperatives where structural adaptations in response to member heterogeneity have not been made (Cook & Iliopoulos, 2016). Moreover, as a result of more diverse members, it is increasingly difficult for the co-operative to demonstrate that it is acting in the best interests of all members (Fulton & Giannakas, 2001).

2.1.1 Dimensions of heterogeneity

It is important to examine the dimensions of member heterogeneity in co-operatives since it helps to identify the sources of conflict potential and adopt governance structures to meet the needs of the members e.g. by introducing advisory boards for different producers or by establishing new ways of organising and financing the co-operative (Kalogeras et al., 2009). Moreover, identifying the attributes, levels and factors of member heterogeneity enhances the

co-operatives' ability to meet the needs of the members (Kalogeras et al., 2009). Despite its importance, very few scholars have taken a step in this direction.

Cook and Iliopoulos (1999), in their study of influence costs, identified eight factors that can be used to explain the degree of heterogeneity. These factors were in order of importance - 1) differences between members in terms of volume of production, 2) variance in members education levels, 3) the geographic dispersion of membership, 4) differences between members in term of farm objectives, 5) increased non-farm income for some members, 6) variance in members age, 7) the number of different commodities produced by members, and 8) the number of different inputs procured by members.

Pozzobon et al. (2011) argue that member heterogeneity can be due to - 1) individual characteristics and 2) farms characteristics. The differences in individual characteristics may be due to – 1) demographic characteristics such as age and education, 2) economic characteristics such as percentage of non-farm income; business objectives; risk preference, and 3) individual beliefs. Similarly, the differences in farm characteristics may be due to – 1) farm size, 2) technology, 3) geographical, 4) types of commodities produced, and 5) types of inputs used (Pozzobon et al., 2011). More recently, Hoehler and Kuehl (2018), based on a comprehensive search of 'member heterogeneity' in economic journals, working papers and conference proceedings, suggested that member heterogeneity in agricultural co-operatives can be grouped under three categories 1) farm (e.g. size, location), 2) member (e.g. age, education) and 3) product (e.g. type and quality).

Considering the arguments and suggestions of Cook and Iliopoulos (1999), Pozzobon et al. (2011) and Hoehler and Kuehl (2018), we decouple member heterogeneity into three dimensions, 1) farmer-member, 2) farm-business and 3) member-interest. The farmer-member dimension is based on differences between members in personal characteristics, especially in their age, experience, and educational background (Cook & Iliopoulos, 1999; James & Sykuta, 2006; Höfer & Rommel, 2015). The farm-business dimension includes physical, financial and product quality related properties. It is centred on differences that pertain to the members farming entities such as size, revenue, product quality, and location (Cook & Iliopoulos, 1999; Österberg & Nilsson, 2009; Cechin, Bijman, Pascucci, & Omta, 2013; Alho, 2015). The difference between members that arises due to their diverging interests (Hansmann, 1999; Kalogeras et al., 2009), such as price and dividend payments, sale of co-operative shares,

concern for the co-operative's future, and importance of being valuable to the co-operative is captured under the member-interest dimension.

2.2 Commitment to Collective Action

Olson (1971), in his work titled *The Logic of Collective Action*, questioned the rational and basis of the foundation of modern democratic thought, and argued that groups will not tend to form and take collective action whenever members jointly benefit. Instead, Olson strongly suggested that rational, self-interested individuals will not act to achieve their common or group interests (e.g. production of a public good), unless there is coercion or some other device to make individuals act in their common interest (Olson, 1971). This argument, which came to be known as the *"Zero Contribution Thesis"*, formed the basis of the presumption, that individuals cannot overcome collective action problems and need to have externally enforced rules to achieve their long-term self-interest. However, Ostrom (2000) argues that observations in everyday life strongly contradict the zero-contribution thesis. Empirical field work has established that individuals from all walks of life and all parts of the world voluntarily organise themselves so as to gain the benefits of trade, to provide mutual protection against risk and to create and enforce rules that protect natural resources (Ostrom, 2000).

In agriculture, co-operatives are an important collective action group. Through agricultural co-operatives, diverse producers use collective action to come together to make joint investments in processing and marketing facilities, to share a collective reputation, to bargain with supplying, processing and retailing firms, to gain access to markets, and to spread costs of extension services (Bouamra-Mechemache & Zago, 2015). In co-operatives, commitment to collective action can be viewed as the members willingness to sacrifice short-term economic gains and make an effort towards the co-operative's long-term success (Cechin, Bijman, Pascucci, & Omta, 2013).

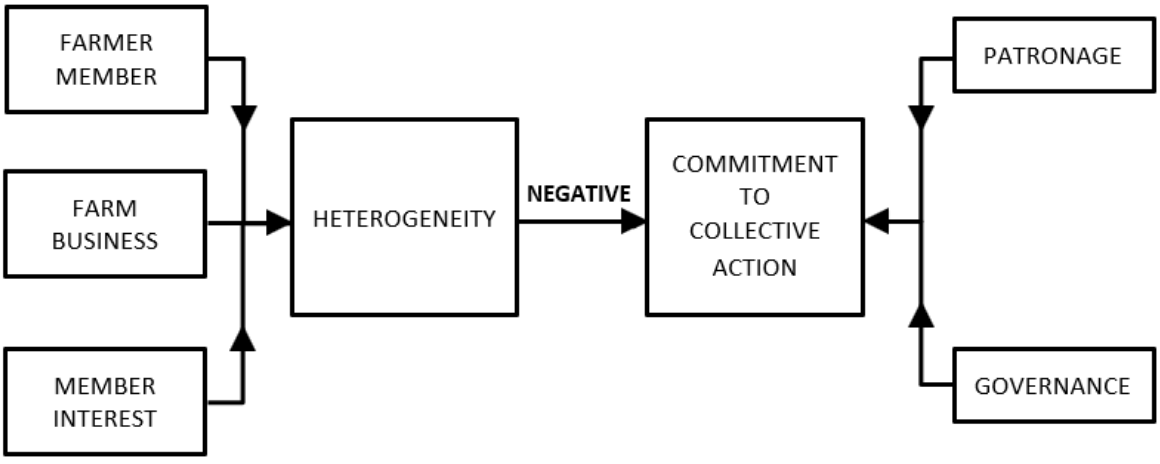
In this study, member commitment to collective action (CCA) is separated into two dimensions 1) commitment to patronage (CP) and 2) commitment to governance (CG). These two dimensions, as well as commitment to collective action in agricultural co-operatives, have already been described and analysed in an earlier research study (Apparao, Shadbolt, & Garnevska, 2020).

2.3 Framework Structure and Hypothesis

The conceptual framework brings together two important phenomena associated with agricultural co-operatives and is structured on the premise that heterogeneity has an important bearing on commitment to collective action. As indicated in Figure 1, the relationship between heterogeneity and commitment to collective action is examined by bringing together the three dimensions of heterogeneity and the two dimensions of commitment to collective action. The framework assumes that each dimension incorporates a number of components (sources) that have been emphasised in research on co-operatives. The farmer-member dimension is comprised of 9 sources, the farm-business dimension is comprised of 14 sources and the member-interest dimension is comprised of 12 sources.

It is hypothesised, that the relationship between heterogeneity and commitment to collective action is negative (inverse), i.e. when heterogeneity is high, commitment to collective action is low and when heterogeneity is low, commitment to collective action is high. It is further argued that this relationship is expressed via the associated dimensions. When there is an increase in heterogeneity within one or more of the heterogeneity dimensions, there is a decrease in either or both commitment to patronage and commitment to governance, and thereby a decrease in commitment to collective action.

Figure 1: Conceptual Framework: Heterogeneity and Commitment to Collective Action



Based on the framework, we propose the following hypotheses –

Hypothesis 1: In large and complex co-operatives, there is a high level of heterogeneity, which is indicated by a majority of the sources comprising each heterogeneity dimension showing high to very high heterogeneity.

Hypothesis 2*:* High heterogeneity will result in a low level of commitment to collective action; as well as commitment to patronage and commitment to governance.

We further propose that if there is high heterogeneity within a source, then there will be a significant difference in CCA, as well as CP and CG between the groups that comprise the heterogeneity source. The basis for this is that heterogeneity can be linked to commitment to collective action by identifying if there is a significant difference in CCA (as well as CP and CG) between the various groups that comprise a source that has high heterogeneity. Similarly, if there is a low level of heterogeneity for a specific source, there will be no significant difference in CCA (and CP & CG) between the groups that comprise the source. Based on this rational we propose:

Hypothesis 3: For the 9 sources of the *farmer-member* heterogeneity dimension that showed high or very high heterogeneity, there is a significant difference in commitment to patronage, commitment to governance and commitment to collective action between the groups that comprise the source. While there is no significant difference between groups for sources that showed low or very low heterogeneity.

Hypothesis 4*:* For the 14 sources of the *farm-business* heterogeneity dimension that showed high or very high heterogeneity, there is a significant difference in commitment to patronage, commitment to governance and commitment to collective action between the groups that comprise the source. While there is no significant difference between groups for sources that showed low or very low heterogeneity.

Hypothesis 5*:* For the 12 sources of the *member-interest* heterogeneity dimension that showed high or very high heterogeneity, there is a significant difference in commitment to patronage, commitment to governance and commitment to collective action between the groups that comprise the source. While there is no significant difference between groups for sources that showed low or very low heterogeneity.

3. Methods

3.1 Background

3.1.1 Dairy Industry and Dairy Co-operatives in NZ

The dairy industry plays a significant role in New Zealand's economy. It provides employment to about 47,310 people and accounts for 28% of NZ's export revenues. Producing 21.3 million tonnes of milk, NZ is the 8th biggest milk producer and the largest dairy exporter in the world, accounting for over 30% of global dairy trade (Shadbolt & Apparao, 2016). In 2017/18, there were 11,590 dairy farms, 4.9 million dairy cows in NZ; and the average dairy farm size was 151 hectares.

Across the world, co-operatives play a major role in the dairy industry, accounting for over 80% of milk production in the U.S.A, Western Europe and Australia (Chaddad, 2007). In New Zealand, the first dairy co-operative was established in 1871. Since then, dairy co-operatives have played a significant role in the NZ economy, and continue to do so (Garnevska, Callagher, Apparao, Shadbolt, & Siedlok, 2017). Dairy co-operatives account for over 86% of NZ's milk processing and contribute to about 7.5% of NZ's GDP.

3.1.2 Fonterra

Fonterra Co-operative Group (Fonterra) was formed in 2001, via the merger of three entities, New Zealand Dairy Group, Kiwi Co-operative Dairies, and the New Zealand Dairy Board. With revenues of about NZ$ 20.4 billion in 2017/18 it is the largest dairy co-operative and also the largest business enterprise in NZ. Fonterra sources about 22 billion litres of milk, which is about 82% of NZ milk production. It is the largest dairy exporter in the world, exporting about 95% of its milk sourced to 140 countries. Fonterra employs 22,000 people across the world and accounts for 25% of NZ's exports. It is governed by an 11-member board (7 elected farmer shareholders and 4 appointed). Farmer shareholders vote for board members on the basis of the number of wet shares they hold, that is, one share per kilogram of milksolids supplied to the co-operative. Additionally, it has a 25 member shareholders council which represents the views of all Fonterra farmer shareholders as suppliers, owners and investors. Each councillor is elected by farmers within the ward they represent, on the basis of one vote per shareholder farm.

Over a 10-year period, the volume of milk sourced by Fonterra increased by 28%. However, over the same 10-year period Fonterra has seen its share of NZ milk supply decrease from 94% (2007/08) to 82% (2016/17). In 2016/17, Fonterra paid its farmer owners, NZ$ 6.12 / kilograms of milk solids (kg MS) and a dividend of NZ$ 0.40 per share. Due to Fonterra's significant exposure to global markets, there has been volatility in both milk price and dividend payments. Milk price has ranged from NZ$ 3.90 /kg MS (2015/16) to NZ$ 8.40 /kg MS (2013/14); while the dividend payments have ranged from NZ$ 0.07 (2007/08) to NZ$ 0.45 (2008/09) per share.

Fonterra is owned by around 10,000 self-employed dairy farmers that are spread across NZ. Although the final element that lead to the formation of Fonterra was the amalgamation of three entities mentioned earlier (i.e. New Zealand Dairy Group, Kiwi Co-operative Dairies, and the New Zealand Dairy Board), the origins of Fonterra can be traced back to the 1870's. The formation of Fonterra is hence characterised by several mergers over the course of many decades. It is reported that there were about 230 dairy co-operatives in the 1960's. These co-operatives were characterised by a unique identity, loyal membership base and strong regional specificity. More importantly there was intense competition between these co-operatives. Over the next three decades, especially in the 1980's and 1990's many dairy co-operatives gradually merged to form larger co-operatives in order to achieve economies of scale. As a result, there were just 3 dairy co-operatives in 2017/18, and the formation of Fonterra was the main outcome and culmination of this process of mergers. As explained by Nilsson and Madsen (2007) mergers between co-operatives are quite complex because a merger involves not only the integration of the business operations of the two co-operatives but also the breaking down of barriers between the members of the two co-operatives and aligning the different ways of thinking within the memberships. Moreover, the merger is further complicated by the concept of heterogeneity – heterogeneity in terms of business activities, logistics, organisational culture, leadership principles, ways of working, and other attributes (Nilsson & Madsen, 2007). Fonterra's large membership base and a foundation based on several mergers of co-operatives that once had a unique identity of their own, and strongly competed against each other, is thought to have introduced considerable member heterogeneity in the co-operative.

3.2 Data Collection

3.2.1 Sample

A survey method was used to collect data on heterogeneity and commitment to collective action. Before the survey, a pilot study was performed using 10 dairy farmers chosen by convenience to inform the development and refinement of the questionnaire. The structured questionnaire that was developed was mailed in July 2017 to a random sample of 2,000 members of Fonterra that was generated by a Fonterra manager. The researchers were blind to the member's names and only had access to the postal contact information of the members. After 6 weeks a reminder was sent out in September 2017 to those members that did not respond. Of the 2,000 surveys that were mailed 294 (15%) were returned by the postal service as being un-deliverable and 576 were returned by the respondents, giving a response rate of 34%. Of these 8 responses were classified as being incomplete and were discarded. Thus, leaving the study with a sample of 568 responses (33%) that were used in the analysis.

3.2.2 Measures

Heterogeneity: As described in the framework earlier, this study captured heterogeneity in agricultural co-operatives along three dimensions: farmer-member, farm-business and member-interest. To achieve this, each dimension was further broken down to its constituent elements or sources of heterogeneity; and the degree of heterogeneity that existed for each of these sources was measured. These sources were included because they are often associated with member heterogeneity in agricultural co-operatives (Iliopoulos & Cook, 1999; Kalogeras et al., 2009; Pozzobon et al., 2011; Hoehler & Kuehl, 2018); and are of specific relevance to heterogeneity within the membership base of NZ dairy co-operatives.

First, we considered gender, age, ethnicity, education, experience in agriculture, experience in share-milking, type of involvement with the farm-business, number of farming entities and years co-operative member as the sources (n = 9) of farmer-member heterogeneity. Second, farm type, dairy system, seasonality, milk production, milk types, milk quality, gross farm revenue, total dairy assets, total debt, non-farm income proportion, stage of business, shares in the co-operative, share of milk supplied to co-operative and region were considered to be important sources (n = 14) of farm-business heterogeneity. Third, we considered likelihood of selling shares, seasons a low milk price is acceptable, willingness to accept lower dividend, concern for the co-operative's future, importance of being valuable to the co-operative,

importance of being a respected member of the community, importance of creating opportunities for future farmers, importance of having time available for socializing with family and friends, importance of having variety in work, importance of looking after the environment, importance of maximizing farm profits, and importance of paying off debts, as the sources (n = 12) of member-interest heterogeneity.

Commitment to Collective Action: The measures used to capture commitment to collective action are explained in Apparao et al. (2020) and were based on the suggestions of Cechin, Bijman, Pascucci, and Omta (2013) and Barraud-Didier et al. (2012). Three statements, farmer's readership of annual reports, attendance of the co-operative's meetings and voting on co-operative matters were considered as an indicator of commitment to governance. Similarly, farmer's propensity for continued supply, importance placed on the relationship with the co-operative, and willingness to invest in the co-operative were considered an indicator of commitment to patronage. Respondents indicated their degree of agreement to each of the six statements on a Likert type 7-point scale (from 1: Strongly disagree to 7: Strongly agree).

3.3 Statistical Analysis

The analysis of data was done using SPSS (IBM® SPSS Statistics). First, a scale reversal was performed for the inverted scale statements. Second, a descriptive analysis of the data set was conducted by determining descriptive statistics such as the median, mode, mean, standard deviation and frequencies of the variables. Third, the construct reliability of the statements used to measure commitment to collective action was determined using the Cronbach Alpha. Fourth, a principal component analysis (PCA) was done to examine and confirm the constituent components of commitment to collective action.

Fifth, the commitment to collective action, commitment to patronage and commitment to governance scores were determined. The commitment to patronage and commitment to governance scores for each respondent was calculated by summing the responses for each of the three statements used to measure them. Since the scale length for each statement was 7, the lowest score possible is 3 (3 x 1) and the highest possible score is 21 (3 X 7). Thereafter, the commitment to collective action score for each respondent was calculated as the sum of commitment to patronage and commitment governance scores. The lowest commitment to collective action score possible is 6 (6 X 1) and the highest score is 42 (6 X 7).

Sixth, the Gini-Simpson Index was used to determine the degree of heterogeneity that existed within each source variable. This is one of the most widely used indexes to measure diversity (heterogeneity) and considers the number of different types that exist in the data field of interest and how evenly entities are distributed among those types. Although its origins lie in the field of ecology, it has been widely used in diverse disciplines, such as genetics, sociology, economics, management etc. For example, the Herfindahl-Hirschman index, which is extensively used to measure market concentration in economics and management, is based on Gini-Simpson Index (Rhoades, 1993). The equation used to determine Gini-Simpson Index is given below -

$$1 - \sum_{i=1}^{R} P^2 i$$

Where R is *richness* and quantifies the number of different types the data field of interest represents. For example, in the case of heterogeneity source variable gender, R is equal to two since the data field of interest comprises of two types, male and female. P_i represents the proportion of individuals that belong to the i^{th} type in the data field of interest. An index value of 0 indicates complete homogeneity, while an index value of 1 indicates complete heterogeneity. We classify heterogeneity in our source variables into five categories based on the index value as follows, 0 to 0.20 very low heterogeneity, > 0.20 to 0.40 low heterogeneity, > 0.40 to 0.60 moderate heterogeneity, > 0.60 to 0.80 high heterogeneity, and > 0.80 to 1.0 very high heterogeneity.

Seventh, for the heterogeneity sources for which correlations could be determined, the Spearman's correlation technique was used to determine if a correlation exists between a heterogeneity source and commitment to collective action as well as commitment to patronage and commitment to governance. Lastly, an analysis of variance (ANOVA) was performed to determine if the commitment to collective action, commitment to patronage and commitment to governance scores differed significantly between groups comprising a source of heterogeneity.

4. Results

*4.1 H*eterogeneity

Of the 35 heterogeneity sources 5 (14%) showed very high levels of heterogeneity (Gini-Simpson index > 0.80). Two sources each were from the farmer-member and farm-business dimension, while one was from member interest (Table 1). High heterogeneity (Gini-Simpson index > 0.60 to 0.80) was the most frequently observed heterogeneity level. It was observed for 20 (57%) sources. Of these, 4 were from farmer-member, 7 were from farm-business and 9 were from member-interest. Since a majority (71%) of the heterogeneity sources that we measured demonstrated high or very high levels of heterogeneity, the membership base of this co-operative can be considered to be heterogeneous. This finding reinforces the point made by co-operative scholars that large and complex agricultural co-operatives are characterised by a heterogeneous membership base.

Moderate levels of heterogeneity (Gini-Simpson index > 0.40 to 0.60) were observed for 3 (9%) sources, 1 from farmer-member and 2 from member-interest. Low levels of heterogeneity (Gini-Simpson index > 0.20 to 0.40) were observed for 6 (17%) sources. Of these 6 sources, 1 was from farmer-member and 5 were from farm-business. Finally, very low levels of heterogeneity (Gini-Simpson index > 0.0 to 0.20) was observed for only 1 (3%) source, belonging to the farmer-member source type. These findings indicate that some degree of homogeneity exists in the farmer-member and farm-business dimensions but not in the member-interest dimension.

Table 1: Heterogeneity Levels by Heterogeneity Dimension and Source Type

Heterogeneity Level	Gini-Simpson Index	Number of Heterogeneity Sources	Break-up by Heterogeneity Dimension		
			Farmer-Member	Farm-Business	Member-Interest
Very High Heterogeneity	> 0.80	5 (14%)	2 (22%)	2 (14%)	1 (8%)
High Heterogeneity	> 0.60 to 0.80	20 (57%)	4 (44%)	7 (50%)	9 (75%)
Moderate Heterogeneity	> 0.40 to 0.60	3 (9%)	1 (11%)	-	2 (17%)

Low Heterogeneity	> 0.20 to 0.40	6 (17%)	1 (11%)	5 (36%)	-
Very Low Heterogeneity	< 0.20	1 (3%)	1 (11%)	-	-
Total		35	9	14	12

4.2 Commitment to Collective Action

A detailed presentation of the results on commitment to collective action are provided in Apparao et al. (2020). In brief, the 6 statements used to measure CCA were found to be reliable as their Cronbach Alpha was 0.71. The principal component analysis (PCA), showed that two components had eigenvalues greater than the cut-off value of 1 and they explained 61.4% of the variance. The three statements (manifest variables) on *governance* load heavily on Component 1 and the three statements (manifest variables) on *patronage* load heavily on Component 2.

The mean and median CCA score was 26.5 (SD = 6.3) and 27.0 respectively and ranged from 6 (n = 1) to 42 (n = 1). This meant merely 0.2% of respondents obtained the potential maximum score for CCA. However, since both the mean and median scores were greater than the scale mid-point of 21, we believe that this co-operative has moderately high levels of commitment to collective action. The mean and median governance score was 14.1 (SD = 4.1) and 15.0 respectively and ranged from 3 (n = 8) to 21 (n = 16). Only 2.8% of respondents obtained the maximum possible score for governance. The mean (12.4, SD = 3.6) and median patronage score (13.0) was lesser and ranged from 3 (n = 6) to 21 (n = 3). Just 0.5% of respondents obtained the potential maximum score for patronage. Since both mean and median governance and patronage scores were above the scale mid-point (10.5), it suggests that this co-operative has moderately high levels of commitment to governance and commitment to patronage within its membership base.

4.3 Heterogeneity and Commitment to Collective Action

It was hypothesized that there is an inverse relationship between heterogeneity and CCA, CP and CG. Therefore, given that a high level of heterogeneity was observed within the membership base of this co-operative a low level of CCA as well as CP and CG is expected. However, as explained earlier this was not the case, and moderately high levels of CCA, CP and CG were observed. Although this relationship between heterogeneity and commitment

could not be statistically tested, this finding tends to suggest that high heterogeneity need not necessarily lead to low CCA, CP and CG.

Importantly, a majority of the 25 sources that showed high or very heterogeneity also showed significant differences ($P < 0.05$) in CCA (n = 16), CG (n = 16), CP (n = 12). Similarly, most of the 7 sources that showed low or very low heterogeneity did not show a significant difference ($P > 0.05$) in CCA (n = 7), CG (n = 6) and CP (n = 7). Of the three sources that showed moderate heterogeneity, there were no differences in CP but one showed differences in CG and two showed significant differences in CCA and CG. These findings our in alignment with our hypothesis that high heterogeneity will result in differences in CCA, CG and CP between the groups that comprise the heterogeneity source, while low heterogeneity will not; and tends to suggest that there is a relationship between heterogeneity and CCA, CG and CP.

*4.3.1 Fa*rmer-Member

Of the 9 farmer-member sources of heterogeneity, 2 (22%) had very high heterogeneity and 4 (44%) had high heterogeneity. Since 66% of sources showed high or very high levels of heterogeneity, the membership base of this co-operative can be considered to be heterogeneous with respect to the farmer-member dimension. Moderate (11%), low (11%) and very low (11%) heterogeneity was observed for 1 source each (Table 1). This indicates that a low degree of homogeneity also exists within this dimension. The descriptive statistics on the 9 sources is presented in Table 2.

For the source Gender, low levels of heterogeneity were observed (GSI = 0.35) and most respondents were male (77 %). Age had a high level of heterogeneity (GSI = 0.76) and most respondents (33%) belonged to the age group of 51-60 years. The source ethnicity had a very low level of heterogeneity (GSI = 0.11). This was also the lowest level of heterogeneity observed across all 35 sources. Most of the respondents were of European ethnicity (94%) and remaining were of Māori (6%) ethnicity. The question on level of education was the least answered one with only 333 (58.9%) respondents answering the question. It had a very high level of heterogeneity (GSI = 0.81) and diploma or trade certificate was the most frequent (24.3%) response. High levels of heterogeneity were observed for the source years' experience in agriculture (GSI = 0.71). Most respondents (43.4%) reported that they have 20-30 years of experience in agriculture. Very high level of heterogeneity (GSI = 0.81) was observed for the source years' share-milking experience. Most respondents (30.6%) reported that they have 0 years' experience in share-milking, but the median response was 3-5 years. Like in the case of

level of education several respondents (n = 187) did not answer the question on the type of involvement with and/or ownership of the farming business. The most frequent response was owner-operator type of involvement (45.9%), and the GSI was 0.73 indicating high levels of heterogeneity. Moderate levels of heterogeneity (GSI = 0.58) were observed for the source number of farming entities, and most respondents (55.8%) reported having only 1 farming entity. High levels of heterogeneity (GSI = 0.73) were observed for the source years co-operative member and most respondents (35.2%) reported being a member of the co-operative for 20-30 years.

Of the 6 sources for which correlations could be determined, a significant ($P < 0.05$) and positive correlation was observed between 4 sources (age, level of education, years' experience in agriculture, and number of farming entities) and commitment to collective action, as well as commitment to governance (Table 2). This finding indicates that farmers that are older, more educated, have greater experience in farming and are involved with more farming enterprises are more committed to collective action and governance of the co-operative. No significant correlations were observed with commitment to patronage. This suggests that CP is not linearly related with any of the heterogeneity sources that comprise the farmer-member dimension.

A significant difference ($P < 0.05$) was observed in the commitment to collective action scores between groups that comprised just 1 (11%) source (age) of the farmer-member dimension (Table 2). There was no difference in CCA between the groups that comprise the remaining 8 sources. Importantly, since high or very heterogeneity was observed in 5 of these 8 sources, it suggests that high level of heterogeneity was not related to a significant difference in CCA. Moreover, only four sources fit with our hypothesis of having a high level of heterogeneity and a difference in CCA or a low level of heterogeneity and no difference in CCA. These findings indicate that heterogeneity in the sources that comprise the farmer-member dimension does not lead to differences in commitment to collective action.

There was a significant difference ($P < 0.05$) in the commitment to governance scores between groups that comprised 4 (44%) sources (age, level of education, years' experience in agriculture and number of farming entities) of the farmer-member dimension. Three of these sources had a high level of heterogeneity. Two sources that had low heterogeneity did not have a significant difference in CG. However, three sources had a high level of heterogeneity and no difference in CG; and one source (number of farming entities) had a moderate level of heterogeneity and a significant difference in CG. As 5 of the 9 sources aligned with the hypothesis, it tends to

suggest that there is a weak association between heterogeneity and CG within the farmer-member dimension.

There was no significant difference (P > 0.05) in commitment to patronage scores between groups for all the 9 sources (Table 2). Since 6 of these sources showed high heterogeneity, it suggests that there is no relationship between heterogeneity and CP within the farmer-member dimension.

Table 2: Farmer-Member: Descriptive Statistics of Heterogeneity and Relationship to Commitment

#	Source Variable	N	Median	Mode	Mean	SD	GSI	ANOVA F Values (Correlation Coefficients)		
								CP	CG	CCA
1	Gender	557	NA	Male	NA	NA	0.35	0.55 (NA)	2.26 (NA)	0.18
2	Age	564	51-60 years	51-60 years	4.17	1.34	0.76	0.45 (0.06)	***4.79*** (0.19**)	***2.58**** (0.15**)
3	Ethnicity	552	NA	European	NA	NA	0.11	0.14 (NA)	2.73 (NA)	1.49
4	Level of education	333	Diploma &/or Trade Certificate	Diploma &/or Trade Certificate	2.99	1.58	0.81	0.95 (0.07)	***2.25**** (0.13*)	1.82 (0.10*)
5	Years' experience in agriculture	565	30-50 years	30-50 years	4.63	1.03	0.71	0.98 (0.04)	***2.74**** (0.14**)	1.84 (0.11**)
6	Years share-milking experience	539	3-5 years	0 years	3.32	1.88	0.81	1.08 (-0.06)	0.51 (-0.04)	0.65 (-0.08)
7	Involvement / Ownership of farming business	381	NA	Owner-operator	NA	NA	0.73	1.45 (NA)	1.32 (NA)	1.19 (NA)
8	Number of Farming entities	566	One	One	1.60	0.80	0.58	0.85 (-0.00)	***3.74**** (0.14**)	1.13 (0.09*)
9	Years Co-op Member	559	20-40 years	20-40 years	3.51	1.08	0.73	0.35 (-0.02)	0.53 (0.03)	0.30 (-0.00)

GSI - Gini-Simpson Index
CP - Commitment to Patronage
CG - Commitment to Governance
CCA - Commitment to Collective Action
NA - Not Applicable
Significance level: * P < 0.05, ** P < 0.01

4.3.2 Farm-Business

Of the 14 sources comprising the farm-business dimension, 2 (14%) had very high heterogeneity and 7 (50%) had high heterogeneity (Table 1). Since 64% of sources showed high or very-high levels of heterogeneity, the membership base of the co-operative can be considered heterogeneous with respect to the farm-business dimension. None of the sources showed moderate and very low levels of heterogeneity (Table 1)**.** However, 5 (36%) sources had low heterogeneity. This suggests that the farm-business dimension is the least heterogeneous (or most homogenous) of the three dimensions. The descriptive statistics on the 14 sources is presented in Table 3.

Farm type had a low level of heterogeneity (GSI = 0.34) and most respondents (80.5%) only had dairy farms. The question on the type of dairying farming system was the least answered amongst the farm-business questions (n = 499). The most frequent response was system 3 (32.5%) type of dairy farming system and the level of heterogeneity was high (GSI = 0.71). The seasonality of dairy farming had a low level of heterogeneity (GSI = 0.21) and most respondents (88.7%) had only a spring calving system. The volume of milk production had a high level of heterogeneity (GSI = 0.81). Over 50% of respondents had a milk production volume of less than 200,000 kg MS, but the most frequent response (25.1%) was a milk production greater than 300,000 kgMS. Most respondents (86.8%) produced only the conventional type of milk and the level of heterogeneity was low (GSI = 0.24). A low level of heterogeneity was observed for the quality of milk (GSI = 0.39) and the most frequent response (43.7%) was a somatic cell count of 100,000 to 150,000 cells per ml. Gross farm revenue (GFR) had a high level of heterogeneity (GSI = 0.79). More than 50% of respondents had a gross farm revenue of less than 1 million, and the most frequent response was NZ$ 500,000 – 1 million (27.3%). High levels of heterogeneity were observed for total dairy assets (GSI = 0.64) and most respondents (52.8%) had dairy assets in the range of NZ$ 2 – 10 million. A high level of heterogeneity (GSI = 0.70) was also observed for total level of debt. More than 50% of the respondents had a total level of debt less than 10 million and the most frequent response (45.8%) was NZ$ 2 – 10 million. Non-farm income as a percentage of total income was less than 15% for most (84.8%) respondents, and the level of heterogeneity was low (GSI = 0.27). Most respondents (54.7%) reported that they were in the consolidation stage of the farming business, but the level of heterogeneity was high (GSI = 0.64). Similar to milk production, Gini-Simpson Index for the number of shares in the co-operative was 0.81, indicating a high

level of heterogeneity. More than 50% of respondents had less than 200,000 shares in the co-operative, but the most frequent response (24.8%) was greater than 300,000 shares. Most respondents (86.8%) reported that they supply 100% of their milk to Fonterra, and the level of heterogeneity was low (GSI = 0.24). The Gini-Simpson Index for region was 0.79, indicating a high level of heterogeneity. Most farming businesses belonged to the Waikato (27.6%) region; and the North Island of NZ accounted for 75% of the farming businesses in our study. This is very similar to the national NZ dairy statistics with Waikato region accounting for 28.8% and the North Island 73% of NZ's dairy farms in 2016/17 (Livestock Improvement Corporation Limited & DairyNZ Limited, 2017).

Of the 9 sources for which correlations could be determined, a significant ($P < 0.05$) and positive correlation was observed between 7 sources (dairy system, milk production, GFR, total assets, total debt, shares in the co-operative and share of milk supplied) and commitment to collective action, as well as commitment to governance. This finding indicates that higher the intensity of the dairy system and larger the milk production volumes, GFR, total assets, total debt, shares in the co-operative and share of milk supplied to the co-operative, greater will be CCA as well as CG. No significant correlations were observed with commitment to patronage. Suggesting that there is no linear relationship between any of the farm-business sources of heterogeneity and a member's commitment to patronage of the co-operative.

A significant difference ($P < 0.05$) was observed in the commitment to collective action scores between groups that comprised 7 (50%) sources (dairy system, milk production, milk quality, GFR, total assets, shares in the co-operative, and region) of the farm-business dimension (Table 3). An important implication of this finding is that a member's CCA can differ based on the type of dairy system, volume of milk produced, the quality of milk produced, the gross farm revenue, total assets of the dairy business, number of shares owned in the co-operative, and the region the dairy business is located. Two sources that had high heterogeneity did not have a significant difference in CCA. But more importantly, all 7 sources for which differences in CCA were found also had a high GSI measure of heterogeneity. While 5 of the 7 sources for which no differences in CCA were found had a low measure of heterogeneity. Since 12 out of the 14 sources fit with the hypothesis, it suggests that there is a relationship between heterogeneity in the farm-business dimension and CCA.

There was a significant difference ($P < 0.05$) in the commitment to governance scores between groups that comprised 7 (50%) sources (dairy system, milk production, GFR, total assets, total

debt, shares in the co-operative, and share of milk supplied to the co-operative) of the farm-business dimension (Table 3). Six of these had high heterogeneity while one had low heterogeneity. There was no significant difference between groups for the remaining 7 sources. Of these 4 had low heterogeneity while 3 had high heterogeneity. As 10 of the 14 sources fit with the hypothesis it suggests that there might be a relationship between heterogeneity in the farm-business dimension and CG.

There was a significant difference ($P < 0.05$) in commitment to patronage scores between groups for just 2 (14%) sources (milk quality and region). While, there was a significant difference between groups for the source dairy system at the 10% level ($P = 0.06$). All three sources had high levels of heterogeneity. There was no significant difference between groups for the remaining 11 sources. Of these 5 had low heterogeneity while 6 had high heterogeneity. As 8 of the 14 sources fit with our hypothesis, it indicates that there might be a weak relationship between heterogeneity in the farm-business dimension and CP.

Table 3: Farm- Business - Descriptive Statistics of Heterogeneity and Relationship to Commitment

#	Variable	N	Median	Mode	Mean	SD	GSI	ANOVA F Values (Correlation Coefficients)		
								CP	CG	CCA
1	Farm type	558	NA	Dairy	NA	NA	0.34	1.36 (NA)	0.77 (NA)	1.14 (NA)
2	Dairy system	499	System 3	System 3	2.98	1.60	0.74	1.68 (0.02)	***5.63**** (0.13**)	***3.70**** (0.10*)
3	Seasonality	565	NA	Spring calving	NA	NA	0.21	0.50 (NA)	1.34 (NA)	1.01 (NA)
4	Milk Production (kgMS/year)	565	150,000 – 200,000	> 300,000	3.92	1.63	0.81	0.68 (0.05)	***5.89**** (0.21**)	***2.83**** (0.17**)
5	Milk Types	567	NA	Conventional milk	NA	NA	0.24	0.33 (NA)	1.13 (NA)	0.07 (NA)
6	Milk Quality (SCC/ml)	556	100,000 – 150,000	100,000 – 150,000	3.01	0.91	0.69	***2.22**** (-0.60)	1.77 (-0.06)	***3.01**** (-0.08)
7	Gross Farm Revenue (NZ $)	538	500,000 – 1,000,000	500,000 – 1,000,000	3.46	1.30	0.79	0.51 (0.03)	***4.83**** (0.19**)	***2.42**** (0.14**)
8	Total Assets (NZ$)	540	2 million– 10 million	2 million – 10 million	3.64	0.96	0.64	0.53 (-0.02)	***9.07**** (0.22**)	***3.39**** (0.14**)
9	Total Debt (NZ$)	537	2 million– 10 million	2 million – 10 million	2.64	1.04	0.70	0.11 (0.00)	***3.31**** (0.14**)	1.07 (0.09*)

10	Non-Farm Income	532	< 15 %	< 15 %	1.21	0.53	0.27	1.85 (-0.08)	0.59 (-0.04)	1.75 (-0.08)
11	Stage of business	539	NA	Consolidation	NA	NA	0.64	0.36 (NA)	0.96 (NA)	0.77 (NA)
12	Shares in Co-op	557	150,000 – 200,000	> 300,000	3.88	1.65	0.81	0.60 (0.06)	***7.81**** (0.22**)	***3.73**** (0.18**)
13	Share of milk supplied	560	100%	100%	1.21	0.58	0.24	0.61 (0.06)	***2.92**** (0.09*)	2.19 (0.09*)
14	Region	562	NA	Waikato	NA	NA	0.79	2.03 (NA)	1.77 (NA)	***2.27**** (NA)

GSI - Gini-Simpson Index
CP - Commitment to Patronage
CG - Commitment to Governance
CCA - Commitment to Collective Action
NA - Not Applicable
Significance level: * P < 0.05, ** P < 0.01

4.3.3 Member-Interest

Of the 12 sources comprising the member-interest dimension, 9 (75%) had high heterogeneity, while 1 (8%) had very high heterogeneity. Since 83% of the sources showed high or very high heterogeneity the membership base of this co-operative can be considered to be heterogeneous with respect to the member interest dimension. Two (16%) sources had moderate levels of heterogeneity. None of the sources showed low and very low levels of heterogeneity (Table 1). These findings indicate that of the three dimensions the member interest dimension is the most heterogeneous. The descriptive statistics on the 12 sources is presented in Table 4.

The most frequent response (33.7%) to the statement *how likely are you to sell some of your co-operatives shares in the next five years* was very unlikely. The Gini-Simpson Index was 0.79, indicating a high level of heterogeneity. Most respondents (51.0%) reported that one season or less would be the *period of time a continued (< $ 5/ kg MS) low milk price payment will be acceptable.* A high level of heterogeneity was observed for this statement (GSI = 0.64). A high level of heterogeneity (GSI = 0.78) was also observed for the statement *how willing are you to accept a lower (< $ 0.20/share) dividend payment temporarily.* The most frequent response (25.6%) was slightly willing while the median response was slightly unwilling. A very high level of heterogeneity (GSI = 0.84) was observed for the statement *I am concerned about the co-operative's future (15 years from now).* The most frequent response (19.8%) was

slightly agree, while the median response was agree. The Gini-Simpson Index for the *statement I think it is important to be valuable to the co-operative* was 0.72, indicating a high level of heterogeneity. The most frequent response (44.4%) was agree. A high level of heterogeneity (GSI = 0.69) was also observed for the statement *I think it is important to be a valuable member of the community.* The most frequent response (45.8%) was agree. The Gini-Simpson Index for the statement *creating opportunities for future farmers is important to me* was 0.71, indicating a high level of heterogeneity. The most frequent response (41.5%) was agree. High level of heterogeneity (GSI = 0.61) was observed for the statement *it is important that I have time available for socializing with family and friends.* The most frequent response (49.3%) was agree. Moderate level of heterogeneity (GSI = 0.59) was observed for the statement *it is important that I have variety in my work.* Most of the respondents (57.1%) agreed with the statement. Moderate level of heterogeneity (GSI = 0.55) was also observed for the statement *looking after the environment is important to me.* The most frequent response (34.5%) was agree. The Gini-Simpson Index for the statement *producing to maximise profits is important to me* was 0.66, indicating a high level of heterogeneity. The most frequent response (47.8%) was agree. A high level of heterogeneity was also observed for the statement *paying off debts is important to me* (GSI = 0.67). The most frequent response (40.7%) was agree.

A significant ($P < 0.05$) correlation was observed between 7 of the 12 sources of member-interest heterogeneity and CCA. The commitment to collective action was greater for members who were less likely to sell co-operative shares, more willing to accept a lower dividend, and gave higher importance to – being valuable to the co-operative, being a respected member of the community, creating opportunities for future farmers, having variety in their work, and looking after the environment. Similarly, significant ($P < 0.05$) correlation was observed between 7 sources of member-interest heterogeneity and commitment to governance. Six of these sources were the same as CCA. The willingness to accept a lower dividend payment was not correlated with CG. Additionally, farmers who placed greater importance on having time available to socialize with family and friends had a higher CG. Lastly, significant ($P < 0.05$) correlation was observed between 6 sources and commitment to patronage (Table 4). The CP was greater for members who were less likely to sell co-operative shares, more willing to accept a lower dividend, less concerned about the co-operatives future and gave higher importance to - being valuable to the co-operative, being a respected member of the community, and creating opportunities for future farmers.

A significant difference ($P < 0.05$) was observed in the commitment to collective action scores between groups that comprised 10 (83%) sources of the member-interest dimension (Table 4). This finding indicates that the CCA of the members can differ depending on their interests related to: selling co-operative shares, milk price, dividend payments, concern for the co-operative, being valuable to the co-operative, being respected by the community, creating opportunities for future farmers, having variety in their work, looking after the environment and producing to maximise farm profits. High heterogeneity was found in 8 of these 10 sources while 2 had moderate heterogeneity. Two sources that had high heterogeneity did not show significant difference in CCA. Since 8 out of the 12 sources fit with our proposed hypothesis, it suggests that there might be a relationship between the member-interest dimension of heterogeneity and CCA.

There was a significant difference ($P < 0.05$) in the commitment to governance scores between groups that comprised 9 (75%) sources (Table 4). High heterogeneity was observed for 7 of these sources and moderate heterogeneity for 2. Three sources that had high heterogeneity did not show differences in CG. Since 7 out of the 12 sources conformed to our hypothesis, it suggests that there might be a relationship between the member-interest dimension of heterogeneity and CG.

Similarly, there was a significant difference ($P < 0.05$) in commitment to patronage scores between groups for 9 (75%) sources of the member-interest dimension (Table 4). All 9 sources showed high heterogeneity. No difference in CP was found for two sources that showed moderate heterogeneity and one source that showed high heterogeneity. As 11 out of the 12 sources aligned well with our hypothesis, it suggests that there might be a relationship between the member-interest dimension of heterogeneity and CP.

Table 4: Member-Interest - Descriptive Statistics of Heterogeneity and Relationship to Commitment

#	Variable	N	Median	Mode	Mean	SD	GSI	ANOVA F Values (Correlation Coefficients)		
								CP	CG	CCA
1	Likelihood of selling shares	563	Very unlikely	Very unlikely	4.06	1.50	0.79	***6.45**** (0.21**)	***4.70**** (0.16**)	***8.30**** (0.22**)
2	Seasons low milk price is acceptable	552	1 season	1 season	1.87	1.19	0.64	***6.75**** (0.04)	0.65 (-0.00)	***3.56**** (0.02)

3	Willingness to accept lower dividend	563	Slightly unwilling	Slightly willing	4.17	1.28	0.78	***13.58*** (0.35**)	***4.38*** (-0.06)	***10.56*** (0.24**)
4	Concerned about Co-op's future	566	Slightly Agree	Agree	4.33	1.82	0.84	***3.78*** (-0.15**)	***3.82*** (0.06)	***3.69*** (-0.06)
5	Being valuable to co-op	567	Agree	Agree	5.47	1.27	0.72	***26.19*** (0.47**)	***68.63*** (0.64**)	***81.58*** (0.69**)
6	Being a respected member of the community	566	Agree	Agree	5.70	1.15	0.69	***2.86*** (0.17**)	***8.58*** (0.28**)	***7.61*** (0.26**)
7	Creating opportunities for future farmers	568	Agree	Agree	5.60	1.60	0.71	***5.34*** (0.19**)	***9.62*** (0.22**)	***10.44*** (0.25**)
8	Having time available for socializing with family & friends	566	Agree	Agree	6.11	0.86	0.61	0.82 (0.01)	1.14 (0.12**)	0.82 (0.07)
9	Having variety in work	567	Agree	Agree	6.10	0.85	0.59	1.90 (0.02)	***2.92*** (0.17**)	***2.84*** (0.11*)
10	Looking after the environment	566	Strongly Agree	Strongly Agree	6.40	1.02	0.55	1.36 (0.06)	***2.87*** (0.13**)	***2.57*** (0.11**)
11	Maximizing farm profits	565	Agree	Agree	5.80	1.31	0.66	***2.95*** (-0.05)	***3.71*** (0.15**)	***2.77*** (0.06)
12	Paying off debts	567	Agree	Agree	5.80	1.53	0.67	1.13 (0.02)	0.27 (-0.01)	0.35 (0.01)

GSI - Gini-Simpson Index
CP - Commitment to Patronage
CG - Commitment to Governance
CCA - Commitment to Collective Action
NA - Not Applicable
Significance level: * P < 0.05, ** P < 0.01

5. Discussion

This study had two main objectives. First, we unravelled heterogeneity in agricultural co-operatives into three dimensions, identified the sources that comprised each dimension and

provided a novel measure and explanation of them. Second, we examined the relationship between the sources of heterogeneity and a members' commitment to collective action as well as commitment to patronage and governance. In pursuing these objectives, our study has generated some valuable insights that are useful in comprehending the phenomenon of member heterogeneity in agricultural co-operatives (Apparao et al., 2019). This in turn could serve as a starting point for evaluating its implications on co-operative performance and for providing suggestions for developing co-operative structures (Kyriakopoulos, Meulenberg, & Nilsson, 2004). Further, by providing an examination of agricultural co-operatives from a socio-psychological perspective, it also aids in the understanding of the relationship between a member and the co-operative, an important aspect that influences co-operative performance (Österberg & Nilsson, 2009). For example, the insights on member heterogeneity can help inform the development of co-operative communication strategies that enhance member commitment (Trechter, King, & Walsh, 2002).

We identified 35 sources of heterogeneity that comprised the three dimensions of heterogeneity – 1) Farmer-member (n = 9), 2) Farm-business (n = 14) and 3) Member-interest (n = 12) and presented a novel measure and explanation of these using the Gini-Simpson Index. Based on this measure we found that considerable heterogeneity exists in this co-operative with all three dimensions measured showing high levels of heterogeneity. As this is a large and fairly complex co-operative a high level of heterogeneity is expected, and this finding is in line with arguments presented by several co-operative scholars (Nilsson, 2001; Birchall & Simmons, 2004; Österberg & Nilsson, 2009; Nilsson et al., 2012; Hoehler & Kuehl, 2018). Moreover, since the foundation of Fonterra was built on several mergers of co-operatives over many decades, a high level of heterogeneity is expected. This is in-line with the arguments presented by Nilsson and Madsen (2007). In addition to the amount of heterogeneity across the 35 sources, the kind of heterogeneity by dimension also showed interesting features and differences. Of the three dimensions the membership base was most heterogeneous in the member-interest dimension with 83% of sources showing high or very high levels of heterogeneity and none of the sources showing low or very low heterogeneity. This indicates that this co-operative is most diverse when it comes to its members-interests and relatively less diverse when it comes to its farmer-member and farm-business dimensions of heterogeneity. Although the term 'member interests' tends to have a range of interpretations within the context of co-operatives, similar to our findings, several scholars have highlighted the significance and impact of heterogeneity that is derived from differences in member-interests (Iliopoulos &

Hendrikse, 2009; Kalogeras et al., 2009; Alho, 2015). Interestingly, the farm-business dimensions showed the greatest homogeneity of the three dimensions, with 36% of sources demonstrating low or very low heterogeneity. This suggests that the membership base tends to be more uniform with respect to farm business related properties, which is not surprising as they are all dairy farms. On the whole, as suggested by Hoehler and Kuehl (2018) this knowledge of member heterogeneity and its dimensions can help identify conflict potential and develop governance structures to meet the needs of the members, e.g. by introducing advisory boards for different producers (Kalogeras et al., 2009) or by establishing new ways of financing the co-operative.

It was hypothesised that high heterogeneity will result in low commitment to collective action in agricultural co-operatives. Since this co-operative had high levels of heterogeneity, low levels of CCA were expected. However, this was not the case as CCA, as well as CP and CG, levels were moderately high. This suggests that high heterogeneity does not lead to low commitment, which is similar to findings reported by Varughese and Ostrom (2001). Based on their work on 18 forest user groups in Nepal, Varughese and Ostrom (2001) found that there was a high degree of collective action despite there being significant heterogeneity. They identified that by having good institutional design and mechanisms to manage for heterogeneity the community was able to overcome the negative implications of heterogeneity and achieve high levels of collective action (Varughese & Ostrom, 2001). Similarly, research has indicated that inequality among certain member attributes may motivate collective action and improve team performance (Pelled, Eisenhardt, & Xin, 1999). Further, Ostrom (1990, 2005) based on her extensive work on governance of the commons presented eight design principles for the effective governance of common pool resources. These were 1. Well defined boundaries, 2. Proportional equivalence between benefits and costs, 3. Collective choice arrangements, 4. Monitoring, 5. Graduated sanctions, 6. Conflict resolution mechanisms, 7. Minimal recognition of rights to organise, and 8. Nested enterprise. According to Ostrom (1990) organizations able to design collective choice arrangements that maximize positive externalities related to diversity and reduce relative ownership costs arising from heterogeneity may effectively manage heterogeneity. Although agricultural co-operatives are different from the common pool resources that Ostrom's work is centred on, they too should benefit from the same principles, as similar to groups involved in common pool resources, members of agricultural co-operative must work together to achieve a common goal which is threatened by self-serving behaviours stemming from heterogeneity. It is therefore possible that the challenges presented by

heterogeneity in this co-operative are mitigated by having well designed structures in place that are aligned with the design principles identified by Ostrom (1990). Furthermore, based on the widely accepted co-operative lifecycle and classification framework developed by Cook (1995, 2018) Fonterra can be considered to be in Stage 5 of the co-operative lifecycle and classified as a new generation co-operative or Sapiro III in structure. Fonterra has put in place mechanisms to bring in outside equity without restructuring as an IOF and developed structures such as increasing share liquidity to ameliorate the issues posed by the five property rights constraints that Cook (1995) has highlighted. As heterogeneity tends to play out via the property rights constraints, by addressing the property rights issues, Fonterra is likely to have mitigated the adverse effects of heterogeneity as well. Importantly, according to Cook (2018) the significant challenges presented by heterogeneity to a co-operative via increased ownership costs can be avoided by the co-operative genius process and the resultant tinkering which includes continuous redesign of collective choice arrangements to achieve regeneration. Fonterra took this approach by changing its ownership rights along with its purpose and culture by adopting tradeable shares (Cook, 2018).

Our study found that there tended to be a relationship between heterogeneity and CCA, CP and CG for the farm-business and member-interest dimensions but not for the farmer-member dimension. This tends to suggest that the higher the heterogeneity in the farm-business and member-interest dimensions, the more likely are there to be differences in CCA as well as CG and CP between the groups that comprise the heterogeneity sources. While heterogeneity in farmer-member sources is not likely to result in differences in CCA. Furthermore, although significant differences in CCA, CG and CP were observed between groups for several sources, it was most pronounced for sources in the member-interest dimension and less for farm-business and much less for farmer-member dimensions. This indicates that of the three dimensions it is the differences in members' interests that is most likely to result in differences in CCA as well as CG and CP. Several scholars have indicated that member-interest heterogeneity could have a significant influence on co-operatives (Hansmann, 1996; James & Sykuta, 2005; Iliopoulos & Hendrikse, 2009; Kalogeras et al., 2009; Iliopoulos & Valentinov, 2018). While differences in farmer-member related properties, such as gender, ethnicity, years as co-operative member is least likely to result in differences in CCA, CG and CP.

Moreover, significant differences in both CP and CG were observed between groups for several heterogeneity sources in the member-interest dimension such as the likelihood of selling co-

operative shares, willingness to accept a lower dividend, concern for the co-operative's future, being valuable to the co-operative and producing to maximise farm profits. However, fewer differences between groups that comprised a heterogeneity source were observed for CP as compared to CG for the farmer-member dimension followed by the farm-business dimension of heterogeneity. This indicates that with respect to famer-member and farm-business sources of heterogeneity CP is relatively more uniform across the groups that comprise the sources and is less influenced by heterogeneity when compared to CG. This is an important finding as it suggests that commitment to patronage tends to remain unaffected by most of the farmer-member and farm-business sources of heterogeneity. While a member's commitment to governance is influenced by relatively more heterogeneity sources in the farmer-member and farm-business dimensions. A members CP is more amenable to being influenced by the co-operative via the use of both monetary (milk price and dividend payments) and non-monetary (member engagement) instruments or policies. Moreover, as these are uniformly applied to the membership base, CP is less likely to vary between member groups. However, this is not the case with commitment to governance. As there is no control, no sanction, and no reward or prize associated with a members' participation in governance, a members' commitment to governance of their co-operative is conceptually similar to an organizational citizenship behaviour of civic virtue (Barraud-Didier et al., 2012). CG is therefore more likely to be influenced by other factors such as the sources of heterogeneity (e.g. age, level of education, type of dairy system, volume of milk produced, total assets, total debt etc.), resulting in greater variability in CG between member groups.

6. Conclusions, implications and limitations

The framework that was developed brought together some relatively robust insights on heterogeneity and commitment to collective action in co-operatives into a more tightly knit and comprehensible whole, and in the specific context of agricultural co-operatives. In doing so we believe the framework serves the purpose of a reference and coordination mechanism for efficient theory testing. It is therefore a small but important and necessary step in the effort that remains to be expended in applying frameworks to the task of linking co-operative structure and processes to its performance. This is a critical challenge that co-operative scholars must address in order to progress co-operative research and enhance its managerial relevance.

We found that this co-operative had high levels of both heterogeneity and commitment to collective action. This suggests that high heterogeneity does not necessarily lead to low

member commitment to collective action. Amongst the heterogeneity dimensions, the greatest heterogeneity was seen in the member-interest dimension and least in the farm-business dimension. This indicates that heterogeneity within the membership base is more likely to be a result of differences in member-interests such as likelihood of selling co-operative shares, willingness to accept a lower dividend, seasons a low milk price is acceptable, importance of being valuable to the co-operative etc.

Additionally, our findings can contribute towards addressing the challenge of strengthening member commitment in agricultural co-operatives and therefore has important managerial implications. For example, the result of the correlation analysis suggest that gains towards further enhancing commitment to collective action can be made by devising a two pronged engagement protocol that either reward or recognise members with higher CCA and also more precisely targeting members with relatively lower CCA. In the specific case of the member-interest dimension our results point out that the co-operative can bolster member commitment by acknowledging and remunerating those with higher CCA and simultaneously paying specific attention to members with lower CCA who tend to be more likely to sell co-operative shares, less willing to accept a dividend, and who give less importance to - being valuable to the co-operative, being a respected member of the community, creating opportunities for future farmers, having variety in their work, and looking after the environment.

This study had a few limitations. Firstly, due to its cross-sectional design and analysis, this study was focused on one large dairy co-operative in New Zealand. The study therefore could not test if the link between heterogeneity and commitment to collective action is statistically significant across diverse co-operatives. The results therefore are indicative at this stage and further research is required to validate them. Moreover, as most dairy co-operatives focus on only one commodity (milk) and farmer-type (dairy farmers) generalisations of the results to non-dairy co-operatives need to be made with caution. Secondly, since the data was collected over a single point in time it does not allow us to study or understand any changes in the relationship between heterogeneity and commitment that can occur. This is important because a member's psychological state can vary over time with respect to their relationship with the co-operative. Lastly, the proposed model did not take into account the important feedback loops that exist between the variables included in the model, and it did not measure the indirect impact of the heterogeneity sources on CCA through other variables. However, by measuring the stated and direct relationship between the heterogeneity sources and CCA, this study is an important first step which can inform future research on the indirect relationship that could

exist via other variables. To examine the feedback loops and measure the indirect relationships, future research on heterogeneity and commitment should consider using structural equation modelling (SEM) as the analytical technique, and data collection and hypothesis testing should be devised accordingly. An important source of member-interest heterogeneity in co-operatives is the succession plan of farmers as it can introduce tension, for e.g. via the horizon and portfolio problems. Future research on heterogeneity should include succession planning as a heterogeneity source.

Despite these limitations our findings contribute towards the growing literature on heterogeneity and commitment in agricultural co-operatives. By revealing the links between heterogeneity and commitment to collective action, this study contributes towards the larger body of research aimed at identifying factors that influence member commitment in co-operatives and therefore come into play in predicting or assessing co-operative performance. We hope that the findings reported in this paper with regards to heterogeneity and commitment to collective action will encourage researchers to further expand the scope of empirical research of these two phenomena in the context of agricultural co-operatives. Lastly, the relationship between commitment to the co-operative and commitment to wider societal requirements such as animal welfare, sustainability and protecting the environment would also be a very interesting area for future research.

References

Alho, E. (2015). Farmers' self-reported value of cooperative membership: evidence from heterogeneous business and organization structures. *Agricultural and Food Economics, 3*(1), 1-22.

Anderson, B., & Henehan, B. (2005). What Gives Cooperatives a Bad Name? *International Journal of Co-operative Management, 2*(2), 7.

Apparao, D., Garnevska, E., & Shadbolt, N. (2019). Examining commitment, heterogeneity and social capital within the membership base of agricultural co-operatives—A conceptual framework. *Journal of Co-operative Organization Management*.

Apparao, D., Shadbolt, N., & Garnevska, E. (2020). *Member commitment in a large New Zealand dairy co-operative: An empirical study*. Manuscript under review.

Barraud-Didier, V., Henninger, M.-C., & El Akremi, A. (2012). The relationship between members' trust and participation in the governance of cooperatives: The role of organizational commitment. *International Food and Agribusiness Management Review, 15*(1), 1-24.

Bhuyan, S. (2007). The "people" factor in cooperatives: an analysis of members' attitudes and behavior. *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie, 55*(3), 275-298.

Bijman, J. (2002). *Essays on Agricultural Cooperatives: Governance Structure in Fruit and Vegetable Chains.* Erasmus University, Rotterdam,

Bijman, J., Hanisch, M., & Van der Sangen, G. (2014). Shifting control? The changes of internal governance in agricultural cooperatives in the EU. *Annals of Public and Cooperative Economics, 85*(4), 641-661.

Birchall, J., & Simmons, R. A. (2004). What motivates members to participate in co-operative and mutual businesses? *Annals of Public & Cooperative Economics, 75*(3), 465-495.

Bogetoft, P., & Olesen, H. B. (2003). *Influence costs in heterogeneous cooperatives: a formal model of sales distortion*. Paper presented at the American Agricultural Economics Association Annual Meeting, Montreal, Canada.

Bogetoft, P., & Olesen, H. B. (2004). Quality incentives and supply chains: managing Salmonella in pork production. *American Journal of Agricultural Economics, 86*(3), 829-834.

Bogetoft, P., & Olesen, H. B. (2007). Sales distortion in heterogeneous cooperatives. In *Vertical Markets and Cooperative Hierarchies* (pp. 213-223). Dordrecht: Springer.

Bouamra-Mechemache, Z., & Zago, A. (2015). Introduction: Collective action in agriculture. *European Review of Agricultural Economics, 42*(5), 707-711. doi:10.1093/erae/jbv027

Cechin, A., Bijman, J., Pascucci, S., & Omta, O. (2013). Decomposing the Member Relationship in Agricultural Cooperatives: Implications for Commitment. *Agribusiness, 29*(1), 39-61. doi:10.1002/agr.21321

Cechin, A., Bijman, J., Pascucci, S., Zylbersztajn, D., & Omta, O. (2013). Drivers of pro-active member participation in agricultural cooperatives: evidence from Brazil. *Annals of Public and Cooperative Economics, 84*(4), 443-468.

Chaddad, F. R. (2007). *The evolution of Brazilian dairy cooperatives: A life cycle approach.* Paper presented at the XLV Congresso Da Sober," Conhecimentos para Agricultura do Futuro", Londrina.

Cook, M. L. (1995). The Future of U.S. Agricultural Cooperatives: A Neo-Institutional Approach. *American Journal of Agricultural Economics, 77*(5), 1153-1159. doi:10.2307/1243338

Cook, M. L. (2018). A life cycle explanation of cooperative longevity. *Sustainability, 10*(5), 1586.

Cook, M. L., & Burress, M. J. (2009). A cooperative life cycle framework. *Unpublished manuscript. Columbia, Mo.: University of Missouri Dept. of Agricultural Economics*.

Cook, M. L., & Iliopoulos, C. (1999). Beginning to Inform the Theory of the Cooperative Firm: Emergence of the New Generation Cooperative. *LTA, 4*(99), 525-535.

Cook, M. L., & Iliopoulos, C. (2000). Ill-defined property rights in collective action: the case of US agricultural cooperatives. In C. Menard (Ed.), *Institutions, Contracts and Organizations* (pp. 335-348). Cheltenham, UK and Massachusetts, USA: Edward Elgar Publishing.

Cook, M. L., & Iliopoulos, C. (2016). Generic solutions to coordination and organizational costs: Informing cooperative longevity. *Journal on Chain and Network Science, 16*(1), 19-27.

Elliott, M., Elliott, L., & Sluis, E. V. d. (2018). A predictive analytics understanding of cooperative membership heterogeneity and sustainability. *Sustainability, 10*(6), 2048.

Fulton, J., & Adamowicz, W. (1993). Factors that influence the commitment of members to their cooperative organization. *Journal of Agricultural Cooperation, 8*, 39-53.

Fulton, M. (1999). Cooperatives and member commitment. *LTA, 4*(99), 418-437.

Fulton, M., & Giannakas, K. (2001). Cooperatives and Membership Commitment: Organizational Commitment in a Mixed Oligopoly: Agricultural Cooperatives and Investor-Owned Firms. *American Journal of Agricultural Economics, 83*(5), 1258.

Garnevska, E., Callagher, L., Apparao, M., Shadbolt, N., & Siedlok, F. (2017). *The New Zealand Co-operative Economy*. Retrieved from New Zealand: https://nz.coop/wp-content/uploads/2017/01/Co-op-report-v9-WEB.pdf

Gorton, G., & Schmid, F. (1999). Corporate governance, ownership dispersion and efficiency: Empirical evidence from Austrian cooperative banking. *Journal of Corporate Finance, 5*(2), 119-140.

Gray, T. W., & Kraenzle, C. A. (1998). *Member participation in agricultural cooperatives: A regression and scale analysis*: United States Department of Agriculture, Rural Development, Rural Business-Cooperative Service.

Hansmann, H. (1996). *The ownership of enterprise*. Cambridge, Mass. : The Belknap Press of Harvard University Press.

Hansmann, H. (1999). Cooperative firms in theory and practice. *LTA, 48*(4), 387-403.

Harte, L. N. (1997). *Creeping Privatisation of Irish Co-operatives: A Transaction Cost Explanation*. Netherlands: Van Gorcum & Comp. B.V.

Hendrikse, G. (2007). Two vignettes regarding boards in cooperatives versus corporations. In *Vertical markets and cooperative hierarchies* (pp. 137-150): Springer.

Hendrikse, G., & Bijman, J. (2002). On the emergence of new growers' associations: self-selection versus countervailing power. *European Review of Agricultural Economics, 29*(2), 255-269.

Hoehler, J., & Kuehl, R. (2018). Dimensions of member heterogeneity in cooperatives and their impact on organization–a literature review. *Annals of Public and Cooperative Economics, 89*(4), 697-712.

Höfer, H.-H., & Rommel, J. (2015). Internal governance and member investment behavior in energy cooperatives: An experimental approach. *Utilities Policy, 36*, 52-56.

Holmstrom, B. (1999). Future of Cooperatives: A Corporate Perspective. *LTA, 4*(99), 404-417.

Iliopoulos, C., & Cook, M. L. (1999). *The efficiency of internal resource allocation decisions in customer-owned firms: the influence costs problem.* Paper presented at the 3rd Annual Conference of the International Society for New Institutional Economics, Washington DC.

Iliopoulos, C., & Hendrikse, G. (2009). Influence Costs in Agribusiness Cooperatives: Evidence from Case Studies. *International Studies of Management and Organization, 39*, 60-80. doi:10.2753/IMO0020-8825390404

Iliopoulos, C., & Valentinov, V. (2017). Member preference heterogeneity and system-lifeworld dichotomy in cooperatives. *Journal of Organizational Change Management*.

Iliopoulos, C., & Valentinov, V. (2018). Member heterogeneity in agricultural cooperatives: A systems-theoretic perspective. *Sustainability, 10*(4), 1271.

James, H. S., & Sykuta, M. (2006). Farmer trust in producer-and investor-owned firms: Evidence from Missouri corn and soybean producers. *22*(1), 135-153.

James, H. S., & Sykuta, M. E. (2005). Property Right and Organizational Characteristics of Producer-owned Firms and Organizational Trust. *Annals of Public and Cooperative Economics, 76*(4), 545-580.

Kalogeras, N., Pennings, J. M., van der Lans, I. A., Garcia, P., & van Dijk, G. (2009). Understanding Heterogeneous Preferences of Cooperative Members *Agribusiness, 25*(2), 289-289.

Kyriakopoulos, K., Meulenberg, M., & Nilsson, J. (2004). The impact of cooperative structure and firm culture on market orientation and performance. *Agribusiness: An International Journal, 20*(4), 379-396.

Lang, K., & Fulton, M. (2004). Member commitment and the market and financial performance of the Saskatchewan Wheat Pool. *Current Agriculture, Food and Resource Ideas, 5*, 238-252.
Levi, Y., & Davis, P. (2008). Cooperatives as the "enfants terribles" of economics: Some implications for the social economy. *The Journal of Socio-Economics, 37*(6), 2178-2188.
Livestock Improvement Corporation Limited, & DairyNZ Limited. (2017). *New Zealand Dairy Statistics 2016-17*. Retrieved from Hamilton, New Zealand:
Nilsson, J. (2001). Organisational principles for co-operative firms. *Scandinavian journal of management, 17*(3), 329-356.
Nilsson, J., Kihlén, A., & Norell, L. (2009). Are traditional cooperatives an endangered species? About shrinking satisfaction, involvement and trust. *International Food and Agribusiness Management Review, 12*(4).
Nilsson, J., & Madsen, O. (2007). Issues in cross-border mergers between agricultural co-operatives. *Journal of Co-operative studies, 40*(3), 27-38.
Nilsson, J., Svendsen, G. L., & Svendsen, G. T. (2012). Are large and complex agricultural cooperatives losing their social capital? *Agribusiness, 28*(2), 187-204.
Olson, M. (1971). *The logic of collective action; public goods and the theory of groups*: Cambridge, Mass., Harvard University Press [1971].
Österberg, P., & Nilsson, J. (2009). Members' perception of their participation in the governance of cooperatives: the key to trust and commitment in agricultural cooperatives. *Agribusiness, 25*(2), 181-197.
Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*: Cambridge university press.
Ostrom, E. (2000). Collective Action and the Evolution of Social Norms. *Journal of Economic Perspectives, 14*(3), 137-158.
Ostrom, E. (2005). Self-governance and forest resources. *Terracotta reader: A market approach to the environment, 12*.
Pelled, L. H., Eisenhardt, K. M., & Xin, K. R. (1999). Exploring the black box: An analysis of work group diversity, conflict and performance. *Administrative science quarterly, 44*(1), 1-28.
Poteete, A. R., & Ostrom, E. (2004). Heterogeneity, group size and collective action: the role of institutions in forest management. *Development and change, 35*(3), 435-461.
Pozzobon, D. M., Zylbersztajn, D., & Bijman, J. (2011). *Modeling heterogeneity and member participation in cooperative governance.* Paper presented at the Fifth International Conference on Economics and Management of Networks (EMNet). Limassol, Cyprus.
Rhoades, S. A. (1993). The herfindahl-hirschman index. *Fed. Res. Bull., 79*, 188.
Shadbolt, N. M., & Apparao, D. (2016). Factors Influencing the Dairy Trade from New Zealand. *International Food and Agribusiness Management Review*.
Simmons, R., & Birchall, J. (2004). Creating and supporting co-operative members in the West Midlands. *Journal of Co-operative Studies, 37*(1), 22-37.
Staatz, J. M. (1987). Farmers' incentives to take collective action via cooperatives: a transaction cost approach. *Cooperative theory: New approaches, 18*, 87-107.
Staatz, J. M. (1989). *Farmer Cooperative Theory: Recent Developments*. (84). Washington, D.C
Trechter, D. D., King, R. P., & Walsh, L. (2002). Using communications to influence member commitment in cooperatives. *Journal of Cooperatives, 17*.
Van Bekkum, O.-F. (2001). *Cooperative models and farm policy reform: Exploring patterns in structure-strategy matches of dairy cooperatives in regulated vs. liberalized markets*. The Netherlands: Koninklijke Van Gorcum.

Varughese, G., & Ostrom, E. (2001). The contested role of heterogeneity in collective action: some evidence from community forestry in Nepal. *World Development, 29*(5), 747-765.

Vitaliano, P. (1983). Cooperative enterprise: an alternative conceptual basis for analyzing a complex institution. *American Journal of Agricultural Economics, 65*(5), 1078-1083.

Weersink, A. (2018). The growing heterogeneity in the farm sector and its implications. *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie, 66*(1), 27-41.

Zusman, P. (1992). Constitutional selection of collective-choice rules in a cooperative enterprise. *Journal of Economic Behavior & Organization, 17*(3), 353-362.

Chapter 5: Member Heterogeneity and Organisational Commitment: An empirical study of a New Zealand dairy co-operative

This chapter addresses research objective 3 and the manuscript has been prepared for submission to the International Journal of Co-operative Accounting and Management (IJCAM). This is a co-operatives specific journal and explores a wide range of topics related to the accounting and management of co-operatives. Moreover, this chapter is related to the previous chapter (manuscript) which has been submitted to IJCAM for review.

Abstract

This paper presents and empirically tests a framework that examines the relationship between member heterogeneity and member organisational commitment in agricultural co-operatives. Member heterogeneity was measured using 35 sources that were grouped under one of three heterogeneity dimensions – 1) farmer-member, 2) farm-business and 3) member-interest. This was linked to three conceptualizations of member organizational commitment namely affective (affective attachment), continuance (perceived costs) and normative (obligation). Based on survey responses from 568 members of a NZ dairy co-operative (Fonterra Co-operative Group), the study found that high heterogeneity does not necessarily result in low affective (AC) and normative commitment (NC) while it might lead to a low continuance commitment (CC). Moreover, the results suggest that heterogeneity could be associated with AC but not NC and CC. Further, our findings tend to indicate that the farmer-member dimension is not related to any of the three organisational commitment components. While the farm-business dimension is related to AC and CC, and the member-interest dimensions is related to AC and NC.

Keywords: Co-operatives, Member, Commitment, Heterogeneity, Performance

1.0 Introduction

The international cooperative alliance (ICA) outlines seven core principles that shape co-operatives and defines a co-operative as "*an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through jointly owned and democratically-controlled enterprise"* (International Co-operative Alliance (ICA), 2018). This is a very broad definition covering off both functional and political elements of a cooperative (Evans & Meade, 2006). More importantly it highlights the dual nature of co-operatives, that is a cooperative is both an association (i.e., society) of members and an enterprise (the cooperative firm) in which economic activities are conducted (Bijman, 2016). Although there are several similarities between co-operatives and the more common Investor Owned Firms (IOF), for example, both types of organizations participate in the same labour market, pay similar wages, management compensation and interest rates; and most operational practices such as packaging, storing, transporting, processing, and advertising are also very similar across both business forms (Zeuli & Cropp, 2004), there are some critical differences as well. Most importantly cooperatives are purposefully organized to serve member needs and are focused on generating member benefits rather than return to investors; and members have a responsibility to provide equity capital and govern the business (Coltrain, Barton, & Boland, 2000). Therefore a cooperative can be viewed as a business that is owned and controlled by the people (patrons) who use its services and whose benefits (services received and earnings allocations) are shared by the users (typically on the basis of use) (Staatz, 1987). In other words, a cooperative can be defined as a user-owned, user-controlled organization whose primary purpose is to maximize benefits for its users (Zeuli & Cropp, 2004). This strong member orientation and focus of cooperatives as opposed to investor orientation of IOF's is the most important differentiating feature between the two. As a result, the core operating philosophies of the two organizational forms are very different. Moreover, cooperative principles provide an additional framework through which options for business strategies, organizational structures, and operations must be analysed (Dunn, Crooks, Frederick, Kennedy, & Wadsworth, 2002).

Despite the member-co-operative relational dimension being an important differentiator of the co-operative model from the more common IOF model, and also a significant source of competitive advantage (Jussila, Goel, & Tuominen, 2012), much of the research work on co-operatives tends to be centred on the non-relational aspects (Røkholt, 1999; Byrne, McCarthy, Ward, & McMurtry, 2012). Research about co-operatives have mainly focused on

theoretical aspects and approaches such as agency theory (Eilers & Hanf, 1999), property rights theory (Cook & Iliopoulos, 2000) contracting theory (Sykuta & Cook, 2001) , transaction cost theory (Hendrikse & Bijman, 2002), and game theory (Karantininis & Zago, 2001). Although these are useful in detailing the economic characteristics of the co-operatives and explaining the reasons for the formation, existence and behaviour, they are not empirically based; and hence not entirely useful in evaluating the performance of co-operatives. While the conventional financial and economic rationale for measuring co-operative performance and explaining the reasons for being a member of a co-operative continue to be important, there is a parallel view that stresses the need to recognise the critical role of other factors (Fulton, 1999; Iliopoulos & Cook, 1999; Nilsson, Svendsen, & Svendsen, 2012; Apparao, Garnevska, & Shadbolt, 2019). Moreover, the literature identifies that while the study and analysis of co-operatives are often strongly driven by economic aspirations (e.g. profit maximization) they are not always in total alignment with the social features of the co-operative organisational form. Furthermore, the empirical studies that exist are mainly focused on applying the behaviour model of cooperatives as a profit-maximizing firm; and empirical applications of other existing models is lacking (Soboh, Lansink, Giesen, & Van Dijk, 2009). Besides, given that members assess their co-operatives in social terms in addition to economic ones; some reorientation of research on agricultural co-operatives with a focus on the socio-psychological perspective of members is also suggested (Österberg & Nilsson, 2009). Two such important socio-psychological phenomena that influence and impact co-operatives are -1) member heterogeneity (Iliopoulos & Cook, 1999; Kalogeras, Pennings, van der Lans, Garcia, & van Dijk, 2009; Hoehler & Kuehl, 2018; Apparao et al., 2019) and 2) member commitment (Fulton, 1999; Österberg & Nilsson, 2009; Bijman & Verhees, 2011; Apparao, Shadbolt, & Garnevska, 2020b). Member heterogeneity deals with the diversity that exists within the membership base while member commitment deals with the force that binds a member to a course of action of relevance to the co-operative.

A very important feature of co-operatives is that it is characterised by collective decision making and self-governance (Apparao et al., 2019). As heterogeneity is perceived to affect this feature, it impacts the performance of co-operatives (Cook, 1995; Iliopoulos & Cook, 1999; Kalogeras et al., 2009; Pozzobon, Zylbersztajn, & Bijman, 2011; Bijman, Hanisch, & Van der Sangen, 2014; Apparao et al., 2019). More specifically, since the control of co-operatives is structured democratically, heterogeneity is likely to generate transaction costs to co-operative decision-making. As argued by Hansmann (1996) an increase in these transaction costs results

in higher decision-making costs in co-operatives relative to IOF's. Similarly, according to Pozzobon et al. (2011), as a consequence of heterogeneity, decision making in traditional co-operatives is likely to be more costly than in IOF's. It has been suggested that the heterogeneity (diversity) of co-operatives' membership is increasing (Simmons & Birchall, 2004). This is because, as co-operatives become larger and more diverse in their operations, membership becomes increasingly heterogeneous (Nilsson et al., 2012). Globalisation and international expansion of co-operatives coupled with structural changes in the farming sector have led to further magnification of the differences between farmer members. Consumer demand for higher quality and more variety have resulted in an increase in diversification at farm level (Bogetoft & Olesen, 2007). Moreover, in search of efficiency gains and additional bargaining power, co-operatives are seeking new members and merging partners outside their original areas (Hoehler & Kuehl, 2018).

For agricultural co-operatives to be successful it is required that farmer-members are willing to supply the co-operative with raw products, capital and managerial inputs (Fulton, 1999; Zeuli & Cropp, 2004), and for this to happen member commitment is essential (Staatz, 1989; Anderson & Henehan, 2005; Cechin, Bijman, Pascucci, & Omta, 2013). It has been suggested that commitment improves co-operative performance in several ways. For example, Bijman and Verhees (2011) maintain that it decreases the transaction costs in member-co-operative transactions because the likelihood of opportunistic behaviour is reduced since committed members are less likely to behave as free riders in their dealings with the co-operative. Solinger, Van Olffen, and Roe (2008) report that commitment incorporates in its members, a willingness to make a sacrifice to contribute to the organizations success, and Cechin et al. (2013) suggest committed members are more likely to make an effort towards delivering to the co-operative's strategy.

It has been argued than an increase in heterogeneity can lead to a decline in member commitment (Fulton & Giannakas, 2001; Apparao et al., 2019). Moreover, a critical aspect to overcoming the perceived heterogeneity problem in agricultural co-operatives is to ensure members reconcile their differences and exhibit a commitment to the organisation. Yet, very few studies have examined the relationship between member heterogeneity and member commitment (Apparao, Shadbolt, & Garnevska, 2020a) and empirical research on this phenomenon is lacking. More specifically, the relationship between member heterogeneity and member organisational commitment, which is a multidimensional attitudinal concept, has not yet, to our knowledge, been studied in the context of agricultural co-operatives. Drawing

from the organisational behaviour literature, and specifically from Meyer and Allen (1991), we define organizational commitment as a psychological state that characterizes the members relationship with the co-operative, and has implications for the decision to continue or discontinue membership in the co-operative.

We strive to address these gaps by pursuing two main objectives. First, to develop a framework that explores the links (and/or relationship) between heterogeneity and members' organisational commitment in agricultural co-operatives. Second, to empirically test these links via the measurement and analysis of heterogeneity and member organisational commitment in agricultural co-operatives. By pursuing these objectives, we present a new theoretical framework for linking member heterogeneity and organisational commitment and provide a much-needed empirical assessment of important phenomena that have been suggested to impact co-operative performance.

This manuscript is structured as follows - the second section presents and explains the theoretical framework, the third section details the methodological aspects of the study carried out on a sample of 568 members of Fonterra Co-operative Group, the fourth section describes the results, and the fifth section presents a discussion of these. The conclusions, limitations and possibilities for future research are presented in the sixth section.

2.0 Theoretical Framework

In this study a framework that provides an examination of member heterogeneity and member organisational commitment in agricultural co-operatives is conceptualized. As empirical studies are necessary to further enhance the understanding of agricultural co-operatives, importance is given towards objectively examining these two phenomena in agricultural co-operatives via outcomes than can be measured. The first step towards achieving this is to provide a description of heterogeneity and organisational commitment.

2.1 Heterogeneity

As co-operatives become larger and more complex in their operations, membership becomes increasingly diverse (heterogeneous), and the increase in heterogeneity has often been suggested as being a significant challenge to the co-operative model (Bijman et al., 2014; Apparao et al., 2019). This is because both democratic costs (Staatz, 1987; Bijman, 2002) and agency costs (Gorton & Schmid, 1999) are believed to be greater in co-operatives than in investor owned firms (IOF). Increased heterogeneity of co-operatives and their members is

suggested to be an important reason for further increase in these costs and resulting decrease in competitiveness of co-operatives (Fulton & Giannakas, 2001; Bijman, 2002; Bogetoft & Olesen, 2004). When members possess diverse preferences for attribute alternatives, disagreements can occur as to which combination is most desirable (Zusman, 1992). As discussed by Vitaliano (1983), Cook (1995), and Hansmann (1996) the divergence in incentives and preferences is particularly problematic for the assignment of contractual property rights among members with diverse characteristics. Moreover increasing heterogeneity leading to conflicting preferences can generate problems in co-operatives (Kalogeras et al., 2009) such as decline in member commitment (Fulton & Giannakas, 2001), decrease in member willingness to supply equity capital (Van Bekkum, 2001), increasing costs related to damaging influence activities (Cook, 1995), tedious decision making process (Hansmann, 1996) and lack of strategic focus (Hendrikse & Bijman, 2002).

The study of heterogeneity in agricultural co-operative should start with decoupling the dimensions of member heterogeneity that exist. These dimensions help identify conflict potential and adopt governance structures to meet the needs of the members e.g. by introducing advisory boards for different producers or by establishing new ways of organising and financing the co-operative (Kalogeras et al., 2009). Moreover, by identifying the attributes, levels and factors of member heterogeneity, the co-operatives' ability to meet the needs of the members can be further strengthened (Kalogeras et al., 2009). Despite its importance, very few scholars have taken a step in this direction. Cook and Iliopoulos (1999), in their study of influence costs, identified eight factors that can be used to explain the degree of heterogeneity in agricultural co-operatives. While Pozzobon et al. (2011) postulate that member heterogeneity in agricultural co-operatives can be because of - 1) individual characteristics and 2) farms characteristics. More recently, Hoehler and Kuehl (2018) posit that member heterogeneity in agricultural co-operatives can be grouped under three categories 1) farm (e.g. size, location), 2) member (e.g. age, education) and 3) product (e.g. type and quality).

In this study, based on the arguments and suggestions of Cook and Iliopoulos (1999), Pozzobon et al. (2011) and Hoehler and Kuehl (2018), we separate member heterogeneity into three dimensions, 1) farmer-member, 2) farm-business and 3) member-interest. Further, each of the heterogeneity dimensions incorporates several sources that have been stressed in research on co-operatives. The farmer-member dimension is comprised of 9 sources, the farm-business dimension is comprised of 14 sources and the member-interest dimension is comprised of 12 sources. These three dimensions, as well as the sources and overall member heterogeneity in

agricultural co-operatives, have already been described and analysed in an earlier research study (Apparao et al., 2020a).

2.2 Organisational Commitment

Organisational commitment, which lies in the area of organizational behaviour is primarily focused on the role it plays in systems that are characterized by employer (i.e., the organization) and employees, and has been conceptualized and measured in several ways. According to Mäkelä and Maula (2006) organisational commitment refers to joint values, goals and actions in a relationship leading to the intention of relationship continuation and deployment of resources. Although many definitions have been proposed for organisational commitment, an underlying and recurring theme appears to be the idea of a psychological bond between the member and the organisation, which can be conceived as an intrinsic attachment or identification of a person with something outside of oneself (Firestone & Pennell, 1993).

According to Meyer and Allen (1987), three distinct yet general themes, affective attachment, perceived costs and obligation, reflect several conceptualizations of attitudinal commitment in literature. Thus, commitment is viewed as having an affective orientation toward the organisation, recognition of the costs associated with leaving the organisation, and a moral obligation to remain with the organisation. These distinct themes were labelled as “affective”, “continuance” and “normative” commitment; and are important because they involve the psychological state reflected in commitment, the antecedent conditions leading to its development, and the behaviours that are expected to result from commitment (Allen & Meyer, 1990).

Based on the widely accepted three component model of organisational commitment presented by Meyer & Allen (Meyer & Allen, 1991), few co-operative studies have identified affective (emotive), continuance (utilitarian), and normative (ideological) dimensions of member commitment reflecting a member’s desire to, need to, and or/sense of obligation to maintain membership and patronage in the co-operative (Jussila & Tuominen, 2010; Jussila, Byrne, & Tuominen, 2012; Jussila, Goel, et al., 2012; Mazzarol, Soutar, & Limnios, 2012; Jussila, Roessl, & Tuominen, 2014).

Affective Commitment: Co-operative literature indicates that the affective dimension of commitment is based on emotional attachments to and bond with co-operative society

(Foreman & Whetten, 2002; Byrne & McCarthy, 2005; Jiménez, Martí, & Ortiz, 2010). It reflects the members desire to remain attached to the particular social entity – as the relationship feels good, brings a sense of belonging, and is satisfying (Byrne & McCarthy, 2005). According to Jussila et al (2012), affective commitment is an essential ingredient for sustainable and successful co-operation because it helps address important challenges intrinsic to the co-operative model such as the free-riding problem, property rights problem and horizon problem (Jussila, Byrne, et al., 2012).

Continuance Commitment: Within the context of co-operatives, it is suggested that continuance commitment is calculative and rational in nature and refers to a members need to stay in order to gain the economic benefits of membership (Jussila et al., 2014). Continuance (utilitarian) commitment is important because the existence of a co-operative is dependent on continued support from members, but this form of commitment is prone to switching vulnerabilities (Oliver, 1997). Although continuance (utilitarian) commitment leads to short termism and selfish behaviour, it may also be a critical tool to keep the co-operative managers accountable to members (members that actively weigh costs and benefits will demand better performance from managers) and thereby reduce agency costs (Jussila, Goel, et al., 2012).

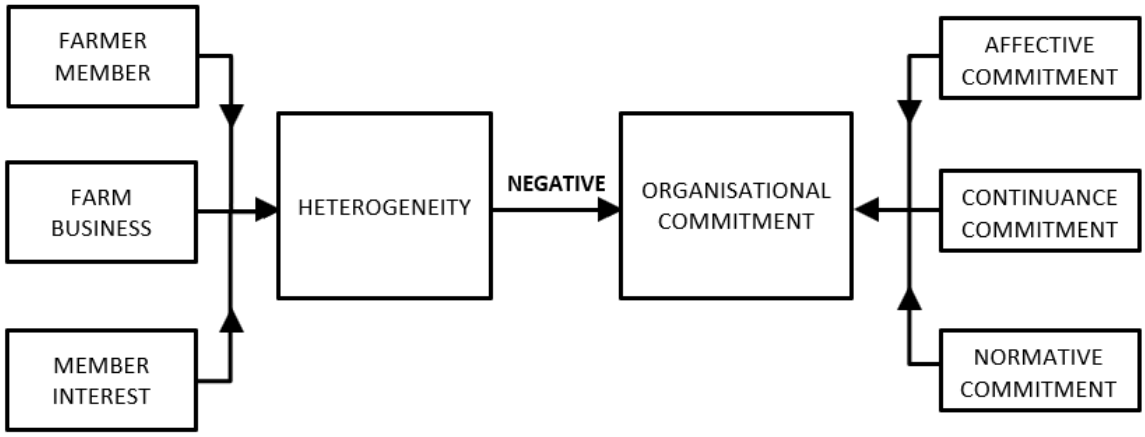
Normative Commitment: According to Byrne and McCarthy (2005), normative commitment reflects the members sense of duty to remain a patron because they feel as though they ought to maintain that relationship. Moreover, there is a close connection between co-operative ideology and normative commitment, and often normative commitment is referred to as ideological commitment, which may be very difficult to build but which is very persistent and creates lasting loyalty (Byrne & McCarthy, 2005). This moral obligation manifests itself when a member considers that opportunistic behaviour (e.g. free riding and taking advantage of the public goods provided by the co-operative) is wrong; and the member thereby is willing to maintain their contribution (Fulton & Adamowicz, 1993; Jussila et al., 2014).

In this study, member organisational commitment is separated into three components 1) Affective 2) Continuance and 3) Normative. These three components, as well as organisational commitment in agricultural co-operatives, have already been described and analysed in an earlier research study (Apparao et al., 2020b).

2.3 Framework Structure and Hypothesis

The conceptual framework is organized based on the premise that heterogeneity has an important influence on member organisational commitment. This relationship between heterogeneity and organisational commitment is examined by bringing together the three dimensions of heterogeneity and the three components of organisational commitment (Figure 1). It is hypothesised, that the relationship between heterogeneity and organisational commitment is inverse, i.e. when heterogeneity is high, organisational commitment is low and when heterogeneity is low, organisational commitment is high. It is further argued that this relationship is expressed via the associated heterogeneity dimensions and organisational commitment components. When there is an increase in heterogeneity within one or more of the heterogeneity dimensions, there is a decrease in one or more components of organisational commitment.

Figure 1: Conceptual Framework: Heterogeneity and Organisational Commitment



Based on the framework, we propose the following hypotheses –

Hypothesis 1: There is a high level of heterogeneity, and a low level of affective, continuance and normative commitment, as well as overall organisational commitment.

We further propose that if there is high heterogeneity within a source, then there will be a significant difference in AC, CC and NC between the groups that comprise the heterogeneity source. The basis for this is that heterogeneity can be linked to organisational commitment by identifying if there is a significant difference in AC, CC and NC between the various groups

that comprise a source of heterogeneity. Furthermore, this could also indicate if an association between heterogeneity and that component of organisational commitment exists. Based on this rational we propose:

Hypothesis 2: There is a significant difference in AC, CC and NC between the groups that comprise each of the 9 sources of *farmer-member* heterogeneity dimension that showed high or very high heterogeneity. While there is no significant difference between groups for sources that showed low or very low heterogeneity.

Hypothesis 3*:* There is a significant difference in AC, CC and NC between the groups that comprise each of the 14 sources of *farm-business* heterogeneity dimension that showed high or very high heterogeneity. While there is no significant difference between groups for sources that showed low or very low heterogeneity.

Hypothesis 4*:* There is a significant difference in AC, CC and NC between the groups that comprise each of the 12 sources of *member-interest* heterogeneity dimension that showed high or very high heterogeneity. While there is no significant difference between groups for sources that showed low or very low heterogeneity.

3.0 Methods

3.1 Background

3.1.1 Agriculture and Dairy Co-operatives

Although co-operatives exist in a wide range of sectors, it is in the agricultural sector that they have the most comprehensive and significance presence. Co-operatives that operate along the agricultural value chain, starting from the supply of farming inputs to the cultivation of agricultural products and livestock farming, and further on to the industrial processing of agricultural products and animals, can be grouped together as agricultural cooperatives (International Cooperative Alliance (ICA) & Euricse, 2014). Agricultural cooperatives have played an important role in strengthening market access and generating competitive returns for independent farm operators during the 20th century (Ortmann & King, 2007). In the United States, there were approximately 1,953 agricultural co-operatives and their average total assets and equity were $47.1 million ad $20.9 million respectively (Demko, 2018). In the EU there are about 51, 392 agricultural co-operatives and their combined annual turnover in €347 billion (Cocolina & Cooperatives Europe, 2016). Particularly in the dairy industry, farmer-owned cooperatives play a rather dominant role with

market shares above 80% in milk collection in the U.S., the major dairy countries in Western Europe and also in Australia and New Zealand (Chaddad, 2007). Moreover, four (Fonterra, FrieslandCampina, Dairy Farmers of America and Arla Foods) of the top 10 dairy companies in the world by revenue are co-operatives (Hunt & van Battum, 2015).

New Zealand has a long standing and deep presence of co-operatives across several sectors. They also account for a significant share of New Zealand's economic activity (Evans & Meade, 2006; Garnevska, Callagher, Apparao, Shadbolt, & Siedlok, 2017). A recent report by Garnevska et al. (2017) found that the top 30 co-operatives and mutuals in NZ generated revenues of over 42 billion NZ$, provided direct employment to 48,000 individuals and catered to a membership base of 1.4 million people. Amongst the top 30 NZ co-operatives, agri-food cooperatives account for 65% of revenues, 68% of assets and 83% of employees (Garnevska et al., 2017). Within the agricultural sector, cooperatives play a very significant role in the dairy industry and account for over 80% of milk processing in New Zealand.

3.1.2 Fonterra

Fonterra Co-operative Group (Fonterra) is owned by around 10,000 self-employed dairy farmers that are spread across NZ. It was formed in 2001 by the amalgamation of three entities - 1. New Zealand Dairy Group, 2. Kiwi Co-operative Dairies, and 3. the New Zealand Dairy Board. This process that lead to the formation of Fonterra was driven by several mergers over the course of many decades. It is reported that there were about 230 dairy co-operatives in the 1960's. These co-operatives were characterised by a unique identity, loyal membership base and strong regional specificity. More importantly there was intense competition between these co-operatives. Over the next three decades, especially in the 1980's and 1990's many dairy co-operatives gradually merged to form larger co-operatives in order to achieve economies of scale. As a result, there were just 3 dairy co-operatives in 2017/18, and the formation of Fonterra was the main outcome and culmination of this process of mergers. As explained by Nilsson and Madsen (2007) mergers between co-operatives are quite complex because a merger involves not only the integration of the business operations of the two co-operatives but also the breaking down of barriers between the members of the two co-operatives and aligning the different ways of thinking within the memberships. Moreover, the merger is further complicated by the concept of heterogeneity – heterogeneity in terms of business activities, logistics, organisational culture, leadership principles, ways of working, and other attributes (Nilsson & Madsen, 2007). Fonterra's large membership base and a foundation based on

several mergers of co-operatives that once had a unique identity of their own, and strongly competed against each other, is thought to have introduced considerable member heterogeneity in the co-operative.

With revenues of about NZ$ 20.4 billion in 2017/18 Fonterra is the largest business enterprise in NZ. Fonterra sources about 22 billion litres of milk, which is about 82% of NZ milk production. It is the largest dairy exporter in the world, exporting about 95% of its milk sourced to 140 countries. Fonterra employs 22,000 people across the world and accounts for 25% of NZ's exports. It is governed by an 11-member board (7 elected farmer shareholders and 4 appointed). Farmer shareholders vote for board members on the basis of the number of wet shares they hold, that is, one share per kilogramme of milksolids supplied to the co-operative. Additionally, it has a 25 member shareholders council which represents the views of all Fonterra farmer shareholders as suppliers, owners and investors. Each councillor is elected by farmers within the ward they represent, on the basis of one vote per shareholder farm.

3.2 Data Collection

3.2.1 Sample

A survey method was used to collect data on heterogeneity and member organisational commitment. Before the survey, a pilot study was performed using 10 dairy farmers chosen by convenience to inform the development and refinement of the questionnaire. A random sample of 2,000 members of Fonterra was generated by a Fonterra manager and the structured questionnaire that was developed was mailed to this sample in July 2017. The researchers only had access to the postal contact information of the members and were blind to the member's names and other details. A reminder was sent out in September 2017 to those members that hadn't yet responded. Of the 2,000 surveys that were mailed 294 (15%) were returned by the postal service as being un-deliverable and 576 were returned by the respondents, giving a response rate of 34%. Of these 8 responses were classified as being incomplete and were discarded. Thus, leaving the study with a sample of 568 responses (33%) that were used in the analysis.

3.2.2 Measures

Heterogeneity: As described in the framework earlier, this study captured heterogeneity in agricultural co-operatives along three dimensions, farmer-member, farm-business and member-interest. To achieve this, each dimension was further broken down to its constituent

elements or sources of heterogeneity; and the degree of heterogeneity that existed for each of these sources was measured. These sources were included because they are often associated with member heterogeneity in agricultural co-operatives (Iliopoulos & Cook, 1999; Kalogeras et al., 2009; Pozzobon et al., 2011; Hoehler & Kuehl, 2018); and are of specific relevance to heterogeneity within the membership base of NZ dairy co-operatives. The farmer-member dimension comprised of 9 sources, the farm-business dimension comprised of 14 sources and the member-interest dimension comprised of 12 sources. These three dimensions, as well as the sources that comprise them, have already been described in an earlier research study (Apparao et al., 2020a).

Organisational Commitment The measures used to capture organisational commitment are explained in Apparao et al. (2020b) and were based on the three component model and scale developed by Allen and Meyer (1990). The original statements developed by Allen and Meyer (1990) were specifically adapted to suit the measurement of the member-farmer and co-operative relationship in a dairy co-operative. All three components, affective, continuance and normative commitment, were measured using eight statements (items) for each. Respondents indicated their degree of agreement to each of the twenty-four statements on a Likert type 7-point scale (from 1: Strongly disagree to 7: Strongly agree).

3.3 Statistical Analysis

The data was analysed using SPSS (IBM® SPSS Statistics). First, a scale reversal was performed for the inverted scale statements. Second, a descriptive analysis of the data set was conducted by determining descriptive statistics such as the median, mode, mean, standard deviation and frequencies of the variables. Third, the construct reliability of the statements used to measure organisational commitment was determined using the Cronbach Alpha. Fourth, the affective, normative and continuance commitment scores were determined for each respondent by summing the responses to each of the eight statements used to measure them. Since the scale length ranged from 1 to 7 for each statement, the lowest score possible is 8 (8 x 1) and the highest possible score 56 (8 x 7).

Fifth, the Gini-Simpson Index (GSI), one of the most widely used indexes to measure diversity (heterogeneity), was used to determine the degree of heterogeneity that existed within each source variable. The GSI takes in account the number of different types that exist in the data field of interest and also how evenly entities are distributed among those types. Although its origins lie in the field of ecology, it has been widely used in diverse disciplines, such as

genetics, sociology, economics, management etc. For example, the Herfindahl-Hirschman index, which is extensively used to measure market concentration in economics and management, is based on Gini-Simpson Index (Rhoades, 1993). The equation used to determine Gini-Simpson Index is given below -

$$1 - \sum_{i=1}^{R} P^2 i$$

Where R is *richness* and quantifies the number of different types the data field of interest represents. For example, in the case of heterogeneity source variable gender, R is equal to two since the data field of interest comprises of two types, male and female. P_i represents the proportion of individuals that belong to the i^{th} type in the data field of interest. An index value of 0 indicates complete homogeneity, while an index value of 1 indicates complete heterogeneity. We classify heterogeneity in our source variables into five categories based on the GSI value as follows, 0 to 0.20 very low heterogeneity, > 0.20 to 0.40 low heterogeneity, > 0.40 to 0.60 moderate heterogeneity, > 0.60 to 0.80 high heterogeneity, and > 0.80 to 1.0 very high heterogeneity.

Sixth, for the heterogeneity sources for which correlations could be determined, the Spearman's correlation technique was used to determine if a correlation exists between a heterogeneity source and AC, CC and NC. Lastly, an analysis of variance (ANOVA) was performed to determine if the AC, CC and NC scores differed significantly between groups comprising a source of heterogeneity.

4.0 Results

4.1 Organisational Commitment

A detailed presentation of the results on organisational commitment are provided in Apparao et al. (2020b). In brief, the Cronbach alpha of the statements used to measure the three different constructs of organisational commitment were all greater than 0.70, indicating that the statements were a reliable measure of the underlying construct being studied. The mean affective commitment score was 37.8 (SD = 9.7) and normative commitment score was 31.7 (SD = 8.1). While the median scores were 39 and 32 respectively. As both the mean and median scores were above the mid-point of 31.5, it suggests that this co-operative has high affective and normative commitment. However, the co-operative had low continuance commitment as both the mean (30.2, SD = 9.0) and median (29.0) CC scores were below the

scale mid-point. Importantly a classification of organisation commitment scores into high and low levels based on the mid-point score of 31.5, revealed that 19.2% (n = 109) of respondents had high levels of all three components, AC, CC and NC; while 10.9% (n = 62) had low levels of all three components of organisational commitment

4.2 Heterogeneity

A detailed presentation of the results on heterogeneity are presented in Apparao et al. (2020a). In brief, high (n = 20, 57%) and very high (n = 5, 14%) levels of heterogeneity were observed for most (n = 25, 71%) of the 35 heterogeneity sources. In contrast low (n= 6, 17%) and very low (n = 1, 3%) heterogeneity were only observed for 7 (20%) sources. This indicates that the membership base of this co-operative is characterised by high heterogeneity.

4.3 Heterogeneity and Organisational Commitment

Significant differences in AC were observed between groups for 23 sources of heterogeneity. While a significant difference in CC and NC between groups was found for only 11 and 8 sources of heterogeneity respectively. Importantly, of the 25 sources that demonstrated high or very heterogeneity, a majority showed significant differences ($P < 0.05$) in AC (n = 17). However, much fewer number of sources showed significant differences in CC (n = 8) and NC (n = 8). Furthermore, of the 7 sources that showed low of very low heterogeneity, a significant difference was observed in AC (n = 3) and CC (n = 2) but not NC. Of the three sources that showed moderate heterogeneity, there were no differences in NC but one showed difference in CC and two showed significant differences in AC. These findings tend to suggest that high heterogeneity will result in differences in AC between groups that comprise the heterogeneity source while low heterogeneity will not. It therefore indicates that there is a relationship between heterogeneity and AC. In the case of CC and NC, the findings suggest that high heterogeneity need not result in significant differences between the groups that comprise the heterogeneity source. This indicates that there might not be a relationship between heterogeneity and CC and NC.

Table 2: Farm- Business - Descriptive Statistics of Heterogeneity and Commitment							
#	**Variable**	**N**	**Mode**	**Gini Simpson Index**	**ANOVA F Values (Correlation Coefficients)**		
					AC	**CC**	**NC**
1	Farm type	558	Dairy	Low	0.00	2.62	0.00
					(NA)	(NA)	(NA)
2	Dairy system	499	System 3	High	**5.32*** **	0.92	1.17
					*(0.11**)*	(-0.07)	(0.01)
3	Seasonality	565	Spring calving	Low	**2.66***	0.93	2.02
					(NA)	(NA)	(NA)
4	Milk Production	565	> 300,000	Very High	**3.16*** **	**4.30*** **	0.98
			kgMS/year		*(0.14***)*	*(-0.16***)*	(0.06)
5	Milk Types	567	Conventional	Low	**4.94****	**2.96****	1.53
			milk		(NA)	(NA)	(NA)
6	Milk Quality	556	100,000 – 150,000	High	**2.25***	1.49	0.86
			SCC/ml		(-0.07)	(0.04)	(-0.01)
7	GFR	538	500,000 – 1,000,000	High	**3.99*** **	**7.11*** **	1.11
					*(0.15***)*	*(-0.20***)*	(0.04)
8	Total Assets	540	2,000,000 – 10,000,000	High	**3.59*** **	**3.64*** **	1.07
					*(0.10**)*	*(-0.12***)*	(0.04)

9	Total Debt	537	2,000,000 – 10,000,000	High	**2.51****	1.73	1.11
					*(0.12***)*	(-0.06)	(0.06)
10	Non-Farm Income	532	< 15 %	Low	0.73	0.54	1.10
					(-0.05)	(0.01)	(-0.05)
11	Stage of business	539	Consolidation	High	0.12	**3.06****	0.45
					(NA)	(NA)	(NA)
12	Shares in Co-op	557	> 300,000	Very High	**4.34*****	**2.43****	**2.24****
					*(0.13***)*	*(-0.11**)*	*(0.09**)*
13	Share of milk supplied	560	100%	Low	**4.61****	0.39	1.56
					*(0.12***)*	(-0.01)	(0.07)
14	Region	562	Waikato	High	**2.54****	**5.16*****	0.95
					(NA)	(NA)	(NA)
NA – Not Applicable							
Significance Level: *P < 0.10, ** P < 0.05, *** P < 0.01							

Table 3: Member-Interest - Descriptive Statistics of Heterogeneity and Commitment

#	Variable	N	Mode	Gini Simpson Index	ANOVA F Values (Correlation Coefficients)

					AC	CC	NC
1	Likelihood of selling shares	563	Very unlikely	High	**14.07*** **	**1.96***	**4.58*** **
					*(0.31***)*	(0.00)	*(0.17***)*
2	Seasons low milk price is acceptable	552	1 season	High	**4.56*** **	1.19	**6.25*** **
					(0.02)	*(-0.09*)*	(-0.08)
3	Willingness to accept lower dividend	563	Slightly willing	High	**9.77*** **	1.09	**5.23*** **
					*(0.27***)*	(0.02)	*(0.16***)*
4	Concerned about Co-op's future	566	Agree	Very High	**10.68*** **	0.62	**2.71****
					*(-0.30***)*	(0.07)	(-0.06)
5	Being valuable to co-op	567	Agree	High	**35.97*** **	1.4	**25.19*** **
					*(0.54***)*	(-0.04)	*(0.44***)*
6	Being a respected member of the community	566	Agree	High	**4.01*** **	1.5	**4.28*** **
					*(0.21***)*	(0.01)	*(0.17***)*
7	Creating opportunities for future farmers	568	Agree	High	**10.72*** **	1.29	**4.80*** **
					*(0.31***)*	(-0.07)	*(0.18**)*
8	Having time available for socializing with family & friends	566	Agree	High	1.40	0.84	1.03
					*(0.11**)*	(-0.07)	(-0.02)
9	Having variety in work	567	Agree	Moderate	**2.20****	0.82	0.81
					*(0.14***)*	(-0.05)	(-0.01)
10	Looking after the environment	566	Strongly Agree	Moderate	**1.99***	0.65	0.49

					*(0.12***)*	*(-0.08*)*	(0.02)
11	Maximizing farm profits	565	Agree	High	**4.42*** **	1.62	0.56
					(0.08)	*(-0.09)*	(-0.03)
12	Paying off debts	567	Agree	High	**2.26***	0.28	0.83
					(0.01)	(0.01)	(0.00)
NA – Not Applicable							
Significance Level: *P < 0.10, ** P < 0.05, *** P < 0.01							

4.3.1 Farmer-member

Of the 6 sources for which correlations could be determined, a significant ($P < 0.05$) and positive correlation was observed between one source (age) and AC, and two sources (age and years' experience in agriculture) and NC (Table 1). No significant correlations were observed for CC. This suggests that CC is not linearly related to any of the farmer-member sources of heterogeneity.

A significant difference ($P < 0.05$) was observed in the affective commitment scores between groups that comprised just 1 (11%) source (number of farming entities) of the farmer-member dimension (Table 1). As high or very heterogeneity was observed in 5 of the 8 sources that comprised the farmer-member dimension, it suggests that high level of heterogeneity does not lead to significant differences in AC. Moreover, only two sources (25%) fit with our hypothesis, as they had a low level of heterogeneity and no difference in AC. These findings indicate that heterogeneity in the sources that comprise the farmer-member dimension is not associated with affective commitment.

There was a significant difference ($P < 0.05$) in the continuance commitment scores between groups that comprised 4 (44%) sources (gender, age, years' experience in agriculture and number of farming entities) of the farmer-member dimension (Table 1). Two of these sources had a high level of heterogeneity, one had low heterogeneity and one had moderate heterogeneity. Four sources with high or very high heterogeneity and one source with low heterogeneity did not have a significant difference in CC. As only 3 sources (38%) aligned with our hypothesis, it tends to indicate that heterogeneity in the sources that comprise the farmer-member dimension is not associated with continuance commitment.

There was no significant difference ($P > 0.05$) in the normative commitment scores between groups that comprised any of the 9 heterogeneity sources of the farmer-member dimension (Table 1). Six of these sources had high or very high level of heterogeneity. Hence only two sources (25%) aligned with out hypothesis as they had low heterogeneity and did not have a significant difference in NC. This indicates that there is no association between heterogeneity and NC within the farmer-member dimension.

4.3.2 Farm-Business

Of the 9 sources for which correlations could be determined, a significant ($P < 0.05$) and positive correlation was observed between 7 sources (dairy system, milk production, GFR,

total assets, total debt, shares in the co-operative and share of milk supplied) and affective commitment (Table 2). A significant and negative correlation was observed for 4 sources (milk production, GFR, total assets and shares in the co-operative) and continuance commitment. A significant and positive correlation was observed for one source (shares in the co-operative) and NC. Suggesting that there is no linear relationship between most of the farm-business sources of heterogeneity and a member's normative commitment.

A significant difference ($P < 0.05$) was observed in the affective commitment scores between groups that comprised 11 (79%) sources (dairy system, seasonality, milk production, milk type, milk quality, GFR, total assets, total debt, shares in the co-operative, share of milk supplied and region) of the farm-business dimension (Table 2). Only one source (stage of business) that had high heterogeneity did not have a significant difference in AC. But 3 sources for which differences in AC were found had a low level of heterogeneity. Since 10 sources (71%) fit with the hypothesis, it suggests that there is an association between heterogeneity in the farm-business dimension and AC.

There was a significant difference ($P < 0.05$) in the continuance commitment scores between groups that comprised 7 (50%) sources (milk production, milk type, GFR, total assets, stage of the business, shares in the cooperative, and region) of the farm-business dimension (Table 2). Six of these had high heterogeneity while one had low heterogeneity. There was no significant difference between groups for the remaining 7 sources. Of these 7 sources, 4 had low heterogeneity while 3 had high heterogeneity. As 10 sources (71%) aligned with the hypothesis it suggests that there might be an association between heterogeneity in the farm-business dimension and CC.

There was a significant difference ($P < 0.05$) in normative commitment scores between groups for just 1 (7%) source (shares in the co-operative). This source had very high levels of heterogeneity. There was no significant difference between groups for the remaining 13 sources. Of these, 5 had low heterogeneity while 8 had high or very heterogeneity. As only 6 sources (43%) fit with our hypothesis, it indicates that there is no association between heterogeneity in the farm-business dimension and NC.

4.3.3 Member-Interest

Of the 12 sources that comprised member-interest heterogeneity, a significant ($P < 0.05$) correlation was observed between 9 sources and AC and 5 sources and NC (Table 3).

Affective and normative commitment were stronger for members who were less likely to sell co-operative shares, more willing to accept a lower dividend, and gave higher importance to – being valuable to the co-operative, being a respected member of the community, and creating opportunities for future farmers. Additionally, AC was stronger for members who were less concerned about the co-operatives future and gave greater importance to - having variety in their work, having time available for socializing with family and friends and looking after the environment. There was no significant correlation between any of the member interest sources and CC at 5% LOS; however, 2 sources showed significant correlation ($P < 0.10$) at 10% LOS. Continuance commitment tended to be stronger for members who were less acceptable of a prolonged low milk price payment and gave lesser importance to looking after the environment.

A significant difference ($P < 0.05$) was observed in the affective commitment scores between groups that comprised 11 (92%) sources (selling co-operative shares, length of time milk price can be low, dividend payments, concern for the co-operative, being valuable to the co-operative, being respected by the community, creating opportunities for future farmers, having variety in their work, looking after the environment, producing to maximise farm profits and paying off debts) of the member-interest dimension (Table 3). High or very heterogeneity was found in 9 of these sources while 2 had moderate heterogeneity. Only one source that had high heterogeneity did not show significant difference in AC. Since most of the sources (90%) fit with our proposed hypothesis, it suggests that there might be an association between the member-interest dimension of heterogeneity and AC.

There were no significant differences ($P > 0.05$) in the continuance commitment scores between groups that comprised any of the 12 sources (Table 3). However, one source (likelihood of selling co-operative shares) showed a significant difference in CC scores between groups ($P < 0.10$) at the 10% LOS. Since only one source (10%) tended to align with our hypothesis, it suggests that there is no association between the member-interest dimension of heterogeneity and CC.

There was a significant difference ($P < 0.05$) in normative commitment scores between groups for 7 (58%) sources (selling co-operative shares, length of time milk price can be low, dividend payments, concern for the co-operative, being valuable to the co-operative, being respected by the community, creating opportunities for future farmers) of the member-interest dimension (Table 3). All 7 sources showed high or very heterogeneity. No difference in NC

was found for two sources that showed moderate heterogeneity and three source that showed high heterogeneity. As most of the sources (70%) aligned with our hypothesis, it suggests that there might be an association between the member-interest dimension of heterogeneity and NC.

5.0 Discussion

The primary objective of this study was to examine the relationship between heterogeneity and a members' organisational commitment to the co-operative. Following on from two prior studies, this was achieved by de-constructing heterogeneity into 3 dimensions and 35 sources (Apparao et al., 2020a) and member organisational commitment into 3 components (Apparao et al., 2020b). In pursuing this objective, our study has generated important insights that are useful in comprehending the phenomenon of heterogeneity and member commitment in agricultural co-operatives. It also aids in the understanding of the relationship between a member and the co-operative, an important aspect that influences the performance of co-operatives (Österberg & Nilsson, 2009).

It was hypothesized that there is an inverse relationship between heterogeneity and overall organisational commitment (Fulton & Giannakas, 2001; Bijman & Verhees, 2011). Therefore, given that a high level of heterogeneity was observed within the membership base of this co-operative a low level of organisational commitment is expected. However, since only 10.2 % of members had low levels off all three components of organisational commitment, the finding does not conform with our hypothesis as it suggests that high heterogeneity does not necessarily lead to low organisational commitment. Moreover, as only 19.2% of members had high levels of all three components, neither does it suggest that high heterogeneity could lead to high organisational commitment.

Drawing from the fact that organisational commitment is a multi-dimensional attitudinal construct (Allen & Meyer, 1990), it was hypothesised that heterogeneity has a distinct relationship with each of the three components of organisational commitment and it is by unravelling these distinct relationships that a greater understanding of heterogeneity and organisational commitment can be achieved. Based on this rationale it was hypothesised that high heterogeneity will result in low affective, continuance and normative commitment in agricultural co-operatives. However, the high levels of AC and NC do not align with our hypothesis and suggests that despite there being high heterogeneity, a farmers' want and obligation to be a member of the co-operative are strong. It is possible that in this co-

operative the challenges presented by heterogeneity to AC and NC are mitigated by having well designed structures and effective member engagement strategies in place. Similar to these findings, based on their work on 18 forest user groups in Nepal Varughese and Ostrom (2001) found that by having good institutional design and mechanisms to manage for heterogeneity the community was able to overcome the negative implications of heterogeneity.

The low level of CC that was observed aligns with our hypothesis and suggests that higher the heterogeneity, weaker will be a farmers' need to be a member of the co-operative. The need to be a member is due to utilitarian or more specifically financial benefit reasons (Jussila, Goel, et al., 2012). Due to the large diversity that exists within the membership base, it is possible that the members utilitarian reasons for being members are also quite varied. The inability of the co-operative to meet these varying needs could potentially be the reason for the low level of CC. Moreover, the CC of the members is influenced by few critical factors that are not entirely within the control of the co-operative such as global prices for dairy commodities and access to markets. Therefore, overcoming the issues presented by heterogeneity and strengthening CC could be challenging for the co-operative

Importantly, across the three heterogeneity dimensions and sources, we found that there tended to be a relationship between heterogeneity and affective commitment, but not continuance and normative commitment. In other words, high heterogeneity is more likely to result in differences in a member's want or desire to be a member of the co-operative; but not in a members' need and obligation to be a member of the co-operative. Furthermore, although significant differences in AC, CC and NC were observed between groups for some of the heterogeneity sources, it was most pronounced for AC, and much less for NC and CC. This further indicates that AC is more likely to be different between members belonging to different groups that comprise a heterogeneity source than either CC or NC. As CC is grounded in the financial-benefit reasons for membership (Jussila, Goel, et al., 2012), it is less likely to be influenced by heterogeneity sources that do not have direct implications on economic or financial benefit aspects of membership. Likewise, NC is based on the ideological reasons for membership (Jussila et al., 2014) and is less likely to be influenced by heterogeneity sources that do not have an ideological aspect to them. In contrast, AC being emotive in nature (Jussila, Byrne, et al., 2012), is more likely to be influenced by several heterogeneity sources as an emotive link is likely to exist for most heterogeneity sources.

Moreover, this difference in AC between groups was most pronounced in the member-interest dimension as compared to the farm-business and farmer-member dimension suggesting that a members' want or desire to be a member is most influenced by members interests.

Amongst the three dimensions of heterogeneity, the farmer-member dimension was not associated with any of the three forms of member organisational commitment. This suggests that farmer-member related properties such as a members age, gender, ethnicity, level of education etc. have no bearing on a members' want, need or obligation to be a member of the co-operative. This is an interesting finding because co-operative scholars have suggested that heterogeneity arising from member characterises such as age, level of education etc. can have a significant impact of co-operative performance (Iliopoulos & Cook, 1999; Pozzobon et al., 2011; Hoehler & Kuehl, 2018; Iliopoulos & Valentinov, 2018). For example Iliopoulos and Cook (1999) found that farmer-member characteristics such as age and level of education can result in increased influence costs in the co-operative.

The farm-business dimension was associated with AC and CC but not NC. This implies that farm-business related properties have an influence on a farmers' want and need to be a member of the co-operative but not on a farmer's obligation to be a member of the co-operative. As CC has is related to the financial benefit reasons of membership, an association with the farm-business dimensions is expected.

The member-interest dimension was associated with AC and NC but not CC. This suggests that properties associated with member-interest have an impact on a farmers emotive and ideological reasons to be a member of the co-operative but not on a farmers' utilitarian reasons to be a member of the co-operative.

The results of the correlation analysis indicated that in the farmer-member dimension farmers that are older, have stronger affective commitment and normative commitment. In addition, farmers with greater experience in agriculture have stronger normative commitment. As suggested by Fulton (1999), younger farmers are less committed because ideological reasons are of less importance to them than older members. Moreover according to Fulton and Adamowicz (1993), younger members are more likely to have a slant towards individualistic values. Similarly, in the farm-business dimension, higher: - the intensity of the dairy system, milk production volumes, GFR, total assets, total debt, shares in the co-operative and share of milk supplied to the co-operative, greater will be AC. In contrast, greater: - the milk

production, GFR, total assets and shares in the co-operative, weaker will be CC. These are very interesting findings because it implies that it is the larger farm-businesses, both in terms of physical and financial attributes, that have a stronger emotive basis for membership; while it is the smaller farm business that have a stronger utilitarian basis for membership of the co-operative.

6.0 Conclusions, implications and limitations

In this study we developed a framework that brought together some vital insights that link heterogeneity and member organisation commitment within the specific context of agricultural co-operatives. This framework is based on 35 sources of heterogeneity that are grouped under three dimensions of heterogeneity: 1. Farmer-Member, 2. Farm-Business and 3. Member-Interest, and three member organisational commitment components: 1. Affective Commitment, 2. Continuance Commitment and 3. Normative Commitment. Consequently, we believe the framework forms a good basis for testing theory and is a vital step towards applying frameworks to the task of linking co-operative theory and structure to its performance. This is a critical challenge that co-operative scholars must address in order to progress co-operative research and enhance its managerial relevance.

We found that this co-operative had high level's heterogeneity and also affective and normative commitment. This tends to suggest that high heterogeneity does not necessarily lead to a fall in the want and obligation to be a member. However, since continuance commitment was low, it suggests that high heterogeneity could potentially lead to decline in the need to be a member.

Across the 35 heterogeneity sources measured, an association was observed between heterogeneity and affective commitment but not continuance and normative commitment. Indicating that heterogeneity is likely to result in differences in a members' want to be a member but not in a members' need or obligation to be a member. Within the three heterogeneity dimensions, an association was found between the farm-business dimension and affective and continuance commitment and the member-interest dimension and affective and normative commitment. Importantly, the farmer-member dimension was not associated with any of the three organisational commitment components.

These findings have important implications for the development and delivery of co-operative communication and member engagement strategies that are focused on strengthening member commitment. For example, our results suggest that organisational commitment in the co-

operative can be improved by segmenting members based on their farm-business and member-interest related properties and developing segment specific engagement strategies. While segmenting members based on farmer-member characteristics may not be as effective. Moreover, as AC tends to vary the most between groups across heterogeneity sources, it requires a much more specific and tailored member engagement protocol. While, in the case of NC and CC, a relatively generic member engagement protocol might be sufficient.

It is also important that the co-operative ensures that CC of the membership base is strengthened, otherwise should the levels of AC and possibly NC fall, then there is a high risk of the members exiting the co-operative. In addition to improving CC, it is recommended that the co-operative focus on further strengthening AC and NC of its membership base. AC in particular is the glue that holds this co-operative together and it is therefore vital that it be continuously strengthened. Especially since the CC in the co-operative is low, should the level of AC fall below desired levels, there is a significant threat of members behaving opportunistically and/or exiting the co-operative.

As unique member-focused organisations built on the strength of the member-co-operative relationship, it is vital that co-operatives recognise the importance of member organisational commitment as a significant indicator of the member-co-operative relationship. Co-operative leadership and management should therefore prioritize its inclusion as a core performance metric or as an indicator of the co-operative's health. It is recommended that co-operatives include AC, CC and NC as one of their key performance indicators. A regular measurement and analysis of these would indicate to what extent the strategy pursued by the co-operative are impacting these critical member commitment indicators and also how effective the member engagement and communication protocols are.

This study had a few limitations. Firstly, this study was centred on one large dairy co-operative in New Zealand. Therefore, generalisations of the results to agricultural co-operatives in other geographies, especially non-dairy co-operatives need to be made with caution. Secondly, a member's psychological state can vary over time with respect to the relationship with the co-operative. Since the data was collected at single point in time it does not allow us to study or understand any changes in the relationship between heterogeneity and commitment that can occur.

Despite these limitations our findings contribute towards the growing literature on heterogeneity and commitment in agricultural co-operatives. By revealing that heterogeneity

can be linked to member organisational commitment, this study contributes towards the larger body of research aimed at identifying factors that influence member commitment in co-operatives; and can hence play an important role in predicting or evaluating co-operative performance. We hope that the findings reported in this paper will encourage researchers to further examine heterogeneity and member organisational commitment in the context of agricultural co-operatives.

References

Allen, N., & Meyer, J. (1990). The measurement and antecedents of affective, continuance and normative commitment to the organization. *Journal of occupational psychology, 63*(1), 1-18.

Anderson, B., & Henehan, B. (2005). What Gives Cooperatives a Bad Name? *International Journal of Co-operative Management, 2*(2), 9-15.

Apparao, D., Garnevska, E., & Shadbolt, N. (2019). Examining commitment, heterogeneity and social capital within the membership base of agricultural co-operatives—A conceptual framework. *Journal of Co-operative Organization Management, 7*(1), 42-50.

Apparao, D., Shadbolt, N., & Garnevska, E. (2020a). *Heterogeneity and Commitment to Collective Action: An empirical study of a New Zealand dairy co-operative*. Mansucript accepted for publication in International Journal of Co-operative Accounting and Management.

Apparao, D., Shadbolt, N., & Garnevska, E. (2020b). *Member commitment in a large New Zealand dairy co-operative: An empirical study*. Manuscript under review.

Bijman, J. (2002). *Essays on Agricultural Cooperatives: Governance Structure in Fruit and Vegetable Chains.* Erasmus University, Rotterdam,

Bijman, J. (2016). Agricultural cooperatives and market orientation: A challenging combination? In *Market Orientation* (pp. 151-168): Routledge.

Bijman, J., Hanisch, M., & Van der Sangen, G. (2014). Shifting control? The changes of internal governance in agricultural cooperatives in the EU. *Annals of Public and Cooperative Economics, 85*(4), 641-661.

Bijman, J., & Verhees, F. (2011). *Member or customer? Farmer commitment to supply cooperatives.* Paper presented at the International Conference on the Economics and Management of Networks (EMNet), Limassol, Cyprus.

Bogetoft, P., & Olesen, H. B. (2004). Quality incentives and supply chains: managing Salmonella in pork production. *American Journal of Agricultural Economics, 86*(3), 829-834.

Bogetoft, P., & Olesen, H. B. (2007). Sales distortion in heterogeneous cooperatives. In *Vertical Markets and Cooperative Hierarchies* (pp. 213-223). Dordrecht: Springer.

Byrne, N., & McCarthy, O. (2005). An analysis of the credit union's use of Craig's commitment building measures. *Journal of Co-operative Studies, 38*(1), 20-27.

Byrne, N., McCarthy, O., Ward, M., & McMurtry, J. (2012). Credit Union Restructuring: Don't forget the member! *International Journal of Co-operative Management, 6*(1.1), 33-41.

Cechin, A., Bijman, J., Pascucci, S., & Omta, O. (2013). Decomposing the Member Relationship in Agricultural Cooperatives: Implications for Commitment. *Agribusiness, 29*(1), 39-61. doi:10.1002/agr.21321

Chaddad, F. R. (2007). *The evolution of Brazilian dairy cooperatives: A life cycle approach.* Paper presented at the XLV Congresso Da Sober," Conhecimentos para Agricultura do Futuro", Londrina.

Cocolina, C. Q., & Cooperatives Europe. (2016). *The Power of Cooperation - Cooperatives Europe Key Figures 2015*. Retrieved from https://coopseurope.coop/sites/default/files/The%20power%20of%20Cooperation%20-%20Cooperatives%20Europe%20key%20statistics%202015.pdf

Coltrain, D., Barton, D., & Boland, M. (2000). *Differences between new generation cooperatives and traditional cooperatives.* Paper presented at the Risk and Profit 2000 Conference, Holiday Inn, Manhattan, Kansas. http://www.uwcc.wisc.edu/info/newgen/cbb.pdf

Cook, M. L. (1995). The Future of U.S. Agricultural Cooperatives: A Neo-Institutional Approach. *American Journal of Agricultural Economics, 77*(5), 1153-1159. doi:10.2307/1243338

Cook, M. L., & Iliopoulos, C. (1999). Beginning to Inform the Theory of the Cooperative Firm: Emergence of the New Generation Cooperative. *LTA, 4*(99), 525-535.

Cook, M. L., & Iliopoulos, C. (2000). Ill-defined property rights in collective action: the case of US agricultural cooperatives. In C. Menard (Ed.), *Institutions, Contracts and Organizations* (pp. 335-348). Cheltenham, UK and Massachusetts, USA: Edward Elgar Publishing.

Demko, I. (2018). *Trends of US Agricultural Cooperatives (1913-2016)*. Retrieved from https://engagedscholarship.csuohio.edu/urban_facpub/1577/?utm_source=engagedscholarship.csuohio.edu%2Furban_facpub%2F1577&utm_medium=PDF&utm_campaign=PDFCoverPages

Dunn, J. R., Crooks, A. C., Frederick, D. A., Kennedy, T. L., & Wadsworth, J. J. (2002). *Agricultural cooperatives in the 21st century* (60). Retrieved from

Eilers, C., & Hanf, C. H. (1999). Contracts between farmers and farmers' processing co-operatives: A principal-agent approach for the potato starch industry. In *Vertical relationships and coordination in the food system* (pp. 267-284): Springer.

Evans, L., & Meade, R. (2006). *The Role and Significance of Cooperatives in New Zealand Agriculture: A Comparative Institutional Analysis*. Retrieved from http://maxa.maf.govt.nz/mafnet/rural-nz/profitability-and-economics/trends/iscr-report-dec-2005/pdf-version/full-report.pdf

Firestone, W. A., & Pennell, J. R. (1993). Teacher commitment, working conditions, and differential incentive policies. *Review of educational research, 63*(4), 489-525.

Foreman, P., & Whetten, D. A. (2002). Members' identification with multiple-identity organizations. *Organization Science, 13*(6), 618-635.

Fulton, J., & Adamowicz, W. (1993). Factors that influence the commitment of members to their cooperative organization. *Journal of Agricultural Cooperation, 8*, 39-53.

Fulton, M. (1999). Cooperatives and member commitment. *LTA, 4*(99), 418-437.

Fulton, M., & Giannakas, K. (2001). Cooperatives and Membership Commitment: Organizational Commitment in a Mixed Oligopoly: Agricultural Cooperatives and Investor-Owned Firms. *American Journal of Agricultural Economics, 83*(5), 1258.

Garnevska, E., Callagher, L., Apparao, M., Shadbolt, N., & Siedlok, F. (2017). *The New Zealand Co-operative Economy*. Retrieved from New Zealand: https://nz.coop/wp-content/uploads/2017/01/Co-op-report-v9-WEB.pdf

Gorton, G., & Schmid, F. (1999). Corporate governance, ownership dispersion and efficiency: Empirical evidence from Austrian cooperative banking. *Journal of Corporate Finance, 5*(2), 119-140.

Hansmann, H. (1996). *The ownership of enterprise*. Cambridge, Mass. : The Belknap Press of Harvard University Press.
Hendrikse, G., & Bijman, J. (2002). On the emergence of new growers' associations: self-selection versus countervailing power. *European Review of Agricultural Economics, 29*(2), 255-269.
Hoehler, J., & Kuehl, R. (2018). Dimensions of member heterogeneity in cooperatives and their impact on organization–a literature review. *Annals of Public and Cooperative Economics, 89*(4), 697-712.
Hunt, T., & van Battum, S. (2015). *Rabobank Global Dairy Top-20.* Retrieved from https://agrihq.co.nz/assets/DairyTrader/Rabobank-Top-10-Report.pdf
Iliopoulos, C., & Cook, M. L. (1999). *The efficiency of internal resource allocation decisions in customer-owned firms: the influence costs problem.* Paper presented at the 3rd Annual Conference of the International Society for New Institutional Economics, Washington DC.
Iliopoulos, C., & Valentinov, V. (2018). Member heterogeneity in agricultural cooperatives: A systems-theoretic perspective. *Sustainability, 10*(4), 1271.
International Co-operative Alliance (ICA). (2018). Cooperative identity, values & principles. Retrieved from https://www.ica.coop/en/cooperatives/cooperative-identity
International Cooperative Alliance (ICA), & Euricse. (2014). *The World Co-Operative Monitor: Exploring The Co-Operative Economy*. Retrieved from https://dl.dropboxusercontent.com/u/24617037/QRcode/WCM2014.pdf
Jiménez, M. C. R., Martí, E. G., & Ortiz, M. J. H. (2010). Member commitment in olive oil co-operatives: Cause and consequences. *Journal of Co-operative Studies, 43*(2), 24-35.
Jussila, I., Byrne, N., & Tuominen, H. (2012). Affective commitment in co-operative organizations: What makes members want to stay? *International Business Research, 5*(10), 1.
Jussila, I., Goel, S., & Tuominen, H. (2012). Member commitment in co-operatives: The utilitarian approach. *Business and Management Research, 1*(3).
Jussila, I., Roessl, D., & Tuominen, T. (2014). Should I Stay or Should I Go? Normative Member Commitment in Co-operatives. *International Journal of Marketing Studies, 6*(6), 26.
Jussila, I., & Tuominen, P. (2010). Exploring the consumer co-operative relationship with their members: an individual psychological perspective on ownership. *International Journal of Co-operative Management, 5*(1), 23-33.
Kalogeras, N., Pennings, J. M., van der Lans, I. A., Garcia, P., & van Dijk, G. (2009). Understanding Heterogeneous Preferences of Cooperative Members *Agribusiness, 25*(2), 289-289.
Karantininis, K., & Zago, A. (2001). Cooperatives and Membership Commitment: Endogenous Membership in Mixed Duopsonies. *American Journal of Agricultural Economics, 83*(5), 1266. Retrieved from http://ezproxy.massey.ac.nz/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=6183782&site=eds-live&scope=site
Mäkelä, M. M., & Maula, M. V. J. (2006). Interorganizational Commitment in Syndicated Cross-Border Venture Capital Investments. *Entrepreneurship Theory and Practice, 30*(2), 273-298. doi:10.1111/j.1540-6520.2006.00121.x
Mazzarol, T., Soutar, G. N., & Limnios, E. M. (2012). *Member Loyalty in Co-operative Enterprises: A Preliminary Assessment.* Paper presented at the 26th Annual ANZAM Conference.

Meyer, J., & Allen, N. (1987). A longitudinal analysis of the early development and consequences of organizational commitment. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement, 19*(2), 199.
Meyer, J., & Allen, N. (1991). A three-component conceptualization of organizational commitment. *Human resource management review, 1*(1), 61-89.
Nilsson, J., & Madsen, O. (2007). Issues in cross-border mergers between agricultural co-operatives. *Journal of Co-operative studies, 40*(3), 27-38.
Nilsson, J., Svendsen, G. L., & Svendsen, G. T. (2012). Are large and complex agricultural cooperatives losing their social capital? *Agribusiness, 28*(2), 187-204.
Oliver, R. L. (1997). *Satisfaction: A behavioral perspective on the consumer*. New York: McGraw-Hill.
Ortmann, G. F., & King, R. P. (2007). Agricultural cooperatives I: History, theory and problems. *Agrekon, 46*(1), 18-46.
Österberg, P., & Nilsson, J. (2009). Members' perception of their participation in the governance of cooperatives: the key to trust and commitment in agricultural cooperatives. *Agribusiness, 25*(2), 181-197.
Pozzobon, D. M., Zylbersztajn, D., & Bijman, J. (2011). *Modeling heterogeneity and member participation in cooperative governance.* Paper presented at the Fifth International Conference on Economics and Management of Networks (EMNet). Limassol, Cyprus.
Rhoades, S. A. (1993). The herfindahl-hirschman index. *Fed. Res. Bull., 79*, 188.
Røkholt, P. O. (1999). *Strengths and weaknesses of the co-operative form; A Matter of Perspective and Opinion.* Paper presented at the ICA International Research Conference, Quebec.
Simmons, R., & Birchall, J. (2004). Creating and supporting co-operative members in the West Midlands. *Journal of Co-operative Studies, 37*(1), 22-37.
Soboh, R. A., Lansink, A. O., Giesen, G., & Van Dijk, G. (2009). Performance measurement of the agricultural marketing cooperatives: the gap between theory and practice. *Review of Agricultural Economics, 31*(3), 446-469.
Solinger, O. N., Van Olffen, W., & Roe, R. A. (2008). Beyond the three-component model of organizational commitment. *Journal of applied psychology, 93*(1), 70.
Staatz, J. M. (1987). Farmers' incentives to take collective action via cooperatives: a transaction cost approach. *Cooperative theory: New approaches, 18*, 87-107.
Staatz, J. M. (1989). *Farmer Cooperative Theory: Recent Developments*. (84). Washington, D.C: United States Department of Agriculture
Sykuta, M. E., & Cook, M. L. (2001). Cooperative and Membership Commitment: A New Institutional Economics Approach to Contracts and Cooperatives. *American Journal of Agricultural Economics, 83*(5), 1273-1279. Retrieved from http://ezproxy.massey.ac.nz/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.1244819&site=eds-live&scope=site
Van Bekkum, O.-F. (2001). *Cooperative models and farm policy reform: Exploring patterns in structure-strategy matches of dairy cooperatives in regulated vs. liberalized markets*. The Netherlands: Koninklijke Van Gorcum.
Varughese, G., & Ostrom, E. (2001). The contested role of heterogeneity in collective action: some evidence from community forestry in Nepal. *World Development, 29*(5), 747-765.
Vitaliano, P. (1983). Cooperative enterprise: an alternative conceptual basis for analyzing a complex institution. *American Journal of Agricultural Economics, 65*(5), 1078-1083.
Zeuli, K. A., & Cropp, R. (2004). *Cooperatives: Principles and practices in the 21st century*. Retrieved from Madison, Wisconsin: http://learningstore.uwex.edu/assets/pdfs/A1457.PDF

Zusman, P. (1992). Constitutional selection of collective-choice rules in a cooperative enterprise. *Journal of Economic Behavior & Organization, 17*(3), 353-362.

Chapter 6: Conclusions

1.0 Introduction

Co-operatives are a unique organisational form that are owned and controlled by the members who use it. Moreover, the primary objective of a co-operative is to maximise benefit for its members. This strong member-orientation of co-operatives is its critical differentiator from the more common investor owned firm. The member – co-operative relationship therefore becomes central to the existence and functioning of the co-operative and forms the foundation upon which the co-operative stands. Despite the member-co-operative relationship being vital, much of the research work on co-operatives tends to focus on the non-relational aspects and traditionally the performance of co-operatives has been examined mainly from an economic or financial perspective. The bulk of research about co-operatives have incorporated theoretical aspects and approaches such as agency theory, property rights theory, ownership theory, transaction cost theory, contacting theory and game theory. Although the non-relational aspects are useful in detailing the economic characteristics of the co-operatives and explaining the reasons for the formation, existence and behaviour, they are predominantly theoretical and not always in total alignment with the social features of the co-operative organisational form. Therefore, they do not present a comprehensive enough assessment and understanding of co-operatives. Moreover, with the evolving nature of the co-operative organisational form, a rethink on how co-operatives are traditionally examined, evaluated and interpreted is required. In order to present a holistic evaluation of co-operative performance and complement the traditional approaches, requires an examination of the member-co-operative relational aspects, specifically from a socio-psychological perspective. To address this research gap, the central premise of this thesis lay in identifying, describing, measuring and analysing the key socio-psychological phenomenon that could potentially influence the member – co-operative relationship. Informed by the literature, three important socio-psychological phenomena were identified and described in this thesis. These were 1) Heterogeneity, 2) Commitment and 3) Social Capital. Thereafter, two socio-psychological phenomena, member commitment and heterogeneity were studied empirically and in greater detail because several co-operative scholars have suggested that these two factors require further scrutiny.

In doing so, this research builds on previous work undertaken which revealed the extent to which socio-psychological aspects, specifically heterogeneity and commitment are studied within the context of co-operative organisational forms. The approach to the research is fundamentally derived from the outcomes which are sought and an interest in contributing to

a greater understanding of co-operatives in general and agricultural co-operatives in New Zealand in specific. The research requires methods which are explorative, informative, co-operative membership focused, and consistent with co-operative principles and expectations. This was achieved through four research papers. In each paper, a novel conceptual framework is developed and presented. In papers two, three and four an empirical test of the frameworks is also performed. As a result, the frameworks serve as a reference and coordination mechanism for efficient theory testing and is a vital step towards applying frameworks to the task of linking co-operative theory and structure to its performance. Moreover, since the objective was to measure the level of commitment and heterogeneity within the membership base and understand the relationship between them that exists, the research adopted a quantitative approach whereby co-operative members were the principal participants in the research.

2.0 Summary and Discussion

The first paper of this thesis was centred on identifying and presenting factors that explain the members' relationship with their co-operative and developing a novel conceptual framework that links these factors. Three such factors were identified – 1) Commitment, 2) Heterogeneity and 3) Social Capital. ***Commitment*** is a broad phenomenon, and an integral attribute of relationships, especially long-term relationships. It has a unique yet significant relevance to co-operatives in general and agricultural co-operatives in specific. This is based not only on the fact that the farmer-member and agricultural co-operative relationship is a long term one characterised by repeated exchanges, but also because member commitment is required for the expression of other properties that are unique and essential for co-operatives. A decrease in member commitment can have a serious impact on agricultural co-operative performance with the most visible feature being member's exiting the co-operatives; and if enough number of members exit, the co-operative will cease to exist. Additionally, a low level of member commitment can also influence co-operative performance by causing reduced participation in governance, non-alignment with the co-operative strategy, increased opportunistic and free-rider behaviour, reduction in patronage (as suppliers or buyers) and greater reluctance to supply the co-operative with capital. ***Heterogeneity*** (or diversity) is an inherent property of any group or collective. According to theory, heterogeneity has a significant bearing whenever collective decision making is required. This is because an increase in heterogeneity leads to members in the group increasingly wanting different outcomes and consequently arriving at an optimal decision in an effective and efficient

manner becomes progressively challenging. This phenomenon has a significant impact on co-operatives. Its effect on the co-operative model stems from the fact that individual farmer-members are different (heterogeneous) in terms of their interests with respect to the co-operative. Apart from leading to a rise in decision making costs, an increase in heterogeneity can have other significant negative effects on the co-operative such as – a decrease in member commitment, increase in opportunistic and free rider behaviour, and poor governance. It can therefore hinder co-operative performance. ***Social capital*** is a broad concept with specific relevance to social organisations (such as communities, groups, collectives etc.); and is comprised of several characteristic features such as norms, values, trust, networks and communication. It is a key element required for creating and maintaining - economic prosperity, development, collective action and governance. With respect to co-operatives, social capital is vital because it forms the social foundation upon which the co-operative exists. A significant loss of social capital could result in the erosion of this foundation and possibly lead to the demise or collapse of the co-operative. It is suggested by few scholars that this decrease in social capital tends to occur when the co-operative grows to become a larger and more complex organisation. Moreover, a decrease in social capital can negatively affect co-operative performance by leading to – a decline in trust, reduced participation, weak governance, increased opportunistic and free riding behaviour, low satisfaction and loss of cohesion. Consequently, a novel three-dimensional framework that encapsulates and links these three factors – commitment, heterogeneity and social capital - was developed and described. This framework forms the basis on which these socio-psychological or non-financial factors can be explored, measured, analysed and interpreted; and provides a broad yet pertinent lens for evaluating co-operative performance from a socio-psychological or non-conventional perspective. Importantly, grounded in co-operative theory and shaped via the framework, it was hypothesised that an increase in heterogeneity would most likely lead to a decline in social capital and weakening of commitment, while an increase in social capital would lead to a strengthening of commitment.

The second paper of this thesis was centred on exploring member commitment, a critical phenomenon that defines and drives the member-co-operative relationship. This was achieved by de-coupling member commitment into two forms 1) organisational commitment and 2) commitment to collective action. Wherein organizational commitment is a psychological state that characterizes the members relationship with the co-operative and has implications on the decision to continue or discontinue membership in the co-operative.

Similarly, commitment to collective action is defined as the initiatives taken by an identifiable group (members) to realize their common interests and involves a willingness to make an effort towards the organization's success, and not demonstrating behaviours that increase exit risk, side-selling and free-riding. While there has been some theoretical development on the subject of member commitment, less progress has been made empirically; and with few efforts to operationalize and test them. This paper was an effort to provide such an empirical test by measuring and analysing member commitment in co-operatives. To achieve this, organisational commitment was unravelled into three components, 1) affective (AC), 2) normative (NC) and 3) continuance (CC); and commitment to collective action (CCA) into two components, 1) patronage and 2) governance. Thereafter, the relationship between the three forms of organisational commitment and the two forms of commitment to collective action in co-operatives was examined. By focusing on a members' organisational commitment and commitment to collective action, this paper provides an important contribution towards examining agricultural co-operatives from a socio-psychological perspective. It thereby enhances the understanding of member and co-operative relationships in agricultural co-operatives. The research also provides a rigorous framework and instrument for understanding and measuring the relationship between member and the co-operative, by measuring organisational commitment and commitment to collective action. It therefore provides a means to monitor member commitment in the co-operative over time, and also for examining the effects of the co-operatives strategies or policies on member commitment. The co-operative had moderately high levels of commitment to collective action as well as commitment to governance (CG) and patronage (CP); and members were more committed towards governance of the co-operative than towards patronage of the co-operative. The co-operative had moderately high levels of AC and moderate levels of NC and slightly low levels of CC. However, since 10.9% of respondents (equating to about 1,090 farmers) had low AC, CC and NC it indicates that some degree of organisational commitment risk exists for this co-operative. Importantly, a member's desire or want to be a member of the co-operative was higher than either their need to be member or sense of obligation to be a member. This indicates that the economic or utilitarian aspects (continuance commitment) is not of most importance to members as suggested by several scholars. More importantly, it is the emotional attachment to the co-operative, leading to a want or desire to be a member (AC) and the sense of obligation that results in members perceiving that being a member of the co-operative is the moral and right thing to do (NC), which influence commitment to collective action. The economic or financial reasons, leading to an individual needing to be a

member of the co-operative (CC), are not related to CCA. For this co-operative, strengthening affective and normative commitment, is quite likely to result in members sacrificing short term economic gains in favour of long-term performance of the co-operative; and also overcoming the free rider problem in co-operatives. While improving the utilitarian aspects of member commitment will have no influence or effect on a member's commitment to collective action. These finding, should be of value to co-operative management as it could have implications on the co-operative's performance via free riding and exit. As unique member-focused organisations built on the strength of the member-co-operative relationship, it is vital that co-operatives recognise the importance of member commitment as a significant indicator of the member-co-operative relationship. Co-operative leadership and management should therefore prioritize the inclusion of AC, CC, NC and CCA as a core performance metric. A regular measurement and analysis of these would indicate to what extent the strategy pursued by the co-operative are impacting these critical member commitment indicators over time and how effective the member engagement and communication protocols are. It is also recommended that the co-operative's management place emphasis on developing structures to manage and improve organisational commitment of their members. Drawing from the literature on employee organisational commitment, few of the ways by which the co-operative can possibly achieve this is by 1) providing members with increased participation in decision making, 2) showing greater recognition and appreciation of its members, 3) providing training and development for its members, 4) ensuring effective and constructive communication with members, 5) creating a sense of community within the membership base and 6) building an environment wherein member perceive that they and their businesses are safe and secure.

The third paper of this thesis was centred on unravelling member heterogeneity in agricultural co-operatives and examining its relationship with commitment to collective action. While several scholars have highlighted the role, importance and impact of heterogeneity on co-operative performance; empirical studies that examine heterogeneity and map out its expression are lacking. Moreover, in order to better understand the phenomenon of heterogeneity it is important to measure and monitor it. This gap is addressed by providing a much-needed empirical assessment. This was achieved by first disentangling heterogeneity in agricultural co-operatives into three dimensions- 1) farmer-member, 2) farm-business and 3) member-interest and developing a measure for it. The farmer-member dimension is based on differences between members in personal characteristics. The farm-business dimension

includes physical, financial and product quality related properties. The difference between members that arises due to their diverging interests forms the basis of the member-interest dimension. In total 35 sources of heterogeneity were identified (Farmer-member = 9, Farm-business = 14, and Member-interest = 12) and a novel measure and explanation of these was presented using the Gini-Simpson Index. Based on this measure considerable heterogeneity was found to exist in this co-operative with all three dimensions measured showing high levels of heterogeneity. Since Fonterra is a large and fairly complex co-operative with a foundation built on several mergers of co-operatives over many decades, a high level of heterogeneity is expected. The farm-business dimensions showed the greatest homogeneity of the three dimensions and suggests that the membership base tends to be more uniform with respect to farm business related properties, which is not surprising as they are all dairy farms. The co-operative was most diverse when it comes to its members-interests. This knowledge of member heterogeneity and its dimensions can help to identify conflict potential and serve as a starting point for evaluating its implications on co-operative performance. Thereafter a novel framework that explored the links (and/or relationship) between heterogeneity and members' commitment to collective action in a large agricultural co-operative was presented and tested. It was hypothesised that high heterogeneity will result in low commitment to collective action in agricultural co-operatives. Since this co-operative had high levels of heterogeneity, low levels of CCA were expected. However, this was not the case as CCA, as well as CP and CG levels were moderately high. This suggests that higher heterogeneity does not lead to lower commitment. It is possible that the challenges presented by heterogeneity in this co-operative are mitigated by having well designed structures in place. Interestingly, of the three dimensions it is the differences in members' interests that was most likely to result in differences in CCA as well as CG and CP. While heterogeneity in farmer-member sources was not likely to result in differences in CCA. By demonstrating the links between heterogeneity and commitment to collective action, this study contributes towards the larger body of research aimed at identifying factors that influence member commitment in co-operatives and therefore could play an important role in predicting or assessing co-operative performance.

The fourth paper of this thesis follows on from papers 2 and 3 and is centred on examining the relationship between member heterogeneity and member organisational commitment in agricultural co-operatives. This was achieved by developing and empirically testing a novel framework that explores the links (and/or relationship) between heterogeneity and members'

organisational commitment in agricultural co-operatives. Based on the framework, it was hypothesised that high heterogeneity will lead to low organisational commitment. In this co-operative, despite there being high heterogeneity, a farmers' want (AC) and obligation (NC) to be a member of the co-operative are strong. It is possible that the challenges presented by heterogeneity to AC and NC are mitigated by having well designed structures and effective member engagement strategies in place. However, since continuance commitment was low, it suggests that high heterogeneity could potentially lead to a decline in the need (CC) to be a member. Across the 35 heterogeneity sources measured, an association was observed between heterogeneity and affective but not continuance and normative commitment. Indicating that heterogeneity is likely to result in differences in a member's want to be a member but not in a member's need or obligation to be a member. Amongst the three dimensions of heterogeneity, the farmer-member dimension was not associated with any of the three forms of member organisational commitment. An association was found between the farm-business dimension and affective and continuance commitment and the member-interest dimension and affective and normative commitment. These findings have important implications for the development and delivery of co-operative communication and member engagement strategies that are focused on strengthening member commitment. For example, it indicates that organisational commitment in the co-operative can be improved by segmenting members based on their farm-business and member-interest related properties and developing segment specific engagement strategies. While segmenting members based on farmer-member characteristics may not be as effective. Moreover, as AC tends to vary the most between groups across heterogeneity sources, it requires a much more specific and tailored member engagement protocol. While, in the case of NC and CC, a relatively generic member engagement protocol might be sufficient.

On the whole, this thesis has enhanced the understanding of the member- co-operative relationship, specifically from a socio-psychological perspective by conceptualizing novel frameworks that are grounded in theory and also empirically testing the frameworks. The insights generated from the application of these frameworks could be valuable for co-operative management as it has the potential to improve the assessment of co-operative performance and to help lead to better informed decisions, especially around strategy, governance, policy, planning and implementation. Although several scholars have suggested that the utilitarian or financial benefit reasons for membership are the single most important factor driving the member – co-operative relationship, this study did not find this to be the

case. In fact, it was identified that it is the emotive and obligatory reasons for membership that are of greater significance, especially in terms of positively influencing collective action. In line with the arguments presented by several scholars that large and fairly complex co-operatives are characterised by high levels of heterogeneity, it was found that high levels of heterogeneity exist within the membership base of Fonterra Co-operative group. Heterogeneity was greatest for member-interests and least for farming-business. Importantly, the farmer-member dimension does not influence either a member's organisational commitment or a member's commitment to collective action. It was also suggested by several scholars that high heterogeneity could lead to lower levels of member commitment. Once again this was not the case, as AC, NC and CCA were high despite there being high levels of heterogeneity. However, as CC levels were slightly low it could be argued that high heterogeneity leads to a slight decline in the need to be a member. Although heterogeneity did not have a significant bearing on member commitment, it should still be measured and monitored regularly. This is because, according to the literature, heterogeneity can hamper co-operative performance by increasing the transactions costs of decision making, and causing an erosion in social capital etc. It is therefore recommended that the co-operative have structures in place to manage for member heterogeneity. Lastly, a vital observation and finding of this thesis is that it is the AC (emotive reasons for membership) that forms the glue that holds the co-operative together. Hence, greater a members' want or desire to be a member of the co-operative, better will be the co-operatives performance. It is therefore imperative that the co-operative regularly monitor AC and constantly strive to further strengthen it. For any erosion or decrease in AC could have significant negative implications on co-operative performance and could also perhaps lead to its demise. Apart from developing specific protocols for strengthening a member's AC, the co-operative should also acknowledge and appreciate members that have a high AC. Moreover, it should be recognised that it is the smaller farms, both in terms of physical and financial attributes, that have shown to have a stronger utilitarian basis for membership and a weaker emotive basis for membership. Therefore, steps should also be taken to specifically strengthen the emotive basis of membership of the smaller farms.

3.0 Limitations

The empirical research component of this study was conducted at a single point in time and was a cross-sectional analysis of one co-operative. As a result, the research does not account for any changes in a member's psychological state and attitude towards the co-operative that

can occur over time. It is important to note that the relationship between a member and the co-operative is a dynamic one and a member's psychological state and attitude towards the co-operative could be different at various points of the relationship. As a result, the research does not throw light on any changes that might occur over time. Therefore, a longitudinal study that takes into account the evolution and variability in a members psychological state would be valuable. Secondly, the empirical research focused on only one co-operative (Fonterra), agricultural sector (dairy), and nation (NZ). Dairy co-operatives are marketing co-operatives wherein the farmer is the supplier of product and are unique because they are focused on a single commodity (milk) and farmer type (dairy farmers). Consequently, they are quite different from input supply or services co-operatives, wherein the farmer is the buyer or customer of product or service and tend to include more than one commodity and farmer type. Therefore, generalizations of the findings, especially to non-dairy co-operatives need to be made with caution. Despite these limitations, this research provides some meaningful contributions towards examining agricultural co-operatives from a socio-psychological perspective and understanding of the member and co-operative relationship. It therefore has significant implications on co-operative performance.

4.0 Future research

Empirical research on the member-co-operative relationship in agricultural cooperatives is still in its infancy and many interesting questions remain to be addressed. We hope that the findings reported in this thesis will further encourage researchers to examine these phenomena in the context of agricultural co-operatives. As explained and demonstrated in this thesis, frameworks should serve as a reference and coordination mechanism for efficient theory testing. Future research should therefore focus on not only developing theoretical frameworks but also on empirically applying these frameworks to the task of linking co-operative theory and structure to its performance. This is a critical challenge that co-operative scholars must address in order to progress co-operative research and enhance its managerial relevance.

Although we identified and explained that social capital was an important phenomenon that explains co-operatives from a socio-psychological perspective and also developed an instrument for measuring social capital in dairy co-operatives, an empirical examination of social capital was not performed in this thesis. Moreover, very little research has been done in the area of social capital in co-operatives and empirical studies that examine social capital in agriculture co-operatives are significantly lacking. Future research should therefore focus on

empirically examining social capital in agricultural co-operative and analysing its relationship with commitment and heterogeneity.

Future research on member commitment should also consider making comparisons between different co-operative types, and also between co-operative members and IOF suppliers or customers, to identify similarities or differences between the groups in relation to affective, normative and continuance commitment. Lastly, it would also be interesting to know the implications of commitment and heterogeneity on co-operative governance, with a specific focus on the design structures for large multinational co-operatives with a heterogenous membership base.

Appendix 1

The Questionnaire

Questionnaire on Member Diversity & Commitment in Fonterra

For each of the questions below, please choose (*"tick" or "circle"*) the response option that best reflects your position/view.

1. **Your Gender ?** ☐ Male ☐ Female

2. **Your Age (years)?**
☐ 18-30 ☐ 31-40 ☐ 41-50 ☐ 51-60 ☐ 61-70 ☐ >70

3. **Your Ethnicity ?**
☐ European ☐ Māori ☐ Pacific Peoples ☐ Asian ☐ Middle Eastern / Latin American / African ☐ Other / Prefer not to answer

4. **Level of Education ?**
☐ NCEA level 1/ School certificate ☐ University entrance /NCEA level 2, 3 or 4 ☐ Diploma / Trade Certificate ☐ Under-graduate ☐ Post-graduate ☐ Other (specify) .....

5. **Number of years' experience in agriculture ?**
☐ <5 ☐ 5-10 ☐ 11- 20 ☐ 21 - 30 ☐ 31-50 ☐ >50

6. **Number of years' of share-milking experience ?**
☐ 0 ☐ 1-2 ☐ 3-5 ☐ 5-7 ☐ 7-10 ☐ >10

7. **What describes your current involvement with the Farming Business ?**
☐ Owner-Operator ☐ Owner-operator with Equity Partner(s) ☐ Owner- with Contract-milker ☐ Owner-with Share-milker ☐ Equity Partner ☐ Other (specify) .....

8. **Number of farming entities you are involved in ?**
☐ 1 ☐ 2-3 ☐ 4-6 ☐ 7-10 ☐ 11-15 ☐ >15

9. **Farm type (check all that apply) ?**
☐ Dairy ☐ Sheep & Beef ☐ Cropping ☐ Horticulture ☐ Mixed ☐ Other (specify) .....

10. **Main farm type ?**
☐ Dairy ☐ Sheep &/or Beef ☐ Cropping ☐ Horticulture ☐ Mixed ☐ Other (specify) .....

11. **Type of dairy farming system in 2015/16 (as per DairyNZ classification) (check all that apply) ?**
☐ System 1 ☐ System 2 ☐ System 3 ☐ System 4 ☐ System 5 ☐ Other (specify) .....

12. **Seasonality of the dairy farming system (check all that apply) ?**
☐ Spring calving ☐ Autumn calving ☐ Split calving ☐ Year round calving ☐ Other (specify) ☐ Not Applicable

1

For each of the statements below, please choose (✓) from one of the seven possible response options that best reflect your view.

	Strongly Disagree	Disagree	Slightly Disagree	Undecided	Slightly Agree	Agree	Strongly Agree
1. I would be very happy to spend the rest of my farming career as a member of my co-operative.	☐	☐	☐	☐	☐	☐	☐
2. I enjoy discussing my co-operative with people outside of it.	☐	☐	☐	☐	☐	☐	☐
3. I really feel as if the co-operatives problems are my own.	☐	☐	☐	☐	☐	☐	☐
4. I think that I could easily become as attached to another dairy company or dairy co-operative as I am to this one.	☐	☐	☐	☐	☐	☐	☐
5. I do not feel like 'part of the family' at my co-operative.	☐	☐	☐	☐	☐	☐	☐
6. I do not feel 'emotionally attached' to my co-operative.	☐	☐	☐	☐	☐	☐	☐
7. This co-operative has a great deal of personal meaning for me.	☐	☐	☐	☐	☐	☐	☐
8. I do not feel a strong sense of belonging to my co-operative.	☐	☐	☐	☐	☐	☐	☐
9. I am not afraid of what might happen if I "exit" my co-operative without having another option lined up.	☐	☐	☐	☐	☐	☐	☐
10. It would be very hard for me to leave my co-operative right now, even if I wanted to.	☐	☐	☐	☐	☐	☐	☐
11. Too much in my life would be disrupted if I decided I wanted to leave my co-operative now.	☐	☐	☐	☐	☐	☐	☐
12. It would not be too costly for me to leave my co-operative now.	☐	☐	☐	☐	☐	☐	☐
13. Right now, staying with my co-operative is a matter of necessity.	☐	☐	☐	☐	☐	☐	☐
14. I feel that I have too few options to consider, if I wanted to leave my co-operative.	☐	☐	☐	☐	☐	☐	☐
15. One of the few serious consequences of leaving my co-operative would be the scarcity of available alternatives.	☐	☐	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree	Slightly Disagree	Undecided	Slightly Agree	Agree	Strongly Agree
16. One of the major reasons I continue to be a member of my co-operative is that leaving would require considerable personal sacrifice	☐	☐	☐	☐	☐	☐	☐
17. I think that people nowadays move from one dairy co-operative to another dairy co-operative or dairy company too often.	☐	☐	☐	☐	☐	☐	☐
18. I do not believe that a member must always be loyal to his or her co-operative.	☐	☐	☐	☐	☐	☐	☐
19. Switching from one co-operative/company to another co-operative/company does not seem at all unethical to me.	☐	☐	☐	☐	☐	☐	☐
20. One of the major reasons I continue to be a member of my co-operative is that I feel a sense of moral obligation to remain.	☐	☐	☐	☐	☐	☐	☐
21. If I got better benefits elsewhere, I would feel it was not right to leave my co-operative.	☐	☐	☐	☐	☐	☐	☐
22. I was taught to believe in the importance of remaining loyal to one's co-operative.	☐	☐	☐	☐	☐	☐	☐
23. Things are better when member-farmers stay with one co-operative for most of their farming careers.	☐	☐	☐	☐	☐	☐	☐
24. I do not think that wanting to be a 'loyal member' to the co-operative is sensible anymore.	☐	☐	☐	☐	☐	☐	☐
25. I will continue to sell my milk to the co-operative, even if another firm offers a better price.	☐	☐	☐	☐	☐	☐	☐
26. A higher milk price is more important than a good relationship with the co-operative.	☐	☐	☐	☐	☐	☐	☐
27. I am willing to invest money in the co-operative, if the co-operative requires it.	☐	☐	☐	☐	☐	☐	☐
28. I am concerned about the co-operative's future (15 years from now)	☐	☐	☐	☐	☐	☐	☐

3

	Strongly Disagree	Disagree	Slightly Disagree	Undecided	Slightly Agree	Agree	Strongly Agree
29. I read the co-operatives annual report every year.	☐	☐	☐	☐	☐	☐	☐
30. I make a sincere effort to attend meetings organised by my co-operative.	☐	☐	☐	☐	☐	☐	☐
31. I make a sincere effort to exercise my right to vote on all matters that are put to a vote or referendum by the co-operative.	☐	☐	☐	☐	☐	☐	☐
32. I think it is important to be a valuable member of the co-operative.	☐	☐	☐	☐	☐	☐	☐
33. Being a respected member of the community is important to me.	☐	☐	☐	☐	☐	☐	☐
34. Creating opportunities for future farmers is not important to me.	☐	☐	☐	☐	☐	☐	☐
35. It is important that I have time available for socializing with family and friends.	☐	☐	☐	☐	☐	☐	☐
36. It is important that I have variety in my work.	☐	☐	☐	☐	☐	☐	☐
37. Looking after the environment is not important to me.	☐	☐	☐	☐	☐	☐	☐
38. Producing to maximize farming profits is important to me.	☐	☐	☐	☐	☐	☐	☐
39. Paying off debts is not important to me.	☐	☐	☐	☐	☐	☐	☐

For each of the questions below, please choose ("tick" or "circle") the response option that best reflects your position/view

1. Farm production per year (KgMs) - of all farms- (2015/16) ?

☐ < 50,000 ☐ 50,000 – 100,000 ☐ 100,000 – 150,000 ☐ 150,000 – 200,000 ☐ 200,000 – 300,000 ☐ > 300,000

2. Types of milk produced (check all that apply) ?

☐ Conventional Milk ☐ Organic Milk ☐ Winter Milk ☐ Specialty Milks (e.g. A1, A2) ☐ Other (specify) ☐ Don't know

3. Main type of milk produced (check ONLY ONE) ?

☐ Conventional Milk ☐ Organic Milk ☐ Winter Milk ☐ Specialty Milks (e.g. A1, A2) ☐ Other (specify) ☐ Don't know

4. Quality (average somatic cell count) of milk produced (2015/16) ?

☐ <50,000 ☐ 50,000 – 100,000 ☐ 100,000 - 150,000 ☐ 150,000 – 250,000 ☐ 250,000 - 350,000 ☐ >350,000

5. Annual gross farm revenue from dairy farm business - of all farms – (NZ $) - (2015/16) ?

☐ < 250,000 ☐ 250,000 – 500,000 ☐ 500,000 - 1,000,000 ☐ 1,000,000 – 2,000,000 ☐ 2,000,000 – 5,000,000 ☐ > 5,000,000

6. Value of total dairy farm assets (including land, livestock, shares & machinery) – of all farms- (NZ $) - (2015/16) ?

☐ <500,000 ☐ 500,000 – 2,000,000 ☐ 2,000,000 – 10,000,000 ☐ 10,000,000 – 20,000,000 ☐ 20,000,000 – 40,000,000 ☐ >40,000,000

7. Total debt of the dairy farm business– of all farms-(NZ $) - (2015/16) ?

☐ <500,000 ☐ 500,000 – 2,000,000 ☐ 2,000,000 – 10,000,000 ☐ 10,000,000 – 20,000,000 ☐ 20,000,000 – 40,000,000 ☐ >40,000,000

8. Proportion of non-farm income as a percentage of – gross farm income – (2015/16) ?

☐ <15% ☐ 15-30 % ☐ 31-50% ☐ 51-70% ☐ 71- 90% ☐ >90%

9. Stage of dairy farm business ?

☐ Entry ☐ Growth ☐ Consolidation ☐ Exit ☐ Entry of next generation ☐ Other

10. Number of years as a member of this co-operative ?

☐ <5 ☐ 5 - 10 ☐ 11 - 20 ☐ 21 - 40 ☐ 41 - 60 ☐ > 60

11. Number of shares in the co-operative ?

☐ < 50,000 ☐ 50,000 – 100,000 ☐ 100,000 – 150,000 ☐ 150,000 – 200,000 ☐ 200,000 – 300,000 ☐ > 300,000

12. How likely are you to sell some of your shares in the co-operative in the next 5 years ?

☐ Extremely likely ☐ Very likely ☐ Slightly likely ☐ Slightly unlikely ☐ Very unlikely ☐ Extremely unlikely

13. Share of milk sold (supplied) to the co-operative (2015/16) ?

☐ 100% ☐ 95-100% ☐ 90-95% ☐ 80-90% ☐ 70-80% ☐ Other

14. How willing are you to sell (supply) your milk to another dairy company/co-operative in the next 5 years, should the option be available and viable?

☐ Extremely willing ☐ Very willing ☐ Slightly willing ☐ Slightly unwilling ☐ Very unwilling ☐ Extremely unwilling

15. Period of time a continued (< $5/KgMs) low milk price payment will be acceptable ?

☐ 1 season ☐ 2 seasons ☐ 3 seasons ☐ 4 seasons ☐ 5 seasons ☐ Other

16. How willing are you to accept a lower (< $0.20/share) dividend payment temporarily (e.g. 3-5 seasons) should the co-operative need investment ?

☐ Extremely willing ☐ Very willing ☐ Slightly willing ☐ Slightly unwilling ☐ Very unwilling ☐ Extremely unwilling

17. Please select the Region(s) you have dairy farming interests in (check all that apply):

☐ Northland ☐ Auckland ☐ Waikato ☐ Bay of Plenty ☐ Central Plateau ☐ Western Uplands ☐ East Coast ☐ Hawkes Bay ☐ Taranaki

☐ Manawatu ☐ Wairarapa ☐ Nelson/ Marlborough ☐ West Coast ☐ North Canterbury ☐ South Canterbury ☐ Otago ☐ Southland ☐ Other

18. Would you like a summary of the research findings: ☐ Yes ☐ No

Thank you very much for completing this questionnaire & supporting research on dairy co-operatives

(Please use the space provided on the back of this page to write any comments you might want to make about your dairy co-operative)

Please use this space to write any comments you might want to make about your dairy co-operative:

Appendix 2

Methodology Sub-Section

1. Introduction

An in-appropriate matching of methodology and the research problem may result in questionable results, ultimately having a negative impact in the researcher's professionalism. It is therefore important to obtain a clear understanding of methodology. According to (Holden & Lynch, 2004), research should not be methodologically led, rather, the methodological choice should be a consequence to the researchers philosophical stance and the social science phenomenon investigated. Further, according to Remenyi, Williams, Money, and Swartz (1998), there are several major questions that require significant consideration by researchers such as "How to research?" and "What to research?", but central to the researchers answers is their perspective on "Why research?". While "What to research" may be driven by several reasons including the researchers own academic interests, the "How to research ?" i.e. the research methodology involves something more than just the practicalities – it necessitates a philosophical solution to "Why research" (Holden & Lynch, 2004). Developing a philosophical perspective requires that the researcher make several core assumptions concerning two dimensions: the nature of society and the nature of science (Burrell & Morgan, 1979).

The social dimension involves a choice between two (diametrically opposite) views of society – regulatory or radical change. In the regulatory view of society, the researcher assumes that society evolves rationally. Society is viewed as unified and cohesive, whereas the radical change perspective views society as being in a constant conflict, as humans struggle to free themselves from the domination of societal structures (Burrell & Morgan, 1979).

Science involves either a subjective or an objective approach to research and these two major philosophical approaches are highlighted by several core assumptions concerning ontology (reality), epistemology (knowledge), human nature (pre-determined or not), and methodology According to Burrell and Morgan (1979), these assumptions are consequential to each other, that is, the researchers view of ontology effects epistemological persuasion which, in turn, effects their view of human nature, consequently, choice of methodology logically follows the assumptions that the researcher has already made.

2. The Nature of Science

Objectivism and subjectivism have been described as a continuum's polar opposites with varying philosophical positions aligned between them. The objectivist approach to social research developed from natural sciences – social science researches decided to employ the highly successful methods of the natural sciences to investigate social science phenomenon. However, subjectivism arose as critics argued, and continue to argue, that both sciences are different and not comparable.

Labelling of Objectivism & Subjectivism in Literature (Holden & Lynch, 2004)

Objectivism	**Subjectivism**
Quantitative	Qualitative
Positivist	Phenomenological
Scientific	Humanistic
Experimentalist	Interpretivist
Traditionalist	
Functionalist	

Ontology relates to the nature of reality, that is, what things, if any, have existence or whether reality is "the product of one's mind" (Burrell & Morgan, 1979). The researchers view of reality is the corner stone to all other assumptions, that is, what is assumed here predicates the researchers other assumptions (Holden & Lynch, 2004). Epistemology refers to the study of the nature of knowledge, that is, "How is it possible, if it is, for us to gain knowledge of the world?" (Hughes & Sharrock, 1997). This in-turn relates to the nature, validity, and limits of inquiry (Rosenau, 1992, p. 109). Much of the research that has been completed in the area of organisational science has been based on the assumption that reality is objective and out there waiting to be discovered and that this knowledge can be identified and communicated to others (Holden & Lynch, 2004). The third element, which concerns human nature, involves whether or not the researcher perceives man as the controlled or as the controller (Burrell & Morgan, 1979). Finally, the last assumption, methodology, is the researches tool-kit – it represents all the means available to social scientists to investigate phenomena.

On the basis of the core assumptions on the nature of science, there are several taxonomies that lie between the extreme philosophical positions, with Morgan and Smircich (1980) continuum of six major philosophical perspectives being one of the most widely accepted.

Supporters of the extreme position on objectivism are realists. They argue that that world predates individuals – it is prior to the existence of human consciousness and, whether or not humans assign labels and perceive the existence of an external reality, the world will still exist as an empirical entity, made up of hard tangible and relatively immutable structures, independent of cognitive efforts of individuals (Gill & Johnson, 1997). Therefore, valid knowledge about a concrete reality can only be discovered through sense observation and measurement and any reference to the intangible or subjective is excluded as meaningless (Giddens, 1976; Morgan & Smircich, 1980).

Objectivists perceive that their studies can be done independently of what is being observed and that their interests, values beliefs etc. will have no influence on what they study or what methods they use. They argue strongly that research choice and methodological choice are made objectively, that is, the researcher is able to set aside their own set of interests, values, skills etc. Objectivists believe that they are "independent of and neither affects nor is affected by the subjects of the research (Remenyi et al., 1998); any other contention implies that "social scientists are prone to employ wrapped logic and improper treatment of empirical data in order to support views they held prior to the investigation" (Gordan,1991). According to Hunt (1993), objectivists retain objectivity by – "Requiring that theories, laws and explanations be empirically testable ensures that they will be inter-subjectively certifiable since different (but reasonably component) investigators with differing attitudes, opinions, and beliefs will be able to make observations and conduct experiments to ascertain their truth of content".

Critiques of objectivism argue that the explanatory success of objectivism in the natural sciences has not been repeated in the social sciences due its significant flaws. Supporters of subjectivism believe that subjectivism is more appropriate to the study of social science due to the complex nature of social science research, i.e. human beings. However, critiques of subjectivism argue that its biggest flaw is its inability to replace objectivism with a better approach. Further several objectivists believe that relativism and incommensurability are other major subjectivist flaws.

3. Hypothetico-deductive Approach

The major aim of objectivists and natural scientists is to identify casual explanation and fundamental laws that explain regularities in human social behaviour (Holden & Lynch, 2004). Due to which, the generalization of results from sample sizes essentially utilizes a hypothetico-deductive process. This process begins with the formulation of hypothesis developed from the

researchers' conceptualization of a particular phenomenon. Objectivists are grounded in causality, meaning that there are independent causes that lead to observed effects, and hypothesis are either verified or refuted by the observed effects. The hypothetico-deductive approach involves the quantitative operationalization of concepts, which involves reductionism, that is, the problem is reduced to its smallest elements (Holden & Lynch, 2004). The reduction enhances a problems comprehension.

4. Quantitative Study vs Qualitative Study

Quantitative research is based on the collection and analysis of a large amount of numeric data that can be tested statistically; and it relies heavily on statistical results to make context free generalizations, i.e. theory testing (Walter, 2006; Wiersma & Jurs, 2009). Cohen (2011) argues that a quantitative research approach in its epistemological and ontological orientation regards human behaviour as an object that can be controlled, thereby ignoring opinions and contributions as opposed to a qualitative approach. Quantitative research hence becomes a critical element of exploratory research, wherein the research problem or situation is studied in order to explain the relationship between different variables involved (Saunders, Lewis, & Thornhill, 2011). The main quantitative research methods according to Remenyi et al. (1998) are – forecasting research, laboratory experiments, large scale surveys and simulation and stochastic modelling. In the case of social issues, the purpose of quantitative research is to measure and count and examine the issue using statistical techniques and find the answers to "what"? and "how many?" (Saunders et al., 2011). The four important features of quantitative research methods are – control (causality), operational definitions (measurable variables), replication and hypothesis testing (generalization) (Bryman, 2008; Burns & Burns, 2008).

Qualitative research is based on the "interpretive" approach to social sciences and focus on words rather than in the collection and analysis of data (Amaratunga, Baldry, Sarshar, & Newton, 2002). Qualitative research approaches help to define what needs to be studied when there is no theory on the topic and variables are not known (Leedy and Ormrod, 2014), as opposed to quantitative approaches that use theory to generate data. The main objective of qualitative research is to express reality and explain people in natural situations through the use of words (Amaratunga et al., 2002). In qualitative research, the focus is on gathering information from the content and there is no need for statistical tools or large scale data sets to infer outcomes from social phenomenon (Walter, 2006; Wiersma & Jurs, 2009). Few of the strengths of qualitative research are – awareness of complexity, preliminary to a quantitative study, carry in-depth study, see through the eyes of individuals being researched, descriptive

in nature and focuses on content, emphasis on process by using standard unstructured interviews, flexibility and theory building from data (Bryman, 2008; Burns & Burns, 2008).

5. The Case Study Approach

Case study approach is one of several methodologies that can be used for conducting research (Yin, 1994). A "case study," can be best defined as an intensive study of a single (relatively bounded phenomenon) unit with an aim (by the scholar) to generalize (elucidate) across a larger set of units (larger class of similar phenomena) (Gerring, 2004). It represents a research strategy that can be likened to - an experiment, a history, or a simulation, which may be considered alternative research strategies (Yin, 1981). As a research strategy, the distinguishing characteristic of the case study is that it attempts to examine: i) a contemporary phenomenon in its real-life context, especially when ii) the boundaries between phenomenon and context are not clearly evident (Yin, 1981). Whereas in experiments, the phenomenon is deliberately divorced from its context (Yin, 1981). Moreover, the types of research questions best addressed by case studies are "explanations", as opposed to other research strategies which focus on addressing incidence questions (Yin, 1981). The case study method is particularly relevant in explaining how and why contemporary events occur over which the researcher has little control. Furthermore, case studies are useful in understanding complex social phenomena, especially where behaviours cannot be manipulated (Yin, 1994); and when there is a need to emphasise the context in which the phenomena occur (Eisenhardt & Graebner, 2007). Moreover, the case study research design aligns well with any social-scientific theoretical framework including behavioralism, rational choice, institutionalism, and interpretivism (Gerring, 2004).

To define a research work as being a case study might mean 1) that its method is qualitative, small-N (Yin, 1994); 2) that the research is ethnographic, clinical, participant-observation, or otherwise "in the field" (Yin, 1994); 3) that the research is characterized by process-tracing (George & Bennett, 2005); 4) that the research investigates the properties of a single case (Campbell & Stanley, 1963; Eckstein, 1992, 2000); or 5) that the research investigates a single phenomenon, instance, or example (the most common usage) (Gerring, 2004). But these definitions are useful for describing certain kinds (subtypes) of case studies, rather than the general phenomenon itself (Gerring, 2004). In general, there are three types of case study research – descriptive, explanatory and exploratory ((Yin, 1994; Leedy & Ormrod, 2005).

Ragin (1999) suggests that case study research is mainly about "casing", that is, defining the topic, including the hypothesis(es) of primary interest, the outcome, and the set of cases that offer relevant information about the hypothesis. Case studies are generally more useful 1) when inferences are descriptive rather than causal, 2) when propositional depth is prized over breadth and boundedness, 3) when (internal) case comparability is given precedence over external case representativeness, 4) when insight in causal mechanisms is more important than insight into causal effects 5) when the causal proposition at issue is invariant rather than probabilistic, 6) when the strategy of research is exploratory, rather than confirmatory, and 7) when useful variance is available for only a single unit or a small number of units (Gerring, 2004).

Case research has a distinct advantage where research and theory are in their formative stages (Graebner & Eisenhardt, 2004) and where the actors and the context are critical (Benbasat, Goldstein, & Mead, 1987). Theory-building case study research in particular is of value when a fresh perspective is needed on a topic as existing theory, or when current perspectives seem inadequate because they have little empirical substantiation, or they conflict with each other or common sense (Eisenhardt, 1989). Another advantage of the case study is its ability to cope with a variety of evidence such as documents artefacts, interviews and other observations (Yin, 1994) and to employ multiple methods of data collection to gather information (Benbasat et al., 1987). According to Sterns, Schweikhardt, and Peterson (1998), in agribusiness research, case study research is capable of generating a robust, comprehensive array of “knowledge” about complex, highly interdependent and dynamic economic and social phenomena, particularly in firm decision making.

The case study research design typically constructs cases from a single unit while remaining attentive to inferences that span similar units outside the formal scope of investigation. A single case study is still a single-shot, a single piece of evidence lying at the same level of analysis as the proposition itself (Gerring, 2004). Non-case study research designs construct cases across units with a focus on illustrating principal causal inference. The case study is therefore not epistemologically distinct from the cross-unit analysis, and the two approaches are inter-dependent; cross-unit work draws upon case study work and case study work does not disregard adjacent units (Gerring, 2004). If adjacent units are thought to be entirely non-comparable, the case study method would be superfluous. Moreover the "subjectivity" of case study research allows for the generation of a great number of hypotheses, and grants them a strong advantage in research at exploratory stages, for the single-unit study allows one to test a multitude of hypotheses in a rough-and-ready way (Gerring, 2004).These insights that might not be visible

to the cross-unit researcher who works with a thinner set of empirical data across a large number of units and with a more fixed definition of cases, variables, and outcomes. Similarly, case studies commonly afford multiple observations of a single case, thus providing firmer evidence of the factual accuracy of a given proposition than would be possible in the analogous cross-unit study (Gerring, 2004). It is important to acknowledge that practical and contextual considerations are often significant factors in the choice between a case study and a non-case study research format; because whatever can be done for a set of units can usually be done more easily for a single unit (Gerring, 2004).

6. The Research Approach Taken

The research builds on previous work undertaken which revealed the extent to which socio-psychological factors, specifically social capital, heterogeneity and commitment are studied within the context of the co-operative organisational form. The literature identifies that while the study and analysis of co-operatives are often strongly driven by economic aspirations (e.g. profit maximization) they are not always in total alignment with the social features of the co-operative organisational form.

The approach to the research is fundamentally derived from the outcomes which are sought i.e. a quantifiable measure of commitment and heterogeneity; and to derive relationships therefrom and an interest in contributing to a greater understanding of co-operatives in general and agricultural co-operatives in New Zealand in specific. The research requires methods which are explorative, informative, co-operative membership focused, and consistent with co-operative principles and expectations. In our research the relatively bounded phenomenon that we are investigating is member commitment and heterogeneity in a New Zealand dairy co-operative. With the larger objective of generalising our findings to the other dairy co-operatives in New Zealand and globally. Due to these reasons, a research approach using a case study is the selected methodology for this research. Moreover, since the objective is to measure the level of commitment and heterogeneity within the membership base and understand the relationship between them that exists, the research adopted a quantitative approach whereby co-operative members were the principal participants in the research. Similar approach has been used by other co-operative scholars (Barraud-Didier et al., 2012; Cechin et al., 2013; Puusa et al., 2018).

As discussed earlier, co-operatives play a significant role within the dairy sector globally, with several co-operatives featuring in the top 10 dairy businesses in the world. Moreover, dairy co-

operatives play a critical role in the New Zealand economy, accounting for over 90% of milk production and a combined revenue of almost 20 billion NZ$. Given the role and importance of dairy co-operatives in the global dairy sector in general and in the NZ economy and agricultural sector in specific, they were identified as being the principal co-operative sector of interest in this research. Furthermore, amongst the dairy co-operatives in NZ, Fonterra Co-operative group is by far the largest and most significant. For this reason, Fonterra was selected as the co-operative organisational form that would be the single case-study that this research focused on.

A potential risk of such an approach is that the selected co-operative sector (i.e. dairy) and organisation (Fonterra) might not provide sufficient information through which generic outcomes can be identified or extrapolated. However, by adopting a quantitative approach and ensuring a large enough sample size is used, it is expected that it will be possible to identify key themes and issues which are generically applicable to all agricultural co-operatives. Moreover, the flexibility within the framework ensures that it is not restrictive in nature and can be purposefully modified quite easily to apply to other co-operative sectors should the need arise. A more specific outline of the advantages and disadvantages of the approach are presented in below (Table 2).

Table 2: Advantages and dis-advantages of the approach taken

Advantages	Dis-advantages
As a "case study" method using a single-case is pursued in this research, a single unit (Fonterra) is intensively studied. This results in empirically-rich, context-specific, and holistic accounts of the phenomena being studied. It is also better suited to addressing "explanations" types of research questions that this research is pursuing.	Improper case selection may alternatively lead to overgeneralisation and/or misunderstandings of the relationship between variables or processes
As a quantitative approach is taken, large amount of numeric data is collected and statistically analysed. The results can be used to make context free generalizations. This is very important for the theory testing objective. Moreover, by testing hypotheses and examining at cause and effect relationships the outcomes can be generalized across a larger set of units (dairy co-operatives in specific and agricultural co-operatives in general).	There is a risk that the answers or characteristics given in a quantitative study aren't an accurate representation of the entire population. Furthermore, as the researcher is detached from participants (to reduce bias in data collection and interpretation), the researcher is an "observer" or an "outside looking in". It will therefore be difficult to get a better understanding, interpretations and

	explanations of the phenomena being studied.
The quantitative research approach requires careful experimental design and the ability for anyone to replicate both the test and the results. Hence, data collection, analysis and interpretation are rigorous, straightforward and less open to error and subjectivity.	As a result of using predetermined working strategies, data collected is only geared towards supporting or rejecting the predetermined paradigms. The approach does not encourage imaginative, critical and creative thinking. Moreover, by focusing mainly on numbers, there is a risk of missing big-picture information or overlooking broader themes and relationships.
By taking an objectivist view, objectivity is retained in this research approach. It therefore requires that theories, laws and explanations be empirically testable. This in-turn ensures that they will be inter-subjectively certifiable since different investigators with differing attitudes, opinions, and beliefs will be able to make observations and conduct experiments to ascertain their truth of content. Hypothesis are either verified or refuted by the observed effects.	As the study was performed in a single point in time, the data collected is useful to paint a present-time picture of what is happening in the selected case. However, it cannot measure or account for changes that are likely to happen over time.
The use of hypotheses, theories and variables makes the work clear and understandable to readers and subsequent researchers. Moreover, such an approach is well informed by the previous studies done on the topic, field or area by previous researchers.	The selected variables with which the quantitative research approach deals with, will only allow access to some selected aspects of the study populations beliefs or actions.
The anonymous or blind nature of the survey strategy makes it useful for data collection because people are more likely to share an honest perspective.	Quantitative research approach using a survey strategy does not give the researcher the option to review answers with participants. The replies provided to researchers must stand by themselves. This approach therefore has very few opportunities to ask for clarity or delve deeper.

References –

Amaratunga, D., Baldry, D., Sarshar, M., & Newton, R. (2002). Quantitative and qualitative research in the built environment: application of "mixed" research approach. *Work study, 51*(1), 17-31.

Benbasat, I., Goldstein, D. K., & Mead, M. (1987). The case research strategy in studies of information systems. *MIS Quarterly*, 369-386.

Barraud-Didier, V., Henninger, M.-C., & El Akremi, A. (2012). The relationship between members' trust and participation in the governance of cooperatives: The role of organizational commitment. *International Food and Agribusiness Management Review, 15*(1), 1-24.
Bryman, A. (2008). *The end of the paradigm wars*: Sage.
Burns, R. P., & Burns, R. (2008). *Business research methods and statistics using SPSS*: Sage.
Burrell, G., & Morgan, G. (1979). *Social paradigms and organizational analysis: Elements of the sociology of corporate life*: London: Heinemann Educational.
Campbell, D. T., & Stanley, J. C. (1963). *Experimental and quasi-experimental designs for research*. USA: Houghton Mifflin Company.
Cechin, A., Bijman, J., Pascucci, S., & Omta, O. (2013). Decomposing the Member Relationship in Agricultural Cooperatives: Implications for Commitment. *Agribusiness, 29*(1), 39-61. doi:10.1002/agr.21321
Eckstein, H. (1992). Case studies in political science. *Handbook of political science, 7*, 118.
Eckstein, H. (2000). Case Study And Theory In Political Science. In R. Gomm, M. Hammersley, & P. Foster (Eds.), *Case Study Method: Key Issues, Key Texts* (pp. 119): Sage Publications.
Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management review, 14*(4), 532-550.
Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management Journal, 50*(1), 25-32.
George, A. L., & Bennett, A. (2005). *Case studies and theory development in the social sciences*. Cambridge, Masachusetts, USA: MIT Press.
Gerring, J. (2004). What is a case study and what is it good for? *American political science review*, 341-354.
Giddens, A. (1976). *New rules of sociological method: a positive critique of interpretative sociologies*. New York: Basic Books.
Gill, J., & Johnson, P. (1997). *Research Methods for Managers* (2nd Edition ed.). London: Chapman.
Graebner, M. E., & Eisenhardt, K. M. (2004). The seller's side of the story: Acquisition as courtship and governance as syndicate in entrepreneurial firms. *Administrative science quarterly, 49*(3), 366-403.
Holden, M. T., & Lynch, P. (2004). Choosing the appropriate methodology: understanding research philosophy. *The marketing review, 4*(4), 397-409.
Hughes, J. A., & Sharrock, W. W. (1997). *The philosophy of social research* (3 ed.). Harlow. Essex: Addison Wesley Longman Ltd.
Leedy, P. D., & Ormrod, J. E. (2005). *Practical Research: Planning And Design* (9 ed.). New Jersey, USA: Merrill.
Morgan, G., & Smircich, L. (1980). The case for qualitative research. *Academy of Management review, 5*(4), 491-500.
Puusa, A., Tuominen, P., & Havukainen, M. (2018). The interrelations between member-commitment, trust, satisfaction and loyalty in a cooperative context. *International Journal of Co-operative Accounting and Management, 1*(1), 35-44.
Ragin, C. C. (1999). The distinctiveness of case-oriented research. *Health services research, 34*, 1137-1151.
Remenyi, D., Williams, B., Money, A., & Swartz, E. (1998). *Doing Research in Business and Management: An Introduction to Process and Method*: SAGE.
Rosenau, P. M. (1992). Post-Modernism and the Social Sciences: Insights. *Inroads, and Intrusions, Princeton, NJ*.
Saunders, M. N., Lewis, P., & Thornhill, A. (2011). *Research methods for business students*: Pearson Education India.

Sterns, J. A., Schweikhardt, D. B., & Peterson, H. C. (1998). Using case studies as an approach for conducting agribusiness research. *The International Food and Agribusiness Management Review, 1*(3), 311-327.

Walter, M. (2006). The nature of social science research. In M. Walter (Ed.), *Social research methods: An Australian perspective* (pp. 1-28). Melbourne, Victoria: Oxford University Press.

Wiersma, W., & Jurs, S. (2009). *Research methods in education: An introduction* (9 ed.): Pearson Education.

Yin, R. K. (1981). The case study crisis: Some answers. *Administrative science quarterly, 26*(1), 58-65.

Yin, R. K. (1994). Discovering the future of the case study. Method in evaluation research. *Evaluation practice, 15*(3), 283-290.

Appendix 3

Summary for Research Participants

Unravelling Commitment and Diversity in a Co-operative

A summary of the PhD Research undertaken by DJ Apparao (Massey University)

Crucial take away:

A novel metric has been developed that can be used to track commitment over time; commitment takes various forms, and all of these can be tracked as they provide useful insights into what drives members to commit. Importantly, affective commitment, or a members' want or desire to be a member of the co-operative, was found to be the glue that holds this co-operative together. The stronger the affective commitment, the stronger will be the co-operative. There was also a strong association between this form of commitment and commitment to collective action. On-going measurement and management of affective commitment levels to ensure they remain high is therefore critical for the co-operative.

Background:

Member Commitment is a core phenomenon that has a significant bearing on the success (longevity) or failure (demise) of co-operatives. As strongly member-oriented organisations, co-operatives look mainly towards their members for raw material supply (milk), capital and governance, and member commitment is very important for this to be achieved. Although many co-operatives are cognizant of the importance of member commitment, they have not strongly included member commitment into their policies and operationalized it. This is largely because co-operatives do not have the right tools to measure, analyse and interpret the implications of member commitment.

Another phenomenon that influences the success or failure of co-operatives is member diversity (heterogeneity). As democratic organisations, co-operatives are driven by collective decision making and consensus. Since different members are likely to demand different and often conflicting actions from the co-operative, an increase in diversity is thought to have a significant bearing on a co-operative's performance. Moreover, it is suggested that increasing diversity is leading to a decline in member commitment in co-operatives.

In this research – a unique measure for commitment and diversity in co-operatives was developed and structures for its analysis and interpretation were also established. Responses from 568 member--owners of a NZ co-operative were used to perform this analysis. Member commitment in specific was analysed from two perspectives, 1) Member Organisational Commitment and 2) Member Commitment to Collective Action.

Member organisational commitment is a psychological state that characterizes the members' relationship with the co-operative. It can be 1) Affective Commitment (*want* based), 2) Normative Commitment (*obligation* based) and/or 3) Continuance Commitment (*need* based). Member commitment to collective action, on the other hand, refers to initiatives taken by members to realize their common interests and primarily involves a willingness to make an effort towards the co-operative's success. It can be 1) Commitment to Governance (as governors), and/or 2) Commitment to Patronage (as suppliers).

Key insights:

- A significant outcome of this research is the development of a novel tool that can be used by the co-operative to measure the level and type of commitment that exists in the co-operative and to monitor it over time.
- This co-operative has high levels of affective commitment and moderate levels of normative and continuance commitment. What this means is that the commitment of members to the cooperative is based less on their obligation towards, or need of, the cooperative respectively, but more on their desire to be a member of the cooperative.
- Commitment to Collective Action levels were slightly high, with members showing greater commitment to governance than patronage. Importantly, 59% of respondents had high levels of both measures.
- An association between commitment to collective action and organisational commitment was found that showed it is the members' *want* followed by their *obligation* to be a member of the co-operative that positively influence and drive commitment to collective action in this co-operative.
- A fairly high degree of diversity/heterogeneity exists in this co-op as 25 of the 35 diversity sources measured showed high levels of diversity. The co-op was most diverse when it came to its members-interests and least diverse in its members' farming-business related properties.
- Contrary to expectation the research found that high diversity did not mean low levels of member commitment, as both commitment to collective action and organisational commitment levels ranged from moderate to high.
- Commitment, in particular the want to be a member, was most influenced by the sources of diversity, with 23 of the 35 sources showing a significant difference. These sources are important factors that influence commitment and can aid in segmentation of members, and also inform the development of segment specific member engagement protocols. For example, two such sources were age and production volumes that suggested that older and larger farmers have significantly greater commitment than younger and smaller farmers.
- 18 of the 35 sources of diversity showed a significant difference in commitment to collective action between groups, with a member's commitment to patronage being less influenced by such factors than a member's commitment to governance.

Recommendations:

- Co-operatives should develop strategies and protocols (i.e. member-facing in addition to market-facing) that will nurture and strengthen member commitment.
- Commitment to collective action and organisational commitment are key indicators of co-operative health and should be regularly measured and monitored.
- A ***member commitment dashboard*** for the co-operative should be developed – informed by the measurement and analysis of member commitment (in conjunction with the heterogeneity sources). This dashboard should include -

- The establishment and trend analysis of member commitment benchmarks.
- A segmentation of the membership-base based on commitment and heterogeneity; development of member commitment profiles & identification of clusters and patterns.
- Identification and recognition of “Commitment Champions” (& “non-committers”).
- Protocols that aid in the development and delivery of personalised and exceptional member engagement/experience.
- The assessment of the impact of specific co-operative strategies or tactics on member commitment.

Appendix 4

Statement of Contribution – Doctorate with Publications/Manuscripts

DRC 16

MASSEY UNIVERSITY
GRADUATE RESEARCH SCHOOL

STATEMENT OF CONTRIBUTION
DOCTORATE WITH PUBLICATIONS/MANUSCRIPTS

We, the candidate and the candidate's Primary Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of candidate:	M. Dhananjay Apparao
Name/title of Primary Supervisor:	Elena Garnevska
Name of Research Output and full reference:	
Dhananjay Apparao, Elena Garnevska, Nicola Shadbolt. (2019). Examining commitment, heterogeneity and social capital within the membership base of agricultural co-operatives—A conceptual framework, Journal of Co-operative Organization and Mar	
In which Chapter is the Manuscript /Published work:	Chapter 2
Please indicate:	
• The percentage of the manuscript/Published Work that was contributed by the candidate:	80%
and	
• Describe the contribution that the candidate has made to the Manuscript/Published Work:	
Identified the research gap. Performed the literature review. Developed the conceptual framework. Wrote the introduction, methodology, results, discussion and conclusions. Prepared the manuscript for submission for review. Responded to	
For manuscripts intended for publication please indicate target journal:	
Has been published in the Journal of Co-operative Organization and Management	
Candidate's Signature:	Dhananjay Apparao Digitally signed by Dhananjay Apparao Date: 2020.03.18 20:17:23 +13'00'
Date:	18/03/2020
Primary Supervisor's Signature:	Dr Elena Garnevska Digitally signed by Dr Elena Garnevska Date: 2020.03.19 17:08:44 +13'00'
Date:	19 March 2020

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Name of candidate:	M. Dhananjay Apparao
Name/title of Primary Supervisor:	Elena Garnevska
Name of Research Output and full reference:	
Dhananjay Apparao, Nicola Shadbolt, and Elena Garnevska. (2020). Member commitment in a large New Zealand dairy co-operative: An empirical study. Submitted to the Journal of Co-operative Organization and Management.	
In which Chapter is the Manuscript /Published work:	Chapter 3
Please indicate:	
• The percentage of the manuscript/Published Work that was contributed by the candidate:	80%
and	
• Describe the contribution that the candidate has made to the Manuscript/Published Work:	
Identified the research gap. Conceptualized and developed a framework. Designed & created a survey instrument. Collected & entered the data. Analyzed the data. Wrote the - introduction, methods, results, discussion and conclusions. Prepared	
For manuscripts intended for publication please indicate target journal:	
Journal of Co-operative Organization and Management	
Candidate's Signature:	Dhananjay Apparao Digitally signed by Dhananjay Apparao Date: 2020.03.18 20:34:05 +13'00'
Date:	18/03/2020
Primary Supervisor's Signature:	Dr Elena Garnevska Digitally signed by Dr Elena Garnevska Date: 2020.03.19 17:06:37 +13'00'
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Name of candidate:	M. Dhananjay Apparao
Name/title of Primary Supervisor:	Elena Garnevska
Name of Research Output and full reference:	
Dhananjay Apparao, Nicola Shadbolt and Elena Garnevska. (2020). Heterogeneity and Commitment to Collective Action: An empirical study of a New Zealand dairy co-operative. Submitted to the International Journal of Co-operative Accounting and Ma	
In which Chapter is the Manuscript /Published work:	Chapter 4
Please indicate:	
• The percentage of the manuscript/Published Work that was contributed by the candidate:	80%
and	
• Describe the contribution that the candidate has made to the Manuscript/Published Work:	
Identified the research gap. Conceptualized and developed a framework. Designed & created a survey instrument. Collected & entered the data. Analysed the data. Wrote the - introduction, method, results, discussion and conclusions. Prepared	
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Name of candidate:	M. Dhananjay Apparao
Name/title of Primary Supervisor:	Elena Garnevska
Name of Research Output and full reference:	
Dhananjay Apparao, Nicola Shadbolt and Elena Garnevska. (2020). Member Heterogeneity and Organisational Commitment: An empirical study of a New Zealand dairy co-operative.	
In which Chapter is the Manuscript /Published work:	Chapter 5
Please indicate:	
• The percentage of the manuscript/Published Work that was contributed by the candidate:	80%
and	
• Describe the contribution that the candidate has made to the Manuscript/Published Work:	
Identified the research gap. Conceptualized and developed a framework. Designed & created a survey instrument. Collected & entered the data. Analyzed the data. Wrote the - introduction, method, results, discussion and conclusions. Prepared the	
For manuscripts intended for publication please indicate target journal:	
International Journal of Co-operative Accounting and Management	
Candidate's Signature:	Dhananjay Apparao Digitally signed by Dhananjay Apparao Date: 2020.03.18 21:24:07 +13'00'
Date:	18/03/2020
Primary Supervisor's Signature:	Dr Elena Garnevska Digitally signed by Dr Elena Garnevska Date: 2020.03.19 17:04:59 +13'00'
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